Geology. — *On Tertiary Foraminifera from Curaçoa.* By L. RUTTEN.

(Communicated at the meeting of November 24, 1928)

The material to be described in this paper, was collected in the year 1921 by the engineer G. MOLENGRAAFF in the island of Curaçoa, and was kindly subjected to our examination. It was taken from the Seru di Cueba, a hill 90 m high in the north of the island [1]). According to MOLENGRAAFF's information the nucleus of this hill consists of diabase, overlain by almost horizontal tertiary limestones, whose thickness — judging from a profile in my possession — may amount to about 40 m. On the north side of the Seru di Cueba these limestones are overlain by quaternary limestones, separated locally by a thin basal conglomerate from the Tertiary. The quaternary limestones incline very slowly seaward. The rocks to be described here have been taken from the southern slope of the Seru di Cueba; a number of detached fossils are derived from the south-, and the east slope; some boulders from the quaternary conglomerate were collected on the north side of the hill.

Some months ago an essay was published by R. KOCH [2]), who also occupies himself with tertiary foraminifera from Curaçoa. In this essay the author describes material collected by Dr. STAUFFER and MOLENGRAAFF on the "Seru Kenepa". According to information obtained from Mr. MOLENGRAAFF there is a mistake here: the Seru Kenepa, situated 3 km to the south of Seru di Cueba consists entirely of diabase, while KOCH's material has been taken from the Seru di Cueba, just as mine has, but it has been collected on the western slope of the hill. There would be very little inducement to publish the result of the examination of MOLENGRAAFF's material, if not considerable differences had appeared to exist between the limestones, examined by KOCH and those studied by me. These differences imply that various levels of the Old Tertiary seem to occur in the Seru di Cueba.

The material studied by KOCH contained besides entirely indifferent foraminifera and lithothamnia numerous Operculina and Alveolina, an occasional, very small nummulite, a few fragments of Orthophragmina (Discocyclina) and many Lepidocyclines. It is especially the latter that were examined more closely by the writer and that helped him in determining the

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[1]) Topographical map of Curaçao. 1 : 20000. Sheet III.

[2]) R. KOCH, Tertiärer Foraminiferenkalk von der Insel Curaçao, Ned. West Indien Eclogae geologicae Helvetiae. **21**, 1928, p. 51—56. T. III.

age of the sediments. We shall have to take account of the results. KOCH has succeeded in determining the following species :

Polylepidina sp.	common.
Pliolepidina panamensis Cushm.	very common.
Isolepidina cf. Raulini Lem. et Douv.	rare.
Isolepidina Macdonaldi Cushm.	very common.
Isolepidina trinitatis Douv.	common.
Isolepidina pustulosa Douv.	common.
Isolepidina cf. Hubbardi Hodson.	rare.
Nephrolepidina Tournoueri Lem. et Douv.	rare.
Nephrolepidina Morgani Lem. et Douv.	rare.
Nephrolepidina sumatrensis Brady	common.
Nephrolepidina yurnagunensis Cushm.	common.
Lepidocyclina (subgen. ind.) curasavica n.s.	the most common form.
Lepidocyclina sp. sp.	

It stands to reason that Lep. curasavica cannot be used as an index for age determination. I also wish to leave out of consideration the two species, whose determination is not quite definite, viz. Isolepidina cf. Raulini and Isolepidina cf. Hubbardi, which moreover are of rare occurrence. As to the first, there must be a mistake, for Lepidocyclina Raulini belongs to Eulepidina, not to Isolepidina. Of the remaining species we may say what follows :

Polylepidina sp. So far as I know all the Polylepidinae described to this day originate from the Eocene [1]).

Pliolepidina panamensis Cushman. T. WAYLAND VAUGHAN [1]) reports of this species that it "is probably eocene, may be oligocene" (l.c. pl. 33, fig. 1).

Isolepidina Macdonaldi Cushman is according to VAUGHAN (l.c.) typical of the Eocene of Panama.

Isolepidina Trinitatis H. Douv. Originally this species is referred to Oligocene. But in the latter years it is regarded as being of Eocene age by H. DOUVILLÉ [2]) as well as by VAUGHAN (l.c.).

