A MONOGRAPH ON THE ORBITOIDIDAE, OCCURRING IN THE TERTIARY OF AMERICA

compiled in connection with an examination of a collection of Larger Foraminifera from Trinidad,

by

WILHELMINA A. E. VAN DE GEYN AND I. M. VAN DER VLERK.

CONTENTS.

I. Introduction.

Some years ago we received a collection of foraminifera-bearing samples from Dr. H. K. KUGLER and Dr. E. LEHNER for examination, in sequence to the collection of larger foraminifera already examined from Central Falcon (Venezuela). (See NETTIE E. GORTER and I. M. VAN DER VLERK, L. G. M., Dl. IV, afl. 2, 1932, p. 94—122).

The material from Trinidad is very rich in representatives of the *Orbitoididae* family. On a closer study of the different genera of this family, for which the large collection of Indian and European *Orbitoididae* in the National Geological Museum in Leiden provided ample material, we observed that for the determination of genus the interlocular canalsystem is the most important feature. In the *Orbitoididae* the plasma is conveyed through the equatorial plane by means of canals and stolons. The first complete description of this was given by H. J. CARTER in the Annals of Nat. Hist., 3rd series, vol. VIII, p. 449—453. In this article he remarks that in *Orbitoides* there are

always four stolons to each chamber, while in infiltrated specimens of *Orbitolites (= Lepidocyclina) mantelli,* he sometimes found ever 6. C. W. GÜMBEL, Abh. k. bayer. Ak. W., II, CI, X, Bd. II, 1868, p. 673, pointed out that these stolons formed a system, which he calls an interlocular canalsystem in analogy to the „interseptal canalsystem" which runs through the septa of the chambers in most foraminifera, but which is absent in the *Orbitoididae.* To avoid confusion with this interseptal canalsystem which in the literature is called simply canalsystem, we thought it better to use the expression „stolonsystem" here. It now appears that this system differs in different groups of *Orbitoididae.* For the sake of brevity however we will here confine ourselves to the groups connected with the genera to be dealt with in this monograph.

The first of these is a large group in which each chamber in the equatorial plane is connected to the neighbouring chambers by **four stolons.** The form and arrangement of the equatorial chambers is characteristic, it is usually arcuate, ogival or lozengeshaped, the chambers may be open, flattened or elongated (see H. DOUVILLÉ, Mém. Soc. Géol. de France, Nouvelle Série, T. 1, 1924, Mém. No. 2, p. 10). The chambers in one concentric ring scarcely touch one another, they are arranged alternately and the whole presents the appearance of a fan. This type is found in the following genera, described in J. A. CUSHMAN's „Foraminifera", by T. W. VAUGHAN.

1. Genus *Orbitoides* D'ORBIGNY, 1847. (We are of opinion that *Simplorbites* DE GREGORIO, 1882, displays a gigantesque embryonic apparatus, as H. DOUVILLÉ has remarked in Bull. Soc. Géol. de France, Sér. 4, vol. 20, 1921, p. 217. In our opinion this form also belongs to the genus *Orbitoides*).
2. Genus *Lepidorbitoides* A. SILVESTRI, 1907. (*Orbitocyclina* VAUGHAN, 1929 is synonymous. See M. G. RUTTEN, Proc. Kon. Ac. Wet. Amsterdam, Vol. XXXVIII, no. 2, 1935, p. 186. *Asterorbis* VAUGHAN et COLE, 1932 should be included in *Lepidorbitoides.*)
3. Genus *Lepidocyclina (pro parte)* [1]: namely those forms with hitherto have been described as: *Lepidocyclina (Pliolepidina)* [1] sp., *Lepidocyclina (Polylepidina)* [1] sp. and the eocene species of *Lepidocyclina s.st.)* [1] sp.

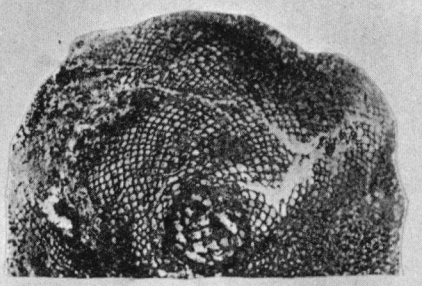
As the accompanying photos show, these have equatorial chambers of the lozengeshaped type and are arranged in a fan shape.

fig. A 1 et 2. Equatorial plane of *Orbitoides* sp. After H. DOUVILLÉ, 1902, 8 ×.

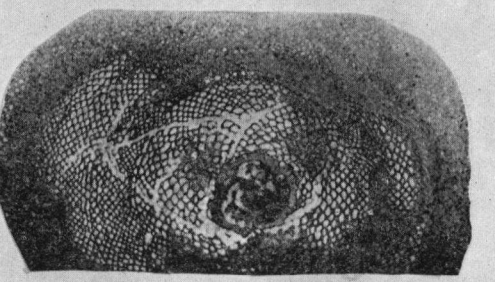
fig. B. „ „ „ *Lepidorbitoides* sp. Coll. Geol. Mus. Leiden, 18 ×.

fig. C 1 et 2. „ „ „ *Lepidocyclina (Lepidocyclina) trinitatis* H. DOUV. [2]) Coll. Geol. Mus. Leiden, 20 ×.

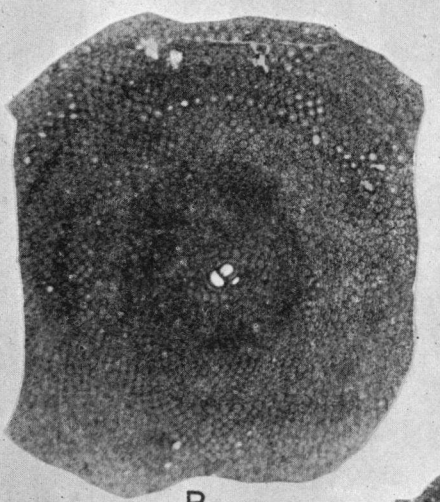
[1]) New names: Orbitoina, Pliorbitoina. Polyorbitoina. Isorbitoina. See p. 227.
[2]) New name: Orbitoina (Isorbitoina) trinitatis (H. Douv.). See p. 227.



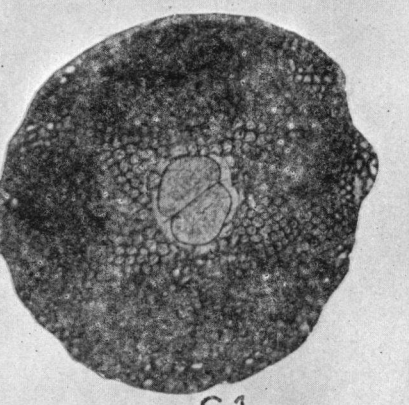
A1



A 2



B



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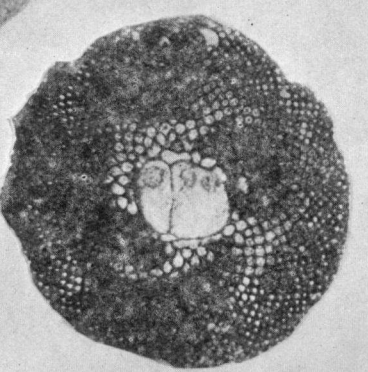

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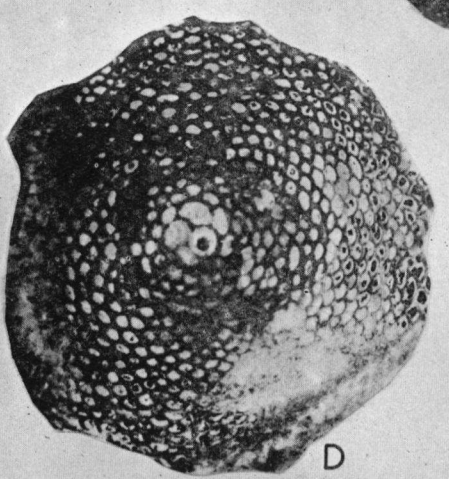
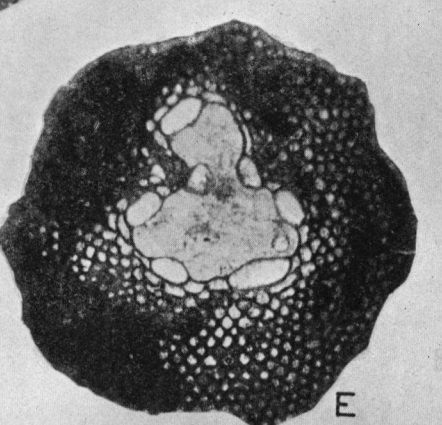
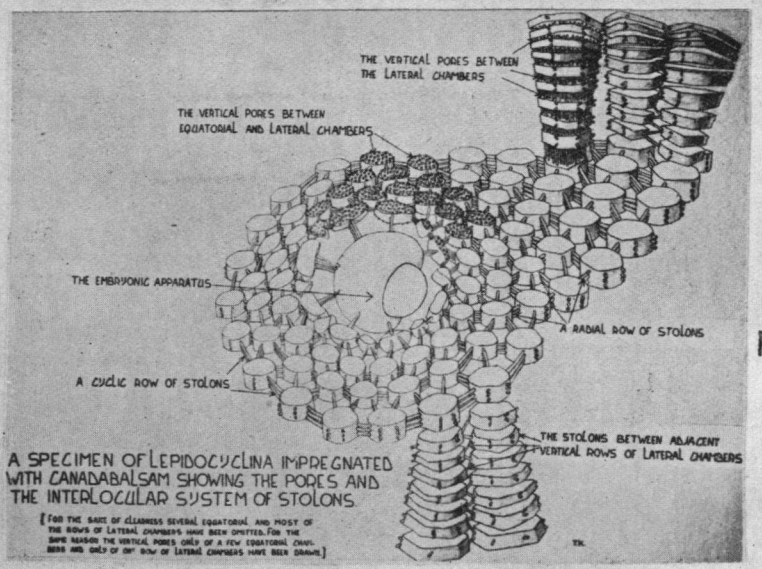


D



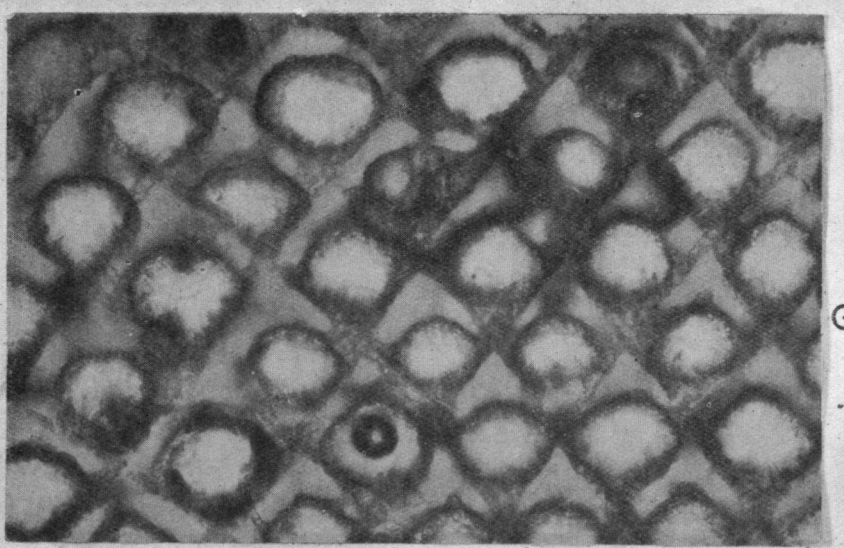
E



A SPECIMEN OF LEPIDOCYCLINA IMPREGNATED WITH CANADABALSAM SHOWING THE PORES AND THE INTERLOCULAR SYSTEM OF STOLONS.

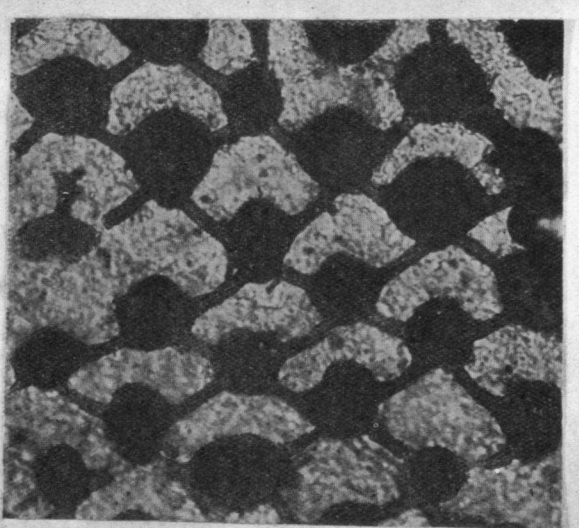
[FOR THE SAKE OF CLEARNESS SEVERAL EQUATORIAL AND MOST OF THE ROWS OF LATERAL CHAMBERS HAVE BEEN OMITTED. FOR THE SAME REASON THE VERTICAL PORES ONLY OF A FEW EQUATORIAL CHAMBERS AND ONLY OF ONE ROW OF LATERAL CHAMBERS HAVE BEEN DRAWN.]

F



G

H



I

fig. D. Equatorial plane of *Lepidocyclina (Polylepidina) proteiformis* VAUGHAN[1]). After W. S. COLE, 1929, 24 ×.

fig. E. „ „ „ *Lepidocyclina (Pliolepidina) tobleri* H. DOUV.[2]) Coll. Geol. Mus. Leiden, 20 ×.

On the photos of the canada balsam preparations it can be seen that the chambers are connected to one another by four stolons.

fig. F. Schematic drawing, constructed from canada balsam preparations, to demonstrate the stolon system.

fig. G. A part of a horizontal section through the equatorial plane of *Orbitoides faujasi* DEFR. (Senonian of S. Limburg, Holland). Coll. Geol. Mus. Leiden. 200 × Can. balsamprep.

fig. H. A part of a horizontal section through the equatorial plane of *Lepidorbitoides* sp. (Cretaceous, Tampico, Mexico). Coll. Geol. Mus. Leiden. 200 × Can. balsamprep.

fig. I. A part of a horizontal section through the equatorial plane of *Lepidocyclina (Lepidocyclina) trinitatis* H. DOUV.[3]) (Eocene, Central Falcon, Venezuela). Coll. Geol. Mus. Leiden. 200 × Can. balsamprep.

A second group of *Orbitoididae* shows an equatorial section in which the chambers are connected by six stolons. Their form is spatulate or hexagonal (sometimes flattened, open or elongated) (See H. DOUVILLÉ, Mém. Soc. Géol. de France, Nouvelle Série, T. 1, 1924, Mém. No. 2, p. 10). The chambers are usually arranged in concentric rings.

This type of equatorial chambers occurs in the Oligocene and Miocene Lepidocyclinae. The one and the other can be clearly seen in the photos.

fig. J. Equatorial plane of *Lepidocyclina* (*Lepidocyclina* s.str.) *falconensis* GORTER et VAN DER VLERK. After GORTER et VAN DER VLERK. 16 ×.

fig. K. Equatorial plane of *Lepidocyclina (Eulepidina) undosa* CUSHMAN. After GORTER et VAN DER VLERK. 8 ×.

fig. L. Equatorial plane of *Lepidocyclina (Nephrolepidina) fragilis* CUSHMAN. After VAUGHAN, 1933. 10 ×.

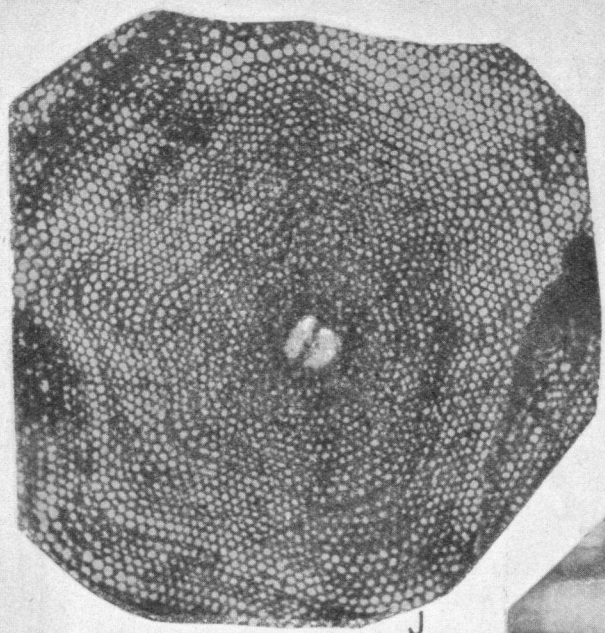
fig. M. Equatorial plane of *Lepidocyclina (Nephrolepidina) tournoueri* LEM. et DOUV. After VAUGHAN, 1933. 10 ×.

fig. N. A part of a horizontal section through the equatorial plane of *Lepidocyclina (Nephrolepidina) angulosa* PROVALE. Coll. Geol. Mus. Leiden. 200 ×.

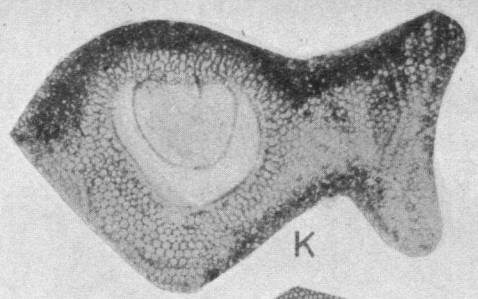
fig. O. Idem. 433 ×.

fig. P. A part of a horizontal section through the equatorial plane of *Lepidocyclina (Nephrolepidina) fragilis* from Florida. Coll. Geol. Mus. Leiden. 500 ×.

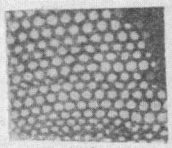
[1]) New name: Orbitoina (Polyorbitoina) proteiformis (Vaughan). See p. 227.
[2]) New name: Orbitoina (Pliorbitoina) tobleri (H. Douv.). See p. 227.
[3]) New name: Orbitoina (Isorbitoina) trinitatis (H. Douv.).



