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197. ANNOTATED BIBLIOGRAPHY OF LATE PALEOZOIC NONFUSULINID FORAMINIFERA

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ABSTRACT

This annotated bibliography includes 233 references pertaining to Late Paleozoic nonfusulinid Foraminifera, and may be considered reasonably complete through the year 1957, inclusive. The bibliography covers three distinct aims: (1) to summarize briefly the contents of each article, (2) to list all new genera and species described therein, and (3) to include, in brackets, all taxonomic changes noted from later publications, thus making the bibliography a useful working tool for specialists.

INTRODUCTION

In conjunction with work on Late Paleozoic nonfusulinid Foraminifera an extensive search of the literature, including all available foreign sources, was undertaken. This has yielded a bibliography of 233 references containing original descriptions of genera and species of Mississippian through Permian Foraminifera, exclusive of the family Fusulinidae. Articles in which these Foraminifera have been used for stratigraphic correlations are also included, but mere mention of foraminiferal names or incidental occurrences have been omitted from this bibliography.

The 233 references obtained have been annotated by the compiler, except in those recent publications in which the author included a comprehensive abstract. In such cases the author's abstract has served as a nucleus and additions and deletions have been made accordingly. The annotations include geologic age, geographic locality, type of illustrations, original language, new genera and species described, and comments, in brackets, on taxonomic changes noted from later publications.

The bibliography may be considered reasonably complete through 1957, with the exception of the Russian references which are reasonably complete only through 1955. A continuing effort is being made to bring the latter up to date, although even direct correspondence with leading Russian specialists has been discouraging.

It will be greatly appreciated if any significant omissions in this bibliography are brought to my attention. Additions will be issued as *addenda* at future intervals.

EVALUATION OF ARTICLES

At present there are many publications devoted to Late Paleozoic Foraminifera, but most of these pertain to the family Fusulinidae. There is basically little specialized literature concerning the smaller Foraminifera, and only in recent years has it become enriched with systematic descriptions of species.

Figure 1 is an attempt to show chronologically the distribution of articles pertaining to Late Paleozoic nonfusulinid Foraminifera according to designated geographic provinces. The Sino-Russian bloc (A) received an early start in the late 1870's through the excellent work of Möller. Articles appeared sporadically until the early 1930's; at that time the directional goal of Soviet geologists was clarified and resulted in a substantial increase in Soviet articles. During the war years nothing was published; after 1945 there was a tremendous increase in Soviet output (1948—24 papers) that has continued to the present. In North and South America (B) there was a sporadic appearance of articles until the late 1920's when Cushman, Waters, Galloway *et al.* intensively described the Late Paleozoic faunas of the western United States. Very little was published in the late 1930's; since then there has been a continued increase in output and this trend seems to be growing. In western Europe, *etc.* (C) there has been a fairly constant flow of articles since 1846 which in recent years shows signs of increasing, mainly due to the work of Cummings. In Australasia (D) articles have occurred sporadically since the last decade of the last century and have culminated in the excellent most recent (1958) article on the Permian Foraminifera of Australia by Crespin.

In regard to descriptions of new genera and species, it is unfortunate that in most cases only descriptions and illustrations of the exterior of the test are given and that the interior structure of the test, as observed by thin-sections, is ignored or glossed over as being either "arenaceous" or "calcareous." In most of the articles by American authors the specific nature of the wall structure of Late Paleozoic nonfusulinid Foraminifera is completely neglected. From this basically unrealistic approach stems different understanding of genera and species and the placing of related forms in distinct families. The classification of Cushman, as used by most American micropaleontologists, has a number of inherent faults which greatly handicaps its use. Not taken into account are the different routes of evolution of the Foraminifera, the influence of environment, and most important of all, the wall structure of the test.

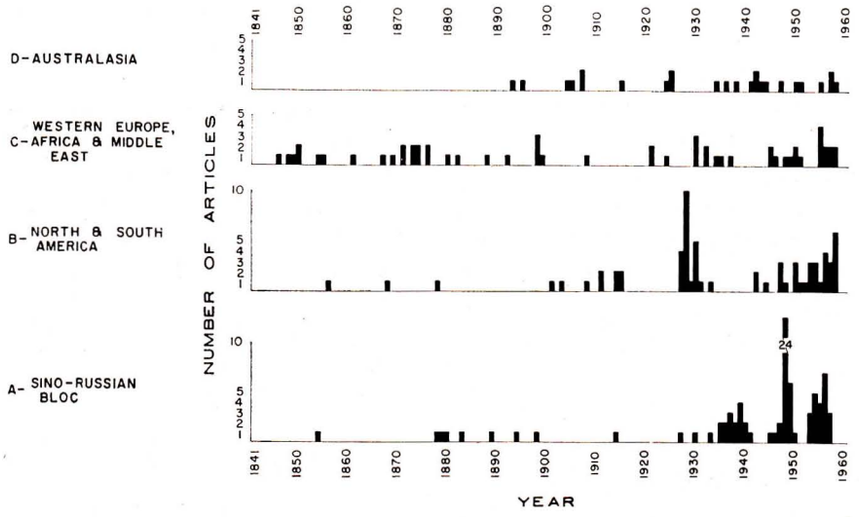

FIGURE 1

Distribution of articles pertaining to
Late Paleozoic nonfusulinid Foraminifera

Differences of opinion relating to the formation of the test wall are common in the literature. Cushman and Waters regard most of the Paleozoic Foraminifera as being "arenaceous" (agglutinated) whereas, Galloway, Harlton, and Warthin regard them as being calcareous (secreted) or mixed agglutinated-secreted. It is difficult to solve the question of the method of test formation because it is almost impossible to determine, with any degree of accuracy, whether the granularity of the test wall is primary or secondary. Galloway *et al.* consider the granular test wall to be a secondary phenomenon resulting from recrystallization; Cushman and others define the grains as calcareous particles of sand size agglutinated from the surrounding medium. This distinct difference of opinion has complicated and overburdened the classification scheme, and has led, as Reitlinger (1950) said "to excessive division and establishment of parallel series inside monotypic groups of Foraminifera." As an example, Reitlinger, p. 7, cites the following:

> "Cushman refers the genera *Lituotuba* and *Ammovertella* to the family Ammodiscidae (now Tolypamminidae), considering their walls to be arenaceous, while the tests, identical in form to the genera *Orthovertella* and *Calcitornella* he refers to the family Ophthalmidiidae, regarding them as calcareous."

It is important at this point to find out to what degree the microstructure of the test wall is a criterion of classification and taxonomic significance. Wood (1949), as a result of petrographically studying the wall structure of a large amount of foraminiferal material of varying ages, was able to erect a series of groups having in common the polarization phenomenon, and to note correlative ties between them. He concluded that the microstructure of the test has great taxonomic significance, although in varying degrees for different groups. The porosity of the test is considered a sign of secondary significance inasmuch as it exists in different groups. This conclusion is essentially in agreement with Reitlinger who, after intensive petrographic study of the microstructure of Middle Carboniferous Foraminifera of the Russian Platform, was able to note a series of groups bound to one another by intergradings. Reitlinger was able to recognize six distinct groups in which genera may be characterized by test walls of different microstructure. Within a genus there is usually a series of transitional forms, from test walls of a purely secreted type to agglutinated. Reitlinger's basic conclusion was that in the Paleozoic the Foraminifera are still in the first stage of evolution; that they have a series of individual highly varied microstructures, different from younger forms, and apparently with no sharp subdivision of the wall type, and that the structure of the wall seems to have depended more on the external medium, with poor development of adaptability of Foraminifera.

It is apparent from the above that more rewarding results can be obtained through detailed microstructure study of the test wall, and it is hoped that future workers will direct more of their research along this line.

Aizenverg, D. E., and Brazhnikova, N. E., 1957, The correlation of the Lower Carboniferous deposits of the Donbass and other regions of the Russian Platform: Akad. Nauk, Doklady, v. 115, no. 1-6, p. 597-600, [English translation].

Deals mainly with Lower Carboniferous stratigraphy based upon previously described foraminiferal species.

Armstrong, A. K., 1958, Meramecian (Mississippian) endothyrid fauna from the Arroyo Peñasco formation, northern and central New Mexico: Jour. Paleontology, v. 32, p. 970-976, pl. 127, 2 text-fig.

From the Mississippian (Meramecian) Arroyo

Peñasco formation of north-central New Mexico an endothyrid fauna is described and illustrated by thin-section photomicrographs. One new species, *Endothyra prodigiosa,* and several previously described species are discussed. Comparison is made with the endothyrid fauna of the Lower Osagian Leadville limestone of the San Juan Mountains, Colorado; faunal evidence, presence of Osagian *Plectogyra* and *Granuliferella,* indicates different age assignments and paleogeographic provinces; [see St. Jean, 1957, for pertinent criticisms of the validity of the genus *Plectogyra*].

BEEDE, J. W., 1911, The Carbonic fauna of the Magdalen Islands: New York State Mus. Bull. 149, no. 493, p. 175.

From the Mississippian rocks of Coffin Island, Magdalen Islands, Canada, one new species of foraminifer, *Nodosinella clarki,* is described and illustrated by line drawings, [Cummings, 1955, p. 226, states that this "form also requires re-examination of the type material before it can be placed accurately."].

BENNIE, J., 1876, Note on the range of *Saccammina carteri* Brady, in the Carboniferous series: Geol. Mag., n.s., d.2, v.3, p. 47.

Lists all known and reported occurrences of *Saccammina carteri* Brady found in the Lower Carboniferous rocks of England. [Specific name of *Saccammina* was changed to *fusuliniformis* by Chapman, 1898, p. 215-218; genus *Saccammina* changed to *Saccamminopsis* to avoid confusing it with the living genus, see Sollas, 1921].

BHATIA, S. B., and SAXENA, I. P., 1957, Occurrence of the genus *Hyperammina* in the marine Permo-Carboniferous bed at Umaria, central India: Contrib. Cushman Found. Foram. Research, v. 8, pt. 4, p. 146-148, pl. 21.

The foraminiferal genus *Hyperammina* is recorded for the first time from a Permo-Carboniferous marine bed at Umaria in central India. The genus is represented by two previously described species—*H. gracilis* Waters and *H.* aff. *H. elongata* Brady var. *clavatula* Howchin, and is described and illustrated by line drawings.

BIRINA, L. M., 1948, New species of calcareous algae and Foraminifera from the transitional (Devonian-Carboniferous) beds of the Moscow basin: Russian State Geological Symposium, Moscow, no. 28, p. 154-159, 2 pl., [in Russian].

From the transitional Devonian-Lower Carboniferous beds of the Moscow Basin a fauna of three new species and one new genus is described and illustrated by rather poor thin-section photomicrographs. The new forms are: *Hyperammina minima, Bisphaera* (n. gen.) *malevkensis,* and *B. irregularis.*

BRADY, H. B., 1871, On *Saccammina carteri,* a new foraminifer from the Carboniferous limestone of Northumberland: Ann. Mag. Nat. Hist., ser. 4, v. 7, p. 177-184, pl. 12.

From the uppermost beds of the Carboniferous so-called "four-fathom limestone" at Elfhills in the north of England the "arenaceous," globose, chambered foraminifer *Saccammina carteri* is described and illustrated by drawings. [Sollas, 1921, believes that *S. carteri* is a calcareous form whose arenaceous appearance is due to secondary silicification and has proposed that *S. carteri* be transferred to the new genus *Saccamminopsis;* apparently Sollas was unaware that the specific name *carteri* had been changed to *fusuliniformis,* see Chapman, 1898, p. 215-218.]

BRADY, H. B., 1873, On *Archaediscus karreri,* a new type of Carboniferous foraminifer: Ann. Mag. Nat. Hist., ser. 4, v. 12, p. 286-290, pl. 11.

From the Lower Carboniferous limestone of England the new form *Archaediscus karreri* is described and illustrated by line drawings. The shell masonry and type of coiling are fully discussed and comparison with other forms is noted.

BRADY, H. B., 1874, On a true Carboniferous nummulite: Ann. Mag. Nat. Hist., ser. 4, v. 13, p. 222-230, pl. 12.

Not a Paleozoic foraminifer [probably Tertiary, *fide* Van den Broeck, 1898, p. 35-38, who believed that these specimens were inadvertently mixed in with the Belgian Carboniferous sample which was sent to Brady].

BRADY, H. B., 1876, A monograph of Carboniferous and Permian Foraminifera (the genus *Fusulina* excepted): Palaeont. Soc. Pub., v. 30, 166 p., 12 pl.

This classic study covers a wide range of forms found in the English sequence of strata as well as in some Permo-Carboniferous material contributed from adjoining countries. Problems of classification and shell masonry are discussed at length in addition to taxonomic descriptions. Work is somewhat outdated; Cummings is in the process of revising and redefining most of Brady's species, [see Cummings, R. H., 1955, 56.] However two new genera, *Nodosinella,* and *Stacheia,* were described; in addition the newly separated genus *Climacammina* was outlined in detail; all forms are illustrated by somewhat classic line drawings.

BRAND, E., 1937, Über Foraminiferen im Zechstein der Wetterau: Senckenbergiana, v. 19, no. 5-6, p. 375-380, 1 text-fig., [in German].

From the Middle and Upper Permian Zechstein formation of the Wetterau region of Germany a foraminiferal fauna of twenty previously described species is listed and discussed. One new species, *Frondicularia stockheimia,* is described and illustrated by line drawings.

BRAZHNIKOVA, N. E., 1939, Data for the study of Foraminifera of the central Donbas District: Acad. Sci. Ukrainian S.S.R., Inst. Geol., Trans., Donetz Basin, p. 145-160, 2 pl., [Russian with English summary].

From wells that penetrated the Middle Carboniferous rocks of the Donbas Region, Russia, a foraminiferal fauna of nineteen species (twelve fusulinids), all previously described, is diagnosed and illustrated by rather poor thin-section photomicrographs.

BRAZHNIKOVA, N. E., and POTIEVSKA, P. D., 1948, Results of studying Foraminifera in material from wells at the western boundary of the Donets Basin: Akad. Nauk S.S.S.R., Kiev, Inst. Geol. Nauk, Trudy, ser. Strat. and Paleontol. v. 1, no. 2, p. 76-103, pl. 5, [in Russian].

From well samples of Carboniferous rocks in the western part of the Donets Basin of European Russia a fauna of eight species (three Fusulinidae), of which four species and one variety are new, is described and illustrated by thin-section photomicrographs. The new forms are: *Glomospira discoidea* [now referred to *Hemigordius discoideus* (Brazhnikova & Potievska) see Reitlinger, 1950, p. 87], *G. irregularis* [now referred to *Brunsiella irregularis* (Brazhnikova & Potievska); see Reitlinger, 1950, p. 17], *Endothyra spirilliniformis, E. bradyi* Mikhailov var. *maxima,* and *Archaediscus subcylindricus.*

BRAZHNIKOVA, N. E., and YARTSEVA, M. V., 1954, The evolution of the genus *Monotaxis:* Paleontol. Sbornik No. 1, p. 62-72, 1 pl., 1 text-fig., [in Russian].

From the Lower Carboniferous rocks of the Greater Donbas sedimentary complex in European Russia the authors have traced the evolution of the genus *Monotaxis.* An evolution chart is given illustrating the earliest representative (lower Visean) *M. exilis* Vissarionova and the major evolutionary breaks which occurred at the end of Visean time and during Namurian time, culminating in radical sedimentary changes brought about by major uplifts. This evolutionary "explosion" manifested itself in the coiling and shape of the foraminiferal test, and proceeded in two distinct directions, (1) development of high cone-shaped tests with a large number of whorls; this form died out before the end of Lower Carboniferous time, and (2) the development of low cone-shaped tests gradually changing into planispiral forms; this form continued well into Middle Carboniferous time. The genus *Monotaxis* Vissarionova, 1948, is emended to include only those forms with two chambers, an initial spherical one, and a second tubular trochospirally coiled one without segmentation. New forms described are: *Monotaxis subconica, M. subplana,* and the planispiral forms *Monotaxinoides priscus,* and *M. transitorius.* All forms are illustrated by thin-section photomicrographs and fully described. Mention is also made of this great similarity between the *Monotaxis gibba* (Möller) group and *Howchinia (Patellina) bradyana* (Howchin), but left as an open question due to inadequate knowledge of the exterior of *Monotaxis gibba* (Möller). [Reitlinger, 1954, regards the genus *Monotaxis* Vissarionova, 1948, as a synonym of *Howchinia.*]

BROECK, E. VAN DEN, 1874, Quelques considérations sur la découverte, dans le calcaire carbonifère de Namur, d'un fossile microscopique nouveau, appartenant au genre Nummulite: Ann. Soc. Géol. Belg., v. 1, p. 16-27, [in French].

See Brady, 1874, "On a true Carboniferous Nummulite;" above reference is the French translation of Brady's paper.

CHAPMAN, F., 1898, Note on the specific name of the *Saccammina* of the Carboniferous limestone: Ann. Mag. Nat. Hist., ser. 7, v. 1, p. 215-218, 1 text-fig.

Re-examination of McCoy's 1849 material, referred to *Nodosaria fusulinaformis,* has led the author to place this form under the genus *Saccammina* [now referred to the genus *Saccamminopsis,* see Sollas, 1921] and to retain the specific name *fusuliniformis* which has priority over the more common specific name *carteri.*

CHAPMAN, F., 1907, Paleontological contributions to the geology of western Australia. Pt-2, Notes on fossils from the Collie coalfield, western Australia, in the collection of the National Museum, Melbourne: Geol. Survey Australia, Bull. no. 27, p. 9-18, pl. 1-2.

From the Late Paleozoic coal measures of western Australia a fauna of five previously described species is discussed and illustrated by rather poor line drawings. The author states that the fauna is depauperate and that it is in keeping with the brackish or estuarine conditions of the area in which these normally marine animals lived at the time. [One form, *Truncatulina haidingeri* d'Orbigny, was renamed *Ammodiscus planoconvexus* (Chapman, Howchin, and Parr, 1934), later work indicates that this form belongs under the *Trochammina;* Crespin, 1958, p. 91, emended it to *T. pokolbinensis.*]

CHAPMAN, F., and HOWCHIN, W., 1905, A monograph of the Foraminifera of the Permo-Carboniferous limestones of New South Wales: Geol. Survey New South Wales, Mem., Palaeontology, no. 14, 22 p., 4 pl.

From the Permian limestone of New South Wales, Australia, a foraminiferal fauna of thirty-five species, of which nine are new, is described and illustrated by line drawings. The work is quite outdated and a later paper (Chapman, Howchin, and Parr, 1934) has restudied and revised a good many of the forms noted. New forms are: *Pelosina hemisphaerica, Haplophragmium pokolbiense* [later revised to *Ammodiscus milletianus* Chapman (Chapman, Howchin, and Parr, 1934); emended to *Involutina* (Loeblich and Tappan, 1954)], *Placopsilina tenuitesta, Lituola cristellarioides* [not a foraminifer], *Stacheia simulans* [not a foraminifer], *Monogenerina pyramidis* [revised to *Nodosaria pyramidis* (Chapman and Howchin)], *?Pleurostomella antiqua* [revised to *Nodosaria? antiqua* (Chapman and Howchin)], *Geinitzina triangularia,* and *Anomalina supracarbonica.*

CHAPMAN, F., HOWCHIN, W., and PARR, W. J., 1934, A revision of the nomenclature of the Permian Foraminifera of New South Wales: Proc. Roy. Soc. Victoria, v. 47, n.s., pt. 1, p. 175-189, 5 text-fig.

The Permian foraminiferal fauna of New South Wales, Australia, of an earlier paper by two of the authors (Chapman and Howchin, 1905) is restudied and revised. Two new species are described: *Lingulina davidi* [previously described as *Bulimina affinis* d'Orbigny], and *Ammodiscus planoconvexus* [previously described as *Truncatulina haidingeri* (d'Orbigny) and now emended to the genus *Involutina; see* Loeblich and Tappan, 1954]; numerous other name changes are also noted. The genera *Monogenerina, Spandelina* (including *Spandelinoides*), and *Geinitzina* are analyzed; *Monogenerina* is placed in the Textulariidae [now Palaeotextulariidae], and *Spandelina* and *Geinitzina* are placed in the Nodosariidae. The authors consider the subgenus *Spandelinoides* as inseparable from *Nodosaria.*

CHERNYSHEVA, N. E., 1940, On the stratigraphy of the Lower Carboniferous Foraminifera in the Makarovski district of the South Urals: Soc. Nat. Moscou. Bull., n.o., v. 48 (Sect. Geol., v. 18), no. 5-6, p. 113-135, pl. 1-2, 5 text-fig., [Russian with English summary].

From the Lower Carboniferous rocks of the Makarovski region, Russia (the western slope of the southern Ural Mountains) a foraminiferal fauna of one new genus and thirteen species (six of which are new) is described and illustrated by thin-section photomicrographs. The new forms are: *Endothyra spinosa, E. rjausakensis, Nanicella dainae, Paraendothyra nalivkini* n. gen., *Spiroplectammina parva,* and *Palaeotextularia lata.* The author states that it is possible to zone the Lower Carboniferous on the basis of smaller Foraminifera and presents the following results. Tournaisian stage has three horizons, the lowest contains *Endothyra communis* Rauser., the middle horizon *E. spinosa* and *Paraendothyra nalivkini,* and the Upper Tournaisian is characterized by the presence of *Spiroplectammina parva.* The Foraminifera of the Visean stage is marked by the occurrence of *Archaediscus,* Visean species of *Endothyra, Bradyina,* and *Climacammina.* The Namurian stage is noted by the presence of *Bradyina cribrostomata* Raus. and Reitl., *Archaediscus baschkiricus* Krest. and Theod., and *Globivalvulina.* [According to Lipina, 1955, p. 21, one previously described species listed as *Brunsia? pulchra* is now referred to *Glomospirella pseudopulchra*].

CHERNYSHEVA, N. E., 1941, A new genus of Foraminifera from the Tournaisian deposits of the Urals: Akad. Nauk S.S.S.R., Doklady, v. 32, no. 1, p. 69-70, 3 text-fig., [in English].

From the middle Tournaisian (Lower Mississippian) rocks of the Ural Mountains of Russia, a new foraminiferal genus and species, *Biseriammina uralica,* is described and illustrated by line drawings. A new family, Biseriamminidae, is erected to include all the Paleozoic representatives with biserially arranged chambers and agglutinated wall structure. The similarities, and apparent relationship, to the genus *Endothyra* are discussed.

CHERNYSHEVA, N. E., 1948, Some new species of Foraminifera from the Visean of the Makarov district (south Urals): Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 246-250, pl. 18, [in Russian].

New species from the Lower Carboniferous Visean rocks of the Makarov District (south Urals), Russia, are described and illustrated by thin-section photomicrographs. The fauna includes five species of which four species and one variety are new. The new forms are: *Endothyra staffelliformis, E. globulus* (Eichwald) var. *parva, Palaeotextularia diversa, Globivalvulina parva,* and *Nodosaria sikazensis.*

CHERNYSHEVA, N. E., 1948, In reference to *Archaediscus* and similar forms from the Lower Carboniferous of the U.S.S.R.: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 61 (Geol. Ser., no. 19), p. 150-158, pl. 2, [in Russian].

From the Lower Carboniferous rocks of Russia the genus *Archaediscus* and its related form *Permodiscus* are discussed, and a new family Archaediscidae is erected to include both forms. Seven species, of which two are new, are described and illustrated by thin-section photomicrographs. The new forms include: *Permodiscus rotundus* and *P. syzranicus.*

CHERNYSHEVA, N. E., 1948, The stratigraphic differentiation of the Visean series of the Makarov district (south Urals) on the basis of Foraminifera: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser., no. 19), p. 90-101, 1 text-fig., [in Russian].

Deals mainly with Visean stratigraphy based upon previously described foraminiferal species.

COLANI, M., 1924, Nouvelle contributions a l'étude des Fusulinides de l'Extrême-Orient: Serv. géol. de l'Indochine, Mém., v. 11, pt. 1, 191 p., 29 pl., [in French].

Primarily a paper dealing with the Permo-Carboniferous fusulinids of Indo-China; contain numerous revisions of Deprat's earlier classic work. A few forms of *Bigenerina* [now referred to *Palaeobigenerina;* see Cummings, 1956, p. 215-216], are noted and illustrated by thin-section photomicrographs. The new genus *Pyramis* is defined and illustrated by *P. parva.* [See Reichel, 1946; genus *Pyramis* found to be a homonym; emended by Licharew, 1939, to *Colaniella parva* (Colani)].

CONKIN, J. E., 1954, *Hyperammina kentuckyensis* n. sp. from the Mississippian of Kentucky, and discussion of *Hyperammina* and *Hyperamminoides:* Contrib. Cushman Found. Foram. Research, v. 5, pt. 4, p. 165-169, pl. 31.

Hyperammina kentuckyensis n. sp. is described

from the Mississippian (Osage) Floyds Knob formation of southwestern Jefferson County, Kentucky. Generic characteristics of *Hyperammina* Brady, 1878, and *Hyperamminoides* Cushman and Waters, 1928, are discussed; *Hyperamminoides* is considered invalid and is suppressed in favor of *Hyperammina*. Generic definitions of *Hyperammina* given by Brady in 1878 and 1884 are accepted and some further additions made. *Hyperammina* embraces all known species of *Hyperammina* and *Hyperamminoides*. A new name, *Hyperammina neoglabra,* is proposed on account of generic reallocation. The new species is illustrated by line drawings.

Cooper, C. L., 1947, Upper Kinkaid (Mississippian) microfauna from Johnson County, Illinois: Jour. Paleontology, v. 21, p. 81-94, pl. 19-23.

A microfauna consisting of Foraminifera, ostracods, and conodonts is discussed and illustrated by whole specimen photomicrographs, from the Upper Mississippian Kinkaid formation of Illinois. The author claims that the microfauna is predominantly Chester and it reflects other Chester faunal and sedimentological characteristics in that it heralds the approaching Pennsylvanian by showing a distinct break from the Middle Mississippian, while at the same time containing some early Pennsylvanian elements. The foraminiferal fauna consists of eight species of which five are new. New forms are: *Glomospira disca, Trepeilopsis mississippiana, Endothyra acuta, E. excentralis,* and *Palaeotextularia asper* [*recte aspera, fide* Thalmann, 1949].

Coryell, H. N., and Rozanski, G., 1942, Microfauna of the Glen Dean limestone: Jour. Paleontology, v. 16, p. 137-151, pl. 23-24.

Two species of Foraminifera and thirty-two species and two varieties of ostracods constitute the authors' contribution to the microfauna of the Upper Mississippian (Chester) Glen Dean limestone of southern Illinois. New species described and illustrated by whole specimen photomicrographs are: *Spirillina obduxa* and *Endothyra bunkerae.*

Crespin, I., 1943, Permian Foraminifera from a bore at Coorabin, New South Wales: Australian Jour. Sci., v. 6 (2), p. 65.

Reports the occurrence of *Hyperamminoides* cf. *H. acicula* Parr [now *Hyperammina acicula* (Parr), see Crespin, 1958, p. 44], and *Ammodiscus* cf. *A. milletianus* Chapman [emended to genus *Involutina;* see Loeblich and Tappan, 1954] from a bore hole which penetrated Permian rocks in New South Wales, Australia. This is the first indication that marine conditions in Permian times extended as far to the southwest in New South Wales as Coorabin.

Crespin, I., 1944, Some Permian Foraminifera from eastern Australia: Roy. Soc. Queensland, Proc., v. 56, p. 23-29, pl. 3.

From the Permian rocks of Queensland and New South Wales, Australia, a foraminiferal fauna of ten species, of which four are new, is described and illustrated by whole specimen photomicrographs. The new forms are: *Nodosaria serocoldensis* [now referred to *Rectoglandulina serocoldensis* (Crespin); see Crespin, 1958, p. 107], *N. springsurensis, Dentalina grayi,* and *Frondicularia parri.*

Crespin, I., 1947, Foraminifera in the Permian rocks of Australia: Australia Bur. Min. Res., Geol. and Geophys., B., no. 15 (Palaeont. Ser. no. 5), 25 p., 2 pl.

A thorough assessment of the Foraminifera found to date in the Permian rocks of Australia; distribution and foraminiferal range charts are given. Foraminiferal assemblages are discussed in detail and sound paleoecologic observations made. All species discussed have been previously described; fourteen of the more common diagnostic forms are illustrated by photographs and line drawings. The reference to the fusulinid genera *Verbeekina* and *Neoschwagerina* originally reported by Chapman and Parr in 1937 is quoted; however, a more recent publication by Crespin and Belford, 1957, states that no fusulinids have been found in the Late Paleozoic rocks of Australia.

Crespin, I., 1950, Foraminifera in Australian stratigraphy: 18th. Int. Geol. Cong., Gt. Britain, 1948, pt. 15, p. 65-69.

Brief summary of the distribution of Permian Foraminifera and their relationship to Australian Late Paleozoic stratigraphy. For a complete revision of earlier Australian references pertaining to Late Paleozoic Foraminifera see Crespin, 1958.

Crespin, I., 1958, Permian Foraminifera of Australia: Bur. Min. Res., Geol. and Geophys., Bull. 48, 207 p., 33 pl.