Isolepidina pustulose H. Douv. Referred with some reserve by H. DOUVILLÉ (l.c.) to the Eocene ; by VAUGHAN without reserve (l.c.).

Nephrolepidina Tournoueri Lem. et Douv. known from the Oligocene of E. Mexico (VAUGHAN l.c.) and from the Oligomiocene of Trinidad (H. DOUVILLÉ l.c.).

Nephrolepidina Morgani Lem. et Douv. known from the Oligocene of Cuba and Mexico (VAUGHAN l.c.).

Nephrolepidina sumatrensis Brady. According to CUSHMAN [3]) this form belongs to the Oligocene of Cuba. However, the pictures he gives are by no means typical. They do not show at all that the form he reproduces are really N. Sumatrensis. With this reserve we must also accept KOCH's specific determination.

Nephrolepidina yurnagunensis Cushman is mentioned from the Oligocene of Cuba.

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[1]) T. WAYLAND VAUGHAN, American and European tertiary larger Foraminifera. Proc. Palaeont. Society, reprinted from the Bull. Geol. Soc. America. **35**, 1924, p. 785—822. pls. 30—36.

[2]) H. DOUVILLÉ, Mém. Soc. géol. de France, Nouvelle série I, **2**, 1924.

[3]) J. CUSHMAN, Un. States Geol. Survey. Professional paper 125 D, 1920.

So, when all comes to all, in the rocks of KOCH a number of Polylepidinae and Isolepidinae that point to Eocene, occur together with Nephrolepidinae that suggest Oligocene. From this KOCH concludes :

"Das Alter des Foraminiferenkalkes..... ist durch das Auftreten mehrerer typischer Oligocänlepidocyclinen als Oligocän bestimmt."

This conclusion looks decisive, but it is liable to objection, since besides "typische Oligocänlepidocyclinen" also "typische Eocänlepidocyclinen" occur.

Now, the rocks examined by me have quite a different fauna, which will be seen first of all from a short description.

G. 574. 1928. D. 10606 [1]) is a rock very rich in Lithothamnium, coarsely porous, without clastic material. The Lithothamnia are very fine-meshed. Unmistakable remains of very small megalospherical Nummulites occur, of which three specimens have the following measures :

N°. 1. diam. 1 mm thickness 0.4 mm embryonal chamber interior 0.175 mm ? 3 whorls.
N°. 2. diam. 1½ mm thickness 0.8 mm embryonal chamber interior 0.16 mm ? 5 whorls.
N°. 3. diam. 1 mm thickness 0.8 mm embryonal chamber interior 0.1 mm 3 whorls.

These three specimens agree well inter se ; but the material is not sufficient to make a specific determination. The only species known with which the fossils may possibly be compared is Numm. variolarius Sow. from the Upper Eocene.

G. 575. 1928. (large, unnumbered section). Light ochre limestone with numberless inflated lepidocyclines with a diameter of from 3—5 mm, partly megalospherical. Under the microscope we see besides very numerous, extremely fine-meshed Lithothamnia, a rare small nummulite and sparse echinid-rests, and a large number of lepidocyclines. The largest are 8 mm in diameter, and are microspherical. Most of them are megalospherical and have a diameter of from 2½—5 mm. All the well-preserved specimens are strongly inflated and have distinct columns, which, however, are few and far between. Where they are visible the initial chambers are isolepidine, with a diameter of about 0.5 mm (fig. 1—5). All these features fairly agree with those of Isolepidina Trinitatis H. Douv.

G. 576. 1928. D. 10607, 10618—10622. Rounded fragment of an ochre limestone with numerous close-meshed Lithothamnia, with Lepidocyclines and Operculina and with sparse Textularidae and Rotalidae, a rare small Nummulite and possibly a Carpenteria. The Lepidocyclines belong to various species. May be there occur a few specimens of Isolepidina Trinitatis. The bulk of the fossils may be classed with two species. In the first place we find flat, small Lepidocyclines with a diameter of less than 3½ mm and a thickness of less than 0.6 mm. There occur sparse, irregular papillae. The number of layers of lateral chambers is mostly 3—4 in the middle, sometimes, but rarely 5 or 6 ; towards the borders this number dwindles down to 0. The embryonal apparatus seems to be variable ; it may have a large diameter. I have never been so fortunate as to obtain a satisfactory horizontal section of the embryonal apparatus in my preparations, so that I do not know to which subgenus of Lepidocyclina the fossils belong. However they generally agree fairly well with Lep. (Polylepidina) proteiformis Vaughan from the Eocene of Mexico (fig. 10—16 and Plate Fig. E).