J



K



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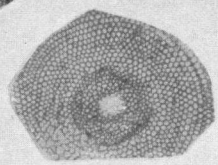
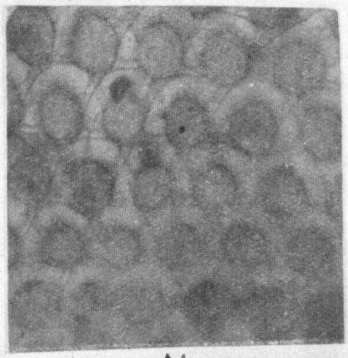


M



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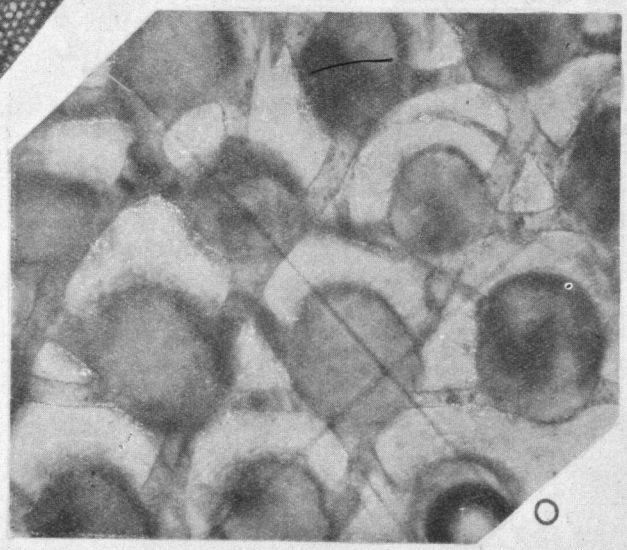
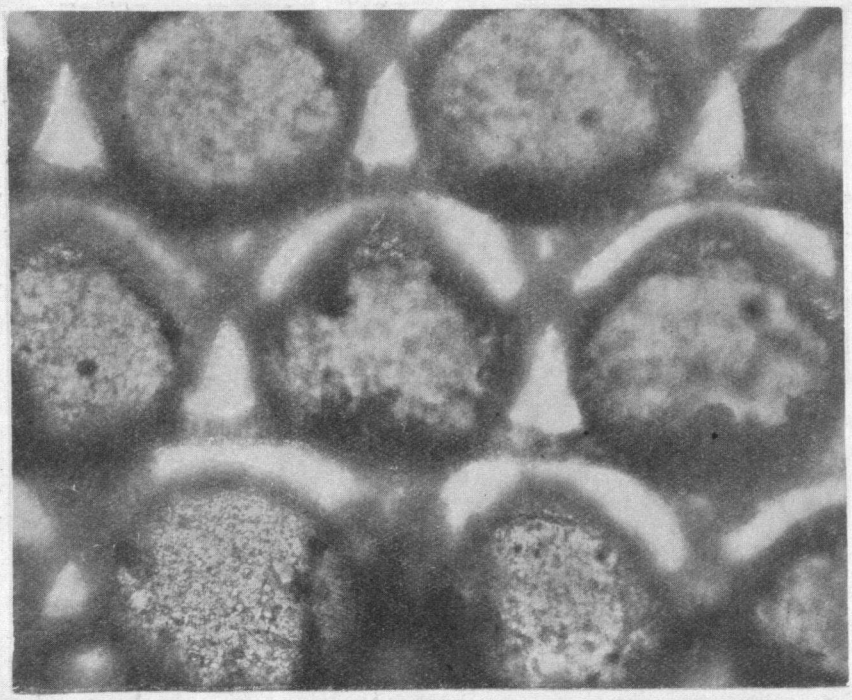


O



P

This method of distincting the Orbitoididae by means of the stolon-system, often meets with the practical difficulty that the stolons are not visible. But in that case the form of the embryonic apparatus comes to our help. In the 4 stolon group only the iso-, plio- and poly-type of embryonic apparatus is known, while in the 6 stolon group on the other hand the eu-, iso- and nephro-types are found. The only confusion that may arise, therefore, is in forms of the iso-type, as these are found in both groups. At the same time the iso-type in the 4 stolon group is of larger size than in the 6 stolon group, the wall is thicker and both the embryonic chambers are surrounded by remarkably large equatorial chambers. Generally speaking it may be said that the 4 stolon type is confined to the Cretaceous and Eocene, while the 6 stolon type is characteristic of the Oligocene and Miocene.

It is, however, possible that *Lepidocyclina (Nephrolepidina) fragilis* CUSHMAN and *Lepidocyclina* (*Lepidocyclina* s.str.) *supera* CONRAD are exceptions.

Various considerations induced us to separate the eocene *„Lepidocyclinae"* of the 4 stolon group from the oligo-miocene *Lepidocyclinae* and to place them in a new genus to which we would give the name of **Orbitoina** with the sub-genera: **Isorbitoina, Pliorbitoina** and **Polyorbitoina.**

The confusion that reigns in the American literature with regard to the division into species has induced us to compile a determination table, for the American species belonging to the genus *Lepidocyclina* and to the genus *Orbitoina.*

In common with the majority of authors we have divided the genera into sub-genera, a sub-division founded solely upon the shape of the embryonic apparatus of the megalospheric forms. A few species, however, remained of which only the microspheric forms are known. These are therefore not included in the key.

As regards the division into species, there are so far 193 species (with varieties) of *Lepidocyclina* described from America. In our opinion this number can be reduced to 31, belonging to *Lepidocyclina* and *Orbitoina.*

In Chap. II we have given an account of all species that have been described up to now. A glance at it will show that several of these can be eliminated at once, as they are insufficiently characterised. It may be said as a general rule, that a species can only be properly classified when it can be examined both externally and in horizontal and vertical section. Further we have combined several „species" under one name, when, in our opinion, they only differed in unessential points, such as small differences in the size of the whole test, of the chambers, of the chamber walls or of the columns. The following characteristics we regard as typical of the species:

1. external shape. This may be polygonal, stellate, saddle-shaped, lenticular or omphaloid (See W. SCHEFFEN, Wetenschappelijke Mededeelingen, No. 21, 1932).
2. average diameter of the test.
3. shape of the equatorial chambers. These may be hexagonal, spatulate, ogival, „arrondie", losangique, etc. See H. DOUVILLÉ, Mém. Soc. géol. de France, Nouvelle Série, T. 1, Mém. No. 2, 1924, p. 10.
4. shape of the lateral chambers. These may be lenticular, rectangular, fissiform, etc. See W. SCHEFFEN, Wet. Med., No. 21, 1932, p. 9.
5. the presence or absence of columns or costae and if they are present, their distribution, which can be seen best in tangential section.

A few notes on Chap. II and III should here be given. Where the shape of the equatorial chambers is mentioned, the shape in horizontal section is meant and where the shape of the lateral chambers is spoken of it means the shape in vertical section. When we say „diameter" we mean the horizontal diameter. Further we did not think it necessary to document our reasons for eliminating or combining species. In the key, the stratigraphic distribution is only given roughly. For a more minute account of it Chap. II should be consulted. It should also be remarked that although we use the European names for the various stratigraphic series and stages, we by no means wish to imply that the series of strata which in America is called Middle Oligocene, for instance, is of the same age as what is called by that name in Europe.

In Chap. II we used by preference the local stratigraphic nomenclature.

In conclusion we wish to express our thanks to all who have been of help to us. In the first place Dr. H. KUGLER and Dr. E. LEHNER who furnished us with the material for the piece of work. And moreover Dr. W. L. F. NUTTALL, 's-Gravenhage, Prof. dr. H. G. SCHENCK, Stanford University, Dr. T. WAYLAND VAUGHAN, La Jolla, Prof. dr. L. M. R. RUTTEN and his son Mr. M. G. RUTTEN, Utrecht and Dr. R. RUTSCH, Basel, who all helped us, either by the supply of material or information.

II. Alphabetical list of the species of Lepidocyclina and Orbitoina, occurring in the Tertiary of America, with literature and localities.

Abh. Kön. Bayer. Akad. Wissensch. = Abhandlungen der Königl. Bayerischen Akademie der Wissenschaften. München.
Am. Journ. Sc. = American Journal of Science. New Haven.
Am. Midl. Nat. = The American Midland Naturalist.
Bull. Am. Ass. Petr. Geol. = Bulletin of the American Association of Petroleum Geologists. Tulsa.
Bull. Am. Pal. = Bulletins of American Paleontology. Ithaca. U. S. A.
Bull. Geol. Soc. Am. = Bulletin of the Geological Society of America. Washington.
Bull. U. S. Nat. Mus. = Bulletin of the United States National Museum. Washington.
Bull. Soc. géol. Fr. = Bulletin de la Société géologique de France. Paris.
Carn. Inst. Publ. = Carnegie Institution Publications. Washington.
Compt. Rend. Ac. Sc. = Comptes rendus hebdomadaires des séances de l'academie des Sciences. Paris.

Centralbl. f. Min. = Centralblatt für Mineralogie, Geologie und Paleontologie. Stuttgart.
Ecl. geol. Helv. = Eclogae geologicae Helvetiae. Lausanne.
Flor. St. Geol. Survey = Annual reports of the Florida State Geological Survey.
Geol. Mag. = Geological Magazine. London.
Hopk. Un. St. = The John Hopkins University Studies in Geology. The John Hopkins Press. Baltimore.
Journ. Pal. = Journal of Paleontology. Chicago.
Journ. Wash. Ac. Sc. = Journal of the Washington Academy of Sciences. Washington.
L. G. M. = Leidsche Geologische Mededeelingen. Leiden.
Mém. Soc. géol. Fr. = Mémoires de la Société géologique de France. Paris.
Petr. Congr. = World Petroleum Congress, organised by the Institution of Petroleum Technologists, held at London, July 19th—25th 1933.
Proc. Ac. Nat. Sc. Philadelphia = Proceedings of the Academy of Natural Sciences of Philadelphia.
Proc. K. A. v. W. = Proceedings Koninklijke Akademie van Wetenschappen te Amsterdam.
Proc. Nat. Ac. Sc. = Proceedings of the National Academy of Sciences. Washington.
Proc. Th. Pan-Pac. C. = Proceedings of the third Pan-Pacific Congress.
Proc. U. S. Nat. Mus. = Proceedings of the United States National Museum. Washington.
Prof. Pap. = United States Geological Survey, Department of the Interior, Professional Papers. Washington.
Quart. Journ. = Quarterly Journal of the Geological Society. London.
Smiths. Misc. coll. = Smithsonian Miscellaneous Collections, published by the Smithsonian Institution. City of Washington.
Tr. Am. Inst. Min. Eng. = Transactions of the American Institution of Mining Engineers.
W. M. = Wetenschappelijke Mededeelingen. Dienst van den Mijnbouw in Nederlandsch-Indië. Bandoeng.

L. aceite Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 95, Pl. XVI, fig. 4—5. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. adkinsi Vaughan. — A- and B-form known. — T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 809, textfig. 5, Pl. 31, fig. 1—5; T. W. VAUGHAN, Proc. Nat. Ac. Sc., vol. 15, no. 3, 1929, p. 290, fig. 4; NETTIE E. GORTER et I. M. VAN DER VLERK, L. G. M., Dl. IV, afl. 2, 1932, p. 108, Pl. 13, fig. 6—7. — Upper Eocene of Mexico and Venezuela. — Is neither Lepidocyclina, nor Orbitoina.

L. ancha Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 77, Pl. XI, fig. 5. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. antillea Cushman. — A- and B-form known. — J. A. CUSHMAN, Carn. Inst. Publ. 291, 1919, p. 63, Pl. 3, fig. 3; J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 78, Pl. XXXV, fig. 4—5; T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 800, Pl. 35, fig. 1—3; T. W. VAUGHAN, Proc. Nat. Ac. Sc., vol. 15, no. 3, 1929, p. 290, fig. 5—7. — Upper Eocene of St. Bartholomew and Lobitos-formation (Upper Eocene) of N. Peru. — Is neither Lepidocyclina, nor Orbitoina.

L. antiguensis Vaughan et Cole. — Only B-form known. — T. W. VAUGHAN and W. S. COLE, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 19, Pl. 10, fig. 8 and Pl. 24, fig. 2—3. — Antigua-formation (Middle Oligocene) of Antigua.

L. (Lepidocyclina) ariana W. S. Cole and G. M. Ponton. — See O. trinitatis H. Douv.

L. ariena Berry. — W. BERRY, Journ. Wash. Ac. Sc., vol. 22, no. 1, Jan. 4, 1932, p. 5, fig. 6. — Talara shale (? Upper Eocene) of N.W. Peru. — Insufficiently described.

L. (Lepidocyclina) armata Rutten. — See O. maracaibensis Hodson.

L. aspera Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 41, Pl. I, fig. 3—4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. (Lepidocyclina) asterodisca Nuttall. — Only A-form known. — W. L. F. NUTTALL, Journ. Pal., March 1932, p. 34, Pl. 7, fig. 5, 8, Pl. 9, fig. 10; W. L. F. NUTTALL, Petr. Congr., 1933, Reprint no. 28. — Lower Oligocene of Mexico.

L. atascaderensis Berry. — See O. trinitatis H. Douv.

L. (Lepidocyclina) attenuata Cushman. — J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 67, Pl. XXIV, fig. 7—8; T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 799; T. W. VAUGHAN, Flor. St. Geol. Survey, 1928, p. 156. — Eocene, Ocala-limestone, Florida. — Insufficiently described.

L. basta Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 93, Pl. XVI, fig. 2—3. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. boggsi Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 100, Pl. XVIII, fig. 5—6. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. bontourana Hodson. — See O. trinitatis H. Douv.

L. borde Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 117, Pl. XIV, fig. 3. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. boweni Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 67, Pl. IX, fig. 1—2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. brachiofera Rutten. — L. M. R. RUTTEN, Proc. K. A. v. W., vol. XXXI, no. 10, 1928, p. 7, fig. 40, Plate, fig. A—B. — Upper Eocene of Curaçao. — Insufficiently described.

L. bravoi Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 55, Pl. VI, fig. 3. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. brightoni Berry. — See O. trinitatis H. Douv.

L. (Lepidocyclina) canellei Lem. et R. Douv. — Only A-form known. — P. LEMOINE et R. DOUVILLÉ, Mém. Soc. géol. Fr., T. XII, fasc. II, 1904, p. 20, Pl. I, fig. 1; Pl. III, fig. 5; J. A. CUSHMAN, U. S. Nat. Mus. Bull. 103, 1918, p. 91, Pl. 34, fig. 1—6; J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 75, Pl. XXXII, fig. 1—5; T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 797; H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. 1, Mém. no. 2, Feuilles 5 à 11, Pl. V à VI, 1924, p. 36, Pl. I, fig. 4—7; H. E. THALMANN, Ecl. geol. Helv., Bd. 25, no. 2, 1932, p. 284; E. DAVID, Compt. Rend. Ac. Sc. 1932, p. 1756; T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, 1933,

p. 14, Pl. 6, fig. 1—6; D. W. GRAVELL, Smiths. Misc. coll., vol. 89, no. 11, 1933, p. 24, Pl. 5, fig. 4—8; H. THALMANN, Centralbl. f. Min., 1934, Abt. B, no. 10, p. 446.
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Under the name of L. yurnaguensis Cushman: J. A. CUSHMAN, Carn. Inst. Publ. 291, 1919, p. 57, Pl. 12, fig. 7—8, textfig. 6*a*, *b*; J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 76, Pl. XXXII, fig. 6—7 and Pl. XXXIII, fig. 1—9; T. W. VAUGHAN, Proc. Nat. Ac. Sc., vol. 9, no. 7, 1923, p. 255; T. W. VAUGHAN, Quart. Journ., vol. LXXXII, pt. 3, 1926, p. 391, Pl. XXV, fig. 4 (Probably fig. 2, 3, 5, 6); R. E. KOCH, Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 52; T. W. VAUGHAN, Journ. Pal., vol. 1, no. 4, 1928, p. 290, 291.
Middle and Upper Oligocene of the Panama Canal Zone, Columbia, Venezuela, E. Mexico, Jamaica, Curaçao, Cayman-Islands, Cuba, Trinidad and Martinique; Antigua-formation, Antigua.

L. cardenasensis Galloway. — J. J. GALLOWAY, Journ. Pal., vol. 1, no. 4, 1928, p. 302, Pl. 51, fig. 1—6; T. W. VAUGHAN, Proc. Nat. Ac. Sc., vol. 15, no. 3, 1929, p. 288. — Upper Cretaceous of Mexico. — Is neither Lepidocyclina, nor Orbitoina.

L. carmani Berry. — See O. trinitatis H. Douv.

L. chaperi Lem. et R. Douv. — First description of P. LEMEOINE and R. DOUVILLÉ, Mém. Soc. géol. Fr., T. XII, fasc. II, 1904, p. 14, Pl. II, fig. 5 and last description of H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, Pl. V à VI, 1924, p. 44, Pl. II, fig. 1—2; T. W. VAUGHAN, Proc. Nat. Ac. Sc., 1926, vol. 12, no. 8, p. 520. — Upper Eocene of the Panama Canal Zone. — Insufficiently described.

L. chattahoocheënsis Cushm. — See L. formosa Schlumberger.

L. chiapasensis Vaughan. — Only A-form known. — T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 808, Pl. 30, fig. 1—3; T. W. VAUGHAN, Proc. Nat. Ac. Sc., vol. 15, 1929, no. 3, p. 290, fig. 4. — Eocene of Chiapas (Mexico). — Is neither Lepidocyclina, nor Orbitoina.

L. chica Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 73, Pl. X, fig. 1—2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. churuguaritana Hodson. — H. HODSON, Bull. Am. Pal., vol. XII, no. 47, 1926, p. 27, Pl. 7, fig. 7—8. — Eocene of Venezuela. — Insufficiently described.

L. circular Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 57, Pl. VI, fig. 4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. collinsi Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 108, Pl. XX, fig. 4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. columna Berry. — See O. trinitatis H. Douv.

L. cookei Cushm. — J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 66, Pl.

XXIV, fig. 5—6; T. W. VAUGHAN, Flor. St. Geol. Survey, 1928, p. 157. — Ocala-limestone (Upper Eocene) of Florida. — Insufficiently described.

L. crassata Cushm. — See L. formosa Schlumberger.

L. crassimargo Vaughan. — T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, p. 33, Pl. 27, fig. 1—3. — Oligocene of Jamaica. — Insufficiently described.

L. curasavica Koch. — Only B-form known. — R. E. KOCH, Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 54, Taf. III, fig. 1—5; L. M. R. RUTTEN, Proc. K. A. v. W., vol. XXXI, no. 10, 1928, p. 1062 and 1066; R. E. KOCH, Ecl. geol. Helv., vol. 22, no. 2, 1929, p. 159; ? M. G. RUTTEN et L. W. J. VERMUNT, Proc. K. A. v. W., no. 2, 1932, p. 233, Pl. I, fig. 1—2 and Pl. II, fig. 5. — Upper Eocene of Curaçao and Venezuela.

L. (Nephrolepidina) dartoni Vaughan. — Only A-form known. — T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, 1933, Pl. 25, fig. 1—2, Pl. 26, fig. 1—3. — Oligocene of Jamaica.

L. decorata Douv. — H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, 1924, p. 48, fig. 46. — Oligocene of Haut-Chagres. — Insufficiently described.

L. delgada Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 87, Pl. XV, fig. 4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. delicada Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 92, Pl. XVI, fig. 1. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. descarnada Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 113, Pl. XXI, fig. 3. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. descarnada Berry var. pequena Berry. — W. BERRY, Hopk. Un St., no. 9, 1929, p. 114, Pl. XXI, fig. 1. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. desiertensis Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 51, Pl. V, fig. 1—2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. despobladensis Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 65, Pl. VIII, fig. 5—6. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. diabloensis Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 89, Pl. XV, fig. 1—2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. (Eulepidina) dilatata Mich. — A- and B-form known. — H. DOUVILLÉ, Compt. Rend. Ac. Sc., T. 164, 1917, p. 846; H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, 1924, p. 48; A. TOBLER, Ecl. geol. Helv., Bd. XIX, no. 3, 1926, p. 720; T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 37, Pl. 26, fig. 4, Pl. 27, fig. 5—6, Pl. 28, fig. 1—1*a*.
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1920, p. 69. — Upper Oligocene of Trinidad, Jamaica, the Panama Canal Zone and Cuba.

L. dilatata var. inermis Staub. — W. STAUB, Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 122. — Oligocene of Cerro la Nuda (Mexico). — Insufficiently described.