One hundred and six species of Permian Foraminifera are discussed and illustrated by both whole specimen and thin-section photomicrographs. Four new genera, *Sacculinella, Hyperamminita, Pseudohyperammina,* and *Giraliarella* are named, all of which are arenaceous forms. Fifty-two new species are described. Arenaceous Foraminifera, especially the genera *Ammodiscus* [now referred to *Involutina*], *Hyperammina, Reophax, Thurammina,* and *Thuramminoides,* are characteristic of the majority of surface samples. Calcareous perforate genera of the Lagenidae, such as *Nodosaria, Dentalina, Lingulina, Frondicularia,* and *Geinitzina,* dominate the assemblages in subsurface samples. The genera *Lenticulina* (*Astacolus*) and *Rectoglandulina* have been recognized for the first time in the Permian rocks of Australia. Calcareous imperforate genera include both mobile and encrusting forms such as *Hemigordius, Flectospira, Streblospira, Calcitornella, Plummerinella, Orthovertella,* and *Trepeilopsis.* Distinctive faunal assemblages have enabled certain widely separated rock units to be correlated. The

new species include: *Hippocrepinella biaperta, Proteonina arenosa, Thurammina phialaeformis, Pelosina ampulla, Sacculinella australae, Hyperammina callytharraensis, H. fletcheri, H. fusta, H. hadzeli, H. hebdenensis, Pseudohyperammina radiostoma, Giraliarella travesi, G. angulata, G. rhomboidalis, Earlandia condoni, Reophax belfordi, R. ellipsiformis, Lugtonia thomasi, Ammodiscus erugatus, A. oonahensis* [*Ammodiscus* now referred to the genus *Involutina;* see Loeblich and Tappan, 1954], *Glomospirella nyei, Ammobaculites eccentrica, A. wandageensis, Spiroplectammina carnarvonensis, Textularia bookeri, T. improcera, Calcivertella palata, Plummerinella kimberleyensis, Trepeilopsis australiensis, Trochammina laevis, T. pokolbinensis, Placopsilina wooramelensis, Stacheia dickinsi, Lenticulina (Astacolus) initialis, Dentalina habra, D. nerrimaensis, Nodosaria crassula, N. decoris, N. fisheri, N. spiculata, N. raggatti, N. tereta, Frondicularia aulax, F. hillae, F. impolita, F. limpida, F. semicostula, F. sutilis, Geinitzina caseyi, G. striato-sulcata,* and *Spirillina papillodentala.*

Taxonomic changes incorporated in this work are as follows: *Thurammina papillata* Chapman and Howchin, 1905, and Parr, 1942 = *Thurammina phialaeformis; Crithionina teicherti* Parr, 1942 = *Thuramminoides teicherti* (Parr); *Hyperamminoides acicula* Parr, 1942 = *Hyperammina acicula* (Parr); *Hyperamminoides expansus* Plummer, 1945 = *Hyperammina expansa* (Plummer); *Hyperamminoides* sp. cf. *H. proteus* Crespin and Parr, 1941, and *H. acicula* Parr, Crespin 1947 (pars) = *Hyperammina hebdenensis; Hyperammina? rudis* Parr, 1942 = *Hyperamminita rudis* (Parr); *Haplophragmium emaciatum* Chapman and Howchin, 1905 = *?Haplophragmoides neocomianus* (Chapman); *Textularia eximia* Crespin and Parr, 1941 = *T. bookeri; Nubecularia lucifuga* DeFrance var. *stephensi* Howchin, 1894, *N. stephensi* Chapman and Howchin, 1905, *Placopsilina tenuitesta,* Chapman and Howchin, 1905, and *Nubecularia stephensi* Etheridge, 1907 = *Calcitornella stephensi* (Howchin); *Trepeilopsis grandis* Chapman in Raggatt, 1936 = *T. australiensis; Truncatulina haidingeri* Chapman and Howchin, 1905, and *Ammodiscus planoconvexus* Chapman, Howchin, and Parr, 1934 = *Trochammina pokolbinensis* new name; *Nodosaria (Dentalina) labiata* Chapman and Howchin, 1905 = *Nodosaria irwinensis* Howchin; *Monogenerina pyramidis* Chapman and Howchin, 1905 = *Nodosaria pyramidis* (Chapman and Howchin); *Nodosaria serocoldensis* Crespin, 1945 = *Rectoglandulina serocoldensis* (Crespin); *?Pleurostomella antiqua* Chapman and Howchin, 1905, *Nodosaria? antiqua* Chapman, Howchin, and Parr, 1934 = *Lingulina antiqua* (Chapman and Howchin), *Bulimina affinis* Chapman and Howchin, 1905 = *Lingulina davidi* Chapman, Howchin, and Parr, *Frondicularia woodwardi* Crespin, 1945 = *F. aulax, Geinitzina postcarbonica* Chapman and Howchin, 1905, and *G. chapmani* Schubert, 1915 = *G. triangularis* Chapman and Howchin.

Pertinent comments on genera and species along with paleoecologic observations are also included.

CRESPIN, I., and BELFORD, D. J., 1957, New genera and species of Foraminifera from the Lower Permian of western Australia: Contrib. Cushman Found. Foram. Research, v. 8, pt. 2, p. 73-76, 80-81, pl. 11-12.

Two new genera belonging to the family Ophthalmidiidae, from the Lower Permian of western Australia, are described. The genus *Streblospira* is represented by three species, *S. meandrina, S. kimberleyensis,* and *S. australae;* and the genus *Flectospira* by one species, *F. prima.* Both whole specimen and thin-section photomicrographs are included.

CRESPIN, I., and PARR, W. J., 1941, Arenaceous Foraminifera from the Permian rocks of New South Wales: Roy. Soc. New South Wales, Jour., Proc. v. 74, p. 300-311, pl. 12, 13.

From the Permian rocks of New South Wales, Australia, a foraminiferal fauna of six species, of which four species and one genus are new, is described and illustrated by line drawings. The new forms are: *Ammodiscus multicintus* [emended to the genus *Involutina;* see Loeblich and Tappan, 1954], *Ammobaculites woolnoughi, Digitina recurvata* n. gen. [Cummings, 1956, p. 214, suggests that the genus *Digitina* may be a synonym of *Mooreinella* Cushman and Waters, 1928], and *Trochammina pulvillus* [*recte pulvilla,* Crespin, 1958.].

CUMMINGS, R. H., 1955, New genera of Foraminifera from the British Lower Carboniferous: Wash. Acad. Sci., Jour., v. 45, p. 1-8, text-fig. 1-5.

A revision of Brady's collection of British Lower Carboniferous Foraminifera has made possible the establishment of three new genera and their type species. Of the family Endothyridae, subfamily Bradyininae, the new genus *Endothyranopsis* with *E. crassus* (Brady) as the type species; of the new subfamily Loeblichinae the new genus *Loeblichia* with *L. ammonoides* (Brady) as the type species, and of the family Trochamminidae the new genus *Fourstonella* with *F. fusiformis* (Brady) as the type species. The author suggests that *Loeblichia* may prove to be the ancestral stock from which the problematical fusulinids such as *Ozawainella,* and *Nankinella* arose. The fauna is illustrated by drawings.

CUMMINGS, R. H., 1955, *Stacheoides,* a new foraminiferal genus from the British Upper Paleozoic: Wash. Acad. Sci., Jour., v. 45, no. 11, p. 342-346, 8 text-fig.

From rocks of the British Lower Carboniferous one new genus, *Stacheoides,* is defined and referred to the family Opthalmidiidae. One new species, *S. papillata,* is described, and Brady's form *Stacheia polytrematoides* Brady, 1876, is now referred to *Stacheoides polytrematoides* (Brady), 1876. Photomicrographs of the above forms are also included.

CUMMINGS, R. H., 1955, *Nodosinella* Brady, 1876, and

associated Upper Palaeozoic genera: Micropaleontology, v. 1, p. 221-238, 1 pl., 10 text-fig.

A revision of the type material of the forms grouped by Brady, 1876, under the genus *Nodosinella* has led to an emendation of this genus and of the family Nodosinellidae. A new family, the Earlandiidae, is erected to include *Earlandia* Plummer, 1930, *Earlandinella* n. gen., *Earlandinita* n. gen., and *Lugtonia* n. gen. Lower Carboniferous representatives of the Hyperammininae and Reophacidae are also described. Wall structure and especially secondary alteration of wall structure is fully outlined. A key to the genera is given and their known stratigraphic range is considered. The following new forms are described and illustrated by drawings and whole specimen photomicrographs: *Earlandia pulchra, Lugtonia minima, L. inflata, L. elongata, Reophax lawensis,* and *R. dalriensis.*

CUMMINGS, R. H., 1956, A revision of the upper Palaeozoic textulariid Foraminifera: Micropaleontology, v. 2, p. 201-242, pl. 1, 24 text-fig.

The problems of a complete revision of the Late Paleozoic textulariid Foraminifera are outlined, the morphology of the group is described in a detailed review of each biocharacter, and the various bioseries are contrasted with the known ontogenic patterns of the genera. The systematic revision recognizes the new family Palaeotextulariidae, which includes the genera *Palaeotextularia, Cribrostomum, Climacammina, Cribrogenerina, Deckerellina, Deckerella, Palaeobigenerina,* and *Monogenerina;* assesses the status of *Textularia* and *Bigenerina,* of the family Textulariidae, and concludes that the occurrence of *Textularia* and *Bigenerina sensu stricto* in the Paleozoic is to be questioned but not denied. Eleven new species of the Palaeotextulariidae are described and illustrated by drawings and whole specimen photomicrographs. New forms are: *Palaeotextularia davisella, P. angulata, Cribrostomum scoticum, C. wilkiestoni, C. ponielum, C. inflatum, C. linnum, C. oveyi, Climacammina superparva, C. ferra,* and *Deckerella quadrata.* An excellent bibliography is also appended.

CUMMINGS, R. H., 1958, The faunal analysis and stratigraphic application of upper Paleozoic smaller Foraminifera: Micropaleontology, v. 4, no. 1, p. 1-24, 1 pl., 6 text-fig.

The value of smaller Foraminifera in Upper Paleozoic stratigraphy is greatly enhanced by the adoption of an integrated procedure of analysis utilizing assemblages from both hard and soft rocks within a stratigraphic sequence. The combined assemblages lead to much greater accuracy in faunal studies. Since a large proportion of most stratigraphic studies must rely on random thin sections in limestone a new technique has been introduced defining more concisely the planes of section. This is achieved by imposing on the solid foraminifer, in a conventional manner, a system of three axes, *A, B,* and *C,* all at right angles to one another. Having identified the three axes in any arbitrary manner, it is possible to define the attitude of any plane of section cutting the foraminifer in a manner similar to the method employed in crystallography. Numerous examples of the above technique are given using the family Palaeotextulariidae as a model. A method of log plotting is also illustrated and its application discussed in detail.

CUSHMAN, J. A., 1928, The microspheric and megalospheric forms of *Apterrinella grahamensis:* Contrib. Cushman Lab. Foram. Research, v. 4, pt. 3, p. 68, 69, 72, pl. 9, fig. 1-4.

Apterrinella grahamensis (Harlton), originally described by Harlton as *Tolypammina grahamensis,* is examined and its microspheric and megalospheric forms illustrated by line drawings and discussed in detail. The author claims that this species perfectly illustrated Hofker's so-called "trimorphism."

CUSHMAN, J. A., 1928, Additional genera of the Foraminifera: Contrib. Cushman Lab. Foram. Res., v. 4, pt. 4, p. 1-8.

It has been found that Schellwien's genus *Psammophis* is preoccupied hence, a new foraminiferal genus *Ammovertella* is proposed with *Psammophis inversus* Schellwien as the genoholotype.

CUSHMAN, J. A., 1942, A new *Cribrogenerina* from the Permian of Texas: Contrib. Cushman Lab. Foram. Research, v. 18, pt. 3, p. 67-69, pl. 16.

First described American species of *Cribrogenerina* from the Permian (Leonard), Bone Springs limestone, of Hudspeth County, Texas, is fully discussed and illustrated by whole specimen photomicrographs. Several series of specimens have been etched from the limestone and the internal and external features are noted. *Cribrogenerina* is usually entirely uniserial and the biserial stage usually omitted. The aperture becomes regularly cribrate early in development, and in the adult stage the entire terminal face is a cribrate plate. The new species is referred to *Cribrogenerina kritzi.* Previous reports of *Cribrogenerina* are also discussed.

CUSHMAN, J. A., and WATERS, J. A., 1927, Pennsylvanian Foraminifera from Michigan: Contrib. Cushman Lab. Foram. Research, v. 3, pt. 2, p. 107-110, pl. 22.

From the Middle Pennsylvanian rocks near Grand Ledge, Michigan, a foraminiferal fauna of eight species, of which four are new, is described and illustrated by line drawings. New forms are: *Ammobaculites compressa, Turritellella spirans* [changed to *Trepeilopsis spirans* (Cushman and Waters); see Cushman and Waters, 1928, p. 38], *Hyperammina bulbosa* [=*Earlandia bulbosa* (Cushman and Waters); see St. Jean, 1957, p. 41], and *Trochammina rudis.*

CUSHMAN, J. A., and WATERS, J. A., 1927, Arenaceous Paleozoic Foraminifera from Texas: Contrib. Cush-

man Lab. Foram. Research, v. 3, pt. 3, p. 146-153, pl. 26-27.

From the Late Paleozoic rocks of Texas a foraminiferal fauna of fifteen new species is described and illustrated by line drawings. New forms are: *Hyperammina glabra, Nodosinella arenata* [changed to *Reophax arenatus* (Cushman and Waters); see Plummer, 1944, p. 225], *Nodosinella glabra* [later Cushman and Waters showed that the form was more accurately placed as *Hyperamminoides glabra* (Cushman and Waters); recently, Conkin, 1954, has renamed this form *Hyperammina neoglabra,* in a revision in which *Hyperamminoides* is included as a synonym of *Hyperammina*], *Glomospira duplex, G. umbilicata, Psammophis inclusus* [redefined as *Ammovertella inclusa* (Cushman and Waters); see Cushman and Waters, 1930, p. 44], *Trepeilopsis grandis, Ammobaculites spirans, Spiroplectammina clavata, Textularia exrayensis, T. fuscalignensis, T. grahamensis* [now referred to *Palaeotextularia grahamensis* (Cushman and Waters); see Cummings, 1956, p. 214], *Trochammina arenosa, Ammchilostoma? triloculina* [later changed to *Glyphostomella triloculina* (Cushman and Waters); see Cushman and Waters, 1928, p. 54], and *Tetrataxis multiloculata* [later changed to *Polytaxis multiloculata* (Cushman and Waters); see Cushman and Waters, 1928, p. 51].

CUSHMAN, J. A. and WATERS, J. A., 1928, Some Foraminifera from the Pennsylvanian and Permian of Texas: Contrib. Cushman Lab. Foram. Research, v. 4, pt. 2, p. 31-55, pl. 4-7.

From the Pennsylvanian and Permian rocks of Texas a foraminiferal fauna of thirty species, of which twenty-seven species and nine genera are new, is described and illustrated by line drawings. The new forms are: *Proteonina cervicifera, Thurammina texana, Hyperammina spinescens, Hyperamminella elegans* n. gen., *H. protea, H. minuta* [the genus *Hyperamminella* is now referred to the genus *Hyperammina;* see Conkin, 1954], *Reophax asperus* [*recte asper, fide* Plummer, 1944, p. 226], *Trepeilopsis* n. gen., *Ammodiscoides conica, Glomospira spinosa, Ammobaculites stenomeca* [*recte stenomecus, fide* Plummer, 1944, p. 236], *A. inconspicua* [*recte inconspicuus, fide* Ireland, 1956, p. 855], *A. stormi* [=*Endothyranella stormi* (Cushman and Waters); see St. Jean, 1957, p. 33], *Agathammina protea, Hemigordius harltoni, H. liratus, H. calcarea, Cornuspira thompsoni, Orthovertella protea* n. gen., [now referred to *Lituotuba protea* (Cushman and Waters); see Reitlinger, 1950, p. 22], *Plummerinella complexa* n. gen., *Mooreinella biserialis* n. gen., *Tetrataxis millsapensis, Polytaxis laheei* n. gen., *Bradyina millsapensis, Glyphostomella* n. gen., and *Patellina protea.*

CUSHMAN, J. A., and WATERS, J. A., 1928, Additional Cisco Foraminifera from Texas: Contrib. Cushman Lab. Foram. Research, v. 4, pt. 3, p. 62-67, pl. 8.

One new genus, *Apterrinella,* is described and illustrated by drawings. Of the eight new species, six are described from two outcrops in the Graham formation (Virgil), and two from an outcrop at the top of the Pueblo formation (Wolfcamp). The new forms are as follows: *Tolypammina delicatula, Spiroplectammina castensis, Bigenerina ciscoensis, Geinitzina ciscoensis, Globivalvulina biserialis, G. ovata, Tetrataxis scutella,* and *T. corona.*

CUSHMAN, J. A., and WATERS, J. A., 1928, *Hyperamminoides,* a new name for *Hyperamminella* Cushman and Waters: Contrib. Cushman Lab. Foram. Research, v. 4, pt. 4, p. 112.

Hyperamminoides Cushman and Waters, 1928, is considered invalid and suppressed in favor of *Hyperammina* Brady, 1878 [see Conkin, 1954, p. 165].

CUSHMAN, J. A., and WATERS, J. A., 1928, The development of *Climacammina* and its allies in the Pennsylvanian of Texas: Jour. Paleontology, v. 2, p. 119-130, pl. 17-20.

Climacammina cylindrica and *Deckerella laheei* n. spp. are described from the Graham formation (Virgil) in Young County, Texas, and *Climacammina cushmani* (Harlton) and *Deckerella clavata* n. sp. from the Kickapoo Falls limestone, Millsap Lake formation (Des Moines), in northern Hood County, Texas [not Parker County as recorded; *fide* Plummer, 1944, p. 263]. All forms are illustrated by either whole specimen or thin-section photomicrographs.

CUSHMAN, J. A., and WATERS, J. A., 1928, Upper Paleozoic Foraminifera from Sutton County, Texas: Jour. Paleontology, v. 2, p. 358-371, pl. 47-49.

This is a study of the Permian fauna found in core samples from a boring for potash in Sutton County, Texas. *Spandelina* and its subgenus *Spandelinoides* are described as new. Of the twenty-three species and subspecies recorded, ten are new: *Endothyra rotunda, Ammobaculites suttonensis, A. texturata, Spiroplectammina suttonensis, Monogenerina texana, Spandelina excavata* n. gen., *S. texana, S. fissicostata, S. (Spandelinoides) nodosariformis,* and *S. (Spandelinoides) striatella.* The fauna is illustrated by whole specimen photomicrographs.

CUSHMAN, J. A., and WATERS, J. A., 1930, Foraminifera of the Cisco group of Texas: Univ. Texas Bull. no. 3019, p. 22-81, pl. 2-12.

Fifty species and subspecies, of which five are new, were found in eighteen samples from four formations of the Cisco group (Virgil); one sample of the Gaptank formation in Pecos County, Texas [not Brewster County as recorded; *fide* Plummer, 1944, p. 263] has been included. The new species are as follows: *Glomospira reversa, G. diversa, Endothyra pauciloculata, Trochammina grahamensis,* and *Placopsilina ciscoensis.* A good many of the authors' forms have been referred to other genera by later workers. The fauna is illustrated by whole specimen and thin-section photomicrographs.

DAIN, L. G., and GROZDILOVA, L. P., 1953, Fossil Foraminifera of the U.S.S.R., Tournayellidae and Archaediscidae: Trans., All-Union Petroleum Scientific Research Geological Exploration Institute, No. 74, 127 p., 11 pl., [in Russian].

One section of the fossil Foraminifera of the U.S.S.R. The book is divided into two integral parts; one embracing the family Tournayellidae by Dain and the other a compilation of the family Archaediscidae by Grozdilova.

In the section on the Tournayellidae the following four genera, thirteen species, and one variety are new: *Glomospiranella* (n.gen.) *rauserae, G. endothyroides* var. *quadriloba, G. asiatica, G. glebovskayae, Brunsiina* (n.gen.) *lipinae, B. uralica, Tournayella* (n.gen.) *discoidea, T. segmentata, Carbonella* (n.gen.) *spectabilis, Forschiella ampla, Lituotubella radaevkaensis, Mstinia orientalis, M. tchernyshevi.* Taxonomic changes include: *Endothyra* (?) *krainica* Lipina 1948 = *Brunsiina krainica* (Lipina); *Endothyra* (?) *minuta* Lipina, 1948 = *Tournayella minuta* (Lipina); *nom. nov., Forschia* (?) *subangulata* Mikhailov, 1939 = *Forschia mikhailovi* Dain.

In the section on the Archaediscidae the following nine species and three varieties are new: *Archaediscus convexus, A. velgurensis, A. vischerensis, A. donetzianus, A. angulatus, A. baschkiricus* Krest. and Theod. var. *pressula, A. latispiralis, A. gregorii* var. *gregorii, A. gregorii* var. *acutiformis, A. stilus,* and *A. minimus.*

Thin-section photomicrographs of all forms are included, along with keys to aid in identifying individual species; stratigraphic ranges are summarized in chart form.

DAVIS, A. G., 1951, *Howchinia bradyana* (Howchin) and its distribution in the Lower Carboniferous of England: Geologists Assoc. London, Proc., v. 62, pt. 4, p. 248-253, pl. 10, 11.

Howchinia bradyana (Howchin) [formerly *Patellina bradyana* Howchin, 1888; see Cushman and Waters, 1927, p. 42], is redescribed and reillustrated by excellent thin-section photomicrographs. At present, *Howchinia* is known only from the English Carboniferous and is regarded as a derivative of *Cornuspira* Schultze. The author suggests that *Lasitrochus* Reichel and *Lasiodiscus* Reichel, from the Upper Permian of Greece and Cyprus, may be derived from *Howchinia.* The foraminifer is often found associated with abundant dasycladaceous algae. [See Reitlinger, 1954, for discussion of relationship of *Howchinia* to the Lasiodiscids.]

DAWSON, J. W., 1868, Acadian geology: 2nd. Ed., MacMillan and Co., London, p. 285, text-fig. 82.

From the Carboniferous rocks of Nova Scotia one new species of foraminifer, *Dentalina priscilla* [referred by Brady, 1876, p. 24, to *Nodosinella priscilla* (Dawson), now referred to *Earlandinita priscilla* (Dawson); see Cummings, 1955, p. 227], is briefly described and illustrated by a simple line drawing.

DELEAU, P., and MARIE, P., 1955, Existence de Fusulinides dans le Westphalien C du Sud-Oranais (Algerie): Soc. Géol. France, C. R. Somm. no. 11-12, p. 220-221, [in French].

From the Lower Pennsylvanian rocks (Westphalian) of Algeria a fauna of ten forms (one fusulinid) is reported. Representative genera are: *Endothyra, Nummulostegina, Climacammina, Biseriammina, Polytaxis, Tolypammina, Hemigordius, Cornuspira,* and *Glomospira.*

DESIO, A., and CITA, M. B., 1955, Nuovi ritrovamenti di calcari fossiliferi del Paleozoico superiore nel bacino del Baltoro (Himalaya-Karakorum): Accad. Nazion. Lincei, Rendic., cl. fis. mat. nat. (8), v. 18, no. 6, p. 587-598, 4 text-fig., [in Italian].

From the Upper Paleozoic rocks in the Baltoro Basin (Himalaya-Karakorum) one smaller Foraminifera referred to the genus *Quinqueloculina?* is reported and illustrated along with several Permian fusulinids. [The form in question cannot be referred to *Quinqueloculina* (Jurassic-Recent), but is more probably either *Archaediscus* or *Glomospira;* photo is quite poor hence the wall structure cannot be properly ascertained.]

DOUGLAS, J. A., 1950, The Carboniferous and Permian faunas of south Iran and Iranian Baluchistan: Geol. Survey India, Mem., n.s., v. 22, Mem. 7, p. 42-44, pl. 4, fig. 9-12.

From the Middle Carboniferous and Permian rocks of Iran six species of smaller Foraminifera, all previously described, are discussed and four of them illustrated by thin-section photomicrographs. They are: *Agathammina pusilla* (Geinitz), *Monogenerina atava* Spandel, *Cribrogenerina sumatrana* (Volz), *Climacammina* sp., *Padangia perforata* Lange, and *Pachyphloia* sp.

EHRENBERG, C. G., 1854, Zur Mikrogeologie: Leipzig, Germany, L. Voss, p. 24, pl. 37, gp. 11, fig. 12-13, [in German].

From the Kohlen-formation of Tula, U.S.S.R. one new genus and species, *Tetrataxis conica,* is noted and illustrated by rather poor drawings. [Attention is called to the fact that Ehrenberg in 1843 introduced the name *T. conica* which was invalid, for although he followed the principle of binomial nomenclature he did not accompany the published name with a figure, definition, or description; hence the name remained *nomina nuda* until corrected in 1854 when Ehrenberg published the name *T. conica* again, and accompanied it with a figure thus establishing the genus and species as valid under the International Rules of Zoological Nomenclature. Accordingly, *T. conica* dates from 1854 not 1843 as Harlton, 1927, and Cushman and Waters, 1930, have indicated.]

EIMER, G. H. T., and FICKERT, C., 1899, Die Artbildung und Verwandtschaft beiden den Foraminiferan: Zeitschr. Wiss. Zool., v. 65, pt. 4, p. 599-708, 45 text-fig., [in German].

One new genus, *Moellerina,* is described and illustrated by a line-drawing [later work by Cummings, 1956, p. 225, indicates that this form should be placed under the genus *Climacammina*].

ELIAS, M. K., 1950, Paleozoic *Ptychocladia* and related Foraminifera: Jour. Paleontology, v. 24, p. 287-306, pl. 43-45, 2 text-fig.

Banded and alveolated structure of calcareous wall, manner of partition of chamber, and discovered megalospheric generation for the genus *Ptychocladia,* whose microspheric generation was previously classified with the ctenostomatous bryozoa, indicate its belonging with adnate Foraminifera. New varieties *P. agellus* var. *tenuis* and var. *rotaliformis,* and new species *P. bassleri* from the Pennsylvanian of Nebraska, Kansas, and Oklahoma are described. *Chabakovia* Vologdin, a supposed alga from the Middle or Lower Cambrian of the southern Urals, is considered related to *Ptychocladia* and hence is the oldest known foraminifer. A similar form from the Lower Permian of Russia is provisionally classified as *Chabakovia (?) shulgae* n. sp. and another new species *Bdelloidina (?) permica* from the Lower Permian of Texas is described. All mentioned forms and the extant genus *Bdelloidina* are united in a new family Ptychocladiidae. The life-cycle of *Ptychocladia* and the evolution and ecology of the new family are discussed. All forms are illustrated by excellent whole specimen and thin-section photomicrographs.

ELIAS, M. K., 1957, Late Mississippian fauna from the Redoak Hollow formation of southern Oklahoma, Part I: Jour. Paleontology, v. 31 [Foraminifera], p. 378-379, pl. 39, fig. 1, 2, 4.

From the late Mississippian Redoak Hollow formation of southern Oklahoma four previously described species of Foraminifera, and one new variety, are described and illustrated by whole specimen photomicrographs. The new form, *Ptychocladia bassleri* Elias var. *oklahomensis,* was previously described and classified as a ctenostomatous bryozoan, but is here described as an encrusting foraminifer.

ETHERIDGE, R., 1873, On the occurrence of Foraminifera (*Saccammina carteri* Brady), in the Carboniferous limestone series of the east of Scotland: Edinburgh Geol. Soc., Trans. v. 2, p. 225, 226.

Fully describes *Saccammina carteri* Brady [now referred to *Saccamminopsis fusuliniformis* (McCoy); see McCoy, 1849, Chapman, 1898, and Sollas, 1921], and discusses its occurrence in the Lower Carboniferous limestones of eastern Scotland.

ETHERIDGE, R., JR., 1907, Palaeontological contributions to the geology of western Australia. Pt. 4, Descriptions of Carboniferous fossils from the Irwin River, collected by Mr. C. F. V. Jackson, late assistant government geologist: Geol. Survey Australia, Bull. 27, p. 26-37, pls. 7-10.

From the Permian rocks of western Australia the previously described encrusting foraminifer *Nubecularia stephensi* Howchin is described and illustrated by excellent line drawings. [Later work, see Crespin, 1958, p. 84, and re-examination of the original material indicates that this form should be referred to *Calcitornella stephensi* (Howchin).]

FLEURY, E., 1924, Notes sur les Foraminifères du Vissen de l'Alentejo et l'anatomie des petits Goniatites de la même formation: Com. Serv. Geol. Portugal, v. 15, p. 49-78, 2 pl., 6 text-fig., [in French].

From the Lower Carboniferous rocks of Alentejo in Portugal the following Foraminifera are briefly described and illustrated by quite poor thin-section photomicrographs: *Saccammina carteri* Brady [now referred to *Saccamminopsis fusuliniformis* (McCoy); see McCoy, 1849, Chapman, 1898, and Sollas, 1921], *Endothyra* sp. *?, Lagena* sp. ind., *Bigenerina* sp. ind., and *?Textularia.*

GALLOWAY, J. J., and HARLTON, B. H., 1928, Some Pennsylvanian Foraminifera of Oklahoma, with special reference to the genus *Orobias:* Jour. Paleontology, v. 2, p. 338-357, pl. 45, 46.