The second species is very small and considerably inflated, the horizontal diameter is only 2—3 mm. We did not find a beautiful horizontal-median section, but the embryonal

[1]) The number with the date refer to the annual catalogue of the Geol. Inst. of Utrecht, the number with "D" refer to the collection of slides.

apparatus is decidedly pliolepidine (fig. 26—33, Pl. fig. C). All the characteristics agree well with Pliolepidina Tobleri H. Douv. from the Upper Eocene of Trinidad.

G. 577. 1928. D. 10608. Rounded white Lepidocyclina-Lithothamnium-limestone, possibly

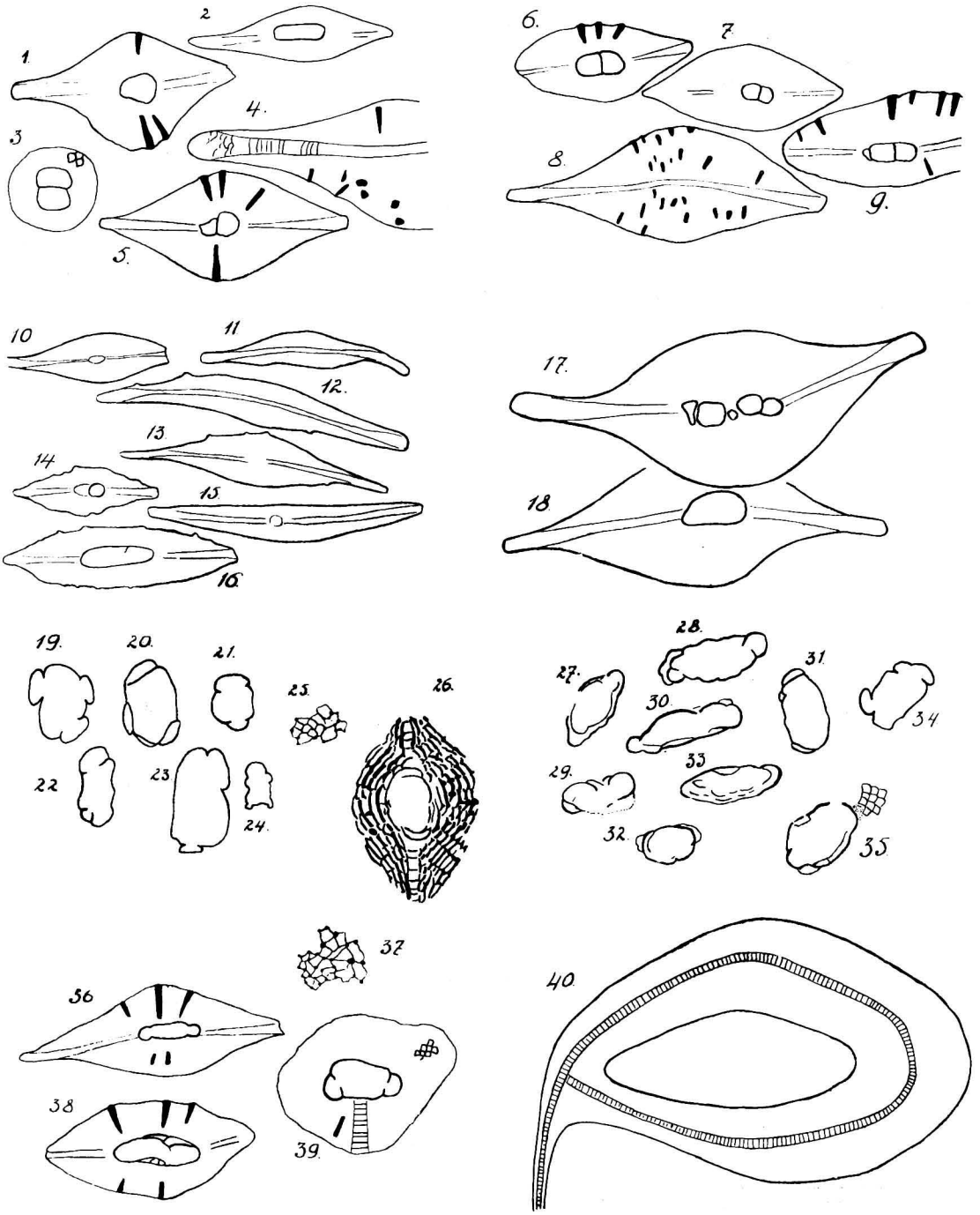

Fig. 1—40

with Nummulites. At least three species of Lepidocyclines occur: 1. Pliolepidina Tobleri H. Douv. (fig. 35); 2. a very flat species; 3. a columnless or nearly columnless, highly inflated species with a diameter of less than 5½ mm, a maximal thickness of 1.6 mm, with 10—12 layers of lateral chambers, and with an irregular embryonal apparatus (fig. 17, 18). I cannot give a specific determination of this species.

G. 578, 1928, D. 10609, 10623, 10624. Rounded fragment of a porous, yellowish white lepidocyclina-lithothamnium-limestone with sparse nummulites and textularids. So far as can be ascertained all the Lepidocyclines belong to Pliolepidina. Some of them very much resemble the Pliolepidina of the preceding rocks (fig. 34). Others are somewhat larger (diameter 2—3, sometimes 5 mm, thickness 1—1.2 mm); they possess more distinct columns, and have 7—10 layers of lateral chambers (fig. 36—39). These differences, however, are not large enough, to warrant a complete separation from Pliolepidina Tobleri. Probably we have to do with a varietal form of Pliolepidina Tobleri.

G. 579. 1928. D. 10610. A yellow-specked, porous limestone with ill-preserved Lepidocyclines, Lithothamnia and Operculina. Different species of Lepidocyclina occur in the rock, of which I could determine only Pliolepidina Tobleri with certainty.