L. diminuta Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 39, Pl. I, fig. 5. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. discoida Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 91, Pl. XV, fig. 5. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. doble Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 112, Pl. XXI, fig. 2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

O. (Isorbitoina) r. douvillei Lisson. — A- and B-form known. — CARLOS I. LISSON, Arch. Asoc. Peruana p. el progr. de la Ciencis, T. I, fasc. 1, 1921, p. 52, Pl. III—V; H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, 1924, p. 36; A. TOBLER, Ecl. geol. Helv., vol. XX, no. 3, 1927, p. 419; L. M. R. RUTTEN, Proc. K. A. v. W., vol. XXXI, no. 9, 1928, p. 935; M. G. RUTTEN et L. W. J. VERMUNT, Proc. K. A. v. W., vol. XXXV, no. 2, 1932, p. 237; NETTIE E. GORTER et I. M. VAN DER VLERK, L. G. M., Dl. IV, afl. 2, 1932, p. 97; P. J. PIJPERS, Geology and Paleontology of Bonaire, Diss., Utrecht 1933, p. 53; A. WERENFELS, Ecl. geol. Helv., vol. 26, no. 1, 1933, p. 102.
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L. duplicata Cushman. — Only A-form known. — J. A. CUSHMAN, U. S. Nat. Mus. Bull. 103, 1918, p. 96, Pl. 41, fig. 2—4; J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 78, Pl. XXXV, fig. 1—3. — Upper Eocene and Oligocene of Panama. — Insufficiently described.

L. ecasa Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 58, Pl. VI, fig. 5—6. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. embotada Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 80, Pl. XII, fig. 1—2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. enana Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 81, Pl. XIII, fig. 1—2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. escabrosa Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 45, pl. III, fig. 1—2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. escatimada Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 47, Pl. III, fig. 5—6. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. esferica Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 66, Pl. VIII, fig. 3—4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. espesa Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 104, Pl. XIX, fig. 3—4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. evertii Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 84, Pl. XIII, fig. 5, Pl. XIV, fig. 1. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. (Lepidocyclina) falconensis Gorter et Van der Vlerk. — Only A-form known. — NETTIE E. GORTER et I. M. VAN DER VLERK, L. G. M., Dl. IV, afl. 2, 1932, p. 105, Pl. 11, fig. 4—6.
Under the name of L. wetherellensis Vaughan et Cole: T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 24, Pl. 12, fig. 6, 7, Pl. 23, fig. 9—10, Pl. 24, fig. 5. — Churuguara Series, Oligocene of Venezuela, Antigua-formation, Antigua.

L. favosa Cushman. — See L. formosa Schlumberger.

L. fina Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 99, Pl. XVIII, fig. 1—2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. flaca Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 110, Pl. XX, fig. 5. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. (Lepidocyclina) floridana Cushman. — A- and B-form known. — J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 67, Pl. XXV, fig. 1—2; T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 796, fig. 3; T. W. VAUGHAN, Flor. St. Geol. Survey, 19th annual report, 1928, p. 156. — Upper-Eocene, Ocala-limestone, Florida. — Insufficiently described.

L. (Eulepidina) formosa Schlumberger. — H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, 1924, p. 49, Pl. II, fig. 4; T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 799; T. W. VAUGHAN, Quart. Journ., vol. 82, pt. 3, 1926, p. 395; W. STAUB, Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 121.
Under the name of L. chattahoocheënsis Cushman: J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 65, Pl. 23, fig. 1—4, Pl. 24, fig. 1—2; T. W. VAUGHAN, Bull. Geol. Soc. Am., 1924, vol. 35, p. 798, Pl. 34, fig. 2.
Under the name of L. crassata Cushman: J. A. CUSHMAN, Carn. Inst. Publ. 291, 1919, p. 61, Pl. 11, fig. 4—5; T. W. VAUGHAN, Bull. Geol. Soc. Am., 1924, vol. 35, p. 798, Pl. 34, fig. 3—4.
Under the name L. favosa Cushman: J. A. CUSHMAN, Carn. Inst. Publ., 291, 1919, p. 66, Pl. 3, fig. 1—26; Pl. 15, fig. 4; J. A.

CUSHMAN, Prof. Pap. 125-D, 1920, p. 66, Pl. XV, fig. 5 B; T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 799, Pl. 34, fig. 8; W. STORRS COLE and R. GILLISPIE, Bull. Am. Pal., vol. XV, 1930, p. 125, Pl. I, fig. 7, not 6; D. W. GRAVELL, Smiths. Misc. coll., vol. 89, no. 11, 1933, p. 32, Pl. 5, fig. 11, Pl. 6, fig. 2; W. L. F. NUTTALL, Petr. Congr., 1933; T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 4; W. S. COLE, Journ. Pal., March, 1934, p. 27, Pl. 4, fig. 2, 3, 12.

Under the name of L. gigas Cushman var. duncanensis Cole: W. S. COLE, Journ. Pal., vol. 8, 1934, no. 1, p. 27, Pl. 3, fig. 16, Pl. 4, fig. 1.

Under the name of L. gigas Cushman var. mexicana Cushman: J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 63, Pl. XIX, fig. 5, Pl. XX, fig. 1—2, Pl. XXI, fig. 1—3; T. W. VAUGHAN, Quart. Journ., vol. LXXXII, 1926, p. 397; W. STORRS COLE and R. GILLISPIE, Bull. Am. Pal., vol. XV, 1930, p. 125.

Under the name of L. raulini Lem. et Douv.: P. LEMOINE et R. DOUVILLÉ, Mém. Soc. géol. Fr., t. XII, 1904, fasc. I, p. 349; Idem fasc. II, p. 11, Pl. I, fig. 3, 6, 9, 13, 16, Pl. II, fig. 3, 10, Pl. III, fig. 4, 14; H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, 1924, p. 49, textfig. 47; W. STAUB, Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 119—123.

Under the name of L. undosa Cushman var. tumida Vaughan: T. W. VAUGHAN, Quart. Journ., vol. LXXXII, 1926, pt. 3, p. 395, Pl. XXIV, fig. 3—5; T. W. VAUGHAN, Proc. Th. Pan-Pac. C., 1926, p. 1853; W. S. COLE et GILLISPIE, Bull. Am. Pal., vol. XV, no. 576, p. 3, Pl. I, fig. 8.

Oligocene of Kapurridge, Trinidad; Chattahoochee-formation, Southeastern U. S.; Cuba; Antigua-formation, Antigua; Glendon-formation, Georgia; Alabama; Meson-formation, Mexico; Moneaque-formation, Jamaica; Duncan Church, Florida. Middle-Oligocene of Cayman Islands.

L. formosoides Douv. — W. STAUB, Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 121—122. — Oligocene of Mexico. — Insufficiently described.

L. forresti Vaughan. — See L. mantelli (Morton) Lem. et Douv.

L. (Nephrolepidina) fragilis Cushman. — A- and B-form known. — J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 63, Pl. XXII, fig. 1—2; T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 798, Pl. 33, fig. 5; T. W. VAUGHAN, Journ. Pal., vol. 1, no. 4, Jan. 1928, p. 294; T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 27, Pl. 14, fig. 1—4. — Ocala-limestone, Eocene of Florida; Tantoyuca-formation, Mexico.

L. fragosa Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 44, Pl. II, fig. 3—4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. gardnerae Cole. — See O. proteiformis Vaughan.

L. georgiana Cushman. — See L. supera (Conrad) H. Douv.

L. gigas Cushman. — See L. undosa Cushman.

L. gigas Cushman var. duncanensis Cole. — See L. formosa Schlumberger.

L. gigas Cushman var. mexicana Cushman. — See L. formosa Schlumberger.

L. (Lepidocyclina) giraudi R. Douv. — A- and B-form known. — R. Douvillé, Bull. Soc. géol. Fr., 1907, p. 307, Pl. X, fig. 9, 10, 15, 16; H. Douvillé, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, 1924, p. 43; T. W. Vaughan, Flor. St. Geol. Survey, 19th annual report, 1928, p. 156; T. W. Vaughan, Smiths. Misc. coll. vol. 89, no. 10, 1933, p. 20, Pl. 10, fig. 9—10, Pl. 24, fig. 4. Under the name of L. parvula Cushman var. crassicosta Vaughan: T. W. Vaughan, p. 17, pl. 8, fig. 1—2, Pl. 10, fig. 7, Pl. 24, fig. 1. — Lower Miocene of Martinique; Oligocene, Antigua, Mexico.

L. gritta Berry. — W. Berry, Journ. Wash. Ac. Sc., vol. 22, no. 1, 1932, p. 4, fig. 9. — Upper Eocene of N.W. Peru. — Insufficiently described.

L. gruesa Berry. — W. Berry, Hopk. Un. St., no. 9, 1929, p. 59, Pl. VII, fig. 3—4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. guppyana Berry. — W. Berry, Hopk. Un. St., no. 9, 1929, p. 86, Pl. XIV, fig. 2—6. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. (Nephrolepidina) haddingtonensis Vaughan. — A- and B-form known. — T. W. Vaughan, Journ. Pal., vol. 1, no. 4, 1928, p. 292, Pl. 50, fig. 1—2. — Upper Eocene of Jamaica. — Insufficiently described.

L. haughti Berry. — W. Berry, Hopk. Un. St., no. 9, 1929, p. 86, Pl. IX, fig. 3—4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. hayesi (Cushman) Vaughan. — T. W. Vaughan, Proc. Nat. Ac. Sc., vol. 9, no. 7, 1923, p. 256. — Is a Discocyclina.

L. hieronymi Rutten et Vermunt. See O. trinitatis.

L. hilli Cushman. — See L. supera (Conrad) H. Douv.

L. hodgensis Vaughan et Cole. — Only B-form known. — T. W. Vaughan, Smiths. Misc. coll., vol. 89, no. 10, 1933, Pl. 12, fig. 1—5.

L. hopkinsi Berry. — W. Berry, Hopk. Un. St., no. 9, 1929, p. 79, Pl. XI, fig. 1—2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. hubbardi Hodson. — See O. trinitatis H. Douv.

L. hubbardi Hodson var. aurarensis Hodson. — See O. trinitatis H. Douv.

L. hubbardi Hodson var. bolivarensis Hodson. — See O. trinitatis H. Douv.

L. inca Berry. — W. Berry, Hopk. Un. St., no. 9, 1929, p. 16, Pl. XII, fig. 3. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. insignificante Berry. — W. Berry, Hopk. Un. St., no. 9, 1929, p. 46, Pl. III, fig. 3—4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. kempi (O'Connell) Cushman. — O'Connell, Tr. Am. Inst. Min. Eng., vol. 51, 1916, p. 13, fig. 5—6; J. A. Cushman, Prof. Pap. 125-D, 1920, p. 79. — Insufficiently described.

L. kinlossensis Vaughan. — Only A-form known. — T. W. VAUGHAN, Journ. Pal., vol. I, no. 4, 1928, p. 286, Pl. 47, fig. 1—6. — Eocene of Jamaica. — Is neither Lepidocyclina, nor Orbitoina. Probably Helicolepidina.

L. kochi Hodson. — See O. trinitatis H. Douv.

L. kugleri Gorter et Van der Vlerk. — See O. maracaibensis Hodson.

L. (Nephrolepidina) lehneri nov. spec. — Under the name of L. sumatrensis (non Brady): J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 76, Pl. XXXIII, fig. 10—11; R. E. KOCH, Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 52; L. M. R. RUTTEN, Proc. K. A. v. W., vol. XXXI, no. 10, 1928, p. 1062. — Oligocene of Curaçao, Cuba.

L. ligera Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 54, Pl. VI, fig. 1—2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. lissoni Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 75, Pl. X, fig. 4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

O. (isorbitoina) macdonaldi Cushman. — Only A-form known. — J. A. CUSHMAN, Bull. U. S. Nat. Mus., 103, 1918, p. 94, Pl. 40, fig. 1—6; J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 77, Pl. 34, fig. 1—3; T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 797; J. A. CUSHMAN, Smiths. Misc. coll., vol. 77, no. 4, 1925, p. 50, Pl. 16, fig. 4; R. E. KOCH, Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 52; L. M. R. RUTTEN, Proc. K. A. v. W., vol. XXXI, no. 10, 1928, p. 1062; T. W. VAUGHAN, Journ. Pal., vol. I, no. 4, 1928, p. 288; M. G. RUTTEN et L. W. J. VERMUNT, Proc. K. A. v. W., vol. XXXV, no. 2, 1932, p. 234, Pl. I, fig. 13; D. W. GRAVELL, Smiths. Misc. coll., vol. 89, no. 11, 1933, p. 25, Pl. 5, fig. 1—3. — Upper Eocene of Panama, Curaçao, Jamaica and Venezuela.

L. (Lepidocyclina) mantelli (Morton) Lem. et Douv. — A- and B-form known. — F. S. MORTON, Am. Journ. Sc., 1833, vol. 23, p. 291, Pl. 5, fig. 9 (under the name of Nummulites mantelli); C. W. VON GÜMBEL, Abh. Kön. Bayer. Akad. Wissensch., vol. 10, 1868, p. 718 (under the name of Orbitoides mantelli); P. LEMOINE et R. DOUVILLÉ, Mém. Soc. géol. Fr., T. XII, fasc. II, no. 32, 1904, p. 10, Pl. I, fig. 4, Pl. II, fig. 18, Pl. III, fig. 7, 12; J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 57, Pl. XII-XIV; H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, 1924, p. 37, textfig. 17, and 17*a*—*d*; T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 796, textfig. 1; T. W. VAUGHAN, Proc. U. S. Nat. Mus., 1927, vol. 71, art. 8, p. 3, Pl. 3, fig. 1; T. W. VAUGHAN, Proc. Ac. Nat. Sc. Philadelphia, vol. LXXIX, 1927, p. 299; W. STORRS COLE et G. M. PONTON, Flor. St. Geol. Surv., Bull. no. 5, 1930, p. 51, Pl. 7, fig. 8—10; W. L. F. NUTTALL, Petr. Congr., 1933.
Under the name of L. forresti Cushman: J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 63, Pl. 19, fig. 4 (not fig. 1—3) (under the name of L. gigas); T. W. VAUGHAN, Proc. U. S. Nat. Mus., vol. 71, art. 8, 1927, p. 1, Pl. I, fig. 1—4, Pl. II, fig. 1—6; T. W. VAUGHAN, Journ. Pal., vol. I, no. 4, 1928, p. 291; T. W. VAUGHAN, Smiths. Misc. coll.,

vol. 89, no. 10, 1933, p. 14, Pl. V, fig. 4; D. W. GRAVELL, Smiths. Misc. coll., vol. 89, no. 11, 1933, p. 25, Pl. 3, fig. 6. — Lower Oligocene of Alabama, Florida, Mexico, Venezuela, Antigua, Jamaica.

L. mantelli (Morton) Lem. et Douv. var. papillata Vaughan. — See L. supera Conrad.

O. (isorbitoina) maracaibensis Hodson. — H. HORSON, Bull. Am. Pal., vol. XII, 1926, no. 47, p. 24, Pl. 6, fig. 2—4; M. G. RUTTEN et L. W. J. VERMUNT, Proc. K. A. v. W., vol. XXXV, no. 2, 1932, p. 236, Pl. I, fig. 9, Pl. III, fig. 2.
Under the name of O. r. douvillei Lisson var. armata Rutten: L. M. R. RUTTEN Proc. K. A. v. W., vol. XXXI, no. 9, p. 944, fig. 24, l.m., Pl. II, fig. 27, 28, 29*a—d*.
Under the name of O. trinitatis H. Douv.; NETTIE E. GORTER et I. M. VAN DER VLERK, L. G. M., Dl. IV, afl. 2, 1932, p. 107, Pl. 13, fig. 1—5.
Under the name of L. kugleri Gorter et Van der Vlerk: NETTIE E. GORTER et I. M. VAN DER VLERK, L. G. M., Dl. IV, afl. 2, 1932, p. 106, Pl. 11, fig. 7—8, Pl. 12, fig. 1—3; J. U. TODD et R. W. BARKER, Geol. Mag., vol. LXIX, no. 822, 1932, p. 538, Pl. XL, fig. 2, Pl. XLI, fig. 5, Pl. XLII, fig. 1. — Eocene of Miranda District, Venezuela; Eocene of N.W. Peru; Eocene of Central Falcon, Menegrande Series, Venezuela; Eocene of Curaçao.

L. (Nephrolepidina) marginata Michelotti. — A- and B-form known. — J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 73, Pl. XXXI, fig. 1 (non fig. 2); T. W. VAUGHAN, Proc. Nat. Ac. Sc., vol. 9, no. 7, 1923, p. 256; H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, 1924, p. 47, fig. 43, Pl. II, fig. 5—6; T. W. VAUGHAN, Quart. Journ., vol. LXXXII, pt. 3, 1926, p. 398; W. L. F. NUTTALL, Petr. Congr., 1933.
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Under the name of L. persimilis H. Douv.: A. TOBLER, Ecl. geol. Helv., Bd. XIX, no. 3, 1926, p. 720.
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L. (Lepidocyclina) matleyi Vaughan. — Only A-form known. — T. W. VAUGHAN, Journ. Pal., vol. 1, no. 4, 1928, p. 292, Pl. 46, fig. 1—3. — Oligocene of Jamaica.

L. mediana Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 62, Pl. VII, fig. 6. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

O. (isorbitoina) meinzeri Vaughan. — Only A-form known. — T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 11, Pl. 3, fig. 1—2, Pl. 4, fig. 1, 2*c*, 3, 4, 5. — Eocene of Mogote Peak, Cuba.

L. meunda Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 43, Pl. I, fig. 6. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. mezquina Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 68, Pl. IX, fig. 5. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. (Lepidocyclina) miraflorensis Vaughan. — Only A-form known. — J. A. CUSHMAN, Bull. U. S. Nat. Mus. 103, 1918, p. 93, Pl. 37, fig. 1—3 and 5 (not Pl. 37, fig. 4, nor Pl. 38) (under the name of L. vaughani). T. W. VAUGHAN, Proc. Nat. Ac. Sc., vol. 9, no. 7, 1923, p. 257; T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 797; T. W. VAUGHAN, Proc. U. S. Nat. Mus., vol. 71, art. 8, 1927, p. 4, Pl. 4, fig. 3—5; T. W. VAUGHAN, Journ. Pal., vol. 1, no. 4, 1928, p. 291. — Oligocene of Jamaica and ? Lower Miocene of Panama.

L. mirandana Hodson. — Only A-form known. — H. HODSON, Bull. Am. Pal., vol. XII, no. 47, 1926, p. 26, Pl. 7, fig. 4—6; T. W. VAUGHAN, Proc. Nat. Ac. Sc., vol. 15, no. 3, p. 288. — Eocene of Venezuela. — Probably a teratological form of O .trinitatis.

L. (Nephrolepidina) morgani Lem. et R. Douv. — Only A-form known. — P. LEMOINE et R. DOUVILLÉ, Mém. Soc. géol. Fr., 1904, T. XII, fasc. II, p. 17, Pl. I, fig. 12, 15, 17, Pl. II, fig. 4, 12, Pl. III, fig. 2; R. DOUVILLÉ, Bull. Soc. géol. Fr., sér. IV, vol. 7, 1907, p. 309; T. W. VAUGHAN, Bull. Geol. Soc. Am., 1924, p. 798; G. A. WARING, Hopk. Un. St., no. 7, 1927, p. 178, Pl. XIX, fig. 11—16; L. M. R. RUTTEN, Proc. K. A. v. W., 1928, p. 1062; (not.: M. G. RUTTEN et L. W. J. VERMUNT, Proc. K. A. v. W., 1932, p. 237, Pl. II, fig. 6); W. L. F. NUTTALL, Petr. Congr. July 1933, p. 7. Under the name of L. marginata Michelotti: NETTIE E. GORTER et I. M. VAN DER VLERK, L. G. M., Dl. IV, afl. 2, 1932, p. 108, Pl. 13, fig. 8—10.
Under the name of L. yurnagunensis Cushman var. morganopsis Vaughan: T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, p. 22, Pl. 11, fig. 5—9, Pl. 23, fig. 1—3. — Oligocene of Venezuela, Cuba, Mexico, Martinique, Trinidad.