From the Pennsylvanian rocks of Oklahoma a fauna of eighteen species (eight fusulinids, three new), of which six species and one genus are new, is described and illustrated by whole specimen photomicrographs. New forms are: *Ammovertella undulata, A. latimerensis, A.? confusa, Bullopora wapanuckaensis, B. redoakensis* [the genus *"Bullopora* is a degenerate attached form, often abundant, particularly in the Cretaceous. The Paleozoic species referred to this genus are entirely different, and belong to the genus *Placopsilina;"* see Cushman "Foraminifera," 1955, p. 230], and *Tuberitina bulbacea* n. gen. A discussion of the wall structure of Paleozoic Foraminifera is given, and the author maintains that the walls of nearly all Paleozoic Foraminifera, instead of being agglutinated, are calcareous and were secreted by the animal. "Arenaceous" forms were derived from calcareous forms, instead of the reverse.

GALLOWAY, J. J., and HARLTON, B. H., 1930, *Endothyranella,* a genus of Carboniferous Foraminifera: Jour. Paleontology, v. 4, p. 24-28.

The test of this genus is compared with that of other well-known calcareous Carboniferous genera and also with the test of "agglutinate" species of *Ammobaculites.* Numerous species already recorded from Texas and Oklahoma under other generic designations are transferred to *Endothyranella.* The genus appeared in the Upper Mississippian, reached its maximum development in the Middle Pennsylvanian, and became

extinct in the Upper Pennsylvanian. *Endothyranella* belongs to the family Endothyridae and was derived from the genus *Endothyra* by becoming evolute.

GALLOWAY, J. J., and RYNIKER, C., 1930, Foraminifera from the Atoka formation of Oklahoma: Oklahoma Geol. Survey, Circ. no. 21, 27 p., 5 pl.

From the Lower Pennsylvanian Atoka formation of Oklahoma a fauna of thirty-three species, of which six species and one genus are new, is described and illustrated by whole specimen photomicrographs. The authors claim that the fundamental wall structure of most of the forms is calcareous and transversely fibrous, although outside of the fibrous layer there may be a granular calcareous layer; foreign grains may also be embedded in the walls. From this study they believe there is no evidence to support the contention that calcareous forms were derived from the arenaceous forms, but much evidence for the converse interpretation. New forms are: *Spirillina radiata, S. concavoconvexa, Agathammina magnatuba, Endothyra whitesidei, Endothyranella* n. gen. [genoholotype *E. powersi* (Harlton) = *Ammobaculites powersi* Harlton], *Tetrataxis concava,* and *Bullopora modesta* [Cushman, 1955, "Foraminifera" p. 230 states *"Bullopora* is a degenerate attached form, often abundant, particularly in the Cretaceous. The Paleozoic species referred to this genus are entirely different, and belong to *Placopsilina."*].

GALLOWAY, J. J., and SPOCK, L. E., 1933, Pennsylvanian Foraminifera from Mongolia: Amer. Mus. Novitates, no. 658, p. 1-7, 2 fig.

A fauna collected from a single block of limestone in the east-central part of inner Mongolia established the existence of marine rocks of Pennsylvanian age in the Gobi region. Thin-section studies yielded a fauna of six previously described species, including one fusulinid. The author states the age of the rock is Middle Pennsylvanian, Upper Moscovian, and very close to the Huanglung limestone of the Lungstan area of east central China. Foraminifera identified are: *Endothyra* sp., *Bradyina nautiliformis* Möller, *Globivalvulina* cf. *G. bulloides* (Brady), *Tetrataxis conica* Ehrenberg, *Climacammina* sp., and the fusulinid *Schubertella lata* Lee and Chen.

GANELINA, R. A., 1956, Foraminifera of the Visean sediments of the northwest region of the Moscow syncline: All-Union Petroleum Scientific-Research Geol. Exploration Inst., Trans., n.s. Publ. 98, p. 31-159, 12 pl., [in Russian].

From the Mississippian (Visean) sediments of the northwest region of the Moscow syncline a microfauna of fifty-nine species (eleven fusulinids, nine new; forty-eight smaller Foraminifera, forty-four new species and one new genus) is described and illustrated by thin-section photomicrographs. The new forms are: *Cornuspira captiosa, Rectocornuspira compta, R. prolixa, R. dilucida, R. diffusa, R. diserta, R. (?) insolentis, Haplophragmella tulica, Archaediscus glomus, A. electus, A. spectabilis, A. matutinus, A. approximatus, A. rhombiformis, Deckerella conquista, Climacammina padunensis, Monotaxis declivis* [Reitlinger, 1954, believes that the genus *Monotaxis* is a synonym of *Howchinia*], *Tetrataxis conciliatus, Quasiendothyra adducta, Q. fucosa, Endothyra posneri, E. sulcata, E. expressa, E. geniculata, E. apposita, E. explicata, E. tatianae, E. excelsa, E. stalinogorski, E. wjasmensis, E. frequentata, E. dorogobuzhica, E. archaediscoidea, E. celsa, E. ovalis, E. korbensis, E. umbonata, Mikhailovella mica* n. gen., *Samarina minuscularia, S. calceus, S. rovrensis, S. orbiculata, Bradyina flosulcus,* and *B. modia.*

GEINITZ, H. B., 1848, Die Versteinerungen des Zechsteingebirges und Rothliegenden oder des permischen Systemes in Sachsen: Arnoldische Buchandlung, Dresden und Leipzig, p. 6, pl. 3, fig. 3-6, [in German].

From the Permian Zechstein rocks of Saxony, Germany, one foraminifer, described under the annelids, is discussed and illustrated by line drawings. The new form is described as *Serpula pusilla* Geinitz [Brady, 1876, p. 26, transfers the forms to *Trochammina pusilla* (Geinitz); foraminifer now referred to *Glomospira pusilla* (Geinitz), see Cushman and Waters, 1927, p. 108].

GEINITZ, H. B., 1861, Dyas oder die Zechsteinformation und das Rothliegende, Pt. 1: Die Animalsichen Ueberreste der Dyas; p. 39-41, 120-123, pl. 10, 20, [in German].

From the Permian Zechstein formation of Germany a fauna of thirteen species is described and illustrated by line drawings. The fauna includes the following (notations and corrections in brackets from Brady, 1876, p. 26, 27 unless otherwise noted): *Nodosaria duplicans* Richter, *N. subacicula* Richter [doubtful organisms], *N. geinitzi* Reuss [*N. radicula* (Linné)], *N. kingi* Reuss, *N. kirkbyi* Richter, *N. jonesi* Richter [varieties of *N. radicula* (Linné)], *Dentalina permiana* Jones [*D. communis* d'Orbigny], *D. kingi* Jones [*D. multicostata* d'Orbigny], *Textularia cuneiformis* Jones, *T. triticum* Jones [according to Cummings, 1956, p. 215, *T. cuneiformis* Jones, 1850 (*non* d'Orbigny, 1839), designated by Cushman, 1928, as type species of *Geinitzina* Spandel 1901; recognized as a homonym by Brady, 1876, and renamed *Textularia jonesi* Brady, 1876; *T. jonesi* Brady, 1876, based on *T. cuneiformis* Jones, 1850 (*non* d'Orbigny, 1839); examination of the wall structure shows that this form cannot be referred to the Textulariidae and must be included in the Lagenidea; it follows that the genus *Geinitzina* must be considered a member of the Lagenidea], and *Serpula pusilla* Geinitz [now referred to *Glomospira pusilla* (Geinitz); see Cushman and Waters, 1927, p. 108].

GIRTY, G. H., 1908, The Guadalupian fauna: U.S.G.S. Prof. Paper 58, [Foraminiferal] p. 56-69, Illus.

From the Permian rocks of the Guadalupe Mountains of west Texas and New Mexico nine species of Foraminifera, of which four are fusulinids, are described

and illustrated by thin-section photomicrographs. The smaller foraminifers are: *Endothyra* spp. a, b, and c, *Spirillina* aff. *S. plana* Möller, and *Lingulina?* sp.

GIRTY, G. H., 1911, On some new genera and species of Pennsylvanian fossils from the Wewoka formation of Oklahoma: New York Acad. Sci., Ann., v. 21, p. 124-125.

Erects as new the annelid genus *Serpulopsis* with *Serpula insita* White, 1878, as the type species; no illustrations given. [Girty, 1915, p. 40-42, emended the genus and included rather poor photographs; Henbest, 1958, p. 128, regards this form as a sessile Foraminifera of the family Tolypamminidae.]

GIRTY, G. H., 1915, Fauna of the Wewoka formation of Oklahoma: U. S. Geol. Survey, Bull. 544, p. 40-42, pl. 5, fig. 7, 8.

Emended the genus *Serpulopsis* Girty, 1911, and included rather poor photographs. [Henbest, 1958, now regards this form as a sessile Foraminifera under the family Tolypamminidae.]

GIRTY, G. H., 1915, The fauna of the Batesville sandstone of northern Arkansas: U. S. Geol. Survey Bull., no. 593, p. 26-27, pl. 10, fig. 11-18.

From the Mississippian (Chester) Batesville sandstone of northern Arkansas two species, one new, of Foraminifera are described and illustrated by thin-section photomicrographs. The Foraminifera are *Trochammina?* sp., and *Endothyra discoidea.*

GLEBOVSKAIA, E. M., 1948, Stratigraphic differentiation of the Visean series by means of Foraminifera in the Levshin borehole no. 1: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 67-69, 1 text-fig., [in Russian].

Deals primarily with Visean stratigraphy based upon previously described foraminiferal species.

GREGORIO, A., 1930, Sul Permiano di Sicilia: Ann. Geol. Pal., Palermo, Italie, livr. 52, p. 48-50, pl. 20, [in Italian].

From the Permian rocks of Sicily three smaller Foraminifera are described and illustrated by rather generalized pencil drawings. The new forms are: *Globigerina (Spongina) permica* [most present-day workers believe that the true *Globigerina sensu stricto* did not evolve until Cretaceous time], *Lagenopsis maliarda,* and *Cylindria minuta.*

GROZDILOVA, L. P., 1956, Miliolids of the Upper Artinskian sediments; Lower Permian of the western slope of the Urals: All-Union Petroleum Scientific-Research Geol. Exploration Inst., Trans. n.s. Publ. 98, p. 521-529, 1 pl., [in Russian].

From the Permian Upper Artinskian (Leonard) rocks of the western slope of the Ural Mountains in Russia a microfauna of six miliolid species, of which four species and one variety are new, is described and illustrated by thin-section photomicrographs. The new forms are: *Hemigordius longus, H. permicus, H. nalivkini,* and *H. ovatus* var. *minima.*

GROZDILOVA, L. P., and GLEBOVSKAIA, E. M., 1948, Materials pertinent to the studies of the genus *Glomospira* and other representatives of the family Ammodiscidae in Visean sediments of Makarov, Krasnokamsk, Kizelovsk, and Moscow districts: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser., no. 19), p. 145-149, pl. 1, [in Russian].

From the Lower Carboniferous Visean rocks of the European part of Russia the genus *Glomospira* and other phylogenetically related forms are discussed. A foraminiferal fauna of five species, of which one is new, is described and illustrated by thin-section photomicrographs. The new form is *Glomospira spirillinoides.*

HALL, J., 1856, Description of new species of fossils from the Carboniferous limestones of Indiana and Illinois: Trans. Albany Inst., v. 4, p. 34-35.

From the Lower Carboniferous rocks of the Spergen Hill locality in Indiana one foraminifer, *Rotalia baileyi* [now referred to *Endothyra baileyi;* see Henbest, 1931, p. 90], is briefly described.

HARLTON, B. H., 1927, Pennsylvanian Foraminifera of the Glenn formation of southern Oklahoma: Jour. Paleontology, v. 1, p. 15-26, pl. 1-5.

From the Pennsylvanian Glenn formation of southern Oklahoma a foraminiferal fauna of thirty-one species of which thirteen are new is described and illustrated by whole specimen and thin-section photomicrographs. New forms are: *Nodosinella glennensis, N. ardmorensis* [both now referred to *Reophax glennensis* (Harlton); see Cummings, 1955, p. 227], *Bradyina holdenvillensis, Endothyra ameradaensis, E. elegans, Ammobaculites powersi, Cribrostomum jeffersonensis, C. lucilleae* [listed as *Climacammina lucilleae* (Harlton) by Warthin, 1930], *Archealagena kansasensis, A. adaensis, A. plummerae, Globigerina seminolensis* [Plummer, 1944, p. 264, examined the holotype of *Globigerina seminolensis* and found it to resemble too closely *G. cretacea* d'Orbigny to be a convincing Pennsylvanian foraminifer] and *Nummulostegina ardmorensis.*

HARLTON, B. H., 1928, Pennsylvanian Foraminifera of Oklahoma and Texas: Jour. Paleontology, v. 1, p. 305-310, pl. 52-53.

Of the fifteen new species, three of which are fusulinids, fourteen are from Texas: five from two exposures of Gaptank formation (Des Moines-Virgil) in eastern Brewster County [not Pecos County, as recorded; *fide* Plummer, 1944, p. 264] one from the Kickapoo Falls limestone (Des Moines) in northern Hood County [not Parker County, as recorded; *fide* Plummer, 1944, p. 264] three from an outcrop of Graham formation (Virgil), and five from the Moran formation (Virgil). New forms are: *Tolypammina grahamensis* [referred to *Apterrinella grahamensis* (Harlton) by

Cushman, 1928; Ireland, 1956, p. 850, claims that *Ammovertella elongata* (Cushman and Waters) is probably synonymous with *Tolypammina grahamensis* Harlton], *Glomospira simplex, Endothyra rothrocki, Bradyina marathonensis, Haplophragmoides marga, H. ciscoensis, Cribrostomum cushmani* [now referred to *Climacammina cushmani* (Harlton); see Cummings, 1956, p. 224], *C. attenuata, Globivalvulina gaptankensis, G. cora, Nodosaroum ciscoensis,* and *N. gaptankensis*. The fauna is illustrated by what appear to be poor drawings.

HARLTON, B. H., 1933, Micropaleontology of the Pennsylvania Johns Valley shale of the Ouachita Mountains, Oklahoma, and its relationship to the Mississippian Caney shale: Jour. Paleontology, v. 7, p. 3-29, pl. 1-7.

The calcareous algae, Foraminifera, conodonts, bryozoans, and ostracods of the Johns Valley shale of Oklahoma are described and figured by whole specimen photographs. Of the thirteen species of Foraminifera four are new: *Hyperammina johnsvalleyensis, Hippocrepina bendensis, Reophax ouachitensis,* and *Spirillina bendensis*. The fauna is regarded as early Pennsylvanian in age.

HARRIS, R. W., and JOBE, T. C., 1956, Chester Foraminifera and ostracods from the Ringwood pool of Oklahoma: Oklahoma Geol. Survey, Circ. No. 39, 41 p., 4 pl.

From the producing "Manning" horizon of Upper Mississippian (Chester) age in the Ringwood Oil Pool of Oklahoma three species of Foraminifera, all previously described, are diagnosed and illustrated by whole specimen photomicrographs. The fauna includes *Glomospira* sp. cf. *G. disca* Cooper, *Endothyra excentralis* Cooper, and *E.* sp.

HENBEST, L. G., 1931, The species *Endothyra baileyi* (Hall); Contrib. Cushman Lab. Foram. Research, v. 7, pt. 4, p. 90-93, pl. 11-12.

Not only does this presentation clarify the specific characters of *Endothyra baileyi* (Hall), but it offers critical information about the masonry of the shell wall as compared with that of recent species of *Cribrostomoides* and *Cyclammina*. Whole specimen and thin-section photomicrographs are included.

HENBEST, L. G., 1953, The name and dimorphism of *Endothyra bowmani* Phillips 1846: Contrib. Cushman Found. Foram. Research, v. 4, pt. 2, p. 63-65, 2 text-fig.

This paper sets forth a recommendation to conserve the name *Endothyra bowmani* Phillips em. Brady 1876 because of the following reasons: (1) the long and extensive use of the term in the literature, (2) the types are lost, (3) the revision leaves the nature of the original specimens as obscure as before, and (4) the proposition, offered in the above paper, that the planispiral and the skew-coiled forms (Zeller's genus *Plectogyra*) represent alternate generations and not different genera.

If dimorphism is ultimately demonstrated the skew-coiled forms now referred to the genus *Plectogyra* Zeller would have to be reassigned to *Endothyra*. Conservation of the name *E. bowmani* Phillips em. Brady 1876 would stabilize the usage prior to 1950 and would avoid the future necessity of a name shift if alternation of generations is verified. [For additional pertinent comments on the genus *Endothyra* see St. Jean, 1957.]

HENBEST, L. G., 1954, Pennsylvanian Foraminifera in Amsden formation and Tensleep sandstone, Montana and Wyoming: Guidebook, Billings Geol. Soc., Fifth Annual Field Conference, p. 50-53.

Discusses the age relationship of the Amsden formation and the Tensleep sandstone on the basis of new foraminiferal collections, mainly fusulinids. A Pennsylvanian (Atokan) age is substantiated for the Amsden formation. Smaller Foraminifera reported from this formation include: *Endothyra, Bradyina, Climacammina, Tetrataxis,* and calcitornellids. The Tensleep sandstone occupies an interval regarded as equivalent to the early half of Des Moines age and extending at least as high as Middle Des Moines age. Species of *Climacammina, Bradyina, Tetrataxis,* and *Calcitornella* are especially common in this interval.

HENBEST, L. G., 1956, Foraminifera and correlation of the Tensleep sandstone of Pennsylvanian age in Wyoming: Guidebook, Wyoming Geological Association, p. 58-63.

Additional collections essentially substantiate the Henbest, 1954, findings.

HENBEST, L. G., 1958, Pennsylvanian-Permian boundary in north-central Texas: Guidebook, The base of the Permian a century of controversy, San Angelo Geol. Soc., p. 38-49, 1 chart.

A discussion of the Permo-Pennsylvanian boundary in north-central Texas delineated mainly on the basis of fusulinids. However, the stratigraphic ranges of two smaller Foraminifera, *Spandelinoides* and *Geinitzina postcarbonaria* Spandel, are further elucidated. The earliest occurrence of these genera found by the writer is in the Chaffin limestone member of the Thrifty formation, now regarded by the U.S.G.S. as the topmost bed of Pennsylvanian age in north-central Texas. One range chart is also presented.

HENBEST, L. G., 1958, Ecology and life association of fossil algae and Foraminifera in a Pennsylvanian limestone, McAlester, Oklahoma: Contrib. Cushman Found. Foram. Research, v. 9, pt. 4, no. 190, p. 104-111, pl. 20.

At a locality near McAlester, Oklahoma, the limestone cap rock of the Secor coal, Pennsylvanian, is associated with calcareous coal balls and has a sedi-

mentary structure and fossil content that indicate a local cataclysm in deposition. Nodules of the limestone contain fossils of numerous well preserved algae that served as supports for various species and genera of sessile or encrusting Cornuspirinae; in addition cornuspirid species encrust productid brachiopod shells. Evidence indicates that originally the algae, Foraminifera, and brachiopods belonged to the same community and that the algae are of marine origin; hence, the biota lived in shallow water and in the photic zone. Attachment of sessile cornuspirids to a perishable support such as sea weed is demonstrated for the first time in the fossil record. Previously described genera discussed and illustrated with fine thin-section photomicrographs include: *Endothyra, Calcivertella, Calcitornella,* and *Plummerinella?*. This marks the first American paper to appear using thin-section photomicrographs to illustrate the encrusting Foraminifera originally described by Cushman and Waters in 1928. One new ? genus with aff. to *Calcitornella* is also described.

HENBEST, L. G., 1958, Geologic and ecologic significance of the Upper Paleozoic Foraminifera in the Hartville area, Wyoming: Wyoming Geol. Assoc. Guidebook, 13th. Annual Field Conference, p. 127-131, 1 text-fig.

Based on long experience with Late Paleozoic Foraminifera the author briefly notes ecologic observations relating to fusulinids and encrusting Foraminifera. He states that the tubular Foraminifera grew in permanent attachment to shells, stones, spines, bryozoan fronds, seaweed, and other supports on the bottom or floating in shelf areas of the sea. Typical genera as *Serpulopsis, Ammovertella, Trepeilopsis, Calcitornella, Plummerinella,* and *Orthovertella* are especially characteristic of fertile, shallow, marine waters and are probably restricted to this type of environment. The abundance of free specimens of encrusting Foraminifera in a limestone does not necessarily mean that the deposit accumulated at a shallow depth as the specimens could have been rafted to the locality on seaweed. However, if free specimens are associated with forms attached to shells or bottom detritus a shallow depth for the deposit could be postulated.

HERITSCH, F., 1934, Die Oberpermische Fauna von Zazar und Vrzdenec in den Savefalten: Vesnik Geol. Instit, Kralj Jugosl. Knj., v. 3, p. 17-21, pl. 2, [German with Slavic summary].

From the Upper Permian rocks of the Zazar and Vrzdenec regions of Yugoslavia three previously described species of Foraminifera are described and illustrated by photomicrographs and line drawings. The described species are: *Nodosinella digitata* Brady, *Bigenerina sumatrana* Volz [was listed as *Cribrogenerina sumatrana* (Volz) by Schubert, 1907, see Cummings, 1956, p. 216], and *Climacammina lagenalis* Lange.

HOWCHIN, W., 1888, Additions to the knowledge of the Carboniferous Foraminifera: Royal Microscopical Soc., Jour., pt. 2, p. 533-545, pl. 8-9.

From the Carboniferous rocks of northern England a foraminiferal fauna of fourteen species of which six species, two varieties, and one genus are described as new and illustrated by line drawings. New forms are: *Hyperammina elongata* Brady var. *clavatula, Lituola rotundata, Webbina fimbriata, Archaelagena* n. gen., *Endothyra conspicua* [now referred to the genus *Endothyranopsis;* see Cummings, 1955, p. 2], *E. circumplicata, E. radiata* Brady var. *tateana, Stacheia moriformis,* and *Patellina bradyana* [now *Howchinia bradyana* (Howchin), see Cushman and Waters, 1927, p. 42].

HOWCHIN, W., 1893, On the occurrence of Foraminifera in the Permo-Carboniferous rocks of Tasmania: Adelaide Meeting of the Australasian Assoc. for the Advancement of Science, p. 1-5, pl. 10-11.

From a group of thin-sections of Permo-Carboniferous rock at one locality in Tasmania, Australia, a foraminiferal fauna of four species (one new variety) is described and illustrated by thin-section photomicrographs. New variety referred to the genus *Nubecularia* is *N. lucifuga* var. *stephensi* [revised to *Calcitornella stephensi* (Howchin), see Chapman, Howchin, and Parr, 1934, p. 183].

HOWCHIN, W., 1895, Carboniferous Foraminifera of western Australia, with descriptions of new species: Roy. Soc. South Australia, Trans., p. 194-198, 200, pl. 10, fig. 1-8.

From the Carboniferous shales of the Irwin River, 200 miles north of Perth, Australia, a foraminiferal fauna of three new species is described and illustrated by line drawings. New forms are: *Cornuspira schlumbergi* [now referred to *Hemigordius schlumbergi* (Howchin); see Crespin, 1958, p. 81], *Nodosaria irwinensis,* and *Frondicularia woodwardi.*

HUZIMOTO, H., 1936, Stratigraphical and paleontological studies of the Titibu system of the Kwanto-Mountainland; Pt. 2, Paleontology: Tokyo Bunrika Diag., Sci. Repts., sect. C, v. 1, no. 2, p. 29-125, pl. 1-26.

From the Permo-Carboniferous Titibu system of Japan a foraminiferal fauna of eleven previously described species is diagnosed and illustrated by thin-section photomicrographs. Described species include: *Glomospira* cf. *G. pusilla* (Geinitz), *Endothyra* sp., *Textularia* cf. *T. gibbosa* d'Orbigny, *T.* cf. *T. eximia* d'Eichwald [both forms of this genus are probably referrable to the genus *Palaeotextularia*], *Pachyphloia* aff. *P. pediculus* Lange, *P.* aff. *P. multiseptata* Lange, *Climacammina* cf. *C. valvulinoides* Lange, *C. lagenalis* Lange, *Cribrogenerina permica* Lange, *C.* sp., and *Hemigordius japonica* Ozawa.

HUZIMOTO, H., 1938, Some foraminiferous fossils from the Koten series of Zido coalfield, Tyosen: Geol. Soc. Japan, Jour., v. 45, no. 533, p. 271-276, pl. 8.

Thin-section studies of a fossiliferous limestone from the upper part of the Koten series, of the Zido coalfield, in Korea yielded a fauna of six species of smaller Foraminifera of which one is new: *Textularia obusa* [now referred to *Palaeotextularia;* see Cummings, 1956, p. 215], and four species of fusulinids of which one is a new variety. Of the described fauna, *Cribrostomum maximum* Lee and Chen, *Cribrostomum* cf. *nelumboforme* Lee and Chen [both forms based upon a non-axial section which may be either a representative of *Climacammina* or a *Cribrogenerina;* see Cummings, 1956, p. 224], and *Endothyra bowmani* Phillips, are described from the Huanglung limestone (Penchi system). *Endothyra bowmani* Phillips is also reported from the upper part of the Middle Carboniferous of the Donetz basin (M_1M_3 zone). Based on the above evidence the author considers the Koten series faunally equivalent to the Middle Carboniferous of the Donetz basin in Russia and the Penchi system of the eastern Asiatic continent.

Ireland, H. A., 1956, Upper Pennsylvanian arenaceous Foraminifera from Kansas: Jour. Paleontology, v. 30, p. 831-864, 7 text-fig.

From insoluble residues of limestones in the Shawnee and Wabaunsee groups of the Virgil series of Kansas a foraminiferal fauna of fifty species, of which twenty-six species and two genera are new, is described and illustrated by line drawings. The difference between *Tolypammina* and *Ammovertella* is discussed; *Ammobaculites,* formerly transferred to the genus *Endothyranella,* is placed under the "arenaceous" forms. The evolutionary relationships of *Ammodiscus* [now *Involutina;* see Loeblich and Tappan, 1954], and *Ammovertella* are shown by the new genus *Ammodiscella* and by gradations among the large numbers of *Ammovertella.* Specimens of what are probably the earliest *Astrorhiza* and *Verneuilina* are described. The species show a large stratigraphic range and none can be considered as an index for subdivision of the Virgil, but assemblages are more distinctive. The Foraminifera appear to favor the environment of a regressive unit of a cyclothem, but have a tolerance for the deeper water environment marked by an abundance of fusulinids. New forms are: *Astrorhiza virgilensis, Saccamminoides multicellus* n. gen., *Thurammina diforamens, T. lawrencensis, T. rectangularis, T. verrucosa, Ammodiscella virgilensis* n. gen., *Glomospira monogranula, Tolypammina extenda, T. nodosa, T. polyverta, T. rugosa, T. serpens, Ammovertella elevata, A. labyrintha, A. primaparva, A. prodigalis, A. tornella, Ammobaculites magnigranulus, A. parallelus, Textularia bucheri, T. elsiae, T. virgilensis* [the above *Textularia* are probably referable to the genus *Palaeotextularia*], *Bigenerina elongata, B. virgilensis* [both forms of *Bigenerina* are probably referable to the genus *Palaeobigenerina*], and *Verneuilina virgilensis.*

Jodot, P., 1930, Sur le Calcaire viséen du Moulin de Chât-Cros pres d'Évaux (Creuse): Géol. Soc. France, Bull., ser. 4, v. 30, p. 273-276, [in French].

Briefly discusses the Foraminifera found in the Lower Carboniferous rocks of Moulin du Chat-Cros near d'Evaux (Creuse) in France. *Nodosinella* sp., several species of *Endothyra* possessing a more massive test wall than *E. bowmani* Phillips and more closely resembling *E. crassa* Brady as figured by Möller, 1878, and other Foraminifera with more massive tests probably allied to *Endothyra* or *Archaediscus* were also observed.

Jodot, P., 1930, Sur l'Existence Dimantien au col San Colombano (Corse) et sur les conséquences tectoniques possibles de cette découverte: Géol. Soc. France, Bull., v. 30, p. 515-562, 2 pl., 13 text-fig., [in French].

Reports the discovery of Lower Carboniferous rocks in the pass of San Colombano on the island of Corsica, and discusses in some detail the tectonic implications. The following Foraminifera are briefly diagnosed and illustrated by thin-section photomicrographs: *Nodosinella* cf. *N. priscilla* Brady, *N.* cf. *N. linguloides* Brady, *Climacammina* sp., *Endothyra* aff. *E. crassa* Brady, *E. globulus* Eichwald, *Archaediscus* cf. *A. karreri* Brady, and *Valvulina* sp. [now referred to genus *Globivalvulina;* see Schubert, 1920].

Johnson, J. H., 1947, *Nubecularia* from the Pennsylvania and Permian of Kansas: Jour. Paleontology, v. 21, p. 41-45, pl. 17.

Foraminifera belonging to the genus *Nubecularia* occur in Kansas rocks ranging from early Mid-Pennsylvanian (Altamont ls.) to near the close of an early Permian Wolfcamp (Ft. Riley ls.). Locally they are abundant and may occur either singly or in large colonies. Many are closely associated with calcareous algae. These occurrences and associations are listed and illustrated by thin-section photomicrographs.

Johnson, J. H., 1950, A Permian algal-foraminiferal consortium from west Texas: Jour. Paleontology, v. 24, p. 61-62, pl. 17.