G. 580. 1928. D. 10611—10617. 10625, 10626. White crumbling limestone with Lepidocyclinae, Lithothamnia and Operculina. Different species of Lepidocyclina occur daceae. A number of small Lepidocyclinae could be isolated. Six of these had a very irregular embryonal apparatus, which was invariably pliolepidine (fig. 19—24, Plate fig. D). The diameter of the megalospherical forms is 3—4.5 mm. Two microspherical forms that apparently belonged to them, had a diameter of 4—6 mm. It is especially with these that we observe distinctly very tiny columns, such as are typical in Pliolepidina Tobleri (fig. 25). The median chambers also resemble those of Pl. Tobleri, but they are somewhat smaller (radial 0.055—0.060 mm tangential 0.07—0.08 mm). The forms may certainly be referred to Pliolepidina Tobleri. Besides this far prevailing form small flat Lepidocyclines occur, probably belonging to the same species as those of no. 576 (?Polylepidina proteiformis).

G. 581, 1928. (Large not numbered slide). Very porous Lithothamnium-Lepidocyclina-limestone with at the least five different species of Lepidocyclina:

1. An inflated form of 3 by 1½ mm with rather large columns (Isolepidina Trinitatis).
2. Pliolepidina Tobleri.
3. Very flat, small lepidocyclines of 3½—5 by 0.75 mm with from 5 to 7 layers of lateral chambers, probably the same form as in 576 (?Polylepidina proteiformis).
4. A semi-inflated, column-poor or column-free form of 5 by 1½ mm, perhaps the same as in 577.
5. A microspherical form of 10 mm diameter, which I cannot determine farther.

G. 582. 1928. (Large, unnumbered slide). A Lithothamnium-Lepidocyclina-limestone, much like no. 581, but which also contains a few small nummulites. The Lepidocyclina-fauna is the same as in 581 (figs. 6—9).