L. mortoni Cushman. — See L. supera (Conrad) H. Douv.

L. munieri Lem. et R. Douv. — P. LEMOINE et R. DOUVILLÉ, Mém. Soc. géol. Fr., 1904, T. XII, fasc. II, p. 20, Pl. II, fig. 22. — Oligocene of Martinique. — Insufficiently described.

L. nelsoni Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 53, 61, Pl. VII, fig. 5. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. novitasensis Vaughan. — See O. trinitatis H. Douv.

L. nuttalli Berry. — See O. trinitatis H. Douv.

L. obtusa Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 70, 71, 72, 73, 74, Pl. X, fig. 3. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. ocalana Cushman. — See L. supera (Conrad) H. Douv.

L. ocalana Cushman var. subdecorata Cushman. — J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 72, Pl. XXVIII, fig. 5; T. W. VAUGHAN, Flor.

St. geol. Survey, 19th annual report, 1928, p. 156. — Ocalalimestone (Eocene) of Florida. — Insufficiently described. See also: O. semmesi.

L. ochra Berry. — W. BERRY, Journ. Wash. Ac. Sc., vol. 22, no. 1, 1932, p. 4. — Talahara Shale (? Upper Eocene) of N.W. Peru. — Insufficiently described.

L. orbicular Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 50, Pl. IV, fig. 3, 4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. pacifica Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 39, 50, 52, Pl. V, fig. 3, 4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. paloma Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 82, Pl. XIII, fig. 3, 4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. panamensis Cushman. — See O. tobleri H. Douv.

L. pancanalis Vaughan et Cole. — See L. canellei Lem. et Douv.

L. papillata Vaughan. — See L. supera (Conrad) H. Douv.

L. parinensis Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 97, Pl. XVII, fig. 3, 4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. parva Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 60, Pl. VII, fig. 1, 2. — Verdun-formation (? Oligocene) of N.W. Peru. — In sufficiently described.

L. (Lepidocyclina) parvula Cushman. — A- and B-form known. — J. A. CUSHMAN, Carn. Inst. Wash. Publ. 291, 1919, p. 58, Pl. 3, fig. 4—7; T. W. VAUGHAN, Flor. St. Geol. Survey, 19th annual report 1928, p. 156; IDEM, Journ. Pal., vol. I, no. 4, 1928, p. 292; W. S. COLE et GILLISPIE, Bull. Am. Pal., vol. XV, no. 576, p. 1—15, Pl. 1—3; T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, p. 16, Pl. 7, fig. 1—5, Pl. 8, fig. 3—5, Pl. 9, fig. 1—4, Pl. 10, fig. 1—6. — Antigua-formation (Oligocene) and Meson-formation of Vera Cruz; Moneaque-formation of Jamaica.

L. parvula Cushman var. crassicosta Vaughan et Cole. — See L. giraudi R. Douv.

L. pellejuda Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 103, 105, Pl. XIX, fig. 5—6. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. persimilis Douvillé. — See L. marginata Mich.

L. perundosa Cushman. — J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 68, Pl. XXVI, fig. 1; T. W. VAUGHAN, Journ. Pal., vol. I, no. 4, p. 294; IDEM, Smiths. Misc. coll., vol. 89, no. 10, p. 12, Pl. 4, fig. 6. — Eocene of Cuba and Jamaica. — Insufficiently described.

L. perundosa Cushman var. morugensis Waring. — See L. undosa Cushman.

L. peruviana Cushman. — See O. r. douvillei Lisson.

L. pestana Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 115. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. pidgeoni Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 98, Pl.

XVII, fig. 5, 6. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. (Nephrolepidina) piedrasensis Vaughan. — Only A-form known. — T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, p. 34, Pl. 27, fig. 4. — Upper Oligocene of N.E. Jamaica.

L. poca Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 53, Pl. V, fig. 5, 6. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. pozoensis Berry. — W. BERRY, Hopk. Un. St., no. 9, 192, p. 75, 76, Pl. X, fig. 5, 6. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. praedilatata Douv. — H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, p. 46, textfig. 42. — Eocene of Stone River (Trinidad). — Insufficiently described.

O. (polyorbitoina) proteiformis Vaughan. — T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 810, Pl. 32, fig. 1—7, textfig. 6; T. W. VAUGHAN, Proc. Nat. Ac. Sc., vol. 15, no. 3, 1929, p. 288, 290, fig. 8; L. M. R. RUTTEN, Proc. K. A. v. W., vol. XXXI, no. 10, 1928, p. 1063, 1065, Pl. E, fig. 5, 6; W. L. F. NUTTALL, Journ. Pal., vol. 4, no. 3, Sept. 1930, p. 277.
Under the name of L. gardnerae Cole: W. S. COLE, Bull. Am. Pal., vol. 15, no. 56, 1929, p. 4, Pl. I, fig. 1—6, Pl. II, fig. 1—2.
Eocene of Mexico, Curaçao and Texas.

L. pseudocarinata Cushman. — J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 66, Pl. XXIV, fig. 3, 4. — Ocala-limestone (Eocene) of Florida. — Insufficiently described.

L. pseudomarginata Cushman. — J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 69, Pl. XXVI, fig. 2, 4; H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, p. 42, Pl. I, fig. 8; W. L. F. NUTTALL, Petr. Congr., 1933, p. 10. — Ocala-limestone, Florida, Stone River, Trinidad, ? Oligocene, Alazan, Mexico. — Insufficiently described.

O. (isorbitoina) pustulosa H. Douv. — A- and B-form known. — H. DOUVILLÉ, Compt. Rend. Ac. Sc., 1917, p. 843, 844, textfig. 1, 2, 4, (not 3); A. TOBLER, Ecl. geol. Helv., vol. XVII, no. 3, 1922, p. 345; H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, 1924, p. 41, Pl. 1, 2, 3, fig. 27—32; R. KOCH, Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 52; NETTIE E. GORTER et I. M. VAN DER VLERK, L. G. M., Dl. IV, afl. 2, 1932, p. 106, Pl. 12, fig. 4—8. — Upper Eocene of San Fernando (Trinidad); Upper Eocene of Seroe Kenepa (Curaçao); Menegrande Series, Central Falcon (Venezuela); Upper Eocene of Isthme de Panama, Jamaica; Lobitos-formation (Upper Eocene) of N.W. Peru.

L. quebrada Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 90, Pl. XV, fig. 3, 6. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. raimonda Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 96, Pl. XVII, fig. 1, 2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. rara Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 106, Pl. XX,

fig. 1, 2. — Verdun-formation (? Oligocene) of N.W. Peru. Insufficiently described.

L. raulini Lem. et Douv. — See L. formosa Schlumberger.

L. redonda Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 49, Pl IV, fig. 1, 2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. redroja Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 71, Pl. IX, fig. 6. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. roscheni Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 78, Pl. XI, fig. 3, 4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. samanica Berry. — W. BERRY, Journ. Wash. Ac. Sc., vol. 22, no. 1, 1932, p. 3, fig. 10. — Talara shale (? Upper Eocene) of N.W. Peru. — Insufficiently described.

L. (Lepidocyclina) sanluisensis Gravell. — D. W. GRAVELL, Smiths. Misc. coll., vol. 89, no. 11, Pl. 4, fig. 1, 2, 3, 4. — San Luis-limestone, Middle Oligocene of Venezuela.

L. schlumbergeri Lem. et Douv. — See L. dilatata Michelotti.

L. schotborghi Rutten et Vermunt. — See O. trinitatis H. Douv.

L. sectionens Berry. — W. BERRY, Journ. Wash. Ac. Sc., vol. 22, no. 1, 1932, p. 3, fig. 11. — Talara shale (? Upper Eocene) of N.W. Peru. — Insufficiently described.

L. seis Berry. — W. BERRY, Journ. Wash. Ac. Sc., vol. 22, no. 1, 1932, p. 5, fig. 3. — Talara shale (? Upper Eocene) of N.W. Peru. — Insufficiently described.

O. (Isorbitoina) semmesi Vaughan et Cole. — Only B-form known. — T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 29, Pl. 15, fig. 3—5, Pl. 30, fig. 1, Pl. 31, fig. 1, 1*a*, Pl. 32, fig. 2, 3.
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Under the name of L. semmesi Vaughan et Cole var. granosa Vaughan et Cole: T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 30, Pl. 30, fig. 2.
Under the name of L. ocalana Cushman var. subdecorata Cushman: W. L. F. NUTTALL, Journ. Pal., vol. 4, 1930, p. 273. — Tantoyuca-formation (Upper Eocene).

L. semmesi Vaughan et Cole var. granosa Vaughan et Cole. — See O. semmesi Vaughan et Cole.

L. senni Gorter et Van der Vlerk. — See L. undosa Cushman.

L. sherwoodensis Vaughan. — See O. trinitatis H. Douv.

L. subglobosa Nuttall. — See O. r. douvillei Lisson.

L. subraulinii Cushman. — Only B-form known. — J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 73, Pl. XXX, fig. 1—6; T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, p. 9, Pl. 2, fig. 1, 2, 3, Pl. 3, fig. 1. — Upper Eocene of Nuevitas (Cuba).

L. sumatrensis Brady. — See L. lehneri nov. spec.

L. (Lepidocyclina) supera (Conrad) H. Douv. — A- and B-form known. — H. DOUVILLÉ, Compt. Rend. Ac. Sc., 1918, p. 263, fig. 6—8, 11; J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 69, Pl. XXVI, fig. 5—7;

H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, 1924, p. 40, Pl. I, fig. 9, 10; T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 797, Pl. 33, fig. 3; T. W. VAUGHAN, Proc. U. S. Nat. Mus., vol. 71, art. 8, 1927, p. 4, Pl. 3, fig. 3; W. L. F. NUTTALL, Petr. Congr., 1933, p. 7; T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 12, Pl. 29, fig. 1—3; W. S. COLE, Journ. Pal., vol. 8, no. 1, p. 23, Pl. 3, fig. 7—15, Pl. 4, fig. 6, 7.

Under the name of L. georgiana Cushman: J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 60, Pl. XVI, fig. 1, Pl. XVII, fig. 1—3, Pl. XVIII, fig. 1—2; T. W. VAUGHAN, Bull. Geol. Soc. Am., vol 35, 1924, p. 799; H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, p. 39; T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 28.

Under the name of L. hilli Cushman: J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 60, Pl. XV, fig. 1, Pl. XVI, fig. 2.

Under the name of L. mortoni Cushman: J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 70, Pl. XXVII; T. W. VAUGHAN, Bull. Geol. Soc. Am., vol. 35, 1924, p. 797, Pl. XXXVI, fig. 1—3; J. J. GALLOWAY, Journ. Pal., vol. 1, no. 4, 1928, p. 300; T. W. VAUGHAN, Proc. Nat. Ac. Sc., vol. 15, no. 3, 1929, fig. 1, 2.

Under the name of L. ocalana Cushman: J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 71, Pl. XXVIII, fig. 3, 4, Pl. XXIX, fig. 1—3; T. W. VAUGHAN, Proc. Nat. Ac. Sc., vol. 9, no. 7, p. 256, 1923; H. DOUVILLÉ, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, 1924, p. 29, 30, 31, 38, 39, fig. 19—21; T. W. VAUGHAN, Flor. St. Geol. Survey, 19th annual report, 1928, p. 58.

Under the name of L. papillata Vaughan: T. W. VAUGHAN, Proc. U. S. Nat. Mus., 1927, vol. 71, art. 8, p. 3, Pl. 3, fig. 2*a*, 2*b*, Pl. 4, fig. 1—2; W. S. COLE et G. M. PONTON, Flor. St. Geol. Survey, Bull. no. 5, 1930, p. 51.

Under the name of L. waylandvaughani Cole: W. S. COLE, Bull. Am. Pal., vol. 14, 1928, p. 221, Pl. 35, fig. 1—10; T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 13, Pl. 5, fig. 1—3, 5, 6. — Eocene: Jackson-formation, Mississipi; Ocala-limestone, Florida; Tantoyuca-formation, Mexico.

Oligocene: Marianna-limestone, Alabama-river; Antigua-formation, Antigua; Meson-formation, Mexico; Costa Rica.

L. sutil Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 109, Pl. XX, fig. 5. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

O. (isorbitoina) tantoyucensis Vaughan et Cole. — T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 30, Pl. 15, fig. 1, 2. — Tantoyuca-formation (Upper Eocene) of Mexico.

L. tempanii Vaughan et Cole. — See L. tournoueri Lem. et Douv.

L. tenu Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 102, Pl. XVIII, fig. 3, 4. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. thompsoni Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 111, Pl. XXI, fig. 1. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

O. (Pliorbitoina) tobleri H. Douv. — Only A-form known. — H. Douvillé, Compt. Rend. Ac. Sc., 1917, p. 844, textfig. 5, 6; H. Douvillé, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, 1924, p. 43, textfig. 34, 35; W. P. Woodring, Bull. Am. Ass. Petr. Geol., vol. 11, no. 9, 1927, p. 995; W. L. F. Nuttall, Quart. Journ., vol. LXXXIV, 1928, p. 105, Pl. VIII, fig. 2, textfig. 10; L. M. R. Rutten, Proc. K. A. v. W., vol. XXXI, no. 10, 1928, p. 1067, Pl. C, D, fig. 19—35; M. G. Rutten et L. W. J. Vermunt, Proc. K. A. v. W., vol. XXXV, no. 2, 1932, p. 237.
Under the name of L. panamensis Cushman: J. A. Cushman, Prof. Pap. 125-D, 1920, p. 77, Pl. XXXIV, fig. 4—6; W. O. Dietrich, Centralbl. für Mineral. Geol. u. Pal., Jahrg. 1924, p. 186; W. P. Woodring, Bull. Am. Ass. Petr. Geol., vol. 11, no. 9, 1927, p. 993. — Upper Eocene of Point Bontour (Trinidad), Naparima-region and Tonosi River (Trinidad), Venezuelan Andes and Seroe di Cuba (Curaçao).

L. tosca Berry. — W. Berry, Hopk. Un. St., no. 9, 1929, p. 42, Pl. II, fig. 1, 2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. (Nephrolepidina) tournoueri Lem. et Douv. — Only A-form known. — P. Lemoine et R. Douvillé, Mém. Soc. géol. Fr., T. XII, fasc. II, 1904, p. 19, Pl. I, fig. 5, Pl. II, fig. 2, 14, Pl. III, fig. 1; H. Douvillé, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, 1924, p. 47; T. W. Vaughan, Bull. Geol. Soc. Am., vol. 35, 1924, p. 798, Pl. 33, fig. 6, 7; R. Koch, Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 52; R. Koch, Ecl. geol. Helv., vol. 22, no. 2, 1929, p. 160; T. W. Vaughan, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 25, Pl. 13, fig. 1, 2.
Under the name of L. tempanii Vaughan et Cole: T. W. Vaughan, Smiths. Misc. coll., vol. 89, no. 10, 1933, p. 26, Pl. 13, fig. 3—6. — Oligocene of Erin Point (Trinidad), Mexico, Arbolgrande, Tamailipas (Mexico), Hodge Hill, Antigua.

L. (Nephrolepidina — trybliolepidina) transiens Umbgrove. — Only A-form known. — J. H. F. Umbgrove, W. M., no. 9, 1929, p. 109. — Erin Point, Oligocene, Trinidad.

L. trenada Berry. — W. Berry, Hopk. Un. St., no. 9, 1929, p. 103, Pl. XIX, fig. 1, 2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

O. (isorbitoina) trinitatis H. Douv. — A- and B-form known. — H. Douvillé, Mém. Soc. géol. Fr., Nouv. Sér., T. I, mém. no. 2, Feuilles 5 à 11, 1924, p. 34, Pl. I, fig. 1; H. Hodson, Bull. Am. Pal., vol. XII, no. 47, 1926, p. 19; A. Tobler, Ecl. geol. Helv., vol. XX, no. 3, 1927, p. 417; A. Werenfels, Ecl. geol. Helv., vol. XX, no. 4, 1927, p. 483—484; W. L. F. Nuttall, Quart. Journ., vol. LXXXIV, 1928, p. 103, Pl. VIII, fig. 12, 13; R. Koch, Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 52; T. W. Vaughan, Journ. Pal., vol. I, no. 4, 1928, p. 289, Pl. 49, fig. 11—13; L. M. R. Rutten, Proc. K. A. v. W., vol. XXXI, no. 10, 1928, p. 1066; R. Koch, Ecl. geol. Helv., vol. 22, no. 2, 1929, p. 160; M. G. Rutten et L. W. J. Vermunt, Proc. K. A. v. W., vol. XXXV, no. 2, 1932,

p. 234, Pl. I, fig. 4; A. WERENFELS, Ecl. geol. Helv., vol. 26, no. 1, 1933, p. 102; P. J. PIJPERS, Geology and Paleontology of Bonaire, Diss., Utrecht, 1933, p. 54; D. W. GRAVELL, Smiths. Misc. coll., vol. 89, no. 11, p. 26, Pl. 3, fig. 7, 8.

Under the name of L. ariana W. S. Cole et G. M. Ponton: W. S. COLE et G. M. PONTON, Am. Midl. Nat., vol. XV, no. 2, p. 142, Pl. 2, fig. 1—5.

Under the name of L. atascaderensis Berry: W. BERRY, Ecl. geol. Helv., vol. 23, no. 2, 1932, p. 491, Pl. XIV, fig. 3, Pl. XV, fig. 6; J. U. TODD, Geol. Mag., vol. LXX, no. 830, Aug. 1933, p. 348, Pl. XVIII, fig. 1—5.

Under the name of L. bontourana Hodson: H. HODSON, Bull. Am. Pal., vol. XII, no. 47, p. 21, Pl. 5, fig. 2, 4, 5.

Under the name of L. brightoni Berry: W. BERRY, Ecl. geol. Helv., vol. 23, no. 2, 1930, p. 493, Pl. XIV, fig. 2 and Pl. XV, fig. 4; J. U. TODD, Geol. Mag., vol. LXX, no. 830, 1933, p. 348.

Under the name of L. carmani Berry: W. BERRY, Ecl. geol. Helv., vol. 23, no. 2, 1930, p. 494, Pl. XV, fig. 5.

Under the name of L. columna Berry: W. BERRY, Ecl. geol. Helv., vol. 23, no. 2, 1930, p. 492, Pl. XIV, fig. 4, 7; J. U. TODD, Geol. Mag., vol. LXX, no. 830, 1933, p. 348.

Under the name of L. hieronymi Rutten et Vermunt = L. canellei Lem. et Douv. var. hieronymi Rutten et Vermunt: L. G. M. RUTTEN et L. W. J. VERMUNT, Proc. K. A. v. W., vol. XXXV, no. 2, 1932, p. 234, Pl. I, fig. 3, Pl. II, fig. 10; P. J. PIJPERS, Geology and Paleontology of Bonaire, Diss. 1933, Utrecht, p. 53, 54.

Under the name of L. hubbardi Hodson: H. HODSON, Bull. Am. Pal. 1926, vol. XII, p. 21, Pl. V, fig. 1, 3, 7, 11; R. KOCH, Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 52; Idem, vol. 22, no. 2, 1929, p. 160; D. W. GRAVELL, Smiths. Misc. Coll., vol. 89, no. 11, 1933, p. 5.