Thin-sections of Permian "algal-balls" from near Vinton, Texas, reveal them to be composed of an intimate intergrowth of the foraminiferal genus *Nubecularia* and the algae *Girvanella* in symbiotic association. *Nubecularia permiana* and *Girvanella texana* are fully described and illustrated by thin-section photomicrographs.

Jones, T. R., Parker, W. K., and Kirkby, J. W., 1869, The Permian *Trochammina pusilla* and its allies: Ann. and Mag. Nat. Hist., ser. 4, v. 4, p. 386-392, pl. 12.

A discussion of *Trochammina pusilla* [now referred to *Glomospira pusilla* (Geinitz); see Cushman and Waters, 1927, p. 108], formerly thought to be an annelid and called *"Serpula" pusilla,* and its comparison to younger forms of the same genus. Complete synon-

ymies of all forms described under the genus at this time are given, and simple line drawings are also included.

KING, W., 1850, Monograph of the Permian fossils of England: Palaeont. Soc., [Foraminifera by T. R. Jones], p. 15-20, 57, pl. 4, fig. 1-9.

From the Permian rocks of England six species of Foraminifera, of which only one appears to be new, are described and illustrated by line drawings. The forms described are: *Serpula? pusilla* [referred by Brady, 1876, p. 26, to *Trochammina pusilla* (Geinitz), and now referred to *Glomospira pusilla* (Geinitz); see Cushman and Waters, 1927, p. 108], *Spirillina* sp. [referred by Brady, 1876, p. 26, to *Trochammina incerta* (d'Orbigny)], *Dentalina permiana* [referred by Brady, *ibid.*, to *Dentalina communis* d'Orbigny], *D. kingii* [referred by Brady, *ibid.*, to *D. multicostata* d'Orbigny], *Textularia triticum,* and *T. cuneiformis* [referred by Brady, *ibid.*, to *T. jonesi* Brady; Cummings, 1956, p. 215, states that *Textularia jonesi* Brady, 1876, based on *T. cuneiformis* Jones, 1850 (*non* d'Orbigny, 1839); examination of the wall structure shows that this form cannot be referred to the Textulariidae and that it must be included in the Lagenidea].

KING, W., 1850, On the occurrence of Permian Magnesian limestone at Tullyconnel, near Artrea, in the county of Tyrone: Geol. Soc. Dublin, Jour., v. 7, pt. 2, p. 73, pl. 1, fig. 12a, b.

From the Permian Magnesian limestone of northern Ireland, *Spirillina pusilla* = *Serpula pusilla* Geinitz [now referred to *Glomospira pusilla* (Geinitz); see Cushman and Waters, 1927, p. 108] is described and illustrated by line drawings.

KRESTOVNIKOV, V. N., and RAUSER-CHERNOUSSOVA, D. M., 1938, On the Foraminifera from the transitional beds between the Devonian and the Carboniferous (Etroeungt zone) of Kazakhstan, south Urals and Samarskaya Luka: Akad. Nauk S.S.S.R., Doklady, v. 30, no. 7-8, p. 587-589, [in English].

The Foraminifera (Endothyras) from the transitional Devonian-Carboniferous beds of the Kazakhstan, south Urals and Samarskaya Luka are discussed in reference to brachipod subdivisions.

KRESTOVNIKOV, V. N., and TEODOROVICH, G. I., 1936, Une nouvelle espèce de foraminifères du genre *Archaediscus* du Carbonifère de l'Oural méridional: Soc. Nat. Moscou, B., n.s., v. 44, Sec. Geol. v. 14 (1), p. 86-90, 3 fig., [Russian with French summary].

From the Carboniferous rocks of the southern Urals, Russia, a new species of foraminifer, *Archaediscus bashkiricus,* is described and illustrated by very poor thin-section photomicrographs. Observations as to the thickness of the test wall in relation to depth of water are also given.

LANE, N. G., 1958, Environment of deposition of the Grenola limestone (Lower Permian) in southern Kansas: Geol. Survey Kansas, Bull. 130, pt. 3, p. 117-164, 6 pl., 5 text-fig.

From an extensive study of the Lower Permian (Wolfcamp) Grenola limestone of southern Kansas the author was able to demonstrate that the algal form genus *Osagia* is an intergrowth of ?algae and *Ammovertella,* an arenaceous encrusting foraminifer. Illustrations include thin-section photomicrographs and line drawings.

LANGE, E., 1925, Eine Mittelpermische Fauna von Guguk Bulat (Padanger Oberland, Sumatra): Geol.-Mijnb. Genoot. Nederland en Kol., Verh., Geol. Ser., v. 7, p. 213-295, 5 pl., [in German].

A Middle Permian foraminiferal fauna from Sumatra is described and illustrated entirely by thin-section photomicrographs. Seventy-nine species of Foraminifera are dealt with, of which fifty-seven species are new. Twenty-one of the species are fusulinids (fourteen new) and the remaining fifty species are smaller Foraminifera of which forty-three species, one variety, and two genera are new. The new forms listed are: under the genus *Nodosinella* the following species, *perpusilla, minima, padangensis, perplexa, hydrocephalus,* and *N.? vauseptata,* and *N.? adhaerens, Nodosaria acantha, N. sumatrensis, N. tricammina, Lunucammina? conica, Vaginulina? chapmani, Geinitzina ovata, Padangia perforata* n. gen., *P. pulchra, P. venosa, Pachyphloia ovata* n. gen., *P. pediculus, P. multiseptata, Lituotuba? rostellata* var. *parva, Lagena permica, Valvulina angulata, Textularia sumatrensis,* and *T. thorax* [both forms of *Textularia* now referred under the genus *Palaeotextularia;* see Cummings, 1956, p. 214], *Bigenerina cucumis* [now referred to *Palaeobigenerina;* see Cummings, 1956, p. 216], *B. perrodata* [now referred to *Palaeotextularia;* see Cummings, 1956, p. 216], *Monogenerina gradata, M. atava, Climacammina tudicla, C. valvulinoides, C. lagenalis, C. bicammina, Cribrogenerina climacamminoides, C. macillenta, C. vermiculata, C. obesa, C. verbeeki, C. permica, Endothyra minima, Stacheia verbeeki, Nummulostegina padangensis* [now referred to *Multidiscus padangensis* (Lange); see Miklukho-Maklai, 1953], *N. schuberti,* and *N.? parva.*

LEBEDVA, N. S., 1956, Foraminifera of the Etroeungtian (Kinderhook) sediments of the Tenghiz territory: All-Union Petroleum Scientific-Research Geol. Exploration Inst., Trans., n.s. Publ. 98, p. 39-53, 3 pl., [in Russian].

From the Etroeungtian sediments (Mississippian, Kinderhook) of the Tenghiz territory of the U.S.S.R. a microfauna of thirteen species and two varieties, of which six species, two genera, and one variety are new, is described and illustrated by thin-section photomicrographs. The new forms are: *Endothyra communis* Rauser var. *umbilicata, E. konensis, E. klubovi, E. tengisica, Cribroendothyra* n. gen., *Quasiendothyra smekhovi, Q. paradoxa,* and *Klubovella konensis* n. gen.

LEE, J. S., 1937, Foraminifera of the Donetz basin and their stratigraphical significance: Geol. Soc. China, Bull., v. 16 (1936-37), p. 48-102, pl. 1-2.

A fauna of Middle and Upper Carboniferous age is described and figured from rocks of the Russian Donetz basin. Thirty-nine Foraminifera of which twenty-four are representatives of the family Fusulinidae are present in this fauna. Of the fifteen remaining species of smaller Foraminifera five are new. The Donetz basin fauna contains the following: *Tetrataxis conica* Ehrenberg, *T. parviconica* Lee and Chen, *T. minima* Lee and Chen, *T. pagodoformis, T. cummulosa, Textularia eximia* Eichwald [*non* Eichwald, based on an oblique longitudinal section of a *Climacammina;* see Cummings, 1956, p. 215], *T. exidula, Cribrostomum elegans* Möller, *C. laxum* Lee and Chen [both forms of *Cribrostomum* must now be placed in *Climacammina,* in view of the multichambered character of their uniserial portion; see Cummings, 1956, p. 224], *Cribrostomum maximum* Lee and Chen [*non Cribrostomum;* may be either *Climacammina* or *Cribrogenerina,* pattern of apertural condition needs to be ascertained; see Cummings, p. 224], *Bigenerina hsukuanghsii, Climacammina variana, Cribrogenerina? nitida* Lee and Chen, *Endothyra bowmani* Phillips, and *Bradyina nautiliformis* Möller.

LEE, J. S., CHEN, S., and CHU, S., 1930, Huanglung limestone and its fauna: Acad. Sinica, Nat. Res. Inst. Geol., Mem. no. 9, p. 85-143, pl. 2-15.

From the Lungtan area in southeastern China, the Middle Carboniferous Huanglung limestone has yielded a foraminiferal fauna of forty-six species of which twenty-six are representatives of the family Fusulinidae (nineteen species, two varieties, and one genus all new), and the remaining twenty species are smaller Foraminifera of which twelve are new. New forms are: *Tetrataxis minima, T. parviconica, T. planolocula, Cribrostomum nelumboforme, C. infundibulum, C. spathulatum, C. moelleri* nov. nom., *C. maximum, C. longissimoides, C. stiloforme, C. laxum* [all the above forms of *Cribrostomum* are now referred to the genus *Climacammina,* in view of the multichambered character of their uniserial portion; see Cummings, 1956, p. 224], and *Cribrogenerina nitida.* The author states that the fauna of the Huanglung limestone is quite similar to that of the Penchi series of north China and that of the Moscovian in European Russia. The fauna is entirely illustrated by thin-section photomicrographs.

LEHMANN, E. P., 1953, Foraminifera of the Glen Eyrie shale of central Colorado: Contrib. Cushman Found. Foram. Research, v. 4, p. 67-76, pl. 11, 12.

From a Lower Pennsylvanian Glen Eyrie shale assemblage of Colorado nine species (of which one is a fusulinid), all previously described, are diagnosed and illustrated by whole specimen photomicrographs. The forms include: *Plectogyra rothrocki* (Harlton) [now referred to the genus *Endothyra;* see St. Jean, 1957, p. 23-27], *Endothyranella armstrongi* Plummer, *Textularia grahamensis* Cushman and Waters [now referred to *Palaeotextularia;* see Cummings, 1956, p. 214], *Climacammina cylindrica* Cushman and Waters, *Tetrataxis conica* Ehrenberg, *T. corona* Cushman and Waters, *Globivalvulina biserialis* Cushman and Waters, and *G. ovata* Cushman and Waters.

LICHAREW, B. (Ed.), 1939, The atlas of the leading forms of the fossil fauna of the U.S.S.R. - v. 6, Permian: The Central Geological and Prospecting Institute, Leningrad, p. 29-31, text-fig. 2, pl. 1, fig. 1-4, 10-13, [in Russian].

The genus *Pyramis* is found to be a homonym (*non Pyramis* Schumacher 1817, *non Pyramis* Coutony, 1839), a new name, *Colaniella,* is proposed and the genotype *C. parva* (Collani) is clarified: [see Collani, 1924].

LIEBUS, A., 1932, Die Foraminiferen. *In:* Die Fauna des deutschen Unterkarbons: pt. 3, Preuss. Geol. Landesanst., Abh., n.s., no. 141, p. 133-175, pl. 9-10, [in German].

From the Lower Carboniferous rocks of Germany, a fauna of fifty-four species, including two species of the family Fusulinidae, is described and illustrated entirely by thin-section photomicrographs. Of the fifty-four species, fifty-two are previously described and two are new. The new forms are *Hemigordius harltoni* Cushman and Waters var. *germanica,* and *Bradyina grandis.*

LIPINA, O. A., 1948, Textulariids of the upper part of the Lower Carboniferous, the south wing, Moscow Basin: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62, (Geol. Ser. no. 19), p. 196-215, pl. 9-12, [in Russian].

From the upper part of the Lower Carboniferous rocks of the southern wing of the Moscow Basin, Russia, a paleotextulariid fauna of sixteen species, of which nine species and eight varieties are new, is described and illustrated by thin-section photomicrographs. New forms are: *Palaeotextularia longiseptata, P. longiseptata* var. *fallax, P. longiseptata* var. *magna, P. longiseptata* var. *crassa, P. bella, P. breviseptata, P. consobrina* var. *intermedia, P. "gibbosa* (d'Orbigny)" var. *minima, Cribrostomum stalinogorski, C. "eximium* (Eichwald)" var. *exiformis, C. "eximium* (Eichwald)" var. *paraeximia, C. "eximium* (Eichwald)" var. *regularis, C. recurrens, Climacammina prisca, C.? deckerelloides,* and *Spiroplectammina? syzranica.* Stratigraphic ranges of the above forms are analyzed and a range diagram is presented.

LIPINA, O. A., 1948, Foraminifera of the Chernyshinsk Suite, Tournaisian Series, Lower Carboniferous, Moscow Basin: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 251-259, pl. 19, 20, [in Russian].

From the Lower Carboniferous Tournaisian rocks

of the Moscow Basin, Russia, six species are described and illustrated by thin-section photomicrographs. New forms are: *Endothyra tuberculata, E. glomiformis, E.? krainica, E? minuta, Spiroplectammina tchernyshinensis,* and *S. mirabilis.*

LIPINA, O. A., 1949, The distribution of small Foraminifera in various facies of Upper Carboniferous and Artinskian deposits of Bashkirian buried massifs: Izvest. Akad. Nauk S.S.S.R. (Geol. Ser. no. 3) p. 50-68, 10 text-fig., [in Russian].

The author presents a review of the vertical and horizontal distribution and correlation of the smaller Foraminifera from the Lower Permian rocks of the Bashkirian region. In addition she characterizes various types of limestones on the basis of the contained Foraminifera and relates the distribution of the smaller Foraminifera as a function of the depth of the basin and the nature of the substratum. Several types of facies with different biocoenoses of small Foraminifera are discussed in detail. The paper represents the first basic work on the facies distribution of Late Paleozoic smaller Foraminifera.

LIPINA, O. A., 1949, Microforaminifera in buried rock bodies of Bashkiria: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 105 (Geol. Ser. no. 35), p. 198-235, 7 pl., [in Russian].

The fauna from the Late Paleozoic rocks of the Bashkirian region of European Russia is described and illustrated by thin-section photomicrographs and line drawings. The fauna consists of forty-nine species of which thirty-three species, and twelve varieties are new. Under the form *Ammodiscus semiconstrictus* Waters the following varieties are new: *maxima, minima, lucida, curvata,* and *arca; A. costiferus,* and *A. horridus* [the genus *Ammodiscus* is now referred to the genus *Involutina;* see Loeblich and Tappan, 1954], *Hemidiscus carnicus* Schellwien var. *spiralis, H.? paracostiferus* var. *grandis, H.? clarus;* under the genus *Glomospira* the following species, *regularis, dublicata, vulgaris, elegans, pseudoseptata,* and *ishimbaica; G.? compressa* var. *conspecta G.? miranda, Tolypammina? communis, T. fraudulenta* var. *tenuiseptata, T. kusjapkulensis, T.? pseudospongia, Ammovertella minuta, Nodosaria netchajewi* Tcherdynziv var. *subquadrata, N. netchajewi* Tcherdynziv var. *ronda, N. longa, N. bella, N. shikhanica, N. mirabilis, N. grandis, N. conspecies, N. tenuiseptata, N. parva, Geinitzina spandeli* Tcherdynziv var. *plana, G.? linguliformis, G. magna, G.? ovoides* [= *Nodosaria ovoides* (Lipina); see Miklunkho-Maklai, 1954, p. 23], *G.? pseudoovoides, G. multicamerata,* and *Pachyphloia densa.* Keys for determining the forms described under the genera *Nodosaria* and *Geinitzina* are also given. [Reitlinger, 1954, p. 71, states that the following forms described by Lipina should now be regarded as belonging under the genus *Lasiodiscus: Ammodiscus semiconstrictus* Waters var. *lucida, A. costiferus, A. horridus, Hemidiscus? paracostiferus,* and *H.? paracostiferus* var. *grandis.*]

LIPINA, O. A., 1955, Foraminifera of the Tournaisian stage and uppermost Devonian of the Volga-Ural region and western slope of the central Urals: Akad. Nauk S.S.S.R., Trudy, Inst. Geol. Nauk, Geol. Ser. no. 163 (70), 96 p., 13 pl., [in Russian].

From the Lower Carboniferous (Tournaisian) rocks of the Volga-Ural region and western slope of the central Ural Mountains a fauna of ninety-eight species and eleven varieties, of which thirty-seven species, six varieties, and seven genera are new, are described and illustrated by thin-section photomicrographs. The new forms are: *Bisphaera minima, B. grandis, Baituganella* (n. gen.) *chernyshinensis, B. vulgaris, Eovolutina tuimasensis, Paracaligella* (n. gen.) *antropovi, P. spinosa, Glomospirella pseudopulchra, Tournayella gigantea* var. *minoris, T. discoibea* Dain var. *angusta, T. costata, Septatournayella* (n. gen.) *pseudocamerata, S. malakhovae, Carbonella spectabilis* Dain var. *crassa, Septabrunsiina* (n. gen.), *Glomospiranella latispiralis, G. rara, Septoglomospiranella* (n. gen.) *dainae, Chernyshinella* (n. gen.) *paraglomiformis, C. paucicamerata, C. tumulosa, Tournayellina* (n. gen.) *vulgaris, Endothyra inflata, E. nordvikensis, E. recta, E. costifera, E. paracostifera* var. *multicamerata, E. tenuiseptata, E. latispiralis* var. *angusta, E. latispiralis* var. *grandis, E. rjausakensis* Chernysheva var. *magna, E. parakosvensis, E. taimyrica, E. crassitheca, E. kosvensis, E. paraukrainica, E. transita, E. infirma, Spiroplectammina nana, S.? angusta,* and *S. spinosa.*

The uppermost Devonian is characterized by two zones: the *Septatournayella rauserae* zone and the zone of frequent *Endothyra communis* Rauser-Chernoussova associated with *Quasiendothyra kobeitusana* (Rauser-Chernoussova).

A brief discussion of the stratigraphic value of subdividing the Tournaisian sequence on the basis of smaller Foraminifera is included. In addition, a section relating to some problems of systematics is also given.

The following taxonomic changes are also included: *Brunsia pulchra* Chernysheva, 1940, Rauser-Chernoussova, 1948, Grozdilova and Gleboskaia, 1948, and Malakhova, 1954 = *Glomospirella pseudopulchra; Tournayella segmentata* Dain, 1953 = *Septatournayella segmentata* (Dain); *Endothyra (?) minuta* Lipina, 1948 = *Septatournayella (?) minuta* (Lipina); *Tournayella modesta* Malakhova, 1954 = *Carbonella spectabilis* Dain; *Endothyra (?) krainica* Lipina, 1948 = *Septabrunsiina krainica* (Lipina); *Endothyra (?) primaeva* Rauser-Chernoussova, 1948, and *Glomospiranella primaeva* Dain, 1953 = *Septaglomospiranella primaeva* (Rauser-Chernoussova); *Endothyra glomiformis* Lipina, 1948 = *Chernyshinella glomiformis* (Lipina); *Endothyra (?) minuta* Lipina, 1948, fig. 8 = *Endothyra (?) pseudominuta* Lipina; *Endothyra*

kobeitusana Rauser-Chernoussova, 1948 = *Quasiendothyra kobeitusana* (Rauser-Chernoussova) 1948; *Spirillina irregularis* Möller, 1879, and *Brunsia irregularis* Mikhailov, 1939 = *Glomospirella irregularis* (Möller); *Spirillina plana* Möller, 1880, and *Forschia plana* Mikhailov, 1939 = *Ammodiscus planus* (Möller), [*Ammodiscus* emended to genus *Involutina;* see Loeblich and Tappan, 1954, see also Malakhova, 1956, *Spirillina irregularis* Möller = *Glomospira irregularis* (Möller)].

LOEBLICH, A. R., and TAPPAN, H., 1954, Emendation of the foraminiferal genera *Ammodiscus* Reuss, 1862, and *Involutina* Terquem, 1862: Wash. Acad. Sci., Jour., v. 44, no. 10, p. 306-310, 2 text-fig.

The genus *Ammodiscus* is found to be a junior synonym of the genus *Spirillina* and hence must be suppressed. The authors emend the genus *Ammodiscus* and state that all those planospiral agglutinated forms commonly referred to as *Ammodiscus* will be henceforth regarded as and placed under the genus *Involutina* Terquem, 1862. The type species of the genus is designated as *Involutina silicea* Terquem, 1862.

As *Ammodiscus* is now regarded as *Involutina* it is removed from the family previously called Ammodiscidae and placed in the family Tolypamminidae Cushman, 1929, subfamily Involutininae Cushman, 1940.

LORENTHEY, E., 1898, Mikroskopische Untersuchungen der Palaeozoischen Gesteine: Wissensch, Ergebnisse der Reise des Gr. B. Szechenyi in Ostasien, v. 3, pt. 4, p. 239-301, text-fig. 22-36, [in German].

From the Late Paleozoic rocks of China a fauna of thirty species and varieties, of which six are new, is described in detail and illustrated by simple line drawings. The new forms are: *Spirillina plana* Möller var. *patella, S. chinensis, Dentalina* sp. *nov. ?, Nodosinella simplex, Lingulina szechenyii,* and *L. nankingensis.*

LYE, M., AND SERRE, B., 1957, Études micropaléontologiques dans le Paléozoique de la Montagne Noire: Revue Inst. Français du Pétrole, v. 12, no. 7-8, p. 783-833, 12 pl., [in French].

From the Lower Carboniferous (Visean) rocks of the Black Mountains in the southeastern part of France a fauna of fifteen, all previously described, Foraminifera is reported and illustrated by thin-section photomicrographs. The reported fauna includes: *Ammodiscus* sp., *A.* cf. *A. semiconstrictus* var. *maxima* Lipina [emended to genus *Involutina;* see Loeblich and Tappan, 1954], *Climacammina rugosa* Morozova, *Geinitzina* cf. *G. uralica* Suleimanov, *Palaeotextularia* sp., *Endothyra* sp., *Plectogyra* sp., *Bradyina* sp., *Archaediscus moelleri* var. *gigas* Rauser, *A. moelleri* var. *ventricosa* Schlykova, *A.* sp., *Globivalvulina* sp., *Tetrataxis lata* Spandel, *T.* sp., and *Aoujgalia* [questionable Foraminifera].

LYS, M., AND SERRE, B., 1958, Études Micropaléontologiques dans le Carbonifère Marin des Asturies (Espagne): Revue de Inst. Français du Pétrole, v. 13, no. 6, p. 879-916, 11 pl., [in French].

From the Late Paleozoic rocks (Upper Visean to Westphalian inclusive) of Asturias in northern Spain a fauna of thirty species, all previously described, of smaller Foraminifera is noted and illustrated by thin-section photomicrographs. The rock subdivisions of this area based on a previous study by Delepine on the brachiopods and goniatites have been confirmed by this study of the smaller Foraminifera, fusulinids, and conodonts. One range chart is also included.

MCCOY, F., 1849, On some new genera and species of Palaeozoic corals and Foraminifera: Ann. and Mag. Nat. Hist., ser. 2, no. 13, January 1849, p. 131-132.

From the Carboniferous limestone of the north of Ireland one new species, *Nodosaria fusulinaformis,* is described and compared to Fischer de Waldheim's *Fusulina cylindrica.* [Brady, 1876, p. 23, believes that the *"Nodosaria"* in question is "probably *Saccammina carteri Brady";* Chapman, 1898, p. 215-218, after reexamination of McCoy's original specimen proposes that the foraminifer be called *Saccammina fusuliniformis* (McCoy); now referred to the genus *Saccamminopsis* see Sollas, 1921].

MAJZON, L., 1955, Paleozoic Foraminifera of the Bükk Mountains: Acta Geol. Acad. Sci. Hungarica, v. 3, p. 95-103, 7 text-fig.

From the Late Paleozoic rocks of the Bükk Mountains in Hungary a small fauna consisting mainly of fusulinids is reported and illustrated by thin-section photomicrographs. Previously described smaller Foraminifera reported include the following genera: *Climacammina, Glyphostomella, Nummulostegina,* and *Glomospira.*

MAKUKLOVA, M. F., 1956, Stratigraphic division of the Middle Carboniferous of the Donetz Basin utilizing Foraminifera: Moscow Soc. Nat. Hist., Bull., Geol. Ser. 31, no. 6, p. 79-102, 3 pl., [in Russian; plate legends confused].

From the Middle Carboniferous rocks of the Donetz Basin, Russia, a microfauna of seventeen species, of which fifteen are fusulinids—twelve new, and two species of smaller Foraminifera, one new, is described and illustrated by thin-section photomicrographs. The new species is *Bradyina elongata.*

MALAKHOVA, N. P., 1953, The Lower Namurian of the western slope of the northern Urals: Akad. Nauk S.S.S.R., Doklady, v. 90, no. 3, p. 449-452, [in Russian].

Deals mainly with Namurian stratigraphic problems utilizing age determinations based upon previously described foraminiferal species.

MALAKHOVA, N. P., 1954, Lower Carboniferous Foraminifera of the siliceous limestones of the western slope of the Urals: Bull. Moscow Soc. Naturalists, Geol. Div., v. 29 (1), p. 49-60, 2 pl., [in Russian].

From the Lower Carboniferous rocks of the western slope of the Ural Mountains in Russia a fauna of

thirteen species, of which eight are new, is described and illustrated by thin-section photomicrographs. New species are: *Hyperammina moderata, Tournayella questita, T.(?) molleri, T. modesta, Haplophragmella didona, Ammobaculites? pygmaeus, Quasiendothyra urbana,* and *Spiroplectammina guttula.*

MALAKHOVA, N. P., 1955, The ecology of *Glomospira* in the Lower Carboniferous of the Urals: Akad. Nauk S.S.S.R., Doklady, v. 105, no. 5, p. 1104-1105, [in Russian].

An analysis of the distribution of *Glomospira* throughout the Lower Carboniferous rocks of the Urals suggests their correlation with the carbonate shallow water marine province, i. e. deposition in agitated waters where waves and current action play a dominant role. The author suggests that the irregular trochoid, compact coiling of the tube of *Glomospira,* which results in a spherical form of the test, is an adaptive mechanism of the animal to its mobile water environment. The spherical or near spherical shape of the test increases its strength and helps in preserving it from destruction, it also helps the animal in its drifting about, which perhaps is of great significance in its struggle for existence.

MALAKHOVA, N. P., 1956, Foraminifera of the Zhartimke River limestone of the southern Urals: Akad. Nauk S.S.S.R., Trudy, v. 24, p. 26-71, pl. 1-8, [in Russian].

From the Carboniferous rocks of the Zhartimke River limestone in the southern Ural Mountains of Russia a fauna of forty-one species and varieties, of which six species and three varieties are new, is described and illustrated by thin-section photomicrographs. The new forms are: *Ammobaculites sarbaicus, A. baschkiricus, A. librovitchi, Archaediscus baschkiricus* Krest. and Theod. var. *longula, Endothyra samarica* Rauser-Chernoussova var. *secunda, Tetrataxis pressulus, Bradyina subita, Samarina delicata,* and *Climacammina gracilis* (Möller) var. *major.*

MALAKHOVA, N. P., 1956, Foraminifera from the Carboniferous rocks of the western slope of the northern and central Urals: Akad. Nauk S.S.S.R., Trudy, v. 24, p. 72-155, pl. 1-15, [in Russian].

From the Carboniferous rocks of the western slope of the northern and central Ural Mountains of Russia a fauna of eighty-three species and varieties, of which sixty-nine species and four varieties are new, is described and illustrated by thin-section photomicrographs. The new forms include: *Glomospira glomerosa, G. quadrata, G. curiosa, G. serenae, G. ovalis, G. elliptica, G. ilimica, G. subglobosa* var. *decoris, G. formosa, Glomospiranella pendula, Ammodiscus bellus, A. borealis, A. nudus, A. pulchrus* [emended to genus *Involutina;* see Loeblich and Tappan, 1954], *Haplophragmella veterana, H. inflata, H. arctica, H. flexuosa, H. rauserae, Ammobaculites ivanovi, A. angulatus, A. attenuatus, A. nalivkini, Tournayella regularis, T. kisella, T. dainae, T. unica, T. moelleri* var. *uralica, T. fastosa, T. rossica, T. vespaeformis, T. primaria, Endothyra kynensis, E. glomiformis* Lipina var. *uralica, E. glomiformis* Lipina var. *polymorpha, E. subrotunda, E. mammata, E. gemma, E. persimilis, E. margarita, E? beata, E. nebulosa, E. crassiseptata, E. obesa, E. superba, E. fausta, E. latissima, E. elegia, E. septima, E. spatiosa, E. singularia, E. abnormis, E. bellicosta, E. cuneata, E. corona, E. analoga, E. apta, E. concava, Tetrataxis dievi, T. expansus, T. sussaicus, T. kiselicus, T. notabilis, T. perfidus, T. vulgaris, T. obtusua, Palaeotextularia irregularis,* and *P. mellina.* The following forms have been emended: *Spirillina subangulata* Möller 1879 = *Tournayella subangulata* (Möller), *Brunsia sygmoidalis* Rauser-Chernoussova 1948 = *Glomospira sygmoidalis* (Rauser), *Spirillina irregularis* Möller 1879 = *Glomospira irregularis* (Möller), and *Brunsia pulchra* Mikhailov 1939 = *Glomospira pulchra* (Mikhailov).