G. 583. 1928. D. 10627—10636. Separate nummulites, to be classed as a new species Numm. striatoreticulatus (figs. 41—50, Plate figs. F—J).

G. 584. 1928. D. 10637, 10638. A few separate specimens of a very remarkable Lepidocyclina, which belongs to a new species L. brachiofera (fig. 40, Plate A, B). In the rock that is still attached to the fossils, also Nummulites, and Operculina, besides a small Lepidocyclina occur.

G. 585. 1928. 10639. A few loose specimina of a very indifferent Operculina, which I did not endeavour to determine specifically.

G. 586. 1928. D. 10640—10641. Limestone with numerous specimens of Isolepidina Trinitatis H. Douv.

G. 587. 1928. D. 10642—10648. Lepidocyclina-Lithothamnium-limestone with Operculina. The Lepidocyclines belong partly to the very flat form that is also found in other rocks. A characteristic of this rock is, however, the occurrence of large, microspherical,

medially highly inflated, columned Lepidocyclina, whose diameter may amount to 16 mm. It may probably be referred to Lepidocyclina curasavica Koch.

Lastly there are a few more separate Lepidocyclinae in the collection, which, however, I did not venture to determine specifically, for want of sufficient microscopical sections.

Besides the samples of tertiary limestone there was at my disposal one fragment of quaternary limestone (*G. 573, 1928*), which differs from the tertiary rocks in every respect. It contains many grains of older rocks, viz. of radiolarite and of totally weathered diabase; there occur in it colonies of Lithothamnia, that are far widermeshed than the tertiary; the tertiary foraminifera are lacking and on the other hand rather many Amphistegina are present.

It appears now that in the tertiary rocks the following typical foraminifera could be identified:

Pliolepidina Tobleri H. Douv.	very numerous.
Pliolepidina Tobleri H. Douv. var.	sparse.
Isolepidina Trinitatis H. Douv.	rather numerous.
Lepidocyclina brachiofera nov. sp.	sparse.
Lepidocyclina sp. (?Polylepidina proteiformis Vaughan)	very common.
Lepidocyclina curasavica Koch.	not common.
Lepidocyclina sp. ind. div.	
Nummulites striatoreticulatus nov. sp.	not common.

When comparing these faunula with the one described by KOCH we see at once essential differences. Nephrolepidines, of which in KOCH's material two species were numerous, are absolutely lacking in the rocks examined by me: in the very numerous preparations I did not detect any. Lepidocyclina curasavica, the most common form with KOCH, occurred only once with me in a single sample; even there the determination is not absolutely certain. Isolepidina Macdonaldi, "very common" in KOCH's material, was not found in my rocks, still it could hardly have been overlooked; the same applies to Pliolepidina panamensis. On the contrary KOCH has not found Pliolepidina Tobleri, the most common form in my material, and in his material the typical Nummulites are absent.

Whereas KOCH may say with some justice that the rocks examined by him are of oligocene age, on the basis of my material of fossils I feel justified in saying with equal justice that *the rocks are eocene.*

The new and remarkable nummulite, occurring in the material examined, is the first typical nummulite that, so far as I know, has been described from America. In VAUGHAN's résumé we read that of nummulites from America only N. parvula Cushman from the Eocene of St. Bartholomew has been pictured and described; this form, however, is a degenerated nummulite, which moreover is insufficiently known from a single section. DOUVILLÉ has reported [1]) different nummulites, but some of them are Operculines (N. Willcoxi, N. Heilprini, N. Floridensis), others again are not so

[1]) H. DOUVILLÉ, C.R. Acad. Sc. Paris **161**, 1915, p. 87—93. **164**, 1917, p. 841—847

well described (N. vascus, N. aff. striatus, N. irregularis) that we can certify their determination, while pictures are entirely lacking.

Palaeontology.

In the foregoing two new species have been mentioned that still require a description, while something must also be said about one of the known Lepidocyclines.