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Under the name of L. kochi Hodson: H. HODSON, Bull. Am. Pal., vol. XII, 1926, p. 24, Pl. VI, fig. 5, 9, 10.

Under the name of L. novitasensis Vaughan: T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 18, 1933, p. 8, Pl. I, fig. 1—4.

Under the name of L. nuttalli Berry: W. BERRY, Ecl. geol. Helv., vol. 23, no. 2, 1930, p. 494, Pl. XV, fig. 1; J. U. TODD, Geol. Mag., vol. LXX, no. 830, p. 348.

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Under the name of L. trinitatis H. Douv. var. venezuelana Hodson: H. Hodson, Bull. Am. Pal., vol. XII, no. 47, 1926, p. 20, Pl. 4, fig. 9.
Under the name of L. (Polyl.) vanslobbeni Rutten et Vermunt: M. G. Rutten et L. W. J. Vermunt, Proc. K. A. v. W., vol. XXXV, no. 2, 1932, p. 238, Pl. I, fig. 11, Pl. II, fig. 9, Pl. III, fig. 3, 4.
Under the name of L. weeksi Hodson: H. Hodson, Bull. Am. Pal., vol. XII, no. 47, p. 23, Pl. 6, fig. 6—8; M. G. Rutten et L. W. J. Vermunt, Proc. K. A. v. W., vol. XXXV, no. 2, 1932, p. 235, Pl. I, fig. 6.
Under the name of L. zuliana Hodson: H. Hodson, Bull. Am. Pal., vol. XII, no. 47, 1926, p. 25, Pl. 7, fig. 1—3; M. G. Rutten et L. W. J. Vermunt, Proc. K. A. v. W., vol. XXXV, no. 2, 1932, p. 238. — Eocene of Point Bontour, Trinidad; Districts of Miranda and Bolivar, Venezuela; Quebadra Montera, N. Peru, Mount Moriah, Trinidad; Seroe di Cuba, Curaçao, Jamaica, Atascadera-limestone, N.W. Peru, Jefferson County, Florida, Nuevitas, Cuba; Bonaire.

L. trinitatis var. caribbeanensis Hodson. — See O. trinitatis H. Douv.

L. trinitatis var. venezuelana Hodson. — See O. trinitatis H. Douv.

L. (Eulepidina) undosa Cushman. — J. A. Cushman, Prof. Pap. 125-D, 1920, p. 68, Pl. XXV; T. W. Vaughan, Bull. Geol. Soc. Am., vol. 35, 1924, p. 820, Pl. 34, fig. 5, 6, 7; T. W. Vaughan, Quart. Journ., vol. LXXXII, 1926, pt. 3, p. 393, Pl. XXIV, fig. 1, 2; H. Douvillé, Compte Rendu Sommaire, Séances Soc. Géol., 1927, Fasc. 4, p. 35, fig. 3, 4; T. W. Vaughan, Journ. Pal., vol. I, no. 4, 1928, p. 294, Pl. 48, fig. 3; W. S. Cole et Gillespie, Bull. Am. Pal., vol. XV, no. 576, p. 3; Nettie E. Gorter et I. M. van der Vlerk, L. G. M., Dl. IV, afl. 2, 1932, p. 110, Pl. 15, fig. 1—4; W. L. F. Nuttall, Petr. Congr., 1933, p. 7; D. W. Gravell, Smiths. Misc. coll., vol. 89, no. 11, 1933, p. 30, Pl. 6, fig. 4.
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Under the name of L. perundosa Cushman var. morugensis Waring: G. A. Waring, Hopk. Un. St., no. 7, 1927.
Under the name of L. senni Gorter et Van der Vlerk: Nettie E. Gorter et I. M. van der Vlerk, L. G. M., Dl. IV, afl. 2, 1932, p. 109, Pl. 14, fig. 1—4.

Under the name of L. undulata Cushman: J. A. CUSHMAN, Carn. Inst., Wash. Publ. 291, 1919, p. 60, Pl. 3, fig. 1*a*, 2, 8, 9, Pl. 15, fig. 2—5; J. A. CUSHMAN, Prof. Pap. 125-D, 1920, p. 60, Pl. 15, fig. 2—5. — Antigua-formation (Middle Oligocene) of Antigua, Meson-formation (Middle-Oligocene) of Mexico, Glendon-formation (Middle Oligocene) of Alabama, Moneaque-formation (Middle Oligocene) of Jamaica, Sanluis-limestone (Middle-Oligocene) of Venezuela, Churuguarie-series (Middle Oligocene) of Central Falcon (Venezuela), Cuba.

L. undosa var. tumida. — See L. formosa Cushman.

L. undulata Cushman. — See L. undosa Cushman.

L. vanslobbeni Rutten et Vermunt. — See O. trinitatis H. Douv.

L. vargasi Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 108, Pl. XV, fig. 7. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. variabilis Rutten. — L. M. R. RUTTEN, Proc. K. A. v. W., vol. XXXI, no. 9, 1928, p. 942, Pl. I, fig. 13—22, 23*a*—*h* and 24*a*—*e*. — Eocene of N.W. Peru. — Is a teratological form of O. trinitatis H. Douv.

L. vaughani Cushman. — See L. marginata Michelotti.

L. (Nephrolepidina) verbeeki Newton et Holland. — R. W. BARKER, Geol. Mag., vol. 69, 1932, p. 278, Pl. 16, fig. 1—5; T. W. VAUGHAN, Smiths. Misc. coll., vol. 89, no. 10, p. 35, Pl. 23, fig. 11. — Lower Miocene (not Eocene) of S.W. Ecuador and Middle Oligocene of Cuba.

L. verdunensis Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 38, Pl. I, fig. 1, 2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. vichayalensis Rutten. — Only A-form known. — L. M. R. RUTTEN, Proc. K. A. v. W., vol. XXXI, no. 9, 1928, p. 945; ? J. U. TODD et R. W. BARKER, Geol. Mag., vol. LXIX, 1932, p. 532, Pl. XL, fig. 5, 6. — Parinas-sandstone (Eocene) of N.W. Peru and Lobitos-formation (Eocene) of N.W. Peru. — Is neither Lepidocyclina, nor Orbitoina. Probably Helicolepidina sp.

L. waylandvaughani Cole. — See L. supera (Conrad) H. Douv.

L. weeksi Hodson. — See O. trinitatis H. Douv.

L. wetherellensis Vaughan et Cole. — See L. falconensis Gorter et Van der Vlerk.

L. wilberi Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 70, Pl. IX, fig. 7. — Verdun-formation (Oligocene) of N.W. Peru. — Insufficiently described.

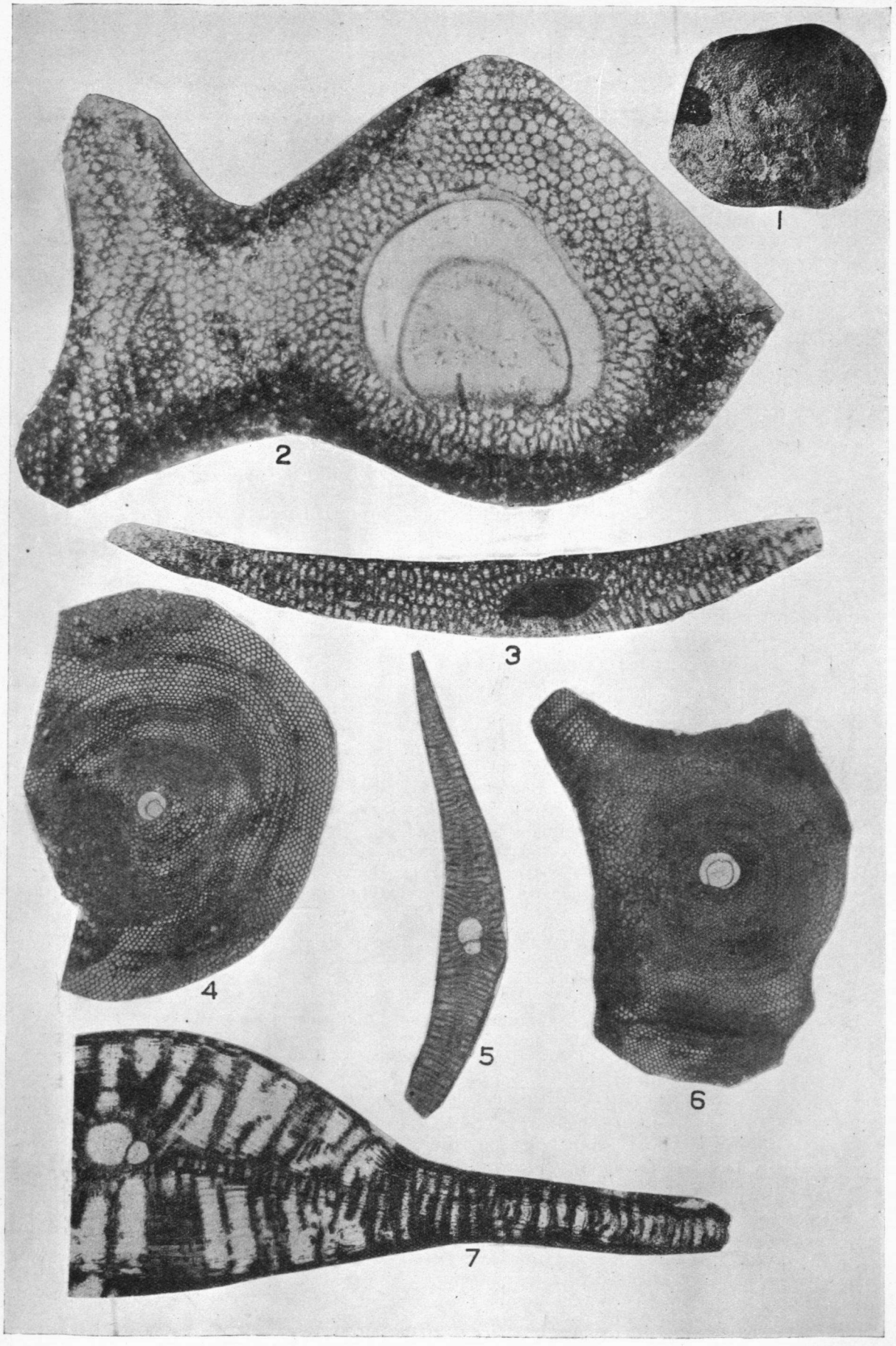
L. woodringi Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 85, Pl. XIV, fig. 4, 5. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. yermensis Berry. — W. BERRY, Hopk. Un. St., no. 9, 1929, p. 62, Pl. VIII, fig. 1, 2. — Verdun-formation (? Oligocene) of N.W. Peru. — Insufficiently described.

L. yurnagunensis Cushman. — See L. canellei Lem. et R. Douv.

L. yurnagunensis Cushman var. morganopsis Vaughan. — See L. morgani Lem. et R. Douv.

L. zuliana Hodson. — See O. trinitatis H. Douv.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III. Key for determination of the subgenera and species of Lepidocyclina s. l. in America.

Nucleoconch bicellular.

The initial chamber is completely surrounded by the second chamber. In horizontal section the first and second chamber form two tangential circles. — **Eulepidina.** Oligocene. (See 1).

The second chamber surrounds only half the initial chamber. — **Nephrolepidina.** Oligocene[1]). (See 2).

The chambers are semicircular, separated by a straight wall. — **Lepidocyclina s.s.** Oligocene[1]). (See 3).

1. EULEPIDINA.

Test shieldshaped.

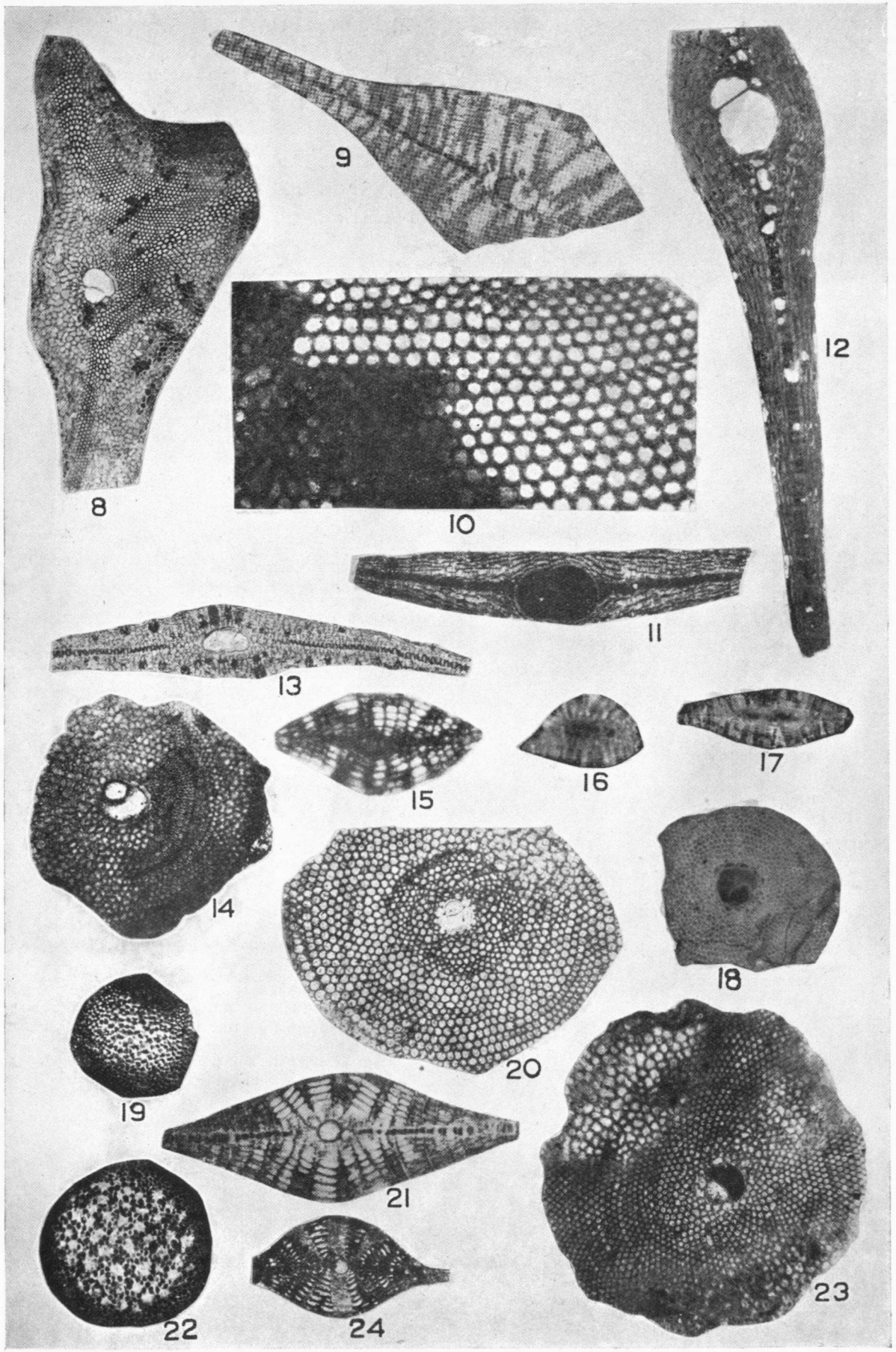
Columns absent. Equatorial chambers hexagonal-spatulate. Lateral chambers rectangular-fissiform, not arranged in vertical rows. B-form 40—60 mm. — **L. undosa Cushm.** (syn.: L. gigas Cushm., L. perundosa Cushm. var. morugensis Waring. L. senni Gorter et v. d. Vl., L. undulata Cushm.). Oligocene (fig. 1, coll. Geol. Mus. Leiden, 3 ×; fig. 2, after Gorter et Van der Vlerk, 16 ×; fig. 3, coll. Geol. Mus. Leiden, 8½ ×).

Diam. 10—15 mm. Columns spread over the whole surface. Equatorial chambers hexagonal-flattened. Lateral chambers rectangular, arranged in vertical rows. B-form 30—40 mm. — **L. dilatata Mich.** Oligocene (fig. 4 and 5, after Lemoine et R. Douvillé; fig. 4, 8 ×; fig. 5, 5 ×).

Test omphaloid.

Equatorial chambers hexagonal-flattened. Lateral chambers reactangular. Columns absent. Thick walls of both equatorial and lateral chambers. B-form 20—30 mm. — **L. formosa Schlumb.** (syn.: L. chattahoocheënsis Cushm., L. crassata Cushm., L. favosa Cushm., L. gigas Cushm. var. duncanensis Cole, L. gigas Cushm. var. mexicana Cushm., L. raulini Lem. et R. Douv., L. undosa Cushm. var. tumida Vaughan). Oligocene (fig. 6, after Lemoine et D. Douvillé; 9 ×; fig. 7, after Vaughan 1926, 5 ×).

[1]) See p. 227.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2. NEPHROLEPIDINA.

Test stellate.

Diam. 4—9 mm. No columns. Equatorial chambers hexagonal, arranged in polygons and elongated in the radius. Lateral chambers fissiform. Walls of both equatorial and lateral chambers thin.

L. dartoni Vaughan.
Oligocene
(fig. 8 and 9, after Vaughan 1933, 9 ×).

Test shieldshaped.

Columns absent.

Diam. 8—12 mm. Equatorial chambers hexagonal and with thick walls. Lateral chambers fissiform. B-form 30—40 mm.

L. fragilis Cushm.[1])
Upper Eocene
(fig. 10, after Vaughan 1933, 20 ×); fig. 11, coll. Geol. Mus. Leiden, 14 ×); fig. 12, after Vaughan 1933, 20 ×).

Columns present.

Diam. 10 mm. Columns rather thick and more developed in the central part. Equatorial chambers hexagonal.

L. piedrasensis Vaughan.
Oligocene
(fig. 13, after Vaughan 1933, 9 ×).

Test lenticular.

Columns absent.

Outlines circular.

Diam. 2—5 mm. Equatorial chambers hexagonal. Lateral chambers rectangular, small.

L. lehneri nov. spec.
Oligocene
(fig. 14 and 15, coll. Geol. Mus. Leiden, 20 ×).

Outline irregular.

Diam. 2—5 mm. Embryonic apparatus forms a transition from nephrolepidine-type to tryblio-lepidine-type. Equatorial chambers hexagonal. Lateral chambers rectangular, large.

L. transiens Umbgrove.
Oligocene
(fig. 16, 17 and 18, coll. Geol. Mus. Leiden, 20 ×).

Columns present.

