GEORGIA

STATE DIVISION OF CONSERVATION

DEPARTMENT OF MINES, MINING AND GEOLOGY

Garland Peyton, Director

THE GEOLOGICAL SURVEY

Bulletin Number 62

CONTRIBUTIONS TO THE PALEONTOLOGY OF NORTHWEST GEORGIA

By

A. T. Allen and J. G. Lester

Emory University

ATLANTA

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LETTER OF TRANSMITTAL

Department of Mines, Mining and Geology

Atlanta, July 14, 1954

To His Excellency, Herman Talmadge, Governor
Commissioner Ex-Officio, State Division of Conservation
Sir:

I have the honor to submit herewith Georgia Geological Survey Bulletin No. 62, Contributions to the Paleontology of Northwest Georgia, by Doctors Arthur T. Allen and James G. Lester of Emory University.

This bulletin fulfills a long-standing demand of paleontologists, stratigraphers, economic geologists, structural geologists, and the geology departments of the colleges and universities.

Very respectfully yours,

GARLAND PEYTON
Director

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CONTRIBUTIONS TO THE PALEONTOLOGY OF NORTHWEST GEORGIA

A. T. Allen and J. G. Lester

INTRODUCTION

This report is presented with the hope that it will serve the multiple purposes of aiding the paleontologist in making systematic collections of Paleozoic fossils, aiding the student in taxonomic identifications, and in helping to stimulate the beginner to devote more effort to the collecting and identification of fossil specimens.

Much thought has been given as to the best and most orderly method of presentation. At first the idea of grouping the illustrations purely on geographic locality was considered because by so doing directions could be given easily. However, confusion would result from the close proximity of formations of different geologic age and repetition would be necessary in making complete lists in different areas. Therefore, it has been decided to list the specimens by arbitrarily chosen stratigraphic units and to show their geographic occurrence on the small index maps which are included with the plates and also on the larger location map in the pocket.

The plates are arranged according to the stratigraphic units listed in the table that follows. In order to avoid confusion these units are correlated with the nomenclature of formations established by Charles Butts (1948). Although, the authors are aware that these are inadequate and erroneous at the present time.

Stratigraphic Units

*Butts'		This Report
Pottsville formation	Pennsylvanian	Lee Group
Pennington shale		
Bangor limestone		Bangor-Pennington
Bangor (restricted) limestone		
Hartselle sandstone		Hartselle-Golconda
Golconda limestone	Mississippian	
Gasper limestone		
Ste. Genevieve limestone		Ste. Genevieve-Gasper
St. Louis limestone		St. Louis
Ft. Payne chert		Ft. Payne - Floyd
Chattanooga shale		Chattanooga shale
Armuchee chert	Devonian	Armuchee

*See Bulletin No. 54, Georgia Division of Mines, Mining and Geology 1948.

Red Mountain formation Sequatchie formation	Silurian	Red Mountain
Maysville limestone Trenton limestone		Upper Ordovician
Lowville-Moccasin limestone Ottossee (Sevier) shale Tellico formation Athens shale Holston marble Lebanon limestone Lenoir limestone Mosheim limestone Murfreesboro limestone	Ordovician	Middle Ordovician
Newala limestone Knox dolomite	Cambro - Ordovician	Lower Ordovician Knox Group
Conasauga formation Rome formation Shady dolomite Weisner quartzite	Cambrian	Conasauga

A short generalized statement describing each formation is included with the plates illustrating the fossils. The reader is referred to Butts (1948) for lithologic and stratigraphic discussions and for localities where the various formations are exposed.

Each fossil plate is accompanied by an explanation which includes a brief description of each fossil, location of occurrence, the magnification of the photograph, acknowledgment of the source of the specimen, and the accession number of the Emory Geology Museum. Where a source is not acknowledged it is to be understood that the collection was made by the authors, by members of the Geology staff, or by students in attendance at the Emory University Geology Field Camp during the summers from 1947 to 1953. The fossils are available for examination and study by any interested persons.