Lepidocyclina (Pliolepidina) *Tobleri H. Douv.* (figs 19—35, Pl. figs C. D.). Among the rocks of Curaçoa this is one of the commonest if not the most common of all species. As late as 1924 DOUVILLÉ (l.c.) still believes in the possibility that Pliolepidina Tobleri is a "teratologic form" of Isolepidina Trinitatis. Nowadays we are bound to look upon Pliolepidina as a proper subgenus of Lepidocyclina. It is not only that in America besides P. Tobleri other species are known (P. duplicata Cushm. and P. panamensis Cushm.) but Pliolepidinae have also been found in the Dutch Indies [1]). In accordance with all this the fossils of Curaçoa can be very well discriminated from Isolepidina Trinitatis, even when eliminating the difference in the embryonal apparatus. The structure of P. Tobleri is smaller, looser and its skeletal columns are much more delicate than those of I. Trinitatis. DOUVILLÉ's view that P. Tobleri should be a teratologic form of I. Trinitatis, cannot be held any longer.

Lepidocyclina brachiofera nova species (fig. 40 and Plate figs A, B). Of this extremely wonderful form only three specimens were present, of which only one is fullgrown (fig. A). The smallest has been used for a controlling horizontal section. The largest specimen has a diameter of rather more than 3 cm ; the middle specimen of 2 cm. The full-grown individual has a median tubercle not sharply outlined ; the upper surface of the plasmostracum is covered with very fine columns, not continuing far interiorly. The most characteristic feature is, that in its early existence the plasmostracum displays at the periphery undulations which in the fullgrown individual are transformed into hollow arms, of unknown length, but whose basal part is still to be observed in fig. A as well as fig B (a transverse section of one arm is shown in fig. 40). In the full-grown specimen not less than ten of such arms have existed. When inspecting the transverse section of an arm it appears that in its walls all the layers of the plasmostracum may be distinguished. In the middle there is a central cavity, then follows a circulating band of layers of lateral chambers, which are the continuation of the lateral-chamber layers at the underside of the test, farther outwardly follows a circulating band of median chambers (hatched in fig. 40), still farther towards the outside a second band of layers of lateral chambers follows which represents the continuation of the lateral-chamber layers at

[1]) I. VAN DER VLERK, Het genus Lepidocyclina in het indopacifische gebied. Dienst van den Mijnbouw. Wetensch. Meded. 8. 1928.

the upper side of the test. But the structure is still somewhat more complicate. The "lowermost" layers of lateral chambers simply bend round in