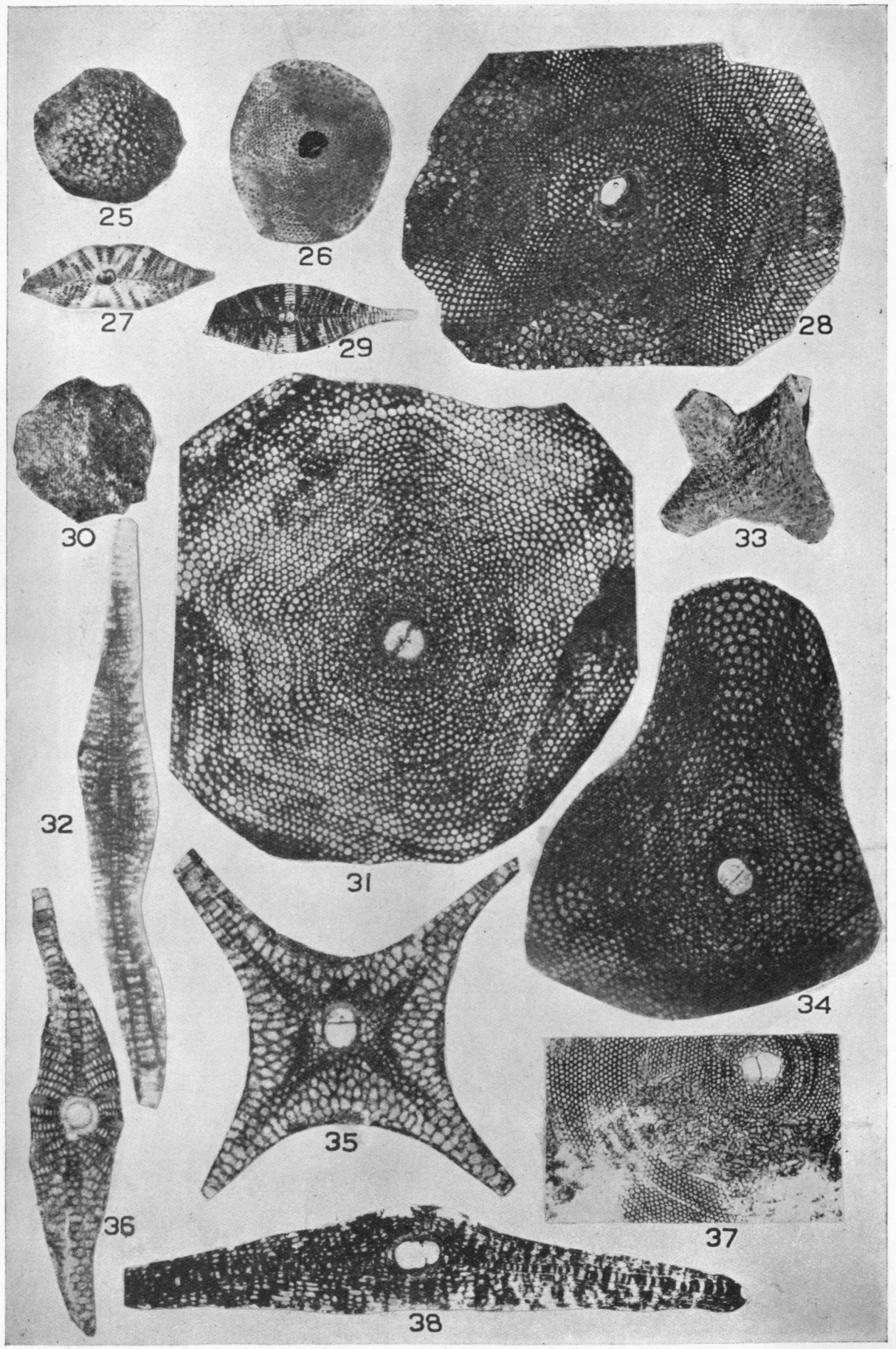
Diam. 2—5 mm. Columns spread over the whole surface. Equatorial chambers hexagonal. Lateral chambers very large and rectangular.

L. tournoueri Lem. et R. Douv.
(syn.: L. tempanii Vaughan et Cole).
Oligocene
(fig. 19 coll. Geol. Mus. Leiden, 11 ×; fig. 20, after Vaughan 1933, 20 ×; fig. 21, after Vaughan 1924, 20 ×).

Diam. 2—5 mm. Some large columns in the central part. Equatorial chambers hexagonal. Lateral chambers rectangular, smaller than those of L. tournoueri.

L. morgani Lem. et R. Douv.
(syn.: L. yurnagunensis Cushm. var. morganopsis Vaughan).
Oligocene
(fig. 22, coll. Geol. Mus. Leiden, 10 ×); fig. 23, after Lemoine et R. Douvillé, 17 ×; fig. 24, after Cushman 1920, 8 ×).

[1]) See p. 227.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Test omphaloid.
Columns distinct especially in the central part. Equatorial chambers hexagonal. Lateral chambers fissiform.

L. marginata Mich.
(syn.: L. vaughani Cushm.).
Oligocene
(fig. 25, coll. Geol. Mus. Leiden, 7 ×; fig. 26 and 27, after Gorter et Van der Vlerk, 12 ×).

Small columns spread over the whole surface. Equatorial chambers hexagonal, towards the periphery they increase in height. Lateral chambers rectangular with in the central part a ratio of width to height of 5 or more to 1.

L. verbeeki Newt. et Holl.
M. Oligocene and Lower Miocene
(fig. 28, after Barker, 18 ×; fig. 29, after Brady, 10 ×).

3. LEPIDOCYCLINA S. STR.
Test polygonal.
Diam. 3—10 mm. About 8 irregularly spreading rays extending from the central area to the margin. Small columns spread over the whole surface. Equatorial chambers hexagonal and arranged in polygons. Lateral chambers rectangular.

L. falconensis Gorter et V. d. Vl.
(syn.: L. wetherellensis Vaughan et Cole).
Oligocene
(fig. 30, after Vaughan et Cole 1933, 10 ×; fig. 31 and 32, after Gorter et Van der Vlerk, 16 ×).

Test stellate.
Diam. 3½—5 mm. Four radiate arms. Small columns spread over the whole surface. Equatorial chambers hexagonal, flattened in the interradial areas, elongated in the radius. Lateral chambers rectangular.

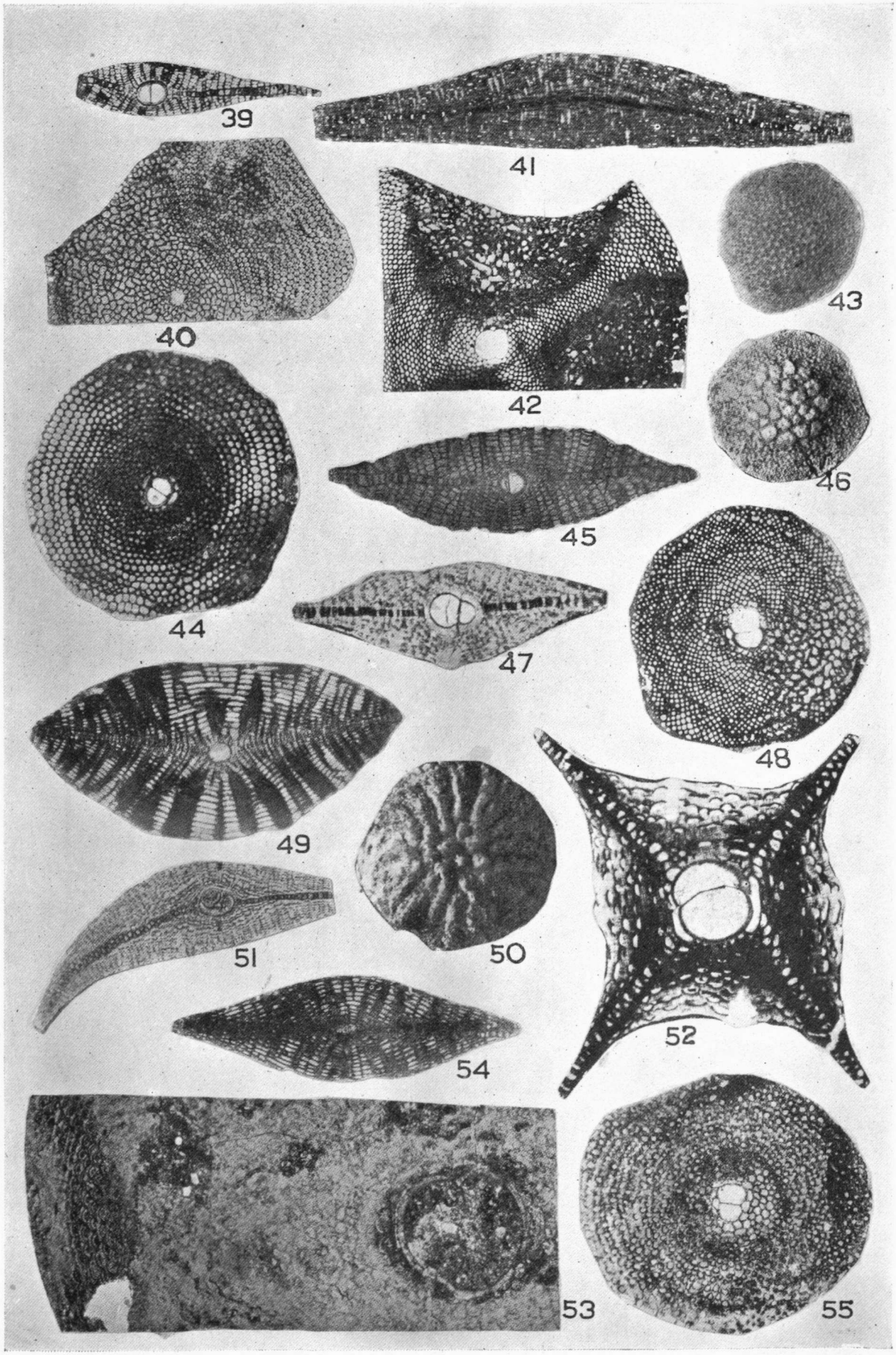
L. asterodisca Nuttall.
Lower Oligocene.
(fig. 33, after Nuttall 1932, 10 ×; fig. 34, after Nuttall 1932, 10 ×).

Test saddleshaped.
Equatorial chambers hexagonal. Lateral chambers rectangular. Diam. smaller than 5 mm. Small columns spread over the whole surface.

L. matleyi Vaughan.
Oligocene
(fig. 35 and 36, after Vaughan 1928, 20 ×).

Test shieldshaped.
Columns absent.
Equatorial chambers hexagonal and strongly flattened. Lateral chambers rectangular. Walls of both equatorial and lateral chambers thick.

L. mantelli (Morton) Lem. et R. Douv.
(syn.: L. forresti Vaughan).
Oligocene
(fig. 37, after Vaughan 1927, 12 ×); fig. 38, coll. Geol. Mus. Leiden, 20 ×).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Equatorial chambers hexagonal. Lateral chambers rectangular, open and with thin walls.

L. miraflorensis Vaughan.
Oligocene
(fig. 39 and 40 after Vaughan 1927, 12 ×).

Columns present and spread over the whole surface. Equatorial chambers hexagonal, flattened. Lateral chambers fissiform. Thick walls of both equatorial and lateral chambers.

L. supera (Conrad) Douv.[1])
(syn.: L. georgiana Cushm.,
L. hilli Cushm.,
L. mantelli (Morton) Lem. et R. Douv. var. papillata Cushm.,
L. mortoni Cushm.,
L. ocalana Cushm.,
L. waylandvaughani Cole.
Upper-Eocene — Oligocene.
(fig. 41, coll. Geol. Mus. Leiden, 10 ×; fig. 42, after Cole 1934, 10 ×).

Test lenticular.
Equatorial chambers hexagonal. Lateral chambers rectangular.
Columns small and spread over the whole surface. Diam. 1½—4 mm.

L. canellei Lem. et Douv.
(syn.: L. canellei Lem. et Douv. var. yurnagunensis Cushm.,
L. pancanalis Vaughan et Cole,
L. yurnagunensis Cushm.).
Middle- and Upper-Oligocene
(fig. 43, after H. Douvillé 1934, 10 ×; fig. 44, after Vaughan 1933, 20 ×; fig. 45, after Lem. et Douvillé, 18 ×).

Columns strongly developed and only present in the central part.
Costae absent.
Lateral chambers lenticular, small and with thick walls. Diam. 3 mm. Diam. B form 5 mm.

L. parvula Cushm.
Oligocene
(fig. 46, after Vaughan 1933, 5 ×; fig. 47, after Vaughan 1933, 20 ×).

Lateral chambers rectangular, large and with thin walls. Diam. 3—8 mm.

L. sanluisensis Gravell.
Middle Oligocene
(fig. 48, after Gravell 1933, 18 ×); fig. 49, after Gravell 1933, 16 ×).

Costae present.
Equatorial chambers hexagonal, flattened near the central part; near the periphery they are elongated and spatulate. Diam. about 3½ mm.

L. giraudi R. Douv.
(syn.: L. parvula Cushm. var. crassicosta Vaughan et Cole).
Oligocene
(fig. 50, after Vaughan 1933, 10 ×).

IV. Key for determination of the sub-genera and species of Orbitoina in America.

Nucleoconch bicellular, with thin-walled semicircular chambers.

Isorbitoina
Eocene
(See 1).

Nucleoconch pluricellular, composed of one large chamber with several chambers around its periphery.

Pliorbitoina
Eocene
(See 2).

Nucleoconch pluricellular, composed of 4 or 5 chambers, which passage into a spiral.

Polyorbitoina.
Eocene
(See 3).

1. ISORBITOINA.
Test saddleshaped.
Diam. 8—14 mm. Small columns in the central part. Equatorial chambers ogival and flattened in radial direction. Lateral chambers large and fissiform.

O. semmesi Vaughan et Cole.
(syn.: L. semmesi Vaughan et Cole var. granosa Vaughan et Cole).
Upper Eocene
(fig. 51, after Vaughan 1933, 9 ×).

Equatorial chambers rhomboid. Lateral chambers lenticular. Some large columns in the central part. Ratio diameter to thickness about 4 : 1. Diam. 5—10 mm.

O. meinzeri Vaughan.
Eocene
(fig. 52, after Vaughan 1933, 17 ×).

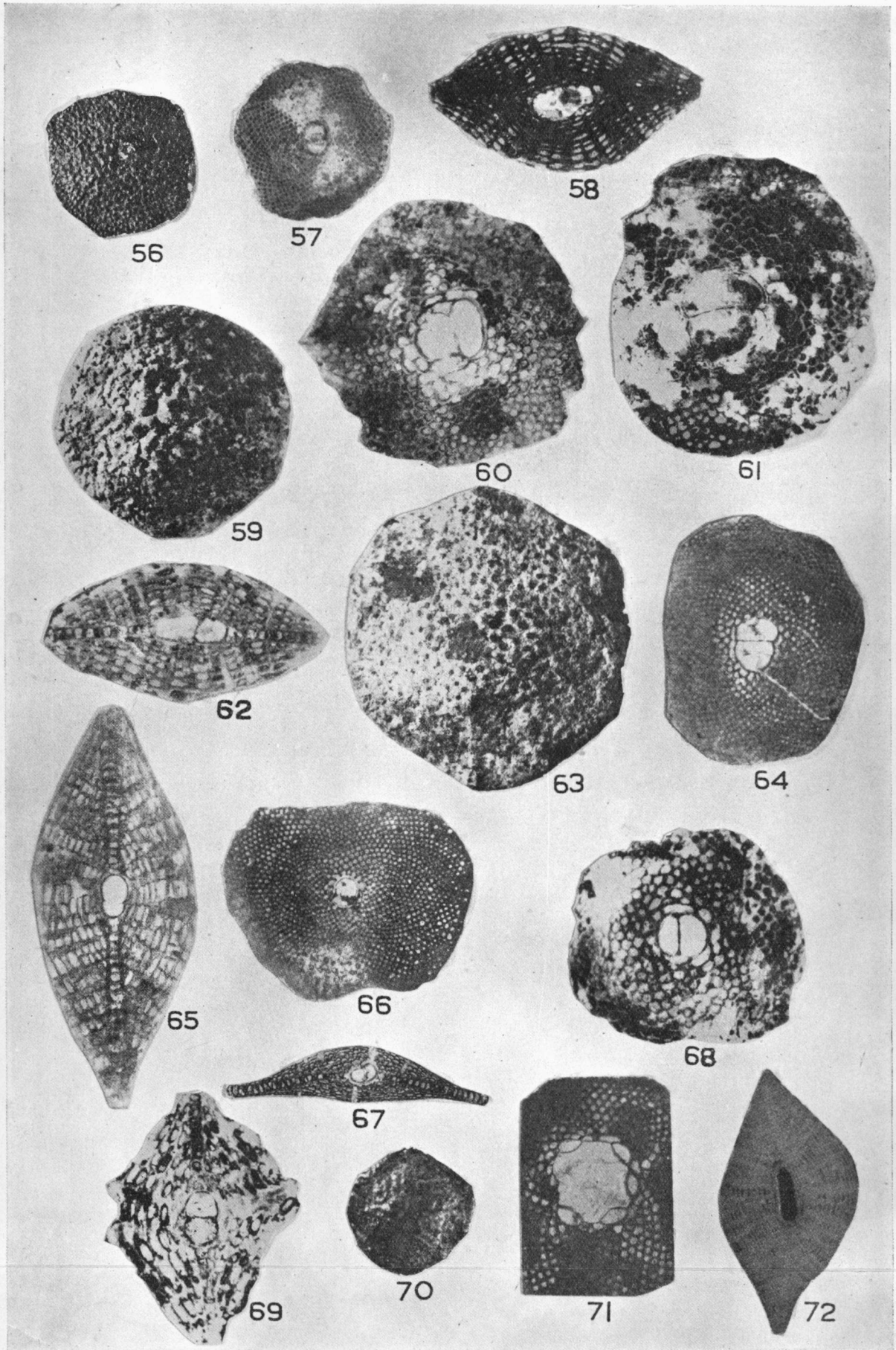
Test shieldshaped.
Columns present. Diam. 5—14 mm. Columns small and spread over the whole surface. Equatorial chambers ogival and flattened in radial direction. B-form 18 mm.

O. tantoyucensis Vaughan et Cole.
Upper Eocene
(fig. 53, after Vaughan 1933, 20 ×.

Test lenticular.
Columns absent. Equatorial chambers lozengeshaped. Lateral chambers lenticular. Diam. 1—3 mm.

O. r. douvillei Lisson.
(syn.: L. peruviana Cushm., L. subglobosa Nuttall).
Upper Eocene
(fig. 54, after Todd et Barker 1932, 36 ×; fig. 55, after Todd et Barker 1932, 18½ ×).

[1]) See p. 227.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Columns present. Equatorial chambers rhomboid. Lateral chambers lenticular, open and with thick walls.

Columns small and spread over the whole surface. Diam. 1—5 mm.

O. trinitatis Douv.
(syn.: L. ariana Cole et Ponton,
L. atascaderensis Berry,
L. bontourana Hodson,
L. brightoni Berry,
L. carmani Berry,
L. columna Berry,
L.hieronymi Rutten et Vermunt = L. canellei Lem. et R. Douv. var. hieronymi Rutten et Vermunt,
L. hubbardi Hodson,
L. hubbardi Hodson var. aurarensis Hodson,
L. hubbardi Hodson var. bolivarensis Hodson,
L. kochi Hodson,
L. novitasensis Vaughan,
L. nuttalli Berry,
L. schotborghi Rutten et Vermunt,
L. sherwoodensis Vaughan,
L. trinitatis Douv. var. caribbeanensis Hodson,
L. trinitatis Douv. var. venezuelana Hodson,
L. vanslobbeni Rutten et Vermunt,
L. weeksi Hodson,
L. zuliana Hodson).
Eocene
(fig. 56 and 57, after Gorter et Van der Vlerk, 7½ ×; fig. 58, coll. Geol. Mus. Leiden, 15 ×; fig. 59, after Hodson 1926, 13 ×; fig. 60, after Hodson 1926, 25 ×; fig. 61, after Hodson 1926, 32 ×; fig. 62, after Hodson 1926, 25 ×).

Columns strongly developed and especially present in the central part. Equatorial chambers lozengeshaped.

O. pustulosa Douv.
Upper Eocene
(fig. 63 and 64, after Gorter et Van der Vlerk, 8 ×; fig. 65, after Todd et Barker 1932, 31 ×).