MALZAHN, E., 1957, Neue Fossilfunde und vertikale Verbreitung der niederrheinischen Zechsteinfauna in den Bihrungen Kamp 4 und Friedrich Heinrich 57 bei Kamp-Lintfort: Geol. Jahrb., v. 73, p. 91-126, pl. 10-13, [in German].

From the Permian of the subsurface of the lower Rhein Valley of Germany a fauna of forty-one previously described species is listed. One photograph illustrating a representative foraminiferal assemblage is also given.

MARPLE, M. F., 1955, Small Foraminifera of the Pottsville formation in Ohio: The Ohio Jour. Sci., v. 55 (2), p. 81-89, 42 fig.

From the Middle Pennsylvanian Pottsville formation of Ohio a foraminiferal fauna of seventeen species is described and illustrated by whole specimen photomicrographs. All of the forms are assigned to previously described species. The author makes comparison with similar forms reported from the Pennsylvanian rocks of Texas and the midcontinent and claims that the Foraminifera seem to have evolved slowly and have wide geographic distribution.

MEUNIER, S., 1888, Examen paléontologique du calcaire à *Saccammina* de Cussy-en-Morvan: Soc. Nat. Hist., D'Autun, Bull. 1, p. 232-236, pl. 7, [in French].

From the Lower Carboniferous (Visean) *Saccammina* limestone of Cussy-en-Morvan, France, a fauna of eight species, of which six species and two genera are new, is described and illustrated from thin sections. The new forms include: *Septammina dichotoma, S. renaulti* (n. gen.), *Cameroconus marmoris* (n. gen.), *Endothyra cusseyensis, Archaediscus gallicus,* and *Climacamina simplex* [*sic Climacammina*].

MEUNIER, S., 1892, Étude micrographique sur le calcaire à *Saccammina* de Cussy-en-Morvan: Naturaliste, Paris, p. 192, 193, 10 text-fig., [in French].

Duplicate of the 1888 article.

MEYER, H. L., 1914, Carbonfaunen aus Bolivia und Peru. *In:* Steinmann, G., Beitrage zur Geologie und

Palaontologie von Sudamerika: Neues Jahr. Min. Geol. Pal., Stuttgart, v. 37, p. 590-652, pl. 13, 14, 5 text-fig., [in German].

From the Late Paleozoic rocks of Bolivia and Peru four species of smaller Foraminifera, all previously described, are briefly discussed but not figured. The forms reported are; in Bolivia: *Archaediscus karreri* Brady, *Endothyra parva* Möller, and *Textularia* sp.; in Peru: *Tetrataxis conica* Ehrenberg, and *Textularia* sp. [both forms of *Textularia* are probably referrable to *Palaeotextularia;* see Cummings, 1956].

MIKHAILOV, A. V., 1935, Foraminifera from the Oka series of the Borovichi District, Leningrad Region: Geol. Hudrogeol. Geod. Trust, Bull., Leningrad, no. 2-3 (7-8), p. 33-36, [Russian with English Summary].

Discusses the stratigraphy of the Late Paleozoic rocks of the Leningrad Region based upon previously described Foraminifera. A few forms are noted as being new species; however, since no formal descriptions or illustrations are included these must be regarded as *nomina nuda.*

MIKHAILOV, A., 1935, On the question of the phylogeny of the Carboniferous Foraminifera: Leningrad Geol., Hydrogeol., Geod. Trust, Bull., no. 2-3 (7-8), p. 38-42, 1 pl., 1 text-fig., [Russian with English summary].

The author criticizes the methodics of composing phylogenetic schemes and emphasizes their highly hypothetical character in the study of Foraminifera. The writer considers Haeckel's postulate concerning the interrelations of phylogenesis and ontogenesis to be only a particular form of phylembryogensis. An example of the phyletic development of the Palaeotextulariidae demonstrates a special form of accelerated development, — negative deviation. An example of such deviation is also illustrated in the falling off of the *Cribrospira* stage in the shell of the genus *Janischewskina.* In a discussion of Galloway's phyletic scheme of the family Endothyridae a number of errors is noted; the author traces these errors to methodological premises.

As illustrative materials the following new Lower Carboniferous genera are cited and a brief diagnosis given: *Mstinia, Brunsia, Janischewkina, Forschia, Forschiella,* and *Endothyrina.* Thin-section photomicrographs of the following new species are given: *Endothyrina elegans, E. typica, Forschiella prisca,* and *Janischewskina typica.*

MIKHAILOV, A., 1939, To the characteristics of the genera of Lower Carboniferous Foraminifera, *In:* Maliavkin, S. F. (Ed.), the Lower Carboniferous deposits of the northwestern limb of the Moscow Basin: Leningrad, Geol. Admin., Symposium (Sbornik), no. 3, p. 47-62, 4 pl., [Russian with English summary].

Twenty-four Lower Carboniferous foraminiferal genera are briefly described and certain general characteristics regarding these forms are given. The author's conclusions may be listed as follows: (1) that Lower Carboniferous Foraminifera are agglutinated, with the peculiar feature that the agglutinated material is calcareous; (2) the most characteristic Lower Carboniferous Foraminifera are the ammodiscids and the endothyrids. Their wide distribution and generic differentiation display a blooming biological process; (3) the first occurrence of the calcareous forms of the *Archaediscus* type appear in the Lower Carboniferous; (4) the genera most characteristic of the Lower Carboniferous are: *Cribrospira, Janischewskina, Forschiella, Mstinia,* and probably *Valvulinella;* (5) fusulinids in the Lower Carboniferous are represented by the more primitive forms of the *Pseudoendothyra* type; and (6) textulariids of the Lower Carboniferous do not differ notably from those of the Middle Carboniferous.

The new genus *Pseudoendothyra,* genotype *Fusulinella struvii* Möller, is described in detail. All forms are illustrated by both whole specimen and thin-section photomicrographs. The following forms are described as new species; these are illustrated by photomicrographs but are not accompanied by descriptions hence must be regarded as *nomina nuda: Hemigordius ulmeri, Tuberitina maljawkini, Glomospira glomospiroides, Brunsia pulchra, Mstinia bulloides, M. fursenko, Bradyina galloway, Endothyra bradyi,* and *Valvulinella kotlukovi.*

MIKHAILOV, A., 1939, Of the Paleozoic Ammodiscidae, *In:* Maliavkin, S. F. (Ed.), The Lower Carboniferous deposits of the northwestern limb of the Moscow Basin: Leningrad, Geol. Admin., Symposium (Sbornik), no. 3, p. 63-69, 5 text-fig., [Russian with English summary].

In a study of Foraminifera of the family Ammodiscidae [now Tolypamminidae; see Loeblich and Tappan, 1954] of the Lower Carboniferous rocks of the Leningrad area the author has included five new genera, of which brief diagnosis had been given in previous works, and three new species. The new forms are: *Brunsia pulchra* n. gen. [*Brunsia pulchra* Mikhailov, 1939 = *Glomospira pulchra* (Mikhailov); see Malakhova, 1956, p. 92], *Endothyrina* Mikh. and Riab., *Forschia* n. gen., *Forshiella* n. gen., *Mstinia fursenko* n. gen., and *M. bulloides.* Certain characteristics pertaining to representatives of this family are as follows: (1) all members have an agglutinated yet calcareous test; (2) the composition and structure of the test wall have systematic characteristics; (3) the evolution of single chambered forms to multichambered forms was realized in a brief span of time; and (4) the evolutionary pattern as conceived by the author is as follows: (A) appearance of ancestral forms in the Lower Paleozoic; (B) luxuriant development in the direction of a definite biological process in size and number of individuals, etc., which culminated in the Lower Carboniferous; and (C) after Low Carboniferous time a period of morphological and biological degeneration begins. New forms are illustrated by both whole specimen and thin-section photomicrographs.

MIKLUKHO-MAKLAI, K. V., 1947, Composition and affinities of the foraminiferal faunas from the Permian deposits of the Caucasus region, U.S.S.R.: Akad. Nauk S.S.S.R., Doklady, v. 58, no. 2, p. 269-271, [in Russian].

A discussion of the Permian stratigraphy of the Caucasus region of Russia based mainly upon previously described foraminiferal species.

MIKLUKHO-MAKLAI, K. V., 1953, Systematic classification of the family Archaediscidae: Annals All-Union Paleont. Soc., v. 14, p. 127-131, pl. 6, [in Russian].

In a brief article on the systematic classification of the family Archaediscidae four genera and two species are described as new and illustrated by thin-section photomicrographs. The new forms, including taxonomic changes are as follows: *Propermodiscus ulmeri* (Mikhailov) n. gen., formerly *Hemigordius ulmeri* Mikhailov, 1939; *Parapermodiscus gefoensis* n. gen., *Neodiscus milliloides* n. gen., and *Multidiscus padangensis* (Lange) n. gen., formerly *Nummulostegina padangensis* Lange, 1925.

MIKLUKHO-MAKLAI, K. V., 1954, Foraminifera of the Upper Permian deposits of the northern Caucasus: State Scientific & Technical Publishing House of Geological Literature, 163 p., 19 pl., 3 encl., [in Russian].

From the Late Permian rocks of the northern Caucasus Mountains of Russia a fauna of ninety species (seventeen fusulinids, seven new), of which six genera, fifty species, four subspecies, and three varieties are new, is described and illustrated by good thin-section photomicrographs. New forms include: *Lasiodiscus medusa, L. insecta, L. planus, L. ovoides, L. rugosus, L. irregularis, Nodosaria mirabilis* Lipina subsp. *caucasica, N. longissima* Suleimanov subsp. *camerata, N. sumatrensis* Lange subsp. *rossica, N. patula, N. linae, N. acera, N. cubanica, N. sagitta, Geinitzina gigantea, G. tcherdynzevi, G. caucasica, G. inflata, G. uralica* Suleimanov subsp. *simplex, Neogeininitzina orientalis* n. gen., *Pseudogeinitzina magna* n. gen., *P. munda, Pseudoglandulina conica, P. paraconica, P. longa, Frondicularia ornata, F. tumida, F. elegantula, Pachyphloia paraovata* var. *maxima, P. pediculus* Lange var. *tegenica, P. lanceolata* var. *gigantea, P. solida, P. robusta, P. gefoensis, P. angulata, Colaniella cyclindrica, C. media, C. nana, Parapachyphloia asymmetrica* n. gen., *P. hemisphaerica, P. radiata, P. minuta, P. rara, P. adducta, P. abagensis, Parageinitzina depressa* n. gen., *P. multicamerata, P. indefinita, Pararobuloides orientalis* n. gen., *P. tumidus, P. caucasicus, P. rugosus, Eocristellaria permica* n. gen., *E. typica,* and *Gourisina rossica.* The following taxonomic changes are also incorporated: *Geinitzina? ovoides* Lipina, 1949 = *Nodosaria ovoides* (Lipina), and *Rubuloides gibbus* Reichel, 1945 = *Pararobuloides gibbus* (Reichel); the genus *Robuloides* is also emended. Stratigraphic distribution charts are given.

MIKLUKHO-MAKLAI, K. V., and EINOR, O. L., 1947, Permian foraminiferal fauna of the Transcaucasus region, U.S.S.R.: Akad. Nauk S.S.S.R., Doklady, v. 58, no. 7, p. 1447-1449, [in Russian]

A discussion of the Permian stratigraphy of the Transcaucasus region of Russia based mainly upon previously described foraminiferal species, mostly fusulinids.

MÖLLER, V. V., 1878, Die Spiral-Gewundenen Foraminiferen des Russischen Kohlenkalks: Mem. Imp. Acad. Sci. St. Petersbourg, ser. 7, v. 25, no. 9, 147 p., 15 pl., [in German].

Thirteen species of the family Fusulinidae (six new) and seven species of the smaller Foraminifera (two new) are extensively described and illustrated by classic line drawings from the Late Paleozoic rocks of Russia. New forms of the smaller Foraminifera are: *Bradyina nautiliformis* n. gen., and *Cribrospira panderi* n. gen.

MÖLLER, V. V., 1879, Die Foraminiferen des Russischen Kohlenkalks: Mem. Imp. Acad. Sci., St. Petersbourg, ser. 7, v. 27, no. 5, 131 p., 7 pl., [in German].

From the Russian Carboniferous limestones a foraminiferal fauna of thirty-three species, of which ten are fusulinids (two new), and twenty-three are representatives of the smaller Foraminifera (fourteen new species, one new variety, and one new genus) is described and illustrated by elaborate, although somewhat idealized, line drawings. New forms are: *Endothyra panderi* [now referred to *Haplophragmella panderi* (Möller); see Rauser-Chernoussova and Fursenko, 1937, p. 270], *E. parva, Spirillina subangulata* [*Spirillina subangulata* Möller, 1879 = *Tournayella subangulata* (Möller); see Malakhova, 1956, p. 103], *S. plana, S. irregularis* [*S. plana* and *S. irregularis* Möller, 1879 = *Ammodiscus planus* (Möller); see Lipina, 1955; genus *Ammodiscus* emended to genus *Involutina,* see Loeblich and Tappan, 1954], *S. discoidea, Cribrostomum* n. gen., *C. bradyi, C. gracile* [now referred to *Climacammina;* see Cummings, 1956, p. 224], *C. commune, C. textuliforme, C. elegans* [now referred to *Climacammina;* see Cummings, 1956, p. 224], *C. pyriforme* [now referred to *Climacammina;* see Cummings, 1956, p. 224], *Tetrataxis conica* var. *gibba, Nodosinella lahuseni,* and *N. tenuis.*

MÖLLER, V. V., 1880, Ueber einige Foraminiferenfuhrende Gesteine Persiens: Jahrb. Geol. Reichsanstalt., Wien, v. 30, pt. 4, p. 573-586, pl. 9, 10, [in German].

From the Carboniferous limestones of central Persia one new species of Foraminifera, *Stacheia grewinski,* is described and illustrated by elaborate line drawings. *Tetrataxis conica* Ehrenberg and *Nodosinella* sp. are also illustrated and their stratigraphic position within the sequence discussed.

MOROZOVA, V. G., 1949, Representatives of the families Lituolidae and Textulariidae from the Upper Car-

boniferous and Artinskian deposits of the Baskirian pre-Ural: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 105 (Geol. Ser. no. 35), p. 244-275, 5 pl., [in Russian].

From the Upper Carboniferous and Permian rocks of the Bashkirian Region of European Russia a foraminiferal fauna of fifty-five species (of which forty-five species and seven varieties are new) is described and illustrated by line drawings. The new forms are: the following forms under the genus *Endothyra, E. rotundata, E. inflata, E. soshkinae, E. bashkirica, E. occidentalis, E. symmetrica, E. octocamerata,* and *E. lipinae;* under the genus *Bradyina, B. crassaformis, B. major, B. septacamerata, B. lucida, B. shikhanica, B. dublipora, B. compressa, B. compressa* var. *minima,* and *B. subsphaerica;* under the genus *Globivalvulina, G. spiralis, G. shikhanensis,* and *G. vulgaris;* under the genus *Tetrataxis, T. hemisphaerica* var. *meridionalis, T. hemisphaerica* var. *elongata, T. hemiovoides, T. subconica, T. curviseptata* var. *moderata, T. shikhanensis, T. nana, T. minuta, T. planulata, T. plana, T. planoseptata, T. irregularis,* and *T. bashkirica;* under the genus *Palaeotextularia, P. simplex, P. orientalis, P. tenuiseptata,* and *P. occidentalis;* under the genus *Climacammina, C. praecursor, C. usolensis, C. major, C. gigas* Suleimanov var. *oviformis, C. bishkadakensis, C. rugosa, C. vissarionovae, C. multiseptata,* and *C. kusjapkulensis;* under the genus *Deckerella, D. elegans, D. elegans* var. *artiensis, D. media,* and *D. media* var. *bashkirica.*

Netschajew, A., 1894, Die Fauna der permischen Ablagerungen des ostlichen Theils des europaischen Russlands: Kazan Imp. Univ., Soc. Nat., Trans., v. 27, no. 4, p. 98-103, pl. 1, [in Russian].

From the Permian rocks of the eastern part of European Russia a foraminiferal fauna of eight previously described species is discussed and illustrated by line drawings. The Foraminifera are: *Nodosaria geinitzi* Reuss, *N.* aff. *N. jonesi* Richter, *N.?* sp. indet. no's. 1 and 2, *Cribrostomum?* sp. indet., *Spirillina roesserli* Schmid, and *S.* sp. indet.

Novik, K. I., 1927, Ueber einige Vertreter des Foraminiferen des Carbons des Donetzbeckens und einiger anderen Distrikte von SSSR: Scientific Magazine of the Geol. Catheder of Dnepropetrovsk, Kharkov, v. 2, p. 155-167, pl. 3, [in Russian].

From the Carboniferous rocks of the Donetz basin of Russia and adjoining areas a foraminiferal fauna of seventeen previously described species (eleven fusulinids), is described and illustrated by rather primitive line drawings. The smaller Foraminifera are: *Bradyina nautiliformis* Möller, *Dentalina multicostata* d'Orbigny, *Cribrostomum bradyi* Möller, *C. elegans* Möller [must be placed in *Climacammina* in view of the multichambered character of the uniserial portion; see Cummings, 1956, p. 224], *Cribrostomum patulum* (Brady), and *Tetrataxis conica* Ehrenberg.

Orlova, I. N., 1955, New genus of the family Archaediscidae: Akad. Nauk S.S.S.R., Doklady, v. 102, no. 3, p. 621-622, 1 text-fig., [in Russian].

From the Lower Carboniferous rocks (Visean) of European Russia (Saratov Province) one new genus and species, *Paraarchaediscus dubitabilis,* of the family Archaediscidae is described and illustrated by thin-section and whole specimen photomicrographs.

Ozawa, Y., 1925, Paleontological and stratigraphical studies on the Permo-Carboniferous limestone of Nagata: Pt. 2, Paleontology: Tokyo, Imp. Univ., Coll. Sci., Jour., v. 45 (1923-25), art. 6, p. 1-90, pl. 1-14.

From the Permo-Carboniferous rocks of Nagato, Japan, a foraminiferal fauna of sixty-seven species of which fifty (seventeen new species and three new varieties) are representatives of the family Fusulinidae and the remaining seventeen (of which four are new species) are smaller Foraminifera is described and illustrated by thin-section photomicrographs. The new forms include: *Hemigordius japonica, Tetrataxis schellwieni, T. linea,* and *Spirillina grandis.*

Paalzow, R., 1935, Die Foraminiferen im Zechstein des östlichen Thüringen: Jahrb. Preuss. Geol. Landes., p. 26-45, pl. 3-5 [in German].

This study describes and figures, with whole specimen and thin-section photomicrographs, a foraminiferal fauna of thirty-nine species, of which nineteen species and one genus are new, from the Permian Zechstein of eastern Thuringia, Germany. The new forms are as follows: *Hyperammina compressa, Adhaerentina permiana* n. gen., *Cornuspira spandeli, Lunucammina elongata, Spandelina cavernula, S. thuringica, Spandelinoides sparsicosta, Nodosaria thuringica, N. cushmani, N. conicodensestriata, Dentalina striatella, Lingulina spandeli, L. linguaeformis, L. articulata, L. pulchra, L. clavata, L. permo-striata, Frondicularia minutissima,* and *F. draco.*

Pantanelli, D., 1882, Note microlitologiche sopra i calcari: R. Accad. Lincei, Rome, Cl. Sci. Fis. Mat. Nat., Mem., Roma, Italia, ser. 3, v. 12, p. 379-396, 2 pl., [in Italian].

From the Carboniferous rocks of Monte Germula, Friuli, Italy, one new species of foraminifer, *Globigerina taramellii,* is described and illustrated by line drawings [later workers believe that the true *Globigerina* did not evolve until Cretaceous time].

Parfitt, E., 1871, On a species of arenaceous foraminifer (?) from the Carboniferous limestone of Devonshire: Ann. Mag. Nat. Hist., ser. 4, v. 7, p. 158-161, pl. 11, fig. 9-12.

An elaborate description and illustrations of a supposed foraminifer from the Carboniferous rocks of Devonshire; [Brady, 1876, p. 22, states: "I confess that, upon very careful examination, after treatment in every way that could be thought of as likely to bring

out structural features, I have been unable to find any satisfactory evidence of organic origin in the specimens kindly furnished to me by Mr. Parfitt."].

PARR, W. J., 1942, Foraminifera and a tubicolous worm from the Permian of the northwest division of western Australia: Roy. Soc. Western Australia, Jour., v. 27, p. 97-115, 2 pl.

From insoluble residues of the Permian rocks of western Australia a foraminiferal fauna of fifteen species, of which ten are new, are described and illustrated by whole specimen photographs. Foraminiferal range charts are given and paleoecologic observations made. New forms are: *Ammodiscus wandageeensis, A. nitidus* [emended to genus *Involutina;* see Loeblich and Tappan, 1954], *Glomospira adhaerens, Tolypammina undulata, Hyperammina coleyi, H.? rudis, Hyperamminoides acicula* [transferred to the genus *Hyperammina;* see Conkin, 1954], *Reophax subasper, R. tricameratus,* and *Trochammina subobtusa.*

PETRI, S., 1956, Foraminíferos do Carbonífero da Amazonia: Brasileira Soc. Geol. Bol., v. 5, no. 2, p. 17-33, 2 pl., [in Portuguese].

From Pennsylvanian rocks of the Amazon Valley of Brazil two new species of Foraminifera, one of which is a fusulinid, are described and illustrated by thin-section photomicrographs. The new species of smaller Foraminifera is *Tetrataxis zelleri;* other smaller Foraminifera include: *Textularia* sp., and *Plectogyra* sp., [see St. Jean, 1957, for discussion of the genus *Plectogyra*].

PHILLIPS, J., 1846, On the remains of microscopic animals in the rocks of Yorkshire: Geol. and Polytech. Soc. West Riding, Yorkshire, v. 2, p. 274-285, pl. 7.

Illustrates (line drawing) and briefly describes *Endothyra bowmanni (sic bowmani)* Phillips from the Lower Carboniferous rocks of Yorkshire, England; [see Brady, 1876, p. 91; Scott, Zeller, and Zeller, 1947, p. 557-558, and St. Jean, 1957, p. 24-27, for pertinent discussions as to present-day controversy over the genus *Endothyra.*].

PLUMMER, H. J., 1930, Calcareous Foraminifera in the Brownwood shale near Bridgeport, Texas: Univ. Texas Bull., no. 3019, p. 5-21, pl. 1.

From fossiliferous shale in a clay pit just north of the city of Bridgeport, Texas, eight species of Foraminifera are described and figured by whole specimen drawings; six of which are new. Recent mapping has indicated that this clay bed belongs to the Palo Pinto limestone formation (Missouri). New forms are: *Earlandia parva* n. gen., *Nodosinella perelegans* [now referred to *Earlandinita perelegans* (Plummer); see Cummings, 1955, p. 231], *Endothyra watersi, Endothyranella armstrongi, Hermigordius regularis,* and *Orthovertella sellardsi.* Foraminiferal shell composition and the biological phenomenon of isomorphism are discussed in detail.

PLUMMER, H. J., 1944, Smaller Foraminifera in the Marble Falls, Smithwick, and Lower Strawn strata around the Llano Uplift in Texas: Univ. Texas Publ. 4401, p. 211-271, pl. 15-17.

From the Lower Pennsylvanian and Strawn rocks of central Texas a foraminiferal fauna of thirty-nine species, of which fifteen species and two genera are new, is described and illustrated by whole specimen photomicrographs. Particular attention was paid to the geologic range of each of the species, and it was found that no foraminiferal species could be designated as a formational marker with, perhaps, the possible exception of the Marble Falls *Reophax bendensis* which, unfortunately, is not widespread and appears to be confined to the more shaly layers. The new forms include: *Thuramminoides sphaeroidalis* n. gen., *Hyperammina clavacoidea, H. elegantissima, Hyperamminoides expansus* [considered invalid and suppressed in favor of *Hyperammina;* see Conkin, 1954], *Reophax bendensis, R. emaciatus, R. expatiatus, R. minutissimus, R. tumidulus, Glomospira articulosa, Glomospirella* n. gen. [with *Glomospira umbilicata* (Cushman and Waters) as genotype], *Haplophragmoides confragosus, Endothyra distensa, Endothyranella armstrongi* Plummer subsp. *sobrina, Bigenerina perexigua* [now listed as *Palaeobigenerina perexigua* (Plummer); see Cummings, 1956, p. 216], and *Cribrostomum marblense.* A fine annoted bibliography listing publications pertaining to Carboniferous Foraminifera described from Texas is also included.

PLUMMER, H. J., 1948, Morphology of *Globivalvulina;* Am. Mid. Nat., v. 39, p. 167-173, 5 text-fig.

On the basis of this study the definition of the genus *Globivalvulina* is emended to include the genus in the family Cassidulinidae. The coiling of the test is definitely established as comprising a compact biserial succession of numerous, rapidly enlarging chambers arranged in a planispiral coil along an axis of biseriality that describes an open helicoid curve. Brady's diagnosis of the genus is fully discussed and criticized in detail. *Globivalvulina biseralis* Cushman and Waters, and *G. bulloides* (Brady) are illustrated by a series of fine line drawings.

PUMRYA, F. S., 1956, Stratigraphy and Foraminifera of the Middle Carboniferous sediments of the eastern Don Basin: All-Union Petroleum Scientific-Research Geol. Exploration Inst., Trans., n.s. Publ. 98, p. 333-485, 17 pl., [in Russian].

From the Middle Carboniferous rocks of the eastern Don Basin of Russia a microfauna of one hundred species, of which eighty-six are fusulinids (thirty-one species, one genus, and three varieties, all new) and fourteen smaller Foraminifera of which seven are new species, is described and illustrated by thin-section photomicrographs. The new species are: *Endothyranella graciosa, Bradyina sphaerica, B. sphaeroidea, Palaeotextularia eogibbosa, Deckerella cylindrica, Tetrataxis eomaxima,* and *T. donetzica.*

RAUSER-CHERNOUSSOVA, D. M., 1938, The upper Paleozoic Foraminifera of the Samara Bend and the Trans-Volga region: Akad. Nauk S.S.S.R., Work Geol. Inst., v. 7, p. 69-167, 9 pl., [Russian with English summary].

From the Permo-Carboniferous rocks of the Trans-Volga Region of Russia, forty-three species of Foraminifera thirty-nine of which are fusulinids (twenty-three new forms); and four new species of the smaller Foraminifera are described and illustrated by thin-section photomicrographs. New forms are: *Glomospira ammodiscoidea* [now referred to *Brunsiella ammodiscoidea* (Rauser-Chernoussova); see Reitlinger, 1950, p. 16], *Haplophragmella irregularis, Endothyranella gracilis,* and *E. protracta.*

RAUSER-CHERNOUSSOVA, D. M., 1946, Visean and Tournaisian Foraminifera from a drill hole at Nordwick (Yurung-Tumus Peninsula): Subsurface of the Arctic, no. 1, p. 203-209, [Russian with English summary].

Deals mainly with Lower Carboniferous stratigraphy based upon previously described foraminiferal species.

RAUSER-CHERNOUSSOVA, D. M., 1948, Foraminifera from the Carboniferous deposits of central Kazakhstan, U.S.S.R.: Akad. Nauk S.S.S.R. Inst. Geol. Trudy, v. 66 (Geol. Ser. no 21), p. 1-25, 3 pl., [in Russian].

From the Carboniferous rocks of the central Kazakhstan region of Russia a foraminiferal fauna of fourteen species, of which thirteen species and one variety, all new, is described and illustrated by thin-section photomicrographs. The new forms are: *Endothyra antiqua, E. kirgisana, E. koktjubensis, E. ishimica, E.? primaeva, E. communis, E.? kobeitusana, E. reliqua, Climacammina simplex* [name pre-occupied see Meunier, 1888, p. 234-235], *Archaediscus krestovnikovi* var. *koktjubensis, A. rugosus, A. spirillinoides,* and *Tetrataxis eominima.*

RAUSER-CHERNOUSSOVA, D. M., 1948, Foraminifera and stratigraphy of the Visean and Namurian series of the central part of the Russian Platform and areas adjoining the Urals: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62, (Geol. Ser., no. 19), p. 102-142, 2 text-fig., [in Russian].

Deals primarily with Lower Carboniferous stratigraphy based upon previously described foraminiferal species.

RAUSER-CHERNOUSSOVA, D. M., 1948, Stratigraphy of the Visean Series of the south wing of the Moscow Basin, by means of the foraminiferal fauna: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 3-40, 9 text-fig., [in Russian].

Deals primarily with Lower Carboniferous stratigraphy based upon previously described foraminiferal species.

RAUSER-CHERNOUSSOVA, D. M., 1948, Stratigraphy of the Visean and Namurian Series of the Syzran oil prospect by the foraminiferal fauna: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 41-66, 3 text-fig., [in Russian].

Deals primarily with Lower Carboniferous stratigraphy based upon previously described foraminiferal species.

RAUSER-CHERNOUSSOVA, D. M., 1948, Genus *Haplophragmella* and similar forms: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 159-165, pl. 3, [in Russian].