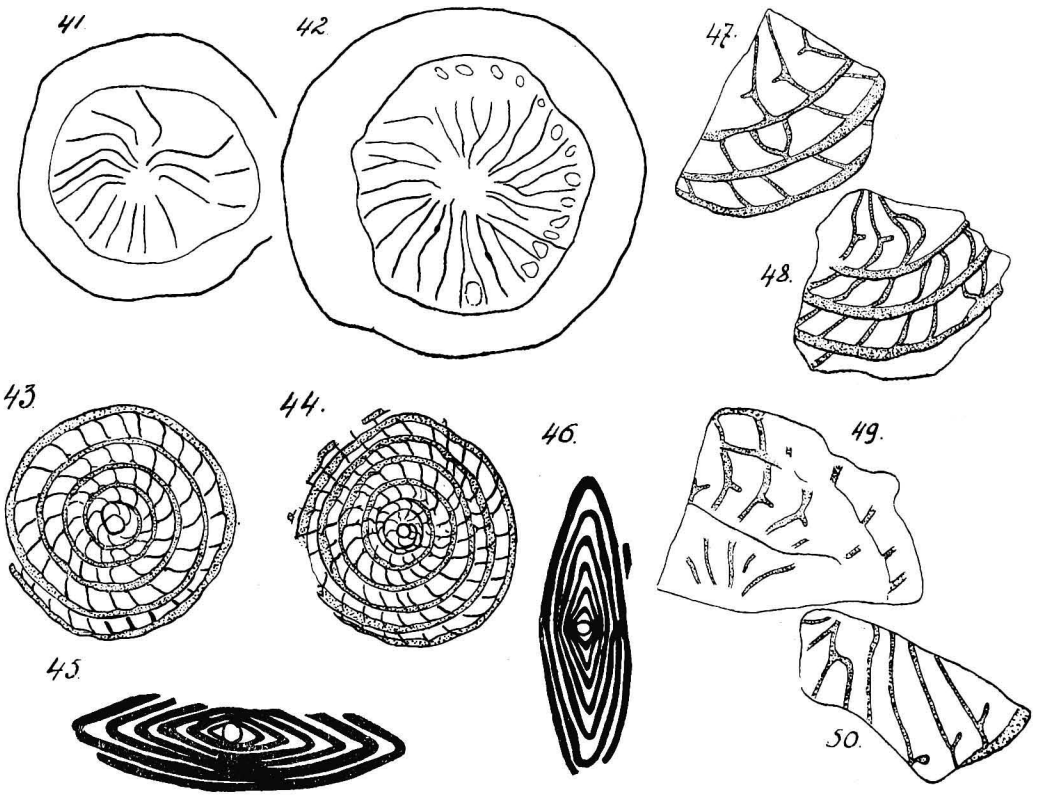

Fig. 41—50.

the arm but the median-chamberlayer, and the uppermost layers of lateral chambers extend still further past the "suture" of the arm, so that the result is that the arm is provided with a longitudinal leaf-shaped appendix (fig. 40). It is a great pity, that only few individuals of this wonderful species have been found, as it would certainly have been worth our while to make a reconstruction of one whole individual.

Nummulites striatoreticulatus nov. sp. (figs 41—50, Pl. figs F, G, H, I, J). These fossils, which occur in a rather large number (between 50 and 100 specimina) in the material of G. MOLENGRAAFF, cannot be classed with any known nummulite. Not only do they differ in the ordinary features (diameter and height, number of whorls, number of septa per whorl) from all nummulites, known to me, in so far as in N. striatoreticulatus such a combination of these features occurs as is not known to exist in any other species, but moreover the structure of the septa exhibits peculiarities that I have not found mentioned anywhere. All the fossils but one are megalospherical. The only microspherical specimen is rather large, c.a. 10 by

2.5 mm. It possesses 10 annuli ; in the ninth whorl about 38 septa occur. For some megalospherical specimens we subjoin the numerical data.

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
diameter (mm)	4	4.7	3.8	4.7	4.7	4.5	4.
thickness (mm)	1.3	1.7	——	——	——	——	——
initial chamber diameter (mm)	0.2	0.3	0.32	0.27	0.25	0.3	0.23
number of whorls	6½	6½	5	6½	6¼	5½	5½
Septa in 5th or 6th whorl	——	——	22	28	25	27	24

It will be seen from this table that the various individuals agree fairly well inter se. It should be observed, however, that the sections were taken from the larger specimens, and that besides them many small individuals (youth-forms?) occur. The fossils are characterized by small thickness (figs 45, 46), closely serried whorls, and very long chambers. The septa arise on the inside of the outer septum, at a slight angle, and while gradually curving, they reach, at a rather large angle, the inner septum (Pl. figs G—I, figs 43, 44).

When noticing, on the surface of the nummulites (Pl. fig. F) or after grinding off a tangential-horizontal surface, the septa (figs 41, 42), they always appear to run radially with slight, irregular bends ; this identifies the nummulites with the striated nummulites. Of real granulae absolutely nothing is to be seen ; occasionally I saw some faint, thickenings on the septa (fig. 42). But in the usual striated structure there appears a complication, unknown to me in any European or Asiatic nummulite (figs 43, 44, 47—50. Plate figs G—I). Namely while in the median plane the septa are simple, a little beyond the median plane they exhibit an anteriorly directed process (slightly schematically in figs 43, 44 ; very beautifully in Pl. fig. H, top of the picture). I succeeded in opening one specimen of a fossil, so that I could study the interior of some whorls. Fig. 50 shows the inside of one whorl ; in figs 47—49 we are face to face with three disk-shaped, fragments of annuli fitting to each other. In all these cases we see distinctly the anteriorly directed processes at a number of septa. Now, in the case of a sub-median cross-section it may happen that on co-operation of the effects of different annuli it would seem as if a reticulate structure appears in part of the section, which in fact does appear in all likelihood, as the above-described processes may extend as far as an anteriorly directed septum.