Test omphaloid.

Equatorial chambers lozengeshaped. Lateral chambers lenticular, small. Columns only developed in the central part.

Columns small.

Diam. 5—7 mm. Ratio diam. to thickness 3 to 4: 1.

O. macdonaldi Cushm.
Upper Eocene
(fig. 66, after Gravell, 13 ×); fig. 67, after Cushman 1920, 8 ×).

Equatorial chambers arcuate. Lateral chambers lenticular with open chambers.

Columns large.

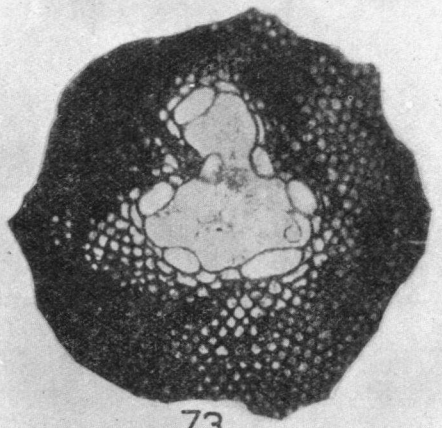
Diam. 1½—4 mm. Ratio diam. to thickness 1 to 2 : 1.

O. maracaibensis Hodson.
(syn.: L. r. douvillei Lisson var. armata Rutten = L. armata Rutten,
L. kugleri Gorter et v. d. Vl.).
Upper Eocene
(fig. 68, after Hodson 1926, 35 ×; fig. 69, after Hodson 1926, 33 ×).

2. PLIORBITOINA.

Test omphaloid. Equatorial chambers ogival. Lateral chambers lenticular ,small. Columns small and only developed in the central part.

O. tobleri Douv.
(syn.: L. panamensis Cushm.)
Eocene
(fig. 70, coll. Geol. Museum Leiden, 12 ×; fig. 71, after Nuttall 1928, 20 ×; fig. 72, after Rutten et Vermunt 1932, 13 ×; fig. 73, coll. Geol. Mus. Leiden, 20 ×).



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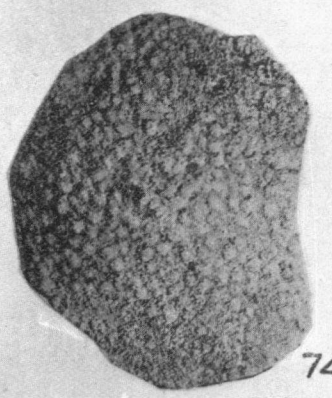

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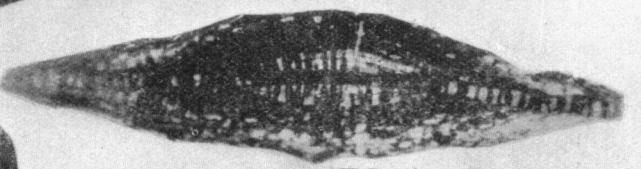

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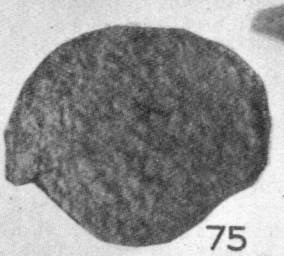

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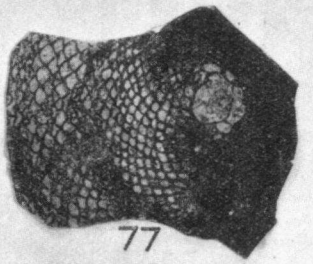

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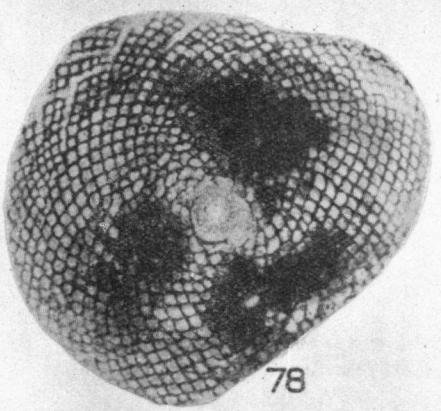

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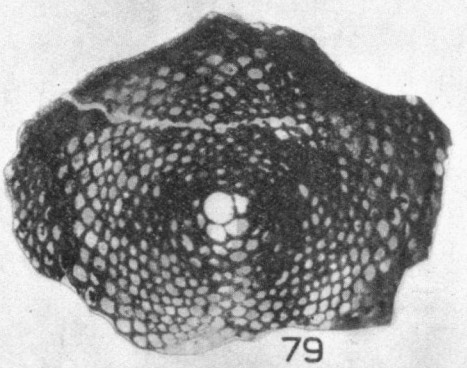

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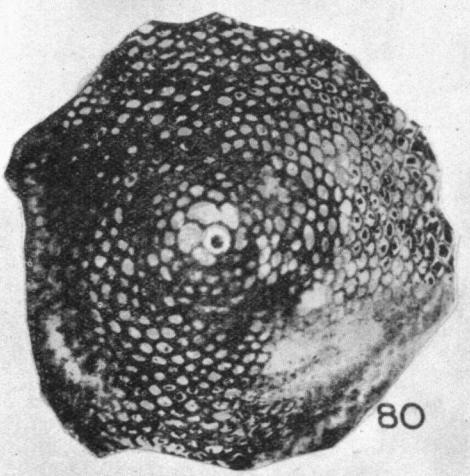

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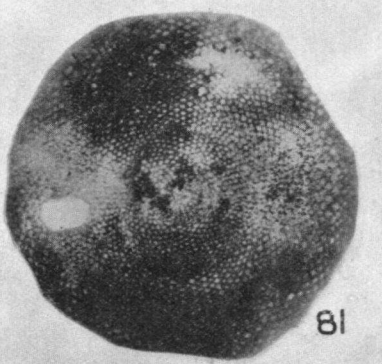

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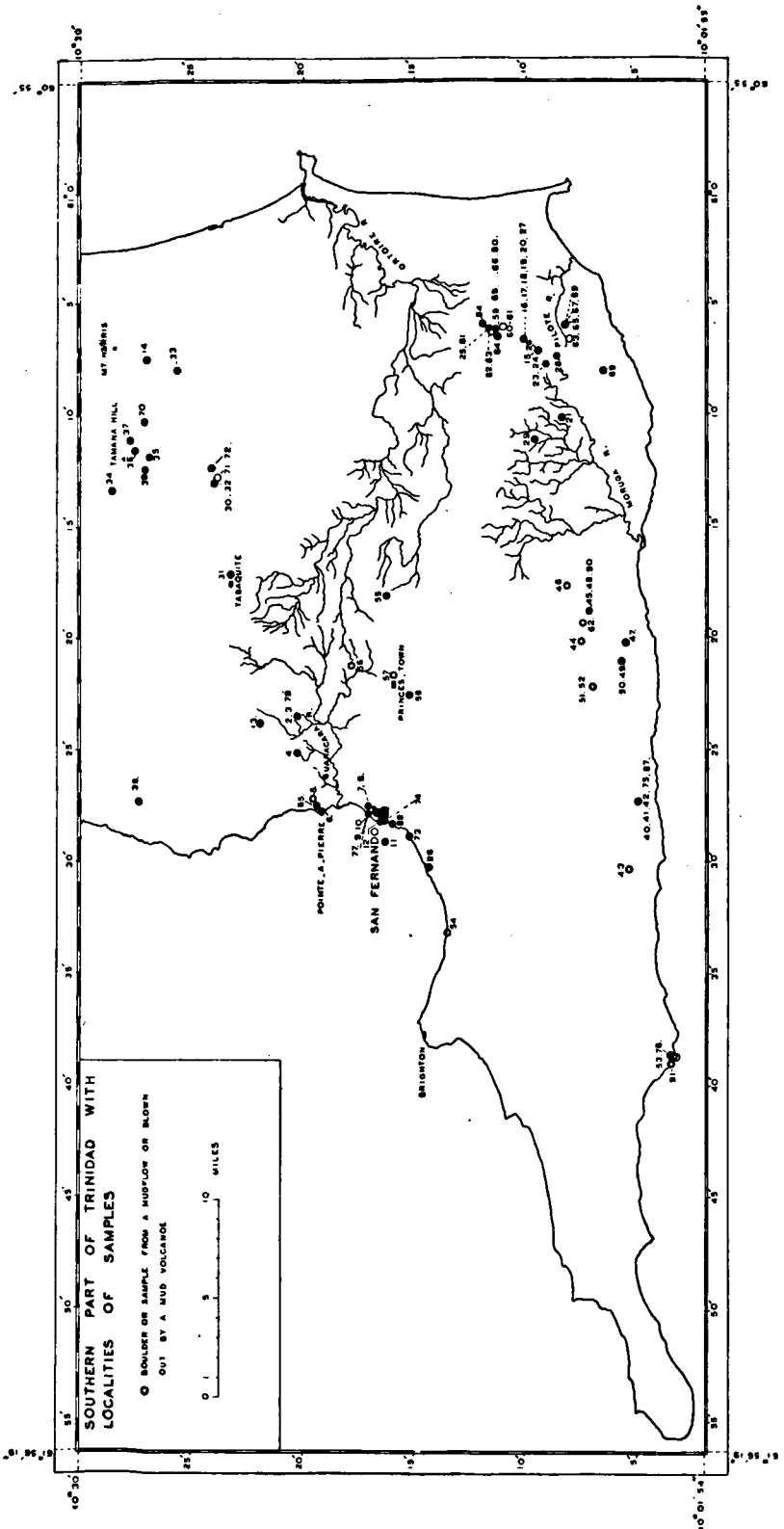
3. POLYORBITOINA.

Test lenticular. Diam. 2½—5 mm. Columns present. Equatorial chambers arcuate. Outer wall curved, inner wall pointed. Lateral chambers lenticular, with very thick walls and irregularly arranged. Diam. B-form 6—8 mm.

O. proteiformis Vaughan.
(syn.: L. gardnerae Cole)
Eocene
(fig. 74, after W. S. Cole 1929, × 8; fig. 75, after Vaughan 1923, × 10; fig. 76, after W. S. Cole 1929, × 15; fig. 77, after Vaughan 1923, × 15; fig. 78, after Vaughan 1923, × 15; fig. 79, after W. S. Cole 1929, × 20; fig. 80, after W. S. Cole 1929, × 28; fig. 81, after W. S. Cole 1929, × 7.


SOUTHERN PART OF TRINIDAD WITH LOCALITIES OF SAMPLES
BOULDER OR SAMPLE FROM A MUDFLOW OR BLOWN OUT BY A MUD VOLCANOE
0 5 10 MILES
SAN FERNANDO
PRINCES TOWN
POINTE-A-PIERRE
BRIGHTON
MT MORRIS
TABAQUITE
PILOTE
MORUGA

V. The samples from Trinidad.

1. The fossil contents of the samples.

1. Ben Lomont Hill. Tectonical wedge. N. 10. 17. 47. W. 61. 24. 20.
F. W. Penny, no. 390.
A light brown, highly fossiliferous limestone.
Larger Foraminifera: *Orbitoina (isorbitoina) trinitatis H. Douv., Discocyclina sp.*

2 and 3. Morne Roche Quarry. N. 10. 20. 15. W. 61. 23. 30.
F. W. Penny and P. W. Jarvis, no. A. 23.
A dark grey limestone with a red weathered crust.
Larger Foraminifera: *Orbitoina (isorbitoina) trinitatis H. Douv., Camerina sp., Discocyclina sp.*

4. Gasparillo Quarry. Guaracara limestone. N. 10. 20. 12. W. 61. 25. 7.
F. W. Penny and P. W. Jarvis.
An ochry yellow cavernous limestone.
No larger Foraminifera. Amphistegina sp. Operculina sp.

5. Bon Accord, block from a boulder bed. N. 10. 19. 30. W. 61. 27. 10.
A grey, somewhat cavernous limestone.
No Foraminifera.

6. Pointe a Pierre. No. 1. Reservoir. N. 10. 19. 7. W. 61. 27. 43.
F. W. Penny, no. P. 229.
A dark limestone.
Larger Foraminifera: *Discocyclina* sp.

7. Vistabella, San Fernando. N. 10. 17. 5. W. 61. 27. 30.
F. W. Penny, nos. 29 and 314.
A light brown limestone.
in 29: Larger Foraminifera: *Discocyclina* sp.
in 314: Larger Foraminifera: *Orbitoina (isorbitoina) trinitatis H. Douv., Orbitoina (isorbitoina) pustulosa Douv., Orbitoina (pliorbitoina) tobleri Douv., Orbitoina (isorbitoina) maracaibensis Hodson, Camerina sp., Discocyclina sp., Helicolepidina sp.*

8. Vistabella, San Fernando. N. 10. 17. 5. W. 61. 27. 30.
F. W. Penny, nos. 29 and 314.
Weathered material.
Larger Foraminifera: *Orbitoina (isorbitoina) trinitatis H. Douv.; Orbitoina (isorbitoina) maracaibensis Hodson; Orbitoina (isorbitoina) pustulosa Douv.; Orbitoina (Pliorbitoina) tobleri Douv.; Discocyclina sp.; Helicolepidina sp.*

9. Mount Moriah Sands, tanks north of San Fernando Railway Station.
N. 10. 17. 4. W. 61. 27. 52.
Only washed samples.

Larger Foraminifera: *Orbitoina (isorbitoina) trinitatis H. Douv.; Orbitoina (isorbitoina) tobleri Douv.; Discocyclina sp.; Helicolepidina sp.*

10. Blocks from approximately same locality as no. 9.
F. W. Penny, no. 304.
A dark grey limestone.
Larger Foraminifera: *Orbitoina (isorbitoina) maracaibensis Hodson; Orbitoina (isorbitoina) trinitatis H. Douv.; Orbitoina (pliorbitoina) tobleri Douv.; Discocyclina sp.*

11. Farallon Rock. Operculina limestone. N. 10. 16. 20. W. 61. 29. 7.
A limestone build up by *Operculina.*
Larger Foraminifera: *Orbitoina (isorbitoina) trinitatis H. Douv.*

12. Bontour Point, lens of marl in Mount Moriah Silts, about 150 feet north of N. 10. 16. 30. W. 61. 28. 15.
Larger Foraminifera: *Orbitoina (isorbitoina) trinitatis H. Douv.; Orbitoina (isorbitoina) pustulosa H. Douv.; Discocyclina sp. (stellate form); Helicolepidina sp.*

13. Hibernia, road just near Estate House. Montserrat Sands, high up in Brasso Series. Much higher than sample 4. N. 10. 21. 55. W. 61. 23. 48.
A brown *Operculinella*-bearing limestone.
No larger Foraminifera.

14. Cunapo Southern Road, stream west of 11¾ mile. About N. 10. 27. 45. W. 61. 7. 30.
A tuffoid calcareous sandstone without foraminifera.

15. Kapur Ridge, East of Zyndel's Trinidad locality 11; cf. no. 26.
A light brown limestone.
Larger Foraminifera: *Lepidocyclina (Eulepidina) undosa Cushman; Lepidocyclina (Eulepidina) formosa Schlumberger.*

16. Mapepire River, south of James Branch, Guayaguayare. Coll. Zyndel. Douvillé sample 9*b*.
A brownish limestone.
Larger Foraminifera: *Lepidocyclina (Lepidocyclina s.s.) canellei H. Douv.; Lepidocyclina (Nephrolepidina) cf. lehneri nov. spec.; Lepidocyclina (Eulepidina) formosa Schlumberger; Lepidocyclina (Eulepidina) undosa Cushman; Heterostegina sp.*

17. Mapepire River.
Lehner, no. 1410 (1923).
A light brown limestone.
Larger Foraminifera: *Lepidocyclina (Nephrolepidina) lehneri nov. spec.; Lepidocyclina (Eulepidina) formosa Schlumberger; Lepidocyclina (Eulepidina) undosa Cushman.*

18. Mapepire River, south of James Branch. Douvillé sample 9*a*. Zyndel.
    Grey glauconiferous limestone.
    Larger Foraminifera: *Lepidocyclina (Nephrol.) tournoueri, Lem. et Douv.; Lepidocyclina (Lepidocyclina s. s.) canellei H. Douv.; Lepidocyclina (Nephrolepidina) lehneri nov. spec.; Lepidocyclina (Eulepidina) dilatata Mich.; Lepidocyclina (Eulepidina) formosa Schlumberger; Heterostegina sp.*
19. Same as 18. Douvillé sample 9*c*.
    A grey limestone with some undeterminable species of *Lepidocyclina, Carpenteria, Globigerina, Rotalia, Textularia,* etc.
20. Mapepire River, N.E. branch.
    Larger Foraminifera: *Lepidocyclina (Lepidocyclina s.s.) canellei H. Douv.; Lepidocyclina (Nephrolepidina) tournoueri Lem. et Douv.; Lepidocyclina (Eulepidina) undosa Cushman; Lepidocyclina (Eulepidina) formosa Schlumberger.*
21. Blacksoil River, Jacks branch.
    Zyndel. Douvillé sample no. 7.
    A grey limestone.
    Larger Foraminifera: *Lepidocyclina (Nephrolepidina) tournoueri Lem. et Douv.; Lepidocyclina (Eulepidina) sp.; Miogypsina sp.*
22. Guayaguayare Road, 60 chains east of 9⅛th mile.
    Parkinson.
    A foraminiferal lumachelle.
    Larger Foraminifera: *Lepidocyclina (Nephrolepidina) fragilis Cushman; Lepidocyclina (Nephrolepidina) verbeeki Newton et Holland; Lepidocyclina (Nephrolepidina) lehneri nov. spec.; Lepidocyclina (Nephrolepidina) tournoueri Lem. et Douv.; Lepidocyclina (Eulepidina) sp.*
23. Logeon River, western branch of N. 10. 9. 4. W. 61. 7. 42.
    A dark grey limestone.
    Larger Foraminifera: *Lepidocyclina (Eulepidina) undosa Cushman; Lepidocyclina (Lepidocyclina s.s.) canellei H. Douv.; Lepidocyclina (Nephrolepidina) verbeeki Newton et Holland; Lepidocyclina (Nephrolepidina) lehneri nov. sp.; Heterostegina sp.*
24. Idem.
    Lehner, 1922.
    A light brown limestone.
    Larger Foraminifera: *Lepidocyclina(Eulepidina)formosa Schlumberger; Lepidocyclina (Nephrolepidina) sp.*

25. Lizard anticline. N. 10. 11. 35. W. 61. 6. 5.
Maerky, no. S. 99.
A greyish brown limestone.
No larger Foraminifera.

26. East of Kapur Ridge, cf. no. 15.
Zyndel. Douvillé sample no. 11.
A greyish limestone foraminiferal lumachelle.
Larger Foraminifera: *Lepidocyclina (Lepidocyclina s.s.) canellei H. Douv.; Lepidocyclina (Nephrolepidina) morgani H. Douv.; Lepidocyclina (Eulepidina) formosa Schlumberger.*

27. Head of Mapepire River.
E. Lehner, nos. 1399—1401 (1923).
A dark grey limestone.
Larger Foraminifera: *Lepidocyclina (Lepidocyclina) canellei H. Douv.; Lepidocyclina (Nephrolepidina) tournoueri Lem. et Douv.; Lepidocyclina (Eulepidina) formosa Schlumberger; Lepidocyclina (Nephrolepidina) lehneri nov. spec.; Heterostegina sp.*

28. Head of Petit Pilote River.
Zyndel. Douvillé sample no. 8.
A grey limestone.
Larger Foraminifera: *Lepidocyclina (Nephrolepidina) lehneri nov. spec.; Lepidocyclina (Nephrolepidina) morgani H. Douv.; Lepidocyclina (Nephrolepidina) verbeeki Newton et Holland; Lepidocyclina (Eulepidina) formosa Schlumberger; Lepidocyclina (Eulepidina) undosa Cushman.*

29. S.E. Corner of Cats Hill Reserve. N. 10. 9. 35. W. 61. 11. 10.
A yellow limestone.
Larger Foraminifera: *Miogypsina sp.*
a fragment of a *Lepidocyclina.*

30. Boussignac Limestone. N. 10. 24. 00. W. 61. 13. 4.
Larger Foraminifera: *Orbitoina (pliorbitoina) tobleri H. Douv.; Orbitoina (isorbitoina) pustulosa H. Douv.; Discocyclina sp.*

31. Baccus River, South of Tabaquite Nariva Road. Guaracare Limestone.
N. 10. 23. 15. W. 61. 17. 12.
F. W. Penny no. 289.
A light greyish limestone.
Larger Foraminifera: *Miogypsina sp.; Lepidocyclina (Nephrolepidina) lehneri nov. sp.*

32. Boussignac. Silts associated with sample 30.
A marl.

Larger Foraminifera: stellate forms of *Discocyclina, Orbitoina (pliorbitoina) tobleri H. Douv.; Orbitoina (isorbitoina) trinitatis H. Douv.; Orbitoina (isorbitoina) pustulosa Douv.; Helicolepidina spiralis Tobler.*

33. Biche Village Quarry. Tamana Limestone. Coordinates for Biche Village: approx. N. 10. 25. 40. W. 61. 7. 65.
F. W. Penny no. 269.
A light brown limestone.
Without any larger foraminifera. Operculina sp.