From the Lower Carboniferous rocks of the European part of Russia the genus *Haplophragmella* and other phylogenetically related forms are fully discussed and their correlative value ascertained. A foraminiferal fauna of three new species, one new variety, and one new genus is described and illustrated by thin-section photomicrographs. The new forms are: *Haplophragmella tetraloculi, Lituotubella glomospiroides* var. *magna* n. gen., and *Endothyrina? gracilis.*

RAUSER-CHERNOUSSOVA, D. M., 1948, The Lower Carboniferous Endothyras of the group *Endothyra crassa* Brady and similar forms: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 166-175, pl. 4, [in Russian].

From the Lower Carboniferous Visean rocks of the European part of Russia the group *Endothyra crassa* Brady and similar forms are discussed; one new species and four new varieties are described and illustrated by thin-section photomicrographs. The new forms are: *Endothyra crassa* Brady var. *intermedia, E. crassa* Brady var. *rossica, E. crassa* Brady var. *mosquensis,* and *E. convexa* var. *regularis.* The stratigraphic ranges of each of the above new forms are discussed and illustrated by a stratigraphic range diagram.

RAUSER-CHERNOUSSOVA, D. M., 1948, About some Endothyras of the group *Endothyra bradyi* Mikhailov: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 176-181, pl. 5, [in Russian].

The Lower Carboniferous foraminiferal group *Endothyra bradyi* Mikhailov is discussed; six new species and one new variety are described and illustrated by thin-section photomicrographs. The new forms are: *Endothyra pauciseptata, E. similis* Rauser. and Reitlinger var. *magna, E. devexa, E. obsoleta, E. exilis, E. samarica,* and *E. mirifica.*

RAUSER-CHERNOUSSOVA, D. M., 1948, Genus *Cribrospira* Möller: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 186-189, pl 7, [in Russian].

The Lower Carboniferous foraminiferal genus *Cribrospira* Möller, 1878, is analyzed in the light of new information, and three new species described and illustrated by thin-section photomicrographs. The new forms are: *Cribrospira mikhailovi, C. mira,* and *C. ? rara.*

RAUSER-CHERNOUSSOVA, D. M., 1948, Some new species of Foraminifera from the Lower Carboniferous sediments in the Moscow Basin: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 227-238, pl. 15, 16, [in Russian].

From the Lower Carboniferous rocks of the Moscow Basin, Russia, the following new Foraminifera are described and illustrated by thin-section photomicrographs. The new forms include: *Ammodiscus priscus* [now referred to the genus *Involutina;* see Loeblich and Tappan, 1954], *Endothyra prokirgisana, Quasiendothyra miranda* n. gen., *Archaediscus karreri* Brady var. *nanus, A. moelleri* var. *gigas, A. krestovnikovi* Rauser. var. *pusillus, A. ovoides,* and *A. parvus.*

RAUSER-CHERNOUSSOVA, D. M., 1948, Some new Lower Carboniferous Foraminifera from Syzran district: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 239-243, pl. 17, [in Russian].

The following new Foraminifera from the Lower Carboniferous rocks of the Syzran district, Russia, are described and illustrated by thin-section photomicrographs. The new forms are: *Hyperammina vulgaris* Rauser. and Reitlinger var. *minor, Glomospira gordialis* Jones and Parker var. *prisca, G. gordialis* var. *irregularis, Ammodiscus volgensis* [now referred to the genus *Involutina;* see Loeblich and Tappan, 1954], *Brunsia sygmoidalis* [*Brunsia sygmoidalis* Rauser-Chernoussova, 1948 = *Glomospira sygmoidalis* (Rauser-Chernoussova); see Malakhova, 1956, p. 94], and *Forschia subangulata* (Möller) var. *parvula.*

RAUSER-CHERNOUSSOVA, D. M., 1949, A discussion of the ontogeny of certain Paleozoic Foraminifera: Akad. Nauk S.S.S.R., Palaeont. Inst., Trudy, v. 20, p. 339-353, 1 pl., 4 text-fig., [in Russian].

The ontogeny of the Late Paleozoic fusulinid and nodosariid Foraminifera of Russia are discussed and six new species, of which three are fusulinids, are described and illustrated by thin-section photomicrographs. The new forms are: *Nodosaria praecursor, N. procer,* and *N. postprocera.*

RAUSER-CHERNOUSSOVA, D. M., BELJAEV, G. M., and REITLINGER, E. A., 1936, Die Oberpalaeozoischen Foraminiferen aus dem Petschora-Lande (der Westabhang des Nord Urals): Akad. Nauk S.S.S.R., Po. Kom., Trudy, v. 126 (Geol. Ser. no. 47), p. 1-127, pl. 1-22, 15 text-fig., [Russian with German summary].

A Late Paleozoic foraminiferal fauna from the northern Urals, Russia, is described and illustrated by thin-section photomicrographs. Of the twenty-four species of smaller Foraminifera described six species are new, three are new varieties, and one genus is new. The new forms are: *Palaeotextularia dobroljubovae, P. oblonga, Endothyra crassa* Brady var. *compressa, E. crassa* Brady var. *sphaerica, E. omphalota* Rauser. and Reitlinger var. *minima,* [*E. omphalota* Rauser-Chernoussova & Reitlinger not described until 1940, *q.v.*], *E. similis, E. prisca, E. tschernovi,* and *Haplophragmella fallas* n. gen.

RAUSER-CHERNOUSSOVA, D. M., BELJAEV, G., and REITLINGER, E. A., 1940, On Carboniferous Foraminifera of the Samara Bend: Geol. Oil. Inst., Trans., n.s., v. 7, p. 1-79, pl. 1-9, [Russian with English summary].

A foraminiferal fauna of Lower to Upper Carboniferous age, from a deep well near Syzran on the right bank of the Volga River, Russia, is described and illustrated by thin-section photomicrographs. Twenty-nine Foraminifera are reported; seventeen fusulinids (seven new), and twelve smaller Foraminifera, of which five species and one genus are new. The new forms are: *Endothyra omphalota, Bradyina cribrostomata, Samarina operculata* n. gen., *Hyperammina vulgaris,* and *H. elegans.*

RAUSER-CHERNOUSSOVA, D. M., and FURSENKO, A. B., 1937, A monographic study of the Foraminifera from the oilfields of the U.S.S.R.: Leningrad-Moscow, Glavnaya Redak., Gorno-Topliv., 315 p., 241 text-fig., [in Russian].

A thorough study of all Late Paleozoic Foraminifera that have been reported in well cuttings from the oilfields of the U.S.S.R. One new name, *Haplophragmella molleri nom. nov.* [formerly *Endothyra globulus* Möller] is offered. All are previously described species and are illustrated by numerous line drawings. An excellent bibliography pertaining to the Late Paleozoic Foraminifera is also appended.

REICHEL, M., 1945, Sur un miliolide nouveau du Permien de l'île de Chypre: Naturf. Ges. Basel, Verh., v. 56, pt. 2, p. 521-530, 2 text-fig., [in French].

From the Permian rocks of the island of Cyprus one new genus and species, *Hemigordiopsis renzi,* of the family Miliolidae, is described and illustrated by line drawings and thin-section photomicrographs. A discussion of other Permian Foraminifera found on the island of Cyprus is also given.

REICHEL, M., 1945, Sur quelques foraminifères nouveaux du Permien méditerranéan: Eclog. geol. Helv., v. 38, p. 524-560, pl. 19, 44 text-fig., [in French].

From the Permian rocks of Greece, the Aegean Islands, and Cyprus a foraminiferal fauna of nineteen species, of which seventeen are new, and five new genera are described and illustrated by line drawings and thin-section photomicrographs. The new forms are: *Lasiodiscus granifer* n. gen., *L. divergens, L. tenuis, L. minor, Lasiotrochus tatoiensis* n. gen., *Robuloides lens* n. gen., *R. acutus, R. gibbus* [= *Pararobuloides gibbus* (Reichel); see Miklukho-Maklai, 1954, p. 66], *R. gourisiensis, Gourisina bronnimanni* n. gen., *Olympina insolita* n. gen., *Pyramis radicula* [now referred to the genus *Colaniella;* see Reichel, 1946, p. 371-373], *Globivalvulina graeca, G. cyprica, G. kantharensis, G. vonderschmitti,* and *G. bristolensis.*

REICHEL, M., 1946, A propos de *Pyramis parva* Colani: Eclogae Geol. Helvetiae, v. 39, no. 2, p. 371-373, [in French].

Reichel, 1945, reported *Pyramis parva* Colani from the Permian of the Mediterranean region; later it was called to his attention that the genus had been reported from the Russian Caucasus by Licharew, who found that the genus *Pyramis* is a homonym; hence he redefined and emended the foraminifer to *Colaniella parva* (Colani), [see Licharew, 1939].

REITLINGER, E. A., 1949, An account of the smaller Foraminifera in the lower part of the Middle Carboniferous in the central Ural and Kama Regions, U.S.S.R.: Akad. Nauk S.S.S.R., Izv., Geol. Ser. no. 6, p 149-164, 1 pl., [in Russian].

From the lower part of the Middle Carboniferous rocks of the central Ural and Kama regions, Russia, a foraminiferal fauna of twenty species, of which eleven species and two varieties are new, are described and illustrated by thin-section photomicrographs. A table showing the geologic range of each of the species is also given. The new forms are: *Ammodiscus multivolutus* [emended to genus *Involutina;* see Loeblich and Tappan, 1954], *Endothyra bradyi* Mikhailov var. *compressa, Climacammina inperata, Globivalvulina moderata, G. eogranulosa, G. scaphoides, Archaediscus pseudomoelleri, A. subbashkiricus, A. rugosus, A. postrugosus, A. borealis, A. timanicus,* and *Tetrataxis eominima* Rauser. var. *elata.*

REITLINGER, E. A., 1950, Foraminifera of the Middle Carboniferous formations of the central part of the Russian Platform (exclusive of the family Fusulinidae): Akad. Nauk S.S.S.R., Inst. Geol. Nauk Trudy, pt. 126 (Geol. Ser. no. 47), 127 p., 22 pl., 15 text-fig., 1 table, [in Russian].

From the Middle Carboniferous rocks of the central part of the Russian Platform a fauna of one hundred and twenty-six species, of which ninety-seven species, twenty varieties and seven genera are new, is described and illustrated by thin-section photomicrographs. The new forms are: *Hyperammina aljutovica, Ammodiscus parvus, A. variabilis, A. tenuissimus, A. gigas, A. turbulentus* [emended to genus *Involutina;* see Loeblich and Tappan, 1954], *Brunsiella densa* var. *parva, Turrispira mira, T.? irregularis, Glomospira pusilliformis, G. mikhailovi, Lituotuba regularis, Ammovertella elegantissima, A. lata, A. vaga, A. delicata, Tolypammina complicata, T. fortis, Glomospirella borealis, G. biformis, Glomospiroides fursenki, Haplophragmina kashkirica, H. potensa, Endothyra inusitata, E. bradyi* Mikhailov var. *simplex, E. bradyi* Mikhailov var. *irregularis, E. minuta, E. mosquensis, E. rzhevica, E. adjutovica, E. siviniensis, E. irinae, E. eostaffelloides* var. *lata, E. spirilliniformis* Brazhnikova and Potievska var. *evoluta, Endothyranella mordovica, Bradyina concinna, B. eonautiliformis, B. pseudonautiliformis, B. samarica* var. *grandis, B. lepida, B. venusta, B. minima, B. pauciseptata, Pseudobradyina pulchra, Textularia eofragilis, T. primitiva, T. angusta* var. *elongata, T. angusta* var. *maxima, T. angusta* var. *decurta, T. minutissima, T. fragilis, T. vulgaris, T. longissima, T. gibbosaeformis, T. grandis, T. ponderosa, T. bruta, T. paracommunis* [all of the above forms of *Textularia* are now referred to the genus *Palaeotextularia;* see Cummings, 1956, p. 214], *Cribrostomum posteximium, C. brevis* [referred to genus *Climacammina;* see Cummings, 1956, p. 224], *Deckerellina mirabilis, D. istiensis, Climacammina elegantula, C. aljutovica, C. procera, C. tenuicribrata, C. fragilis, C. obscura, C. keltmensis, C. ivanovae, C. obsoleta, C. moelleri* var. *timanica, C. grandis, C. apliatula, Deckerella tenuissima, D. gracilis, D. composita, D. mjachkovensis, D. dvinensis, Spiroplectammina conspecta, Tetrataxis minima* Lee and Chen var. *latispiralis, T. minima* Lee and Chen var. *mosquensis, T. planispiralis, T. angusta* Vissarionova var. *serpukhovensis, T. numerabilis, T. paraconica, Globivalvulina minima, G. kamensis, G. pulchra, G. mosquensis, G. syzranica, G. granulosa* var. *complicata, G. granulosa* var. *compressa, G. granulosa* var. *multiseptata, G. rauserae, Archaediscus probatus, A. karreriformis, A. subbashkiricus* Reitlinger var. *grandis, A. timanicus* Reitlinger var. *minima, A. permodiscoides, A. variabilis, Hemigordius simplex, Tuberitina maljavkini* Mikhailov var. *grandis, T. collosa* var. *plana, T.? rotundata, Palaeonubecularia fluxa, P. uniserialis, P. rustica, Syzrania bella,* and *S. confusa.* Of the above listed Foraminifera the following are new genera: *Brunsiella, Turrispira, Glomospirella* [name preoccupied; genus *Glomospirella* originally described by Plummer, 1944, p. 233], *Glomospiroides, Haplophragmina, Palaeonubecularia,* and *Syzrania.* A chart showing the geologic range of each of the above new species is appended. In addition the following taxonomic changes are also included: *Glomospira ammodiscoidea* Rauser-Chernoussova, 1938 = *Brunsiella ammodiscoidea* (Rauser-Chernoussova); *Glomospira irregularis* Brazhnikova and Potievska, 1948 = *Brunsiella irregularis* (Brazhnikova and Potievska); *Orthovertella protea* Cushman and Waters, 1928 = *Lituotuba protea* (Cushman and Waters); *Glomospira discoidea* Brazhnikova and Potievska, 1948 = *Hemigordius discoideus* (Brazhnikova and Potievska).

REITLINGER, E. A., 1954, New family Lasiodiscidae: Akad. Nauk S.S.S.R., Inst. of Geol., Paleontol. Sbornik No. 1, p. 69-80, 2 pl., 1 text-fig., [in Russian].

From the Middle Carboniferous rocks of the southwestern part of the Russian Platform one genus and two species are described as new and illustrated by thin-section photomicrographs. The new forms are: *Eolasiodiscus donbassicus* n. gen., and *E. galinae.* A detailed study establishes their close kinship with the Lower Carboniferous genus *Howchinia* and with the Permian genera *Lasiodiscus,* and *Lasiotrochus.* The new genus, *Eolasiodiscus,* supplies the missing link in

the evolutionary chain from Lower Carboniferous to Permian genera, whose kinship was noted earlier [see Davis, 1951]. This new group has been separated into a new family, the Lasiodiscidae. The author believes that the root of the lasiodiscid family probably should be looked for in the peculiar archaeodiscid group of *Archaediscus spirillinoides* Rauser-Chernoussova, 1948, and *A. monstratus* Grozdilova and Lebedeva, 1954. The genus *Monotaxis* Vissarionova, 1948, is regarded as a synonym for the genus *Howchinia*. One evolutionary chart of the family Lasiodiscidae is also given.

REUSS, A. E., 1854, Ueber Entomostraceen und Foraminiferen im Zechstein der Wetterau: Jahresbericht d. Wetterauer Gesellsch., v. for 1851-53, p. 59-77, 12 text-fig., [in German].

From the Permian Zechstein formation of the Wetterau Region of Germany a fauna of ten ostracods and one foraminifer is described and illustrated by simple line drawings. The foraminifer is *Nodosaria geinitzi* [Brady, 1876, p. 26 places this form under *N. radicula* (Linné)].

RICHTER, R., 1855, Aus dem thüringischen Zechstein: Zeitschrift d. deutsch. geol. Gesel., v. 7, p. 526-533, pl. 26, [in German].

From the Permian Zechstein rocks of Thuringia, Germany, the following Foraminifera have been described and illustrated by line drawings: *Serpula pusilla* Geinitz [now *Glomospira pusilla* (Geinitz); see Cushman and Waters, 1927, p. 108], *Textularia cuneiformis* Jones [recognized as a homonym by Brady and renamed *T. jonesi* Brady; see Brady, 1876, p. 273; according to Cummings, 1956, p. 215, examination of the wall structure of *T. jonesi* shows that this form cannot be referred to the Textulariidae and must be included in the Lagenidea], *T. triticum* Jones, *Nodosaria geinitzi* Reuss [referred to *N. radicula* (Linné) by Brady; see Brady, 1876, p. 124], and *Dentalina permiana* Jones [referred to *D. communis* d'Orbigny; see Brady, 1876, p. 27].

ROTH, R., and SKINNER, J., 1929, The fauna of the McCoy formation, Pennsylvanian, of Colorado: Jour. Paleontology, v. 3, p. 332-352, pl. 28-31.

From the Lower Pennsylvanian McCoy Formation of Colorado four new species of Foraminifera are described and illustrated by whole specimen and thin-section photomicrographs. Excellent preservation of the specimens have enabled the author to emend the genus *Deckerella* and illustrate the method of growth of the genus *Bradyina*. The new forms are: *Bradyina magna, Climacammina magna, Deckerella goessi* and *T. vaccula.*

ST. JEAN, J., 1957, A Middle Pennsylvanian fauna from Dubois county, Indiana: Indiana Geol. Survey, Bull. 10, 66 p., 5 pl., 3 text-fig.

This report describes twenty-three species belonging to fourteen genera of lower Middle Pennsylvanian Foraminifera from a single shale outcrop in Dubois County, Indiana. Seven species are representatives of the family Fusulinidae. The new species and previously described forms are as follows: *Hemigordius liratus* Cushman and Waters, *Endothyra tortilis, E. kennethi, E. teres, E. media* Waters, *E. whitesidei* Galloway and Ryniker, *Endothyranella pugnoidea, E. stormi* (Cushman and Waters), *Bradyina magna* Roth and Skinner, *Globivalvulina biserialis* Cushman and Waters, *Tetrataxis concava* Galloway and Ryniker, *T. biconvexa, T. labiata, T. corona* Cushman and Waters, *Polytaxis laheei* Cushman and Waters, and *Earlandia bulbosa* (Cushman and Waters). Most of the specimens are phyloneanic (small simple forms which lack complexities of ornamentation and structure). The fauna correlates well with other formations of early Des Moines age in Illinois, Texas, and Oklahoma. Species range from Lower to Upper Pennsylvanian in age.

Thin sections of all species were made and showed that the wall is calcareous and in many species is composed of a thin-dense, tectumlike outer layer and a thicker, transversely fibrous alveolarlike inner layer. The granular appearance which some students have called "arenaceous" is not "arenaceous or agglutinated," but is caused by recrystallization of the original wall during fossilization. Wall structure, phylogeny, and techniques in sectioning small Late Paleozoic Foraminifera are discussed.

Special attention is given to *Endothyra bowmani* Phillips, the genotype of *Endothyra; Plectogyra* Zeller is placed in synonymy with *Endothyra.*

The illustrations are excellent and consist of both whole specimen and thin-section photomicrographs. The following taxonomic changes are also included: *Endothyranella minuta* Galloway and Ryniker, 1930 = *E. pugnoidea; Ammobaculites stormi* Cushman and Waters, 1928 = *Endothyranella stormi* (Cushman and Waters); and *Hyperammina bulbosa* Cushman and Waters, 1927, Cushman and Waters, 1930, and Plummer, 1944 = *Earlandia bulbosa* (Cushman and Waters).

SCHELLWIEN, E., 1898, Die Fauna des Karnischen Fusulinenkalks: Palaeontographica, v. 44 (1897-1898), pt. 5-6, p. 237-282, pl. 17-24, [in German].

From the Late Paleozoic rocks of Germany a foraminiferal fauna of twenty-two species, of which eleven are fusulinids (nine new species and three new varieties) and eleven are smaller Foraminifera (four new species, one new variety, and two new subgenera) are described and illustrated by line drawings. The new forms are: *Psammophis inversus* [now referred under the genus *Ammovertella;* see Cushman, 1928], *Hemidiscus carnicus, Bigenerina geyeri* [now referred to *Palaeobigenerina;* see Cummings, 1956, p. 216], and *Tetrataxis maxima* var. *depressa.*

SCHMID, E. E., 1867, Uber die Kleineren organischen Formen des Zechsteinkalks von Selters in der Wet-

terau: Neus Jahrb. f. Min., p. 576-588, pl. 6, [in German].

From the Permian Zechstein limestones of the Wetterau Region of Germany the following Foraminifera are described and illustrated by line drawings: *Trochammina incerta* d'Orbigny [probably referable to the genus *Involutina;* see Loeblich and Tappan, 1954], *T. filum* (Schmid) [now referred to *Orthovertella protea* Cushman and Waters; see Cushman and Waters, 1928, p. 45], *Nodosaria radicula* Linné, and *Dentalina communis* d'Orbigny.

SCHUBERT, R. J., 1908, Zur Geologie des Osterreichischen Belebit: Jahrb. Geol. Reichsanst., v. 58, p. 345-386, pl. 16, [in German].

From the Permian rocks of northern Dalmatia (Yugoslavia) a fauna of ten species of which three are fusulinids, and seven are smaller Foraminifera, one new, is illustrated, and described by thin-section photomicrographs. The new form is *Valvulinella bukowskii.*

SCHUBERT, R. J., 1915, Die Foraminiferen des jungeren Palaeozoikums von Timor: Palaontologie von Timor, pt. 2, p. 47-59, pl. 39-41, [in German].

From the Permian rocks of Timor one new species of Foraminifera, *Geinitzina chapmani,* is described and illustrated by a simple line drawing. Other Foraminifera discussed are representatives of the family Fusulinidae.

SCHUBERT, R. J., 1921, Palaeontologische Daten zur Stammensgeschichte der Protozoen: Pal. Zeitschr., v. 3, pt. 2, p. 129-188, [in German].

The new genus *Globivalvulina* is proposed; genoholotype is *G. bulloides* (Brady) = *Valvulina bulloides* Brady, 1876. Later work indicates that the test is calcareous and not arenaceous as originally described; the test is biserial and possibly related to the Cassidulinidae although Cushman lists it under the Trochamminidae [see Plummer, 1948].

In addition the new genus *Ruditaxis,* genotype *Valvulina rudis* H. B. Brady, is proposed to include those forms like *Tetrataxis* but depressed planoconvex, chambers indistinct and labyrinthic, and the test wall subarenaceous. Schubert also erected the genus *Palaeotextularia;* but several workers have questioned the validity of the genus because he did not designate a type species.

SCHWAGER, C., 1883, Karbonische Foraminiferen aus China und Japan. *In:* Richtofen, F. von, China: Berlin; D. Reimer, v. 4, Pal., art. 7, p. 106-159, pl. 15-18, [in German].

Primarily a paper describing the Permo-Carboniferous fusulinids of China and Japan, although six species of smaller Foraminifera, of which two are new, are described but not figured. The new forms are: *Climacammina protenta* and *C. cribrigera.*

SCOTT, H. W., ZELLER, E., AND ZELLER, D. N., 1947, The genus *Endothyra:* Jour. Paleontology, v. 21, p. 557-562, pl. 83-84, 2 text-fig.

The genus *Endothyra* is diagnosed and described as having three primary wall layers: the tectum, diaphanotheca, and tectorium; and a secondary layer, the outer tectorium. The manner of coiling is illustrated and described as complex. Variously oriented sections are termed horizontal axial, vertical axial, oblique axial, and transverse. The relationship of *Endothyra* to the fusulinids, as suggested by the wall structure, is fully discussed; [see St. Jean, 1957, p. 24, for further comments and criticisms; see also Wood, 1949, p. 239-253 for discussion of *Endothyra* wall structure].

SELLIER DE CIVRIEUX, J. M., 1951, Occurrencia del género *Globivalvulina* en el Permiano de Venezuela: Venezuela, Dir. Geol., B., Geol. v. 1, no. 1, p. 141-146, 5 text-fig., [in Spanish].

From rocks of Middle Permian age (Palmarito group) near Merida in the Venezuelan Andes a species of *Globivalvulina* with affinities to *G. graeca* Reichel, is described and illustrated by thin-section photomicrographs. The author makes comparison with all other described species of *Globivalvulina* and comes to the conclusion that there is a distinct relationship between increase in maximum test diameter and evolutionary development, i.e., the more highly evolved the species the greater the test diameter. The species in question has a maximum test diameter of 0.8 mm and is more closely compared to *G. graeca* Reichel, whose maximum diameter is the same. The globivalvulinids are found associated with abundant minute fusulinids, calcareous algae, and crinoid fragments. This is the first reported occurrence of the genus *Globivalvulina* from the Carribean region.

SILVESTRI, A., 1932, Sulle cosiddette Schwagerine della Valle Sosio (Palermo): Soc. Geol. Italiana, Boll., v. 51, p. 253-264, pl. 8, [in Italian].

From the Permian rocks of the Sosio valley, in the province of Palermo, Sicily, eight previously described species of fusulinids are reported and in part illustrated by thin-section photomicrographs. One species of smaller Foraminifera *Saccammina? fabianii* is reported as new; since no description or illustration accompanies the faunal list this form must be regarded as *nomen nudum.*

SOLLAS, W. J., 1921, On *Saccammina carteri* Brady, and the minute structure of the foraminiferal shell: Geol. Soc. London, Quart. Jour., v. 77, p. 193-212, pl. 7.

A detailed petrographic study of the foraminifer *Saccammina carteri* Brady, from the Carboniferous rocks of the classic Elfhills locality in Northumberland, England, has led the author to believe that *S. carteri* Brady is not an "arenaceous" form, but instead a calcareous imperforate form whose "arenaceous" appearance is due to "post-mortem molecular rearrangement." To avoid confusing this form with the

living arenaceous genus *Saccammina,* a new genus *Saccamminopsis* is proposed [specific name of *Saccammina* changed from *carteri* to *fusiniformis;* see Chapman, 1898].

SPANDEL, E., 1898, Die Foraminiferen des deutschen Zechstein und ein zweifelhaftes mikroscopishes Fossil: Verl. Inst. "General-Anzeiger," Nurnberg, p. 1-15, 11 text-fig., [in German].

From the Permian Zechstein rocks of Germany two new genera and nine new species are discussed and illustrated by simple line drawings. The new forms are: *Cornuspira kinkelini, Dentalina labiata, Nodosaria striato-clavata, Frondicularia fischeri, Lingulina zimmermanni, Orthocerina permiana, Geinitzella cunciformis, G. acuta* n. gen. [genus found to be preoccupied, now referred to genus *Geinitzina;* see Spandel, 1901], and *Lunucammina permiana* n. gen.

SPANDEL, E., 1901, Die Foraminiferen des Permo-Karbon von Hooser Kansas, Nord-Amerika: Abhandl. der Natur-hist. Gesellsch., Nürnberg, p. 3-20, 10 text-fig., [in German].

From thin sections of cherty limestone of Permo-Carboniferous age near Hooser, Kansas, twelve foraminiferal forms are named and illustrated by simple line drawings. Seven of the species are new, and a new genus, *Monogenerina,* is described. *Geinitzina* is offered as a new name for *Geinitzella,* published in 1898 but found to be preoccupied. The new species are *Ammodiscus concavus* [now referred to the genus *Involutina;* see Loeblich and Tappan, 1954], *Monogenerina atava, M. nodosariformis, Nodosaria postcarbonica, Geinitzina postcarbonica, Dentalina bradyi,* and *Tetrataxis conica* Ehrenberg var. *lata.*

STACH, E., 1956, Eine Foraminifere im Brandschiefer des Rhurflozes Wellington: Deutsch. Geol. Gesellschaft, Zeitschr., v. 107, p. 116-119, pl. 7, 8, [in German].

From the Carboniferous oil shales of Germany one new foraminifer, *Calcituba wellingtonensis,* is described and illustrated by numerous excellent thin-section photomicrographs.

STEINMANN, G., 1880, Mikroskopische Thierreste aus dem deutschen Kohlenkalke (Foraminiferen und Spongien): Deutschen. Geol. Gesellschaft, Zeitschr. v. 32, p. 394-400, pl. 19, [in German].

From the Carboniferous rocks of Schlesien (formerly eastern Germany, but now Poland) two species of smaller Foraminifera are described as new and illustrated by line drawings. The new forms are: *Cornuspira carbonaria,* and *Trochammina roemeri.*

SULEIMANOV, I. S., 1945, Some new species of small Foraminifera from the Tournaisian of the Ishimbayevo oil-bearing region: Akad. Nauk S.S.S.R., Doklady, v. 48, no. 2, p. 124-127, 5 fig., [in English].

From the Lower Carboniferous rocks of the Ishimbayevo oil-bearing region of Russia, two new genera are described and illustrated by line drawings. The genus *Archaesphaera* is erected to include all those psammosphaerid forms whose test is composed of very fine calcite grains without any inclusions of foreign material. Two species are included in the above genus: *A. minima* and *A. magna.* The genus *Parathurammina* is erected to include all those thuramminid forms that possess a uniform calcareous test wall and numerous apertures. Three new species are included in this genus: *P. dagmarae, P. oldae,* and *P. cuchmani* [*sic cushmani*]. The stratigraphic ranges of the above new forms, and the previously described Foraminifera *Spiroplectammina chernyshinensis* Lipina and *Endothyra glomiformis* Lipina are discussed in some detail.

SULEIMANOV, I. S., 1948, Stratigraphy of Lower Carboniferous sediments in Ishimbayevo District (Visean and Namurian series): Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 84-89, 1 text-fig., [in Russian].