The small index maps which are included show localities where collecting is good and where fossils of several species may be found. In order to spot more definitely the collecting ground, the exact area has been shaded. The large map shows the location sites indicated on the plates and on the small index maps and the best highways and roads leading to them. These locations should not be considered as the only ones where the illustrated fossils may be found. At many of the localities shown on the map, fossils other than the ones described also occur.

The identifications have been made by comparison of the specimens

with available descriptions, many of which are listed in the **Selected References.** The emphasis has been on identification of known forms rather than differentiation of new species. This is indicated by the many forms which only are identified generically and others which are identified as being similar to some particular form.

This study should be considered as an introduction rather than as the completed study of the Paleozoic fauna and flora. Many problems have been brought to our attention by it which offer fertile areas for further detailed investigations in paleontology, sedimentation, and stratigraphy.

Acknowledgments:

The authors are indebted to many people for aid in the preparation of this report. Although it is impossible to adequately acknowledge our gratitude to all of them, we would like to express our appreciation to Dr. G. Arthur Cooper, Curator of Invertebrate Paleontology and Paleobotany, United States National Museum for making the fossils collected by Dr. Charles Butts available for study and photographing; to Miss Lewis Lipps, Biology Department of Shorter College for the loan of several specimens; to Mr. M. L. Fisher of Chickamauga for the use of several lower Ordovician cephalopods; to Louis Vest, Craig Wright, F. T. Ingram, Robert Crisler, and many other geology students from Emory University.

Financial aid has been given by the Emory University Research Committee and by the Georgia Division of Mines, Mining, and Geology for expenses in the collecting of the specimens and in the reproduction of the plates. The project could not have been completed without this help.