34. Cumuto Road, 17th mile. Old Quarry. N. 10. 28. 30. W. 61. 13. 25.
F. W. Penny no. 86.
(lower Miocene: W. C. Mansfield).
A brown limestone.
Without any larger Foraminifera.

35. 14½ Mile on Guaico-Tamana Road. Tamana Limestone or Brasso Limestone. N. 10. 26. 52. W. 61. 11. 51.
F. W. Penny no. 82.
A dark grey limestone.
Without any larger Foraminifera. Operculina sp.

36. Guaico-Tamana Road, 13⅝th mile. *Operculina* Limestone. N. 10. 27. 30. W. 61. 11. 37.
F. W. Penny no. 81.
A light brown Operculina-limestone.
Without any larger Foraminifera.

37. Guaico-Tamana-Road, 12¾ miles. *Amphistegina*-Limestone. N. 10. 27. 45. W. 61. 11. 10.
A light brown *Amphistegina* limestone. No larger Foraminifera.

38. Cumuto Road, 19¾ mile. N. 10. 27. 5. W. 61. 12. 28.
F. W. Penny no. 84.
A red limestone.
Without any larger Foraminifera.

39. Machapooree Quarry. *Amphistegina* Limestone. N. 10. 27. 22. W. 61. 27. 20.
A yellow *Amphistegina*-limestone.
Without any larger Foraminifera.

40. Morne Diablo Quarry, hard rock. N. 10. 5. 0. W. 61. 27. 20.
F. W. Penny no. 97.
A light greyish yellow limestone.
Larger Foraminifera: *Miogypsina sp.; Lepidocyclina (Nephrolepidina) morgani H. Douv.; Lepidocyclina (Lepidocyclina s.s.) supera Conrad.*

41. idem, washing from bed „2".
Larger Foraminifera: *Lepidocyclina (Lepidocyclina s.s.) canellei H. Douv.; Lepidocyclina (Nephrolepidina) tournoueri Lem. et Douv.; Lepidocyclina (Lepidocyclina) supera Conrad; Miogypsina sp.*

42. idem, washing from bed „4''.
Larger Foraminifera: *Lepidocyclina (Lepidocyclina s.s.) canellei H.Douv.; Lepidocyclina(Lepidocyclina s.s.) giraudi R. Douv.; Lepidocyclina (Lepidocyclina s.s.) supera Conrad; Miogypsina sp.*

43. Coora Road, 7¼ mile. Boulder in stream east of road. Probably from a mudflow. About N. 10. 5. 22. W. 61. 30. 20.
F. Penny no. 256.
A dark grey limestone.
Larger Foraminifera: Only *Miogypsina.*

44. Head of Moriquite River. Blocks in Ravine. Probably from a mudflow. About N. 10. 7. 30. W. 61. 20. 10.
F. W. Penny no. 123.
Larger Foraminifera: *Lepidocyclina (Nephrolepidina) morgani H. Douv.; Lepidocyclina (Lepidocyclina s.s.) supera Conrad.*

45. Meijas (Cunin) Quarry. N. 10. 7. 10. W. 61. 18. 50.
A light yellow limestone.
Larger Foraminifera: *Lepidocyclina (Lepidocyclina s.s.) canellei H. Douv.; Lepidocyclina (Eulepidina) undosa Cushman.*

46. Cortez Trace, Boulder in stream. Probably from a mudflow. N. 10. T. 7. W. 61. 17. 42.
F. W. Penny no. 125.
Larger Foraminifera: *Lepidocyclina(Eulepidina)formosa Schlumberger; Lepidocyclina (Eulepidina) undosa Cushman; Lepidocyclina (Nephrolepidina) lehneri nov. spec.*

47. Head of la Lune River. Zyndel locality no. 4. Probably N. 10. 5. 30. W. 61. 20. 15.
A yellow limestone.
Larger Foraminifera: *Lepidocyclina(Eulepidina)formosa Schlumberger; Lepidocyclina (Eulepidina) undosa Cushman.*

48. Same as 45, loose orbitoids washed from detritus.
Larger Foraminifera: *Lepidocyclina (Eulepidina) undosa Cushman; Lepidocyclina (Lepidocyclina s.s.) matleyi Vaughan; Heterostegina sp.*

49. Marac Quarry, fresh limestone. N. 10. 5. 40. W. 61. 21. 5.
A dark grey limestone.
Only a fragment of a *lepidocyclina.* No determinable larger foraminifera.

50. idem. Orbitoidal lens in shales adjacent to limestones.
Larger Foraminifera: *Miogypsina sp.; Lepidocyclina (Nephrolepidina) dartoni Vaughan; Lepidocyclina (Nephrolepidina) tournoueri Lem. et Douv.; Lepidocyclina (Eulepidina) undosa Cushman.*

51. Karamat Mudvolcanoe, limestones blown out. N. 10. 7. 0. W. 61. 22. 11.
Larger Foraminifera: *Heterostegina sp.; Lepidocyclina (Nephrolepidina) verbeeki Newton et Holland; Lepidocyclina (Nephrolepidina) lehneri nov. spec.; Lepidocyclina (Nephrolepidina) tournoueri Lem. et Douv.; Lepidocyclina (Lepidocyclina) canellei H. Douv.*

52. idem, loose orbitoids picked from mud.
Larger Foraminifera: *Lepidocyclina (Nephrolepidina) tournoueri Lem. et Douv.; Lepidocyclina (Eulepidina) undosa Cushman; Lepidocyclina (Eulepidina) formosa Schlumberger.*

53. Erin Point, blown out by mud volcano. N. 10. 02. 15. W. 61. 38. 43.
A dark grey limestone.
Larger Foraminifera: *Lepidocyclina (Nephrolepidina-Trybliolepidina) transiens Umbgrove; Lepidocyclina (Eulepidina) formosa Schlumberger; Heterostegina sp.*

54. Aripero Coast, loose blocks. ? locality mentioned by Douvillé? Zyndel. About N. 10. 13. 35. W. 61. 33. 10.
Larger Foraminifera: Only *Discocyclina sp.* No *Orbitoina, Camerina sp.*

55. Adivinanza Quarry. *Amphistegina* Rock. N. 10. 16. 15. W. 61.18. 10.
F. W. Penny no. 153.
A brown cavernous limestone.
No larger Foraminifera.

56. Brothers Estate, weathered clay (mudflow?) from Pit on this estate. Estate situated around N. 10. 17. 50. W. 61. 21. 15.
F. W. Penny no. 151.
Larger Foraminifera: *Lepidocyclina (Eulepidina) undosa Cushman; Lepidocyclina (Lepidocyclina s.s.) parvula Cushman; Lepidocyclina (Lepidocyclina s.s.) canellei H. Douv.*

57. Craignish Trig. Station. Boulder on Hill, probably near situ. N. 10. 15. 53. W. 61. 21. 40.
F. W. Penny no. 171.
A light yellow cavernous limestone.
No larger Foraminifera.

58. Lothians Quarry. N. 10. 15. 13. W. 61. 22. 33.
A light yellow cavernous limestone.
No larger Foraminifera.

59. Lizard Springs. N. 10. 11. 18. W. 61. 6. 10.
Maerky no. 104.
A dark brown limestone.
Larger Foraminifera: *Lepidocyclina(Eulepidina)formosa Schlumberger; Miogypsina sp.; Lepidocyclina (Lepidocyclina s.s.) canellei H. Douv.*

60. Lizard Springs. Puddingstone. Boulder probably from mudflows. Lehner no. 951.
    A dark grey limestone.
    Larger Foraminifera: *Camerina sp.; Discocyclina sp.*
61. Lizard Springs. Supposedly cretaceous clay containing orbitoidal forms.
    Mearky no. 102, III.
    Larger Foraminifera: *Discocyclina sp.; Camerina sp.*
62. Moruga River. Block in mudflow.
    Lehner no. 581 (1926).
    A dark grey limestone.
    Larger Foraminifera: *Lepidocyclina (Eulepidina) dilatata Mich.; Lepidocyclina (Eulepidina) formosa Schlumb.; Lepidocyclina sp.*
63. Guayaguayare. Probably from mudflow.
    Lehner no. 1158.
    A light brown limestone.
    Larger Foraminifera: *Miogypsina sp.; Lepidocyclina (Nephrolepidina) morgani Lem. et Douv.; Lepidocyclina sp.; Lepidocyclina (Lepidocyclina s.s.) canellei Lem. et Douv.*
64. Lizard Springs. Ravin Ampelu.
    Lehner nos. 427 and 428.
    A dark brown limestone.
    Larger Foraminifera: *Lepidocyclina (Lepidocyclina s.s.) canellei Lem. et Douv.; Miogypsina sp.; ? Camerina sp.*
65. Guayaguayare.
    Lehner no. 955.
    Two stones:
    1e. A brownish ochry limestone.
    Larger Foraminifera: *Miogypsina sp.; Lepidocyclina (Lepidocyclina s.s.) canellei H. Douv.; ? Camerina sp.*
    2e. A grey limestone.
    Larger Foraminifera: *Camerina sp.; Discocyclina sp.*
66. Lizard Springs.
    Lehner no. 747 (1924).
    A red limestone.
    Larger Foraminifera: *Orbitoina (pliorbitoina) tobleri H. Douv.; Lepidocyclina sp.*
67. Guayaguayare.
    Lehner no. 1074.
    A dark grey limestone.
    Larger Foraminifera: *Camerina sp.; Discocyclina sp.*
68. Lizard Springs. Little stream north of 1¼ mile on Duckham Road.
    Lehner no. 586.
    A brown limestone.

Larger Foraminifera: *Camerina sp.; Discocyclina sp.; Orbitoina (isorbitoina) trinitatis H. Douv.; Orbitoina (isorbitoina) meinzeri Vaughan.*

69. Guayaguayare.
Lehner no. 956.
A dark grey silicified limestone.
Larger Foraminifera: *Discocyclina sp.; Camerina sp.; Orbitoina (isorbitoina) trinitatis H. Douv.*

70. Cunapo River. Blocks. Probably about N. 10. 27. 3. W. 61. 10. 20.
F. W. Penny no. 493.
Sample absent.

71. Boussignac, near wells L and M. Exact locality not known, probably not the same as sample no. 30, erratic.
A brownish limestone.
Larger Foraminifera: *Heterostegina sp.; Lepidocyclina (Lepidocyclina s.s.) canellei H. Douv.; Lepidocyclina (Nephrolepidina) lehneri nov. spec.*

72. Head of Cush River.
F. W. Penny no. 288.
A grey limestone.
No larger Foraminifera.

73. Foram. Mount No. 62. *Heterostegina* from Alley Creek Shell Bed. N. 10. 15. 20. W. 61. 29. 00.
A dark brown limestone.
Larger Foraminfera: *Miogypsina sp.; Heterostegina sp.*

74. Top of Cliff south of Bontour Point. Probably same as Jarvis Cipero Section 11. Foram. Mount 8. N. 10. 16. 20. W. 61. 28. 20.
A light brown marl.
Larger Foraminifera: *Orbitoina (pliorbitoina) tobleri H. Douv.; Discocyclina sp.*

75. Scree from Morne Diablo, same as no. 40.
P. W. Jarvis.
A yellow marl.
Larger Foraminifera: *Lepidocyclina (Lepidocyclina s.s.) supera Conrad; Lepidocyclina (Eulepidina) formosa Schlumberger; Miogypsina sp.*

76. Picked material from Vistabella. Same as 7 and 8 picked by Jarvis.
Sample absent.

77. Mount Moriah silts from Railway Tank Site at San Fernando. Same as no. 9, picked foram. mount no. 3.
A light brown marl.
Larger Foraminifera: *Orbitoina (pliorbitoina) tobleri H. Douv.; Discocyclina stellata.*

78. „Erin Point'' (cf. no. 53). Collected from a reef visible only at low tide and said to be in situ.
C. C. Wilson.

1e. A dark grey limestone.
No larger Foraminifera.

2e. „Erin Point", „Punta Blanca" Duplicate sample.
Larger Foraminifera: *Lepidocyclina (Nephrolepidina) tournoueri Lem. et Douv.; Lepidocyclina (Lepidocyclina s.s.) matleyi Vaughan; Lepidocyclina sp.; Lepidocyclina (Eulepidina) formosa Schlumberger; Heterostegina sp.*

79. Morne Roche (cf. samples 2 and 3); sandy clay overlying orbitoidal rock.
No larger Foraminifera.

80. Lizard Springs. LS. 104. Same as no. 59.
A dark grey limestone.
Larger Foraminifera: *Lepidocyclina(Eulepidina)formosa Schlumberger; Lepidocyclina (Lepidocyclina s.s.) canellei H. Douv.; Miogypsina sp.; Camerina sp.*

81. Lizard Springs. LS. 99. Same as no. 25.
A brownish limestone.
Larger Foraminifera: *Discocyclina sp.*

82. Lizard Springs. LS 95. N. 10. 11. 30. W. 61. 6. 14.
Glauconit brecci.
No larger Foraminifera.

83. Lizard Springs. LS 62. N. 10. 11. 30. W. 61. 6. 17.
A dark grey brownish limestone.
No larger Foraminifera.

84. Lizard Springs. LS. 78. N. 10. 11. 54. W. 61. 5. 55.
A brown limestone.
Larger Foraminifera: *Lepidocyclina (Nephrolepidina) tournoueri H. Douv.; Lepidocyclina sp.*

85. Pointe a Pierre, Railway Station. N. 10. 19. 19. W. 61. 27. 27.
Oolithic limestone, weathering red and looking like grit.
No larger Foraminifera.

86. Orbitoidal limestone (presumably of old eocene age) as boulder in the Plaisance Conglomerate (believed to be about Jacksonian). Hermitage Quarry „c".
No larger Foraminifera.

87. Morne Diablo Quarry cf. Nos. 40—42, 75.
H. G. Kugler no. 2638.
A white limestone.
Larger Foraminifera: *Miogypsina sp.; Lepidocyclina (Lepidocyclina s.s.) canellei H. Douv.*

88. Block of Orbitoidal Limestone, 200 feet north of Bontour Point, San Fernando.
A partly crystallized reef-limestone.

Larger Foraminifera: *Discocyclina sp.; Orbitoina (pliorbitoina) tobleri H. Douv.; Orbitoina (isorbitoina) sp.*

89. Guayaguayare. La Bouée River, Pit Muehlemann 1337.
A yellow limestone.
Larger Foraminifera: *Orbitoina (isorbitoina) trinitatis H. Douv.; Orbitoina (pliorbitoina) tobleri H. Douv.; Orbitoina (isorbitoina) macdonaldi; Orbitoina (isorbitoina) supera Conrad; Discocyclina sp.; Helicolepidina sp.*

90. Meijas Quarry cf. no. 45 and 48.
H. G. Kugler no. 2292.
A dark brown orbitoidal limestone.
Larger Foraminifera: *Lepidocyclina (Lepidocyclina s.s.) canellei H. Douv.; Lepidocyclina (nephrolepidina) lehneri nov. spec.; Lepidocyclina(Eulepidina) sp.; Miogypsina sp.; Heterostegina sp.*

91. Erratic lumps of glauconite Orthophragmina Limestone, contained in the reef of orbitoidal marlstone, sent previously as no. 78. Erin, Punta Blanca.
At the outside of the stone: Oligocene Orbitoids: *Lepidocyclina (nephrolepidina) tournoueri Lem. et Douv.; Lepidocyclina (Eulepidina) sp.*
In the centre of the stone: *Discocyclina sp.*

2. Conclusions on the age of the samples from Trinidad.

Eocene: 1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 25, 30, 32 (cretaceous?), 54 (cretaceous?), 60 (cretaceous?), 61 partly, 65, 66, 67, 68, 69, 74, 88 partly, 91.

Oligocene: 15, 16, 17, 18, ? 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 31, 40, 41, 42, 43, 44, 45, 46, 47, 48, ? 49, 50, 51, 52, 53, 56, 59, 62, 63, 64, partly 65, 71, 73, 75, partly 78, 80, ? 84, 87, 90, partly 91.

Miocene: 4, 13, 14, 33, ? 34, 35, 36, 37, ? 38, 39, 55, ? 57, ? 58, 79.

No larger Foraminifera: 5, 25, 72, 81, 82, 83, 85, 86.

3. Description of the new species:

Lepidocyclina (Nephrolepidina) lehneri nov. spec.

(see the figures 14 and 15).

Syn. L. sumatrensis (non Brady) J. A. Cushman, Prof. Pap. 125-D, 1920 p. 76, Pl. XXXIII, fig. 10—11.
R. E. Koch, Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 52.
L. M. R. Rutten, Proc. K. A. v. W., vol. XXXI, no. 10, 1928, p. 1062.

Test lenticular, surface no papillate. Diameter of the megalospheric form 1—2.5 mm., thickness about 0.4—1 mm.

The equatorial section shows the embryonic chambers, who are of nephrolepidine type. The diameter of the embryonic apparatus, measured across both chambers, is 0.9 mm.; the thickness of the chamberwall is 0.05 mm. The median chambers are hexagonal, and arranged in circles. The median chambers in the vertical section are quadrangular; they increase gradually in size from the centre to the periphery.

The lateral chambers are rectangular, and arranged in vertical rows. On both sides of the median layer lie about 10—12 lateral chambers; the ratio of length to thickness is in the middle of the test about 2:1; towards the edge never less then 1:1. The chambers are 30—40μ high and 60—100 μ long. No pillars are present.

Locality: Trinidad. Mapepire river 17 and 18;
Gayaguayare Road 22;
Logeon River 23;
Head of Petit Pilote River 28;
Baccus River 31;
Cortez trace 46;
Karamat Mudvolcanoe 51;
Boussignac limestone 71;

Geological Horizon: Oligocene.