Deals mainly with Lower Carboniferous stratigraphy based upon previously described foraminiferal species.

SULEIMANOV, I. S., 1948, In reference to some Lower Carboniferous sediments in rocks from the Sterlitamak District: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 244-245, 4 text-fig., [in Russian].

The Late Paleozoic foraminiferal genera *Tuberitina* and *Archaediscus* from the Lower Carboniferous rocks of the Sterlitamak District, Russia, are described and illustrated by line drawings. New forms are: *Tuberitina minima,* and *Archaediscus parvus* Rauser. var. *regularis.*

SULEIMANOV, I. S., 1949, Certain Foraminifera from the Upper Paleozoic sediments of Bashkiria: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 105 (Geol. Ser. no. 35), p. 236-243, 1 pl., [in Russian].

A foraminiferal fauna from the Late Paleozoic (Permian) rocks of the Bashkirian Region of European Russia is described and figured by line drawings. Of the ten species described six are new; *Ammodiscus semiconstrictus* Waters [now referred to *Involutina;* see Loeblich and Tappan, 1954], *Hemidiscus carnicus* Schellwien, *Nodosaria netchajivi* Tcherdynzev, *N. longissima, N. elegantissima, Geinitzina uralica, G. longa, Climacammina longissimoides* Lee and Chen, *C. gigas,* and *Tetrataxis elegans.*

TEICHERT, C., 1951, The marine Permian faunas of western Australia. Palaeont. Zeitschr., v. 24, pt. 1-2, p. 76-90, 1 text-fig.

The marine Permian faunas of western Australia, consisting of about 350 species of which 44 species are Foraminifera and of these 33 species belong to the arenaceous group, are briefly reviewed and compared with the Tethyan, eastern Australia and Gondwana faunas. The western Australian faunal province has close affini-

ties with the eastern Tethys (Salt Range, Timor) and is rather dissimilar to the eastern Australian province. A more complete up-to-date treatment of the Australian Permian Foraminifera may be found in Crespin, 1958.

TERMIER, G., AND TERMIER, H., 1950, Paléontologie Marocaine: II-Invertébrés de l'Ere Primaire; pt. 1-Foraminifères, Spongiaires et Coelentérés: Morocco, Serv. Mines, Notes et Mém., no. 73, p. 30-40, 112-115, pl. 1, 2, [in French].

From the Carboniferous rocks of Morocco, French North Africa, a foraminiferal fauna of twenty-three species (one fusulinid) of which four species and two genera are new is described and illustrated by rather poor line drawings. The new forms are: *Haplophragmoides cyclamminiformis, H. maroccana, Volvotextularia polymorpha* n. gen. [Cummings, 1956, p. 216 states *"Volvotextularia* . . . is in no way related to *Textularia* and is possibly a derivative of the Tetraxinidae"], *Aoujgalia variabilis* n. gen. [may be Foraminifera; more probably sponge or algae). A somewhat bizarre classification of the Foraminifera is also presented.

TRIEBEL, E., 1948, Die Foraminiferen-gattung *Ammodiscus* im deutschen Zechstein: Senckenbergiana (Senckenb. Naturf. Ges.), v. 29, p. 137-139, 4 text-fig., [in German].

The author discusses the systematic position of the genus *Ammodiscus* in the Permian Zechstein rocks of Germany and compares *Ammodiscus* to its isomorphic form *Cornuspira*. The so-called "secondary overcrusting of the foraminiferal test wall of *Cornuspira*" as reported by Wicher leads the author to believe that the *Ammodiscus* species introduced in the literature belong collectively to *Cornuspira*. [*Ammodiscus* has been emended to *Involutina;* see Loeblich and Tappan, 1954].

TSCHERDYNZEW, W. A., 1914, Zur Foraminiferenfauna der Permischen Ablagerungen des ostlichen Theils des Europaischen Russlands: Trav. Soc. Nat. Univ. Kazan, v. 46, n. 5, 88 p., 3 pl., [in Russian].

From the Permian rocks of the European part of Russia a fauna of forty-one species, of which twenty-five are new, is described and illustrated by thin-section photomicrographs. New species are: *Lingulina semivelata, L. media, L. familiaris, L. fallax, L. pijmae, Lingulinopsis permiana, L. rotaliaeformis, Geinitzina indepressa, G. spandeli, G. angusta, Frondicularia spicaeformis, F. cordiformis, Nodosaria elabugae, N. netschajewi, N. fragilis, N. wjatkensis, N. krotowi, N. noinskyi, Orthocerina hexagona, Cornuspira kamae, Psammophis anguineus, P. filiformis* [emended to genus *Ammovertella;* see Cushman, 1928], *Hemidiscus transiens, Glomospira hemigordiformis* [now referred under the genus *Brunsiella;* see Reitlinger, 1950, p. 16], and *G. perturbata.*

TSCHERDYNZEW, W. A., 1937, Contributions to the microfauna of the Kazanian Series of the Permian System: Kazan Univ. Soc. Nat., Trans., Kazan, v. 55, no. 5-6 ("Uchenye Zapiski," v. 97, no. 3-4), p. 303-312, 1 pl., [Russian with English summary].

The microfauna of the Kazanian (Upper Guadalupian) Permian sediments of Russia is discussed. A number of "new species" of smaller Foraminifera are mentioned, but the proper descriptions and illustrations are wanting; all forms appear to be *nomina nuda.*

UDDEN, J. A., 1903, Foraminiferal ooze in the Coal Measures of Iowa: Jour. Geology, v. 11, p. 283, 284, and 430.

From the Pennsylvanian (Missourian) strata of Iowa a microfauna is listed. The author submitted the samples to E. Schellwien who identified the following forms: *Psammophis inversus* Schellwien [redefined as *Ammovertella inversa* (Schellwien), see Cushman, 1928], and *Endothyra parva* Möller. In the same journal, p. 430, Udden reports finding a similar foraminiferal bed in the Upper Carboniferous rocks of the Chinati Mountains of west Texas.

UDDEN, J. A., 1914, The deep boring at Spur: Univ. Texas Bull. no. 363, p. 76-87, text-fig. 4-17.

From a Permo-Pennsylvanian rock sequence, encountered in drilling a well in northwest Texas, numerous microfossils are reported and illustrated by simple line drawings. All of the Foraminifera have been previously described. To the compiler's knowledge this marks the first reported occurrence and illustration of smaller Foraminifera from the Late Paleozoic rocks of Texas.

VASICEK, M., and RUZICKA, B., 1957, Namurian Thecomoebina from the Ostrava-Karvina Coal District; Sbornik Narodniho Musea v Praze, Acta Musei Nationalis Pragae, v. 13, B, no. 5, p. 333-340, pl. 40-41.

From the Namurian rocks (Uppermost Mississippian-Lowest Pennsylvanian) of north central Czechoslovakia one new genus, *Prantlitina,* of the order Thecamoebina with two subgenera have been described and illustrated by both thin-section and whole specimen photomicrographs. Under the subgenus *P. (Prantlitina)* the following new species have been described: *P. (Prantlitina) sustai* and *P. (Prantlitina) remesi.* The species *P. (Prantlitinopsis) sturi* is placed in the new subgenus *P. (Prantlitinopsis).*

The author cites evidence that the Thecamoebina lived in a restricted fresh-water environment.

VASICEK, M., and RUZICKA, B., 1957, Namurian Foraminifera from the Ostrava-Karvina Coal District, Sbornik Narodniho Museau v Praze, Acta Musei Nationalis Pragae, v. 13, B, no. 5, p. 341-362, pl. 42-44.

From the Namurian rocks (Uppermost Mississippian-Lowest Pennsylvanian) of north central Czechoslovakia a fauna of seven species, of which four species and one genus are new, is described and illustrated by thin-section and whole specimen photomicrographs.

The new forms are: *Cepekia cepeki* n. gen., *Hemigordius pribyli, Apterrinella augustai,* and *Tetrataxis nemejci.*

VDOVENKO, M. V., 1954, Notice of and new species of Foraminifera from the Lower Visean rocks of the Donets Basin: Kiev State Univ., Geol. Misc. Collection no. 5, p. 63-76, 3 pl., [in Russian].

From the Lower Visean rocks of the Donets Basin of Russia a fauna of eleven new species, of which three are fusulinids, is described and illustrated by very poor thin-section photomicrographs. The new species of smaller Foraminifera are: *Quasiendothyra solida, Q. magna, Q. media, Q. calmiussi, Q. accurata, Lituotubella tenuissima, L. glarea,* and *Spiroplectammina venusta.*

VENUKOFF, P., 1889, La fauna du calcaire inférieur du Bardoun en Mongolie: Russ. - Kais. Min. Ges., St. Petersburg, Verh., ser. 2, v. 25, p. 210-227, pl. 2, [Russian with French summary].

From the Lower Carboniferous rocks of Bardoun in Mongolia one new species of Foraminifera, *Bradyina potanini,* is described and illustrated by thin-section photomicrographs.

VISSARIONOVA, A. YA., 1948, Stratigraphic significance of the Foraminifera of the Visean Series in Tuimazinsk District: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 70-83, 17 text-fig., [in Russian].

Deals primarily with Lower Carboniferous stratigraphy based upon previously described foraminiferal species.

VISSARIONOVA, A. YA., 1948, The group of *Endothyra globulus* Eichwald from the Visean Series of the Lower Carboniferous of the European part of the Union: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 182-185, pl. 6, [in Russian].

From the Lower Carboniferous Visean rocks of the European part of Russia the group *Endothyra globulus* Eichwald is discussed; one new species and variety are described and illustrated by thin-section photomicrographs. The new forms are: *Endothyra paula* and *E. globulus* Eichwald var. *numerabilis.*

VISSARIONOVA, A. YA., 1948, Some species of the subfamily Tetraxinae Galloway from the Visean Series of the European part of the Union: Akad. Nauk S.S.S.R., Inst. Geol. Nauk, Trudy, v. 62 (Geol. Ser. no. 19), p. 190-195, pl. 8, [in Russian].

From the Lower Carboniferous Visean rocks of the European part of Russia a tetraxinid foraminiferal fauna of five species, one variety, and one genus, all new, is described and illustrated by thin-section photomicrographs. The new forms are: *Tetrataxis media, T. dentata* var. *magna, T. paraminima, T. angusta,* and *Monotaxis exilis* n. gen., [Later authors, Reitlinger, 1954, regard the genus *Monotaxis* as a synonym of *Howchinia.*].

VOLZ, W., 1904, Zur Geologie von Sumatra; Anhang II-Einige neue Foraminiferen und Korallen sowie Hydrokorallen aus dem Oberkarbon Sumatras: Geol. Pal. Abh., n.s., v. 6, no. 2, p. 93-110, text-fig. 26-45, [in German].

From the Permian rocks of Sumatra a foraminiferal fauna of six species (one fusulinid), of which four are new, is described and illustrated by line drawings. The new forms are: *Bigenerina wysogorskyi, B. sumatrana,* and *B. leonhardi* [all three forms of *Bigenerina* are now referred to the genus *Cribrogenerina;* see Cummings, 1956, p. 216], and *B. milchi* [now referred to the genus *Climacammina;* see Cummings, 1956, p. 216].

WARTHIN, A. S., 1930, Micropaleontology of the Wetumka, Wewoka, and Holdenville formations: Oklahoma Geol. Survey, Bull., no. 53, 95 p., 7 pl.

From the Pennsylvanian (Des Moines) Wetumka, Wewoka, and Holdenville formations of Oklahoma a foraminiferal fauna of thirty species, of which six species, one variety, and one genus are new, is described and illustrated by whole specimen photomicrographs. The new forms are: *Rectocornuspira lituiformis* n. gen., *R. holdenvillana, Endothyra rotaliformis, Tetrataxis corona* Cushman and Waters var. *pauperata, Nodosinella? fittsi, N.? delicatula* [both species of *Nodosinella* are now grouped under the genus *Reophax;* see Plummer, 1944], and *Monogenerina grandis.*

WATERS, J. A., 1927, A group of Foraminifera from the Dornick Hills formation of the Ardmore Basin: Jour. Paleontology, v. 1, p. 129-133, pl. 22.

From the Pennsylvanian Dornick Hills formation of southern Oklahoma (the shales lying between the Jolliff and Otterville limestones) a foraminiferal fauna of eight new species and two new varieties is described and illustrated by whole specimen photomicrographs. The new forms are: *Hyperammina gracilis* var. *rugosa, Nodosinella laheeii, N. brevis, N. crassa* [all three forms of *Nodosinella* are now referred to *Reophax glennensis* (Harlton); see Plummer, 1944], *Ammodiscus semiconstrictus* var. *regularis* [emended to *Involutina;* see Loeblich and Tappan, 1954], *Ammolagena contorta, Ammobaculites minutus,* and *Stacheia subglobosa.*

WATERS, J. A., 1928, A group of Foraminifera from the Canyon division of the Pennsylvanian formation in Texas; Jour. Paleontology, v. 1, p. 271-275, pl. 42.

From the Middle Pennsylvanian shales exposed below the Ranger limestone in north central Texas a foraminiferal fauna of eleven species, of which nine are new, is described and illustrated by what appear to be whole specimen drawings. The new forms are: *Hyperammina clavata, Glomospira compressa, Lituotuba calcarina, Endothyra media, E. grandis, E. ovata, Ammobaculites nitida, A. gracilis,* and *Textularia cornuta.*

WHITE, C. A., 1878, Descriptions of new species of in-

vertebrate fossils from the Carboniferous and Upper Silurian rocks of Illinois and Indiana: Acad. Nat. Sciences of Philadelphia, Proc., v. 30, p. 37.

Describes as new the annelid *Serpula insita* from the Coal Measures of Newport, Indiana; no illustrations included. [Girty, 1911, p. 124-125, erected a new annelid genus *Serpulopsis,* with *Serpula insita* White as the type species, again no illustrations were given. Later, Girty, 1915, p. 40-42, emended the genus and included somewhat poor representative photographs. Henbest, 1958, p. 128, now regards this form as a sessile Foraminifera of the family Tolypamminidae.]

Wood, A., 1949, The structure of the wall of the test in the Foraminifera; its value in classification: Geol. Soc. London, Quart. Jour., v. 104, p. 229-255, pl. 13-15.

The terms so widely used in the classification of the Foraminifera "perforate" and "hyaline," "imperforate" and "porcellaneous," are shown to be based on characters of entirely different significance. Perforation or nonperforation of the test wall may occur in any group, while the hyaline or porcellaneous appearance, fundamentally depending on the microstructure of the wall, is much more reliable. The structure of the test wall as observed in polarized light is described for all the main groups of Foraminifera, and the conclusion is reached that the microstructure is a character whose importance differs somewhat in different groups. In part this may be ascribed to the actual time of appearance of the particular structure, and the degree of differentiation that has since occurred. There is little doubt, however, that the microstructure of the test is a character of taxonomic importance. Attention is called to the supposed three-layered wall in the genus *Endothyra* as described and reported by Scott, Zeller, and Zeller, 1947. The author, on p. 239, reports that he has not seen a three-layered test wall in any British specimen of *Endothyra;* also in the discussion of Wood's paper C. D. Ovey, p. 253, reiterates the same view.

Woodland, R. B., 1958, Stratigraphic significance of Mississippian endothyroid Foraminifera in central Utah: Jour. Paleontology, v. 32, p. 791-814, pl. 99-103, 5 text-fig.

From the Mississippian rocks of central Utah an endothyroid fauna of fourteen species, of which eight are new, is described and illustrated by numerous thin-section photomicrographs. The new species are: *Granuliferella asperata, G.? granulella, Plectogyra gibbosa, P. turgida, P. bullata, P. kleina, Endothyra? lanceolata,* and *E. hamula.*

Comparative phylogeny can be used to correlate Upper Mississippian time equivalents between central Utah and the Mississippi Valley. Lower Mississippian forms of the two areas are dissimilar and correlation is uncertain.

A vagrant benthonic habit of endothyroids during life is indicated by limited lithologic association with unbraded echinoderm segments, irregularity of form, and granular wall of individuals. Flood occurrence is attributed to biological and ecological agents which periodically killed and preserved sensitive populations en masse. Endothyroid sensitivity to environment is indicated by their diminished abundance or complete absence in rocks of non-calcareous composition and non-encrinitic texture.

Wray, J. L., 1952, Endothyroid Foraminifera from the Greenbrier Series (Mississippian) of northern West Virginia: Jour. Paleontology, v. 26, p. 946-952, 20 text-fig.

From the Upper Mississippian Greenbrier Series of northern West Virginia a fauna of endothyroid Foraminifera is discussed and illustrated by line drawings. Two genera, *Endothyra* and *Plectogyra,* are recognized but no attempt is made to distinguish existing species or to describe new species. [See St. Jean, 1957, p. 25-26, for pertinent comments and criticisms.]

Yabe, H., 1942, *Saccamminopsis* limestone: Imp. Acad. Tokyo, Pr., v. 18, no. 10, p. 682-685, 3 fig.

From the Lower Carboniferous coralline limestone of Japan the foraminifer *Saccamminopsis carteri* (Brady) [now referred to *S. fusuliniformis* (McCoy); see Chapman, 1898, Sollas, 1921, and Rauser-Chernoussova and Fursenko, 1937] is fully discussed and illustrated by thin-section photomicrographs. The author believes that the test wall of *Saccamminopsis* was originally perforate, although in most cases its primary structure is no longer retained. Pore measurement of one of the author's figures is given as 0.007 mm broad.

Zeller, D. E., 1953, Endothyroid Foraminifera and ancestral fusulinids from the type Chesteran (Upper Mississippian); Jour. Paleontology, v. 27, p. 183-199, pl. 26-28, 9 text-fig.

Thin-section studies of rocks of the Mississippian type Chester series reveal the presence of the fusulinid genus *Millerella* as far down in the Mississippian as the New Design group. Associated with *Millerella* are numerous large plectogyroids. A fauna of three new species of the fusulinid genus *Millerella* and seven new species of the genus *Plectogyra* is described and illustrated by line drawings and thin-section photomicrographs. The new forms described under the genus *Plectogyra* are: *P. tantala, P. kentuckyensis, P. versabilis, P. pandorae, P. maxima, P. excellens,* and *P. phrissa* [see St. Jean, 1957, p. 23-27, for pertinent comments and criticisms].

Zeller, E. J., 1950, Stratigraphic significance of Mississippian endothyroid Foraminifera: Univ. Kansas Paleont. Contrib., Protozoa, Art. 4, p. 1-23, pl. 1-6.

A study of the genus *Endothyra* indicates that they first appeared in Upper Devonian strata, became fairly abundant in the Kinderhook and Osage, attain maximum development both in size and abundance in

the Meramec, then decline somewhat in the Chester. *Endothyra,* as previously recognized, is found to contain forms that should be excluded from the genus, hence a new genus and species, *Plectogyra plectogyra,* is erected to include those endothyroid forms which are not planispiral. The phylogenetic trends of the endothyroids are diagrammatically illustrated and their relationship to the fusulinids is discussed. [See St. Jean, 1957, p. 23-27, for pertinent comments and criticisms.]

ZELLER, E. J., 1957, Mississippian endothyroid Foraminifera from the Cordilleran Geosyncline: Jour. Paleontology, v. 31, p. 679-704, pl. 75-82.

From a systematic study of twelve measured sections of Mississippian rocks in the Cordilleran Region a stratigraphic zonation based upon endothyroid Foraminifera is proposed and fully discussed. Seventeen species and one genus are described as new and illustrated by thin-section photomicrographs. The new forms are: *Granuliferella granulosa* n. gen., *G. plectula, G. tumida, Plectogyra tumula, P. anteflexa, P. trachida, P. tumesepta, P. rugosa, P. irregularis, P. inflata, P. nevadaensis, Endothyra taedia, E. disca, E. symmetrica* [specific name preoccupied; see Morozova, 1949, p. 247-48], *E. spiroides, E. utahensis,* and *E. macra* [See St. Jean, 1957, p. 24-27, for a discussion of the genus *Plectogyra*].

CONTRIBUTIONS FROM THE CUSHMAN FOUNDATION
FOR FORAMINIFERAL RESEARCH
VOLUME X, PART 3, JULY, 1959

RECENT LITERATURE ON THE FORAMINIFERA

Below are given some of the more recent works on the Foraminifera that have come to hand.

ADAMS, C. G. Geological distribution of **Discospirina** (Foraminifera) and occurrence of **D. italica** in the Miocene of Cyprus.—Palaeontology (Pal. Assoc. London), v. 1, pt. 4, Jan. 1959, p. 364-368, pl. 61—Specimens reported from Cyprus as **Cycloloculina miocenica** are re-identified as **Discospirina italica,** and the range of the genus is extended back to middle Miocene.

BARRIER, JANINE, and NEUMANN, MADELEINE. Contribution à l'étude de **Nonionina cretacea** Schlumberger.—Revue de Micropaléontologie, v. 1, No. 4, March 1959, p. 223-229, pls. 1, 2.—**Nummofallotia** n. gen. (genotype **Nonionina cretacea** Schlumberger) ranges from Coniacian to Maestrichtian.

BATJES, DERK ANDERS JOHAN. Foraminifera of the Oligocene of Belgium.—Instit. Royal Sci. Nat. Belgique, Mém. No. 143, Sept. 30, 1958, p. 1-188, pls. 1-13, maps 1-15, text figs. 1-11 (sections), tables 1-4 (distrib. charts).—About 140 species and varieties are recorded and illustrated, mostly from Oligocene and Miocene of Belgium and Germany, but with some from Miocene of Netherlands also included. Two new species of **Bulimina** are described from Germany, one from late Oligocene, the other from middle Miocene.

BÉ, ALLAN W. H. Ecology of Recent planktonic foraminifera: Part 1—Areal distribution in the western North Atlantic.—Micropaleontology, v. 5, No. 1, Jan. 1959, p. 77-100, pls. 1, 2, text figs. 1-52 (maps, graphs, diagram), tables 1, 2.—Quantitative analysis of Foraminifera from 29 plankton tows taken in Sargasso Sea, Gulf Stream, and continental slope water. Nineteen species are recognized, illustrated by excellent photographs, and their absolute and relative abundance plotted on maps. Species are grouped as to their cold and warm tolerance.

BECKMANN, JEAN PIERRE. Correlation of pelagic and reefal faunas from the Eocene and Paleocene of Cuba.—Eclogae geol. Helvetiae, v. 51, No. 2, December 1958, p. 416-422, text figs. 1, 2 (map, range chart). —Ranges of 16 genera and 4 species of larger Foraminifera are indicated in terms of the planktonic zones from Paleocene to lower Oligocene.

BERGQUIST, HARLAN R. Micropaleontologic study of Grandstand Test Well 1, northern Alaska, **in** ROBINSON, FLORENCE M.—U. S. Geol. Survey Prof. Paper 305-E, 1958 (Jan. 21, 1959), p. 337-338.—**Verneuilinoides borealis** faunal zone of Albian age present throughout well.

Micropaleontologic study of Meade Test Well 1 and Kaolak Test Well 1, northern Alaska, **in** COLLINS, FLORENCE RUCKER.—U. S. Geol. Survey Prof. Paper 305-F, 1958 (Jan. 13, 1959), p. 373-374.—**Verneuilinoides borealis** faunal zone present in lower parts of both wells; Foraminifera very sparse.

BERMES, BORIS J. Interim report on geology and ground-water resources of Indian River County, Florida.—Florida Geol. Survey Inf. Circ. No. 18, 1958, p. 1-74, text figs. 1-12, tables 1-4.—Foraminifera listed in well logs.

BEZRUKOV, P. L., MURDMAA, I. O., SAIDOVA, H. M., and FILATOVA, Z. A. Ob osadkakh i Donnoj Faune severnoj Chasti Vostochno-Kitajskogo Morja (in Chinese and Russian).—Oceanologia et Limnologia Sinica, v. 1, No. 3, Nov. 1958, p. 269-315, text figs. 1, 2 (map, profile), tables 1-5.

BHATIA, S. B., and SINGH, S. K. Carboniferous (Uralian) foraminifera from Manendragarh, central India. —Micropaleontology, v. 5, No. 1, Jan. 1959, p. 127-134, pls. 1, 2, table 1.—A fauna of 9 arenaceous species (1 new and 2 indeterminate) shows affinities with the Pennsylvanian of North America.

BLOW, WALTER H. Age, correlation, and biostratigraphy of the upper Tocuyo (San Lorenzo) and Pozón formations, eastern Falcón, Venezuela.—Bull. Am. Paleontology, v. 39, No. 178, Feb. 9, 1959, p. 67-251, pls. 6-19, text figs. 1-5 (lineage diagrams), maps 1-4, charts 1-4.—Direct correlation is possible between the lower and middle Miocene planktonic biozones used in Trinidad and the benthonic biozones of eastern Falcón. In the eastern Falcón area 3 new biozones are set up for middle to upper Miocene sediments corresponding to sediments that are devoid of planktonic Foraminifera in Trinidad. Trans-Atlantic correlation of the Miocene sediments of eastern Falcón is discussed. Two **Globorotalia** lineages and 3 of **Globigerina** and **Globigerinoides** are studied and diagrammed. Two hundred sixty species and subspecies (14 new), a third of them planktonic, are recorded and many are illustrated. Ranges of most of the planktonics are shown within the 12 zones and subzones from Aquitanian to Pliocene.

BOGDANOVICH, A. K. Ontogeneticheskoe Razvitie **Quinqueloculina konkensis** iz konkskikh otlozhenij Predkavkaz'ja I soobrazhenija O Samostojatel'nosti roda **Adelosina** Orb.—Voprosy Mikropaleontologii, v. 2, 1958, p. 74-83, pls. 1, 2.—From the middle Miocene.

BOTTERON, GERMAIN. Étude de sédiments récoltés au cours de plongées avec le bathyscaphe "Trieste" au large de Capri.—Univ. Lausanne Bull., no. 124, 1958, p. 1-19, pls. 1-4, text figs. 1, 2 (graph, photographs of cores).—Foraminifera listed and a few illustrated from samples taken at 450 and 1090 meters.

BRONNIMANN, PAUL. New Pseudorbitoids from the Upper Cretaceous of Guatemala, Texas and Florida. —Eclogae geol. Helvetiae, v. 51, No. 2, Dec. 1958, p. 422-437, pl. 1, text figs. 1-9 (graphs, sketches, map), tables 1-4.—Three new species.

BYKOVA, N. K. O Printhipakh Vydelenija Nekotorykh Rodov Iz Semejstva Buliminidae I Bolivinitidae, **in** Mikrofauna SSSR, Sbornik 9.—Trudy Vses. Neft Nauch.-issl. Razved. Instit., vyp. 115, 1958, p. 225-231.

BYKOVA, N. K., BALAKHMATOVA, V. T., VASILENKO, V. P., VOLOSHINOVA, N. A., GRIGELIS, A., DAIN, L. G., IVANOVA, L. V., KUZINA, V. I., KUZNEZOVA, Z. V., KOZYREVA, V. F., MOROZOVA, V. G., MJATLIUK, E. V., and SUBBOTINA, N. N. Novye Rody I Vidy Foraminifer, **in** Mikrofauna SSSR, Sbornik 9.—Trudy Vses. Neft. Nauch.-issl. Razved. Instit., vyp. 115, 1958, p. 5-81, pls. 1-12. —Sixty new species and one new variety from beds

ranging in age from Late Paleozoic to Tertiary. Seven new genera and 1 new subgenus are erected: **Mesoendothyra** Dain n. gen. (type species **M. izjumiana** n. sp.) in Mesoendothyridae Voloshinova n. fam.; **Tobolia** Dain n. gen. (type species **T. veronikae** n. sp.) and **Mariella** Dain n. gen. (type species **M. sibirica** n. sp.) in Polymorphinidae; **Pseudoepistominella** Kusnezova n. gen. (type species **P. mirusa** n. sp.) in Epistominidae; **Brotzenella** Vassilenko n. subgen. of **Anomalina** (subgenerotype **A. monterelensis** Marie); **Kolesnikovella** Bykova n. gen. (type species **Tritaxia elongata** Halkyard) and **Candella** Bykova n. gen. (type species **Trifarina labrum** Subbotina) in Buliminidae; and **Miliospirella** Grigelis n. gen. (type species **M. lithuanica** n. sp.) in Spirillinidae.

BYSTRICKÁ, HEDVIGA, and CECH, FRANTISEK. Bemerkungen zur Stratigraphie des Lignitbeckens unter dem Vihorlat (German summary of Czech text). Geol. Práce [Bratislava], Zprávy, 14, 1958, p. 124-128.—Foraminifera listed.

CARTER, A. N. Tertiary Foraminifera from the Aire district, Victoria.—Geol. Survey Victoria, Bull. No. 55, 1958, p. 1-76, pls. 1-10, text figs. 1-4 (maps, columnar section, diagram), 1 table, 3 distrib. charts. —Stratigraphic ranges in 6 formations of Eocene, Oligocene, and Miocene age are indicated for 65 species. Thirty-eight of these ((11 new) are described and illustrated. Eleven faunal zones (2 Eocene, 4 Oligocene, and 5 Miocene) are recognized. Correlation with several other Tertiary sequences in Australia is proposed, and evidence for the boundaries between the 3 ages (Eocene, Oligocene, and Miocene) is discussed.