This can be seen very distinctly in the middle of Pl. fig. G and also, but less distinctly, in fig. H. It should be pointed out that this retiform or pseudo-retiform structure has a quite different origin from that of the netlike structure known in the true reticulate nummulites from Europe and Asia.

Further research will have to show if we have to do here with a new group of nummulites, which may have been confined to America.

EXPLANATION OF THE FIGURES.

Figs 1—5. Lepidocyclina (Isolepidina) Trinitatis H. Douv. (in fig. 4 a microspherical form). From G. 575, 1928. × 13.

„ 6—9. Lepidocyclina (Isolepidina) Trinitatis H. Douv. (Fig. 8 microspherical). From G. 582, 1928. × 13.

„ 10—16. Lepidocyclina aff. ??Polylepidina proteiformis Vaughan. From G. 576, 1928. 10, 11, 14 from D. 10618, 12 from D. 10607, 13 from D. 10622, 15, 16 from D. 10619. × 13.

„ 17. 18. Lepidocyclina sp. From G. 577, 1928. D. 10608. × 13.

„ 19—25. Pliolepidina Tobleri H. Douv. From G. 580, 1928. 19 from D. 10611, 20 from D. 10612, 21 from D. 10613, 22 from D. 10614, 23 from D. 10615, 24 from D. 10625, 25 from D. 10617. × 13.

„ 26. Pliolepidina Tobleri H. Douv. From G 576, 1928, D. 10621. × 16.

„ 27—33. Pliolepidina Tobleri H. Douv. From G. 576, 1928. 27 from D. 10607, 28, 31, 33 from D. 10620, 29 from D. 10607, 30 from D. 10619, 32 from D. 10621. × 13.

„ 34. Pliolepidina Tobleri H. Douv. From G. 578, 1928, D. 10623. × 13.

„ 35. Pliolepidina Tobleri H. Douv. From G. 577, 1928, D. 10608. × 13.

„ 36—39. Pliolepidina Tobleri H. Douv. var. From G. 578, 1928, 36, 37 from D. 10809, 38, 39 from D. 10623.

„ 40. Lepidocyclina brachiofera nov. sp. Transverse section of one of the "arms". G. 583, 1928. × 8.

„ 41, 42. Nummulites striatoreticulatus nov. sp. Seen from above and ground tangentially. × 10.

„ 43. Nummulites striatoreticulatus nov. sp. Horiz. section. D. 10636. × 8.

„ 44. Nummulites striatoreticulatus nov. sp. Horiz. section. D. 10634. × 6.

„ 45. Nummulites striatoreticulatus nov. sp. Vert. section. D. 10628. × 9.

„ 46. Nummulites striatoreticulatus nov. sp. Vert. section. D. 10629. × 9.

„ 47—50. Nummulites striatoreticulatus nov. sp. Interior aspect of an opened plasmostracum. × 11.

Plate figs A, B. Lepidocyclina brachiofera nov. sp. About natural size.

„ „ C. Pliolepidina Tobleri H. Douv. From G. 576, 1928. D. 10619. Same as in fig. 30. × 22.

„ „ D. Pliolepidina Tobleri H. Douv. From G. 580, 1928. D. 10625. Same as in fig. 24. × 15.

„ „ E. Lepidocyclina aff. ??Polylepidina proteiformis Vaughan. From G. 576, 1928. D. 10619. Same as in fig. 16. × 22.

„ „ F. Nummulites striatoreticulatus nov. sp. × 10.

„ „ G. Nummulites striatoreticulatus nov. sp. × 10. D. 10631.

„ „ H. Nummulites striatoreticulatus nov. sp. × 10. D. 10630.

„ „ I. Nummulites striatoreticulatus nov. sp. × 10. D. 10635. Same as in fig. 42.

„ „ J. Nummulites striatoreticulatus nov. sp. × 15. D. 10633.

All the magnifications are approximative.

The drawings are made either with camera lucida (Nos. 1—42, 47—50) or drawn over a photo, after which the photographic print was washed away.

L. RUTTEN: „TERTIARY FORAMINIFERA FROM CURAÇOA".

PLATE Fig. A—J