CAMBRIAN SYSTEM

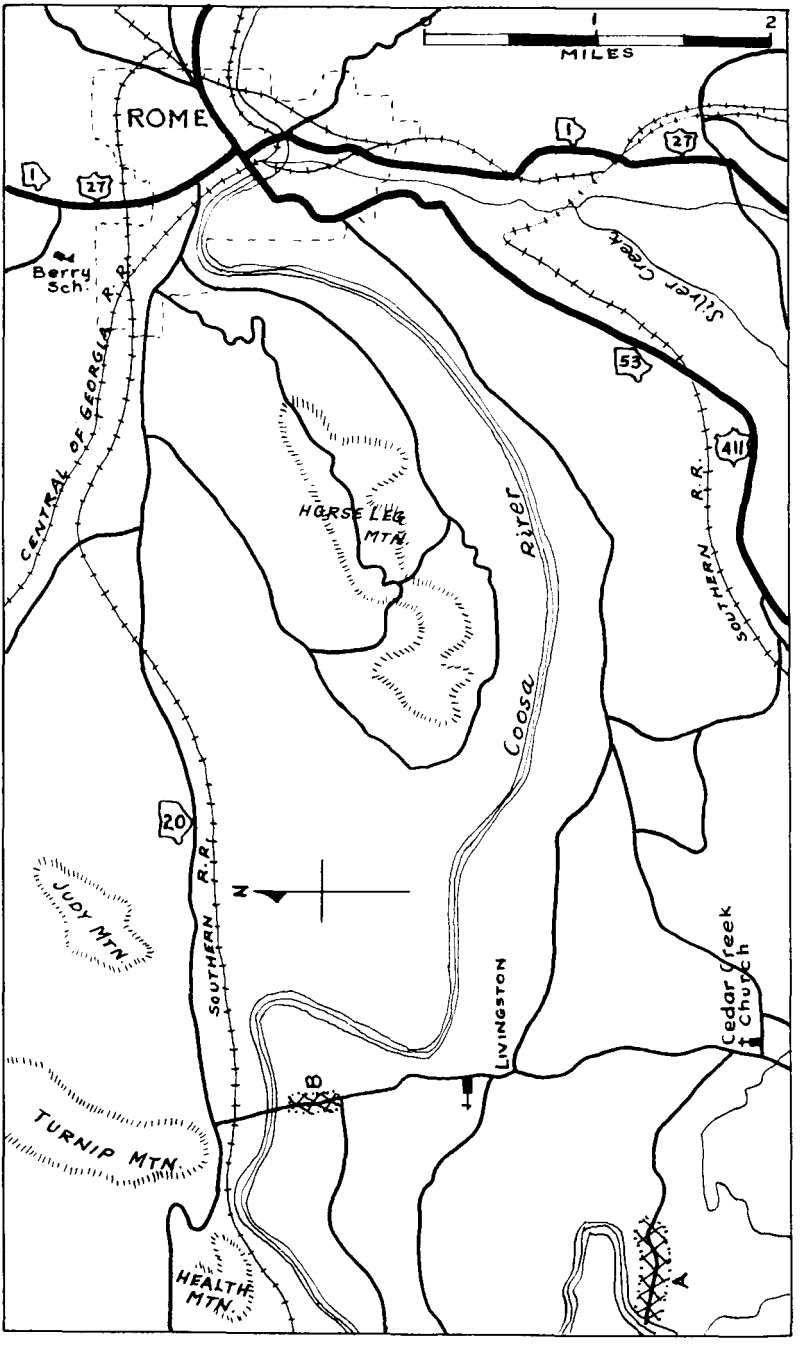
CONASAUGA FORMATION

The Conasauga is composed of massive blue to black crystalline limestones, fine-grained, light-gray limestones, and greenish to yellow shales.

On weathering the calcium carbonate is leached from the argillaceous limestones and the percentage of shale in outcrops appears much higher than in the unweathered rock. In some of the shale zones, clay concretions develop and many of the recognizable fossils occur on the surface of these concretions.

Fossils are sparse in the Conasauga in Georgia. Those figured are from three general localities:

1. West of Rome in the vicinity of Livingston and in the bend of the Coosa River near the Spann Farm.
2. In the Bluffs of the Coosa River at Cedar Bluff, Alabama.
3. Northeast of Dalton.



A - SPANN FARM (J.S.BENTON)

B - ROADCUT SOUTH OF THE COOSA RIVER

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FOSSILS OF THE CONASAUGA FORMATION

PLATE 1.

FOSSILS OF THE CONASAUGA FORMATION

Explanation

FIGURE

1. *Brooksella ? cf. Brooksella alternata* Walcott.

   Upper surface of filling of internal cavity, X 2.

   Collected by L. Lipps on road between Benton farm and Cedar Creek Church. Index Map 1.

   Loaned by Shorter College.

   *Note: This form has not been positively identified but is included with the hope that other investigators may find additional specimens.


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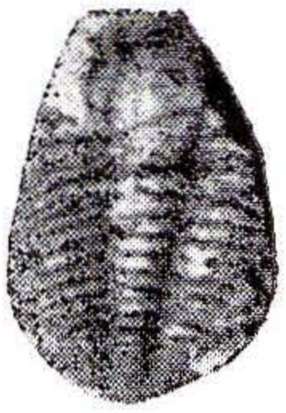
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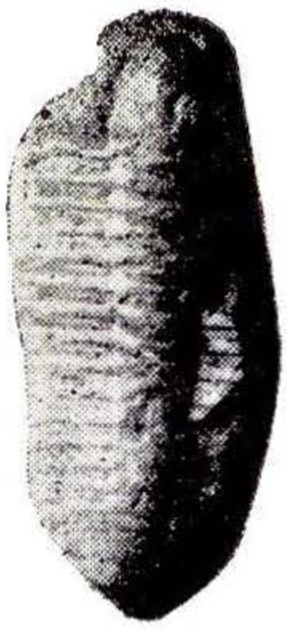
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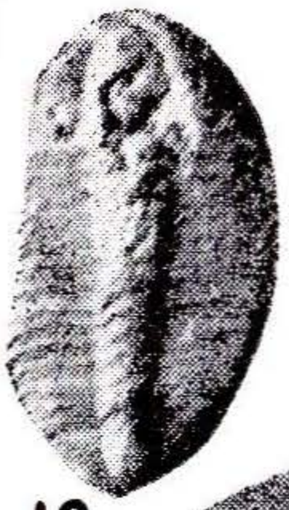
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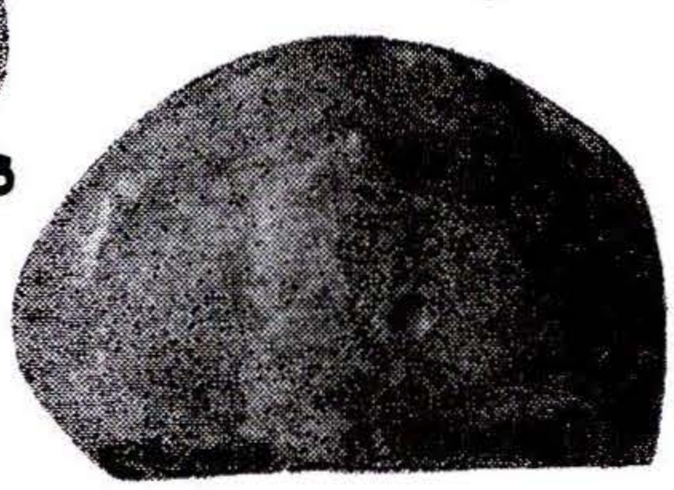
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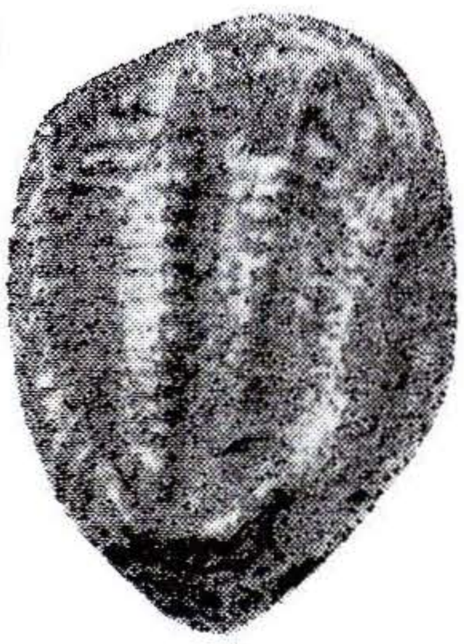
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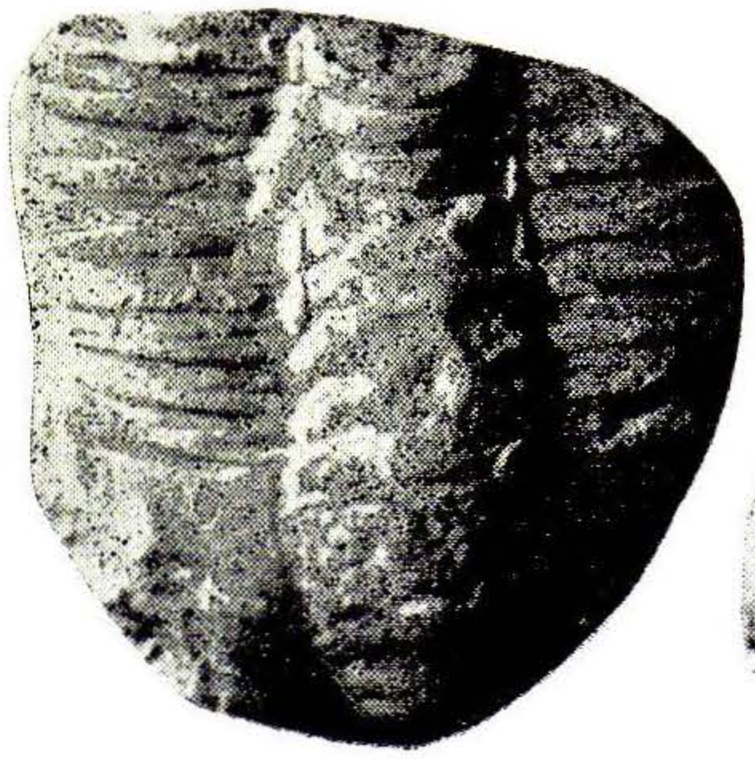
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