CHUBB, L. J. Upper Cretaceous of central Chiapas, Mexico.—Bull. Am. Assoc. Petr. Geol., v. 43, No. 4, April 1959, p. 725-756, text figs. 1-10, tables 1-3.—Foraminifera reported as identified by BRONNIMANN.

CICHA, IVAN. Mikrobiostratigraphische Verhältnisse des Neogens in den Cf Bohrungen in Weiterer Umgebung der Gemeinde Laksárska Nová ves (Innenalpines Wiener Becken) (German summary of Czech text).—Geol. Prace, Zpravy 14, 1958, p. 92-106, pls. 8-11, 1 table, —Miocene Foraminifera listed. Assemblages from 2 Helvetian and 2 Tortonian zones are illustrated.

COLOM, G. Sur une nouvelle espèce Mediterranéenne du genre **Hofkerina**.—Revue de Micropaléontologie, v. 1, No. 3, Dec. 1958, p. 148-154, pls. 1-3.—**Hofkerina mediterranea** n. sp. from deep water off the Balearic Islands and Morocco.

Foraminiferen aus dem Kalk von Santa Maria **in** Gesteine und Fossilien von den Azoren, by KREJCI-GRAF, KARL, FRECHEN, JOSEF, WETZEL, WALTER, and COLOM, GUILLERMO.—Senckenbergiana Lethaea, Band 39, No. 5/6, Dec. 15, 1958, p. 337-347, pls. 5-8. —Ten planktonic species and 21 benthonic ones from upper Miocene to Pliocene, most of them illustrated.

DROOGER, C. W., and KAASSCHIETER, J. P. H. Foraminifera of the Orinoco-Trinidad-Paria shelf. Reports of the Orinoco Shelf Expedition, Vol. IV.—Verhandel. Kon. Nederl. Akad. Wetenschappen, Afd. Natuurkunde, Eerste Reeks, Deel XXII, Dec. 1958, p. 1-108, pls. 1-5, text figs. 1-4, maps 1-41.—Several distinctive zones and areas are recognized on the basis of Foraminifera assemblages. One hundred sixty-one benthonic species and varieties (1 new and 1 a new name) and 28 planktonic species are reported and many illustrated. Distribution and abundance are shown on separate maps for 36 benthonic species and varieties, and for some planktonic assemblages. Depth of deposition of Miocene and Pleistocene sediments in a borehole on Aruba is interpreted by comparison with the Recent assemblages.

DURAND DELGA, MICHEL, and MAGNÉ, JEAN. Données stratigraphiques et micropaléontologiques sur le nummulitique de l'est des Cordillères Bétiques (Espagne).—Revue de Micropaléontologie, v. 1, No. 3, Dec. 1958, p. 155-175, pls. 1, 2, text figs. 1-6 (sections), tables 1-4.—Distribution of Foraminifera in several sections covering Danian to upper Oligocene.

FALLOT, PABLO, DURAND DELGA, MIGUEL, BUSNARDO, ROBERTO, and SIGAL, JACOBO. El Cretáceo superior del Sur de Caravaca (provincia de Murcia).—Notas y Comunicaciones Instit. Geol. Min. España, No. 50, 1958, p. 283-298, 1 pl., text figs. 1-3 (map, section, columnar section).—Foraminifera from pelagic facies listed and illustrated in section.

FEYLING-HANSSEN, ROLF W. Mikropaleontologiens teknikk (in Norwegian with English summary).—Norwegian Geotechnical Institute, Pub. No. 29, 1958, p. 1-14, text figs. 1-6.—Describes techniques of study of Foraminifera from late Pleistocene marine clays.

Stratigraphy and shear strength. A geotechnical problem from a geological point of view (in Norwegian with English summary).—Norwegian Geotechnical Institute, Pub. No. 29, 1958, p. 1-15, 1 pl., text figs. 1-5 (graphs).—In the late Pleistocene marine clays close correlation is observed between stratigraphical zones based on fossil Foraminifera and shear strengths of the clay deposits. Foraminifera are illustrated.

FOMINA, E. B. K voprosu o stroenii stenok rakovin nekotorykh vizejskikh Foraminifer Podmoskovnogo bassejna.—Voprosy Mikropaleontologii, v. 2, 1958, p. 121-123, text figs. 1, 2.

FORTI, A. Studi statistici su una microfauna aquitaniana dell'Appennino pavese-vogherese.—Riv. Ital. Pal. Stratig., v. 64, No. 4, 1958, p. 349-357, pl. 18, text figs. 1-3 (graphs).—List of species (some illustrated) and percentage diagrams for families.

FURSENKO, A. V. O Predstaviteljakh **Palmula** Lea V Melovykh Otlozhenijakh Prikaspijskoj Vpadiny I O Sistematicheskom Polozhenii Ehtogo Roda, **in** Mikrofauna SSSR, Sbornik 9.—Trudy Vses. Neft. Nauch.-issl. Razved. Instit., vyp. 115, 1958, p. 107-113, pl. 1. —Two new species of **Palmula** from the Cretaceous.

GARROT, H., LACASSAGNE, R., and NOUET, G. Caractères microstratigraphiques du Dogger des Ardennes et Liason avec certains sondages de Normandie.—Revue de Micropaléontologie, v. 1, No. 4, March 1959, p. 208-216, pl. 1, text figs. 1-3.—Distribution of 23 Foraminifera and 10 Ostracoda shown in 4 ammonite zones in the Bajocian and 5 in the Bathonian.

GERKE, A. A. O Nekotorykh Vazhnykh Osobennostjakh Vnutrennego Stroenija Foraminifer iz Semejstva Ljagenid po Materialam iz Permiskikh, Triasovykh i Lejasovykh Otlozhenij Sovetskoj Arktiki.—Sbornik statei po paleontologii i biostratigrafii (Leningrad), vyp 4, 1957, p. 11-26, text figs. 1-5.—Concerning detailed structure of lagenid apertures and walls.

GRADER, P. Geological history of the Heletz-Brur area, Israel. Part I, Upper Cretaceous-Quaternary.—Israel Geol. Survey Bull. No. 22, Dec. 1958, p. 1-15, text figs. 1-6 (maps, correl. chart), correl. table.—In a series of wells, 2 Cenomanian zones and a Miocene one are recognized by smaller Foraminifera.

GRAHAM, JOSEPH J., and MILITANTE, PRISCILLA J. Recent Foraminifera from the Puerto Galera area, northern Mindoro, Philippines.—Stanford Univ. Pub.,

Geol. Sci., v. 6, No. 2, Feb. 12, 1959, p. 1-171, pls. 1-19, tables 1-8, text figs. 1, 2 (map, graph).—A systematic catalog, beautifully illustrated, including 264 species and varieties (23 indeterminate but none described as new). Quantitative record of distribution at 60 shallow water stations: bay, cove, channel, and beach localities. Ecological data are included.

GUTSCHICK, RAYMOND C., and TRECKMAN, JOHN F. Arenaceous Foraminifera from the Rockford limestone of northern Indiana.—Jour. Pal., v. 33, No. 2, March 1959, p. 229-250, pls. 33-37, text figs. 1-3.—Forty species (22 new and 7 indeterminate) from insoluble residues of Mississippian Kinderhook age, illustrated by excellent photographs.

HOFKER, JAN. Foraminifera from the Cretaceous of Limburg, Netherlands. XXXVII. **Linderina visserae** nov. spec.—Natuurhist. Maandblad, 47e Jrg., Nos. 9-10, Oct. 31, 1958, p. 125-127, text figs. 1-8.—From the Dano-Paleocene.

XXXVIII. The gliding change in **Bolivinoides** during time.—Natuurhist. Maandblad, 47e Jrg., Nos. 11-12, Dec. 31, 1958, p. 145-159, text figs. 1-11.—Developmental series from 3 localities were studied statistically and illustrated. Similar orthogenetic changes shown for **Neoflabellina** and 3 species in the Gavelinellidae.

Daviesina voigti n. sp., eine gesteinsbildende Foraminifere aus dem Campan des subherzynen Beckens.—Mitteil. Geol. Staatsinstit. Hamburg, Heft 27, Dec. 1958, p. 69-73, text figs. 1-5.—From a conglomerate horizon composed of **Daviesina.**

IORGULESCU, T. Contributions to the micropaleontological study of the Neogene of Oltenia (English summary).—Bucharest. Instit. petrol, gaze si geol., v. 4, 1958, p. 29-45, 1 table.—Foraminifera listed from 10 micropaleontological zones between Aquitanian and lower Pliocene.

JANÁCEK, JOSEF. Eine neue Salzlagerstätte in der Ostslowakei (German summary of Czech text).—Geol. Práce [Bratislava], Zprávy 14, 1958, p. 72-91, 3 diagrams, 1 table.—Foraminifera listed.

KANTOROVÁ, VIERA, and BEGAN, AUGUSTIN. Klippenzone in der Weiteren Umgebung der Gemeinde Pruské (German summary of Czech text).—Geol. Práce [Bratislava], Zprávy 14, 1958, p. 107-117, 1 map, 1 chart.—Characteristic species listed from Albian to Maestrichtian.

KHALILOV, D. M. Stratigrafija Tretichnykh Otlozhenij Talysha po mikrofaune.—Akad. nauk SSSR, Trudy Azerbajdzhan. neft. ehksped. soveta po izucheniju proizvod. sil an SSSR, Voprosy geologii Talysha, 1958, p. 136-149.

KIREEVA, G. D. Nekotorye Ehkologicheskie Morfy Shvagerin Bakhmutskoj Kotloviny Donethkogo Bassejna.—Voprosy Mikropaleontologii, v. 2, 1958, p. 91-104, pls. 1, 2.—Descriptions and illustrations of schwagerinids.

KNIPSCHEER, H. C. G. Beitrag zur Einstufung der Promberger Schichten der Subalpinen Molasse Oberbayerns nach Kleinforaminiferen. A. Über den stratigraphischen Wert von **Streblus beccarii** (L.) und **Streblus** cf. **beccarii** (L.). B. Oligozäne Kleinforaminiferen in den Promberger Schichten.—Abhandl. Hess. Landes. Bodenforschung, Heft 23, May 15, 1957, p. 87-89.—Lists of Foraminifera from Chattian.

KRASHENINNIKOV, V. A. O Stroenii Ust'ja u Nekotorykh Predstavitelej Nonionid I Ehl'fidiid.—Voprosy Mikropaleontologii, v. 2, 1958, p. 105-120, pls. 1, 2, text figs. 1-7.—Eight nonionids, 6 new, from the upper Tortonian.

KSIAZKIEWICZ, MARIAN. Stratigraphy of the Magura series in the Sredni Beskid (Carpathians).—Poland Instit. Geol. Biul. 135, tom 3, 1958, p. 43-96, pl. 17 (map), text figs. 1-7, 1 table.—Nine members of a sequence from Senonian to upper Eocene are characterized by Foraminifera, chiefly nummulites.

LESKO, BARTOLOMEJ. Flysch Zwischen Medzilaborce und Pichné (Ostslowakei) (German summary of Czech text).—Geol. Práce [Bratislava], Zprávy 14, 1958, p. 56-71, figs. 1, 2 (columnar sections).—Foraminifera mentioned.

LISZKA, STANISLAW. Culm-Foraminifera from Gluchowki near Cracow (in Polish with English summary).—Ann. Soc. Geol. Pologne, v. 28, Année 1958, fasc. 2, p. 153-168, pls. 18, 19.—Twelve species (1 new and 3 indeterminate) of upper Visean age.

LLOYD, ADRIAN J. Arenaceous Foraminifera from the type Kimeridgian (Upper Jurassic).—Palaeontology (Pal. Assoc. London), v. 1, pt. 4, Jan. 1959, p. 298-320, pl. 54, text figs. 1-5.—Twenty-five species, 3 new, with their ranges indicated in about 1200 feet of section. Comparison of agglutinable materials with the materials actually used indicates that species agglutinate preferred grain sizes and, in some cases, preferred types of material.

LYS, M., and BOURDON, M. Observations complémentaires sur les Foraminifères du Néogène du Bas-Rhône.—Comptes Rendus Congrès Soc. Savantes de Paris et des Departements, sec. Sci., sous-sec. Géol., Colloque sur le Miocène, 1958, p. 207-211, 1 pl.—List of species and description of 2 new ones.

MAGNÉ, JEAN, and POLVÊCHE, JEAN. Sur la présence dans l'Ouarsenis oranais (Algérie) d'une série de passage du Crétacé à l'Eocène.—Soc. Géol. Nord, Lille, Ann. 77, 1957, p. 164-170.—Smaller Foraminifera from Danian and Montian-Thanetian.

MAHEL, MICHAL. Kalke im Alb der Westkarpatischen serie im Gebirge Strázovská Hornatina (German summary of Czech text).—Geol. Práce [Bratislava], Zprávy 14, 1958, p. 13-16.—Foraminifera listed.

MALLORY, V. STANDISH. Lower Tertiary biostratigraphy of the California Coast Ranges.—Am. Assoc. Petr. Geol., Tulsa, Jan. 1959, 416 p., 42 pls., 7 text figs. (maps, correl. chart), 19 tables.—Companion to the Kleinpell 1938 monograph. Five stages, each with 2 zones based on smaller Foraminifera; 2 stages comprising the Paleocene, 1 each comprising lower, middle, and upper Eocene. In the systematic catalog of 738 entries, 43 species and 14 varieties are described as new. Most of the forms are illustrated.

MARIE, PIERRE. Sur la faune de Foraminifères des marnes à **Nassa** du Bosq d'Aubigny.—Comptes Rendus Congrès Soc. Savantes de Paris et des Departements, sec. Sci., sous-sec. Géol., Colloque sur le Miocène, 1958, p. 239-246, 1 table.—List of Pliocene Foraminifera.

Peneroplidae du Crétacé Supérieur a faciès récifal. 1. A propos de genres **Broekina** et **Praesorites** et sur le nouveau genre **Vandenbroekia.**—Revue de Micropaléontologie, v. 1, No. 3, Dec. 1958, p. 125-139, pl. 1.—New subfamily Broekininae for **Praesorites** and **Vanbenbroekia** n. gen. (genotype **V. munieri** n. sp.); the former having subdivided chambers, the latter simple chambers.

MARINCAS, VALERIA, and BALUTA, C. Contributions à l'étude de la microfaune sarmatienne de Dealul Magura (Vallée du Strei) (French résumé).—Acad. Repub. Pop. Romine, An. 8, 1-2, Jan.-June 1957, p. 83-97, pls. 1, 2.—Nine species and one variety are recorded and illustrated. Dominance of **Elphidium** suggests brackish conditions.

MARTIN, GERALD P. R. Eine Foraminiferen-Fauna aus dem Helvétien des Jensberges südlich Biel (Kt. Bern).—Eclogae geol. Helvetiae, v. 51, No. 2, Dec. 1958, p. 309-329, text figs. 1-22.—Sixty-one species reported and a few of them illustrated.

MAYNC, WOLF. Note on the genera **Alveolophragmium** and **Reticulophragmium** (Foraminifera).—Eclogae geol. Helvetiae, v. 51, No. 2, Dec. 1958, p. 305-308.—Examination of **Alveolophragmium** confirms the presence of alveolar wall structure and interio-areal aperture. Thus **Labrospira** (a synonym of **Cribrostomoides)** cannot be a synonym of **Alveolophragmium. Reticulophragmium** remains valid for alveolar forms with interio-marginal aperture.

The foraminiferal genera **Spirocyclina** and **Iberina.**—Micropaleontology, v. 5, No. 1, Jan. 1959, p. 33-68, pls. 1-8, text figs. 1-3.—Emendation of **Spirocyclina** based on its genotype **S. choffati** Munier-Chalmas (being illustrated for the first time), and reinstatement of **Iberina** for some of the species erroneously placed in **Spirocyclina.** Discussion of age of **Iberina**-bearing beds in Europe, North Africa, Near East, and America shows that the species **I. lusitanica** (Egger) cannot be used as a restricted stratigraphic marker.

Deux nouvelles espèces Crétacées du genre **Pseudocyclammina** (Foraminifères).—Revue de Micropaléontologie, v. 1, No. 4, March 1959, p. 179-189, pls. 1-4, text figs. 1, 2.

McGUGAN, ALAN. Comments on "A simplified method of grinding foraminifera."—Micropaleontology, v. 5, No. 1, Jan. 1959, p. 76.

McKEE, EDWIN D., CHRONIC, JOHN, and LEOPOLD, ESTELLA B. Sedimentary belts in lagoon of Kapingamarangi Atoll.—Am. Assoc. Petr. Geol. Bull., v. 43, No. 3, March 1959, p. 501-562, pl. 1, text figs. 1-21 (maps, photographs, sections, graphs), tables 1-10.—Two of the 6 facies belts are characterized by Foraminifera. **Amphistegina madagascariensis** is dominant above a depth of 50 feet, and **A. lessonii** between 120 and 200 feet.

MIKLUKHO-MAKLAJ, A. D. Novoe Semejstvo Foraminifer—Tuberitinidae M.-Maclay fam. nov.—Voprosy Mikropaleontologii, v. 2, 1958, p. 130-135, text fig. 1, table 1.—New family includes **Tuberitina, Capidulina,** and 2 new genera: **Eotuberitina** (type species **Tuberitina maljavkini** Reitlinger = **E. reitlingerae** nom. nov.) and **Neotuberitina** (type species **Tuberitina maljavkini** Mikhailov).

MIKLUKHO-MAKLAI, A. D., and RUSAKOV, I. M. An assemblage of foraminifers from the Paleozoic rocks of the Koryak Range (translated from Russian).—Proc. Acad. Sci. USSR, Geol. Sci. sections, v. 118, no. 6, Jan.-Feb. 1958, p. 1173-1175.—Species listed from several Carboniferous age groups.

MIKLUKHO-MAKLAJ, A. D., RAUZER-CHERNOUSOVA, D. M., and ROZOVSKAJA, S. E. Sistematika I Filogenija Fuzulinidej.—Voprosy Mikropaleontologii, v. 2, 1958, p. 5-21, text figs. 1, 2.—Includes phylogenetic diagram of fusulinid genera.

MORIKAWA, ROKURO. Fusulinids from the Akasaka Limestone (Part 1).—Sci. Repts. Saitama Univ., Urawa, ser. B (Biol. and Earth Sci.), v. 3, No. 1, 1958, p. 93-130, pls. 12-26, text fig. 1 (map).—Twenty-one species, 8 new, and 2 varieties, both new. Fifteen fusulinid zones were recognized.

MOROZOVA, V. G. K Sistematike I Morfologii Paleogenovykh Predstavitelej Nadsemejstva Globigerinidea.—Voprosy Mikropaleontologii, v. 2, 1958, p. 22-52, text figs. 1-6.—Includes phylogenetic diagram of globigerinid and related genera.

Stratigrafija i nekotorye Osobennosti geologicheskoj istorii thentral'nogo Talysha.—Akad. nauk SSSR, Trudy Azerbajdzhan. neft. ehksped. soveta po izucheniju proizvod. sil an SSSR, Voprosy geologii Talysha, 1958, p. 43-95, tables 1-3, text figs. 1-6.—Range and abundance charts for smaller Foraminifera in the Eocene and Oligocene.

NAKKADY, SAAD E. Stratigraphic and Petroleum Geology of Egypt (U.A.R.).—Univ. Assiut, Mon. ser. no. 1, 1958, p. 1-215, text figs. 1-37 (charts, graphs, columnar sections, cross sections, geologic maps, structure maps, isopach maps, paleogeographic maps, distribution maps).—Divided into 2 parts with 4 and 5 chapters respectively. In the chapter on stratigraphic sequence of microfaunas is summarized current knowledge regarding major or characteristic species of Foraminifera from numerous ages and horizons.

NEUMANN, MADELEINE. Révision des Orbitoïdidés du Crétacé et de l'Éocène en Aquitaine Occidentale.—Soc. Géol. France (n. sér.), Mém. No. 83, 1958, p. 1-174, pls. 1-36, text figs. 1-54, tables 1-7.—Nine species from the Upper Cretaceous, none new, and 25 species and 1 variety from the Eocene, 2 species new. Fourteen genera are grouped into 3 subfamilies of the Orbitoididae with one, Orthophragmininae, new. Includes section on internal structure.

ORLOVA, I. N. Foraminifery Uglenosnogo Gorizonta Rajona Saratovskikh Dislokathij.—Voprosy Mikropaleontologii, v. 2, 1958, p. 124-129, pl. 1, text figs. 1-5.—Five new species from the Mississippian.

PAGE, RICHARD A. The questionable age of the Aquia formation.—Jour. Pal., v. 33, No. 2, March 1959, p. 347-350.—Correction of Cushman (1944) and Shifflett (1948) identifications and re-evaluation of species indicates Paleocene instead of Wilcox age.

PARKER, FRANCES L. Eastern Mediterranean Foraminifera.—Reports Swedish Deep-Sea Expedition 1947-1948, v. VIII, Sediment Cores from the Mediterranean Sea and the Red Sea, fasc. II, No. 4, Dec. 1958, p. 217-283, pls. 1-6, tables 1-20, text figs. 1-6 (map, graphs).—Quantitative study and interpretation of 16 cores and 60 surface sediment samples. Eighteen planktonic species (1 new) and 110 benthonic ones (3 species and 1 subspecies new); most of them illustrated.

PARKER, FRANCES L., and ATHEARN, WILLIAM D. Ecology of marsh Foraminifera in Poponesset Bay, Massachusetts.—Jour. Pal., v. 33, No. 2, March 1959, p. 333-343, pl. 50, text figs. 1-5 (map, graphs).—Eight stations, from almost non-marine to near marine, were sampled bimonthly for a year and studied quantitatively as to live and dead percentages and seasonal fluctuations. Eleven arenaceous and 5 calcareous species, none new, are involved.

PLÖCHINGER, B. Das Molasseprofil längs der Bregenzer Ach und des Wirtatobels (with contributions by R. OBERHAUSER on micropaleontology and G. WOLETZ on heavy mineral analysis).—Jahrb. Aus-

tria Geol. Bundes., Jahrg. 1958, Band 101, heft 2, p. 293-322, pl. 24 (map and sections), text figs. 1-4 (profiles), tables 1-6.—Occurrence and abundance of Foraminifera are plotted.

POIGNANT, ARMELLE. Un nouveau genre de Foraminifères du Stampien d'Aquitaine.—Revue de Micropaléontologie, v. 1, No. 3, Dec. 1958, p. 117-120, pl. 1.—**Falsocibicides aquitanicus** n. gen., n. sp., having supplementary umbilical apertures.

POZARYSKI, WLADYSLAW, BIELECKA, WANDA, and SZTEJN, JANINA. Stratigraphy of the Przytyk-Deba area near Radom (Central Poland) (in Polish with English summary).—Poland Instyt. Geol. (Warsaw) Biul. 126, 1958, p. 155-181, tables 1-4.—Presence of Foraminifera in Lower Cretaceous and Upper Jurassic parts of 4 bore holes is plotted.

REJTLINGER, E. A. K Voprosu Sistematiki I Filogenii Nadsemejstva Endothyridea.—Voprosy Mikropaleontologii, v. 2, 1958, p. 53-73, text figs. 1-4.—Includes phylogenetic diagram of endothyrid genera.

RIAZANOV, G. F. The morphology and taxonomy of the genus **Protriticites** Putrja, 1948, (in Russian).—Doklady Akad. Nauk SSSR, tom 123, No. 4, 1958, p. 752-755, 1 pl.

On the genus **Pseudotriticites** Putrja, 1940 (in Russian).—Doklady Akad. Nauk SSSR, tom 123, No. 5, 1958, p. 933-936, 1 pl.

ROVEDA, V. **Nummulites retiatus**, nouvelle espèce de Nummulite réticulée des Abruzzes (Italie).—Revue de Micropaléontologie, v. 1, No. 4, March 1959, p. 201-207, pl. 1.—Reticulate nummulite from the base of the Oligocene.

SAIDOVA, H. M. Novye Dannye Po Ehkologii Foraminifer.—Priroda, Oktjabr' 1958, Ottisk iz no. 10, p. 107-110, 1 map.

SHUTHKAJA, E. K. Izmenchivost' Nekotorykh Nizhnepaleogenovykh Planktonnykh Foraminifer Severnogo Kavkaza.—Voprosy Mikropaleontologii, v. 2, 1958, p. 84-90, pls. 1-3, text fig. 1.—Three species and one new variety from middle and upper Eocene and upper Paleocene.

SILVA, G. HENRIQUES da. Contribuição para o conhecimento da microfauna do Miocénico marinho da ilha do Principe.—Garcia de Orta (Lisboa), v. 6, No. 3, 1958, p. 507-510, pls. 1, 2.—Small Foraminifera observed in thin section. **Amphistegina** predominant.

SKOLNICK, HERBERT, and ARNAL, ROBERT E. Ventura basin edge environment.—Am. Assoc. Petr. Geol. Bull., v. 43, No. 2, Feb. 1959, p. 477-484.—Paleoecologic interpretation based in part on Foraminifera assemblage.

SPIEGLER, D. Abnormale Entwicklungserscheinungen an Nummuliten vom Fundpunkt Brandhorst bei Bünde.—Geologie (Berlin), Jahrg. 7, heft 8, Dec. 1958, p. 1058-1065, pls. 1, 2.

TAI, YOSHIRO. On the "Togarian Stage"—Miocene Microbiostratigraphy of the Setouchi geologic province (in Japanese with English abstract).—Jour. Geol. Soc. Japan, v. 64, No. 757, Oct. 1958, p. 516-525, text figs. 1-3 (maps, section), tables 1, 2.—Five faunules in the middle Miocene based mostly on smaller Foraminifera.

TODD, RUTH. Foraminifera from Western Mediterranean Deep-Sea Cores.—Reports Swedish Deep-Sea Expedition 1947-1948, v. VIII, Sediment Cores from the Mediterranean Sea and the Red Sea, fasc. II, No. 3, Dec. 1958, p. 167-215, pls. 1-3, tables 1-20, text figs. 1-5 (map, graphs).—Quantitative study and interpretation of 18 cores. Fifteen planktonic species (1 new) and about 200 benthonic ones (3 new); a few illustrated.

VENEZUELA MINISTERIO DE MINAS E HIDROCARBUROS. Stratigraphical lexicon of Venezuela (English edition).—Bol. Geologia, Spec. Pub. No. 1, 1956, 664 p., index map, geol. map.—Occurrence of Foraminifera and Foraminifera zones.

VAN VOORTHUYSEN, J. H. Foraminiferen aus dem Eemien (Riss-Würm-Interglazial) in der Bohrung Amersfoort I (Locus typicus).—Meded. Geol. Stichting, n. ser., No. 11, 1957 (1958), p. 27-39, pls. 23-26, text fig. 1, 1 range and abund. chart.—A beautifully illustrated record of the fauna, 47 species and varieties, 4 new and 6 indeterminate.

Les Foraminifères Mio-Pliocènes et Quaternaires du Kruisschans.—Instit. Royal Sci. Nat. Belgique, Mém. No. 142, June 30, 1958, p. 3-34, pls. 1-10, distrib. and abund. chart, 1 section.—Ninety species (1 new and 13 indeterminate) and 15 varieties, nearly all illustrated.

WEINHANDL, RUPERT. **Schackoinella,** eine neue Foraminiferengattung.—Verhandl. Austria Geol. Bundesanstalt, heft 2, 1958, p. 141-142, text fig. 1.—**Schackoinella** gen. nov. (genotype **S. sarmatica** sp. nov.) described from the lower Sarmatian of Austria and assigned to the Hantkeninidae.

WITWICKA, E., BIELECKA, W., STYK, O., and SZTEJN, J. The methods of working out microfossils (in Polish).—Poland Instyt. Geol. (Warsaw) Biul. 134, 1958, p. 1-156, text figs. 1-69, table 1.

ZALESNY, EMIL R. Foraminiferal ecology of Santa Monica Bay, California.—Micropaleontology, v. 5, No. 1, Jan. 1959, p. 101-126, pl. 1, text figs. 1-21 (maps, graphs, distrib. table).—Quantitative study of living and dead specimens is based on 70 samples from 6½ to 460 fathoms in depth and covering shelf, canyon, and slope areas. Over 90 species and varieties (2 species and 2 varieties new) are counted and their percentages recorded. For a selected few, distribution patterns are plotted on maps. Frequency distribution profiles are plotted across shelf and slope and lengthwise along canyon. Depth ranges, plotted for 19 selected species, are much shorter for living than for dead specimens. Discussion of the probable controlling environmental factors is included.

ZHIZHCHENKO, B. P. Printhipy Stratigrafii I Unifithirovannaja Skhema Delenija Kajnozojskikh Otlozhenij Severnogo Kavkaza I Smezhnykh Oblastej.—Gosudarst. Nauchno-Tekhnich. Izdat. Neft. Gorno-Topliv. Literat., Moscow, 1958, 310 p., 46 text figs.—Many species of Foraminifera included in tables and discussion.

ZIEGLER, JOSEPH H. **Lituola grandis** (Reuss) aus dem Untermaastricht der Bayerischen Alpen, ein Beitrag zur Systematik und Stammesgeschichte der Lituolidae (Foram.).—Palaeontographica, Band 112, Abt. A, lieferung 1-4, Jan. 1959, p. 59-132, pls. 6-10, appendix 1, 2 (graphs, diagrams), text fig. 1 (range chart).—A well illustrated monograph of the species. Discussion of generic characteristics and diagnoses of 13 genera in the Lituolidae.

RUTH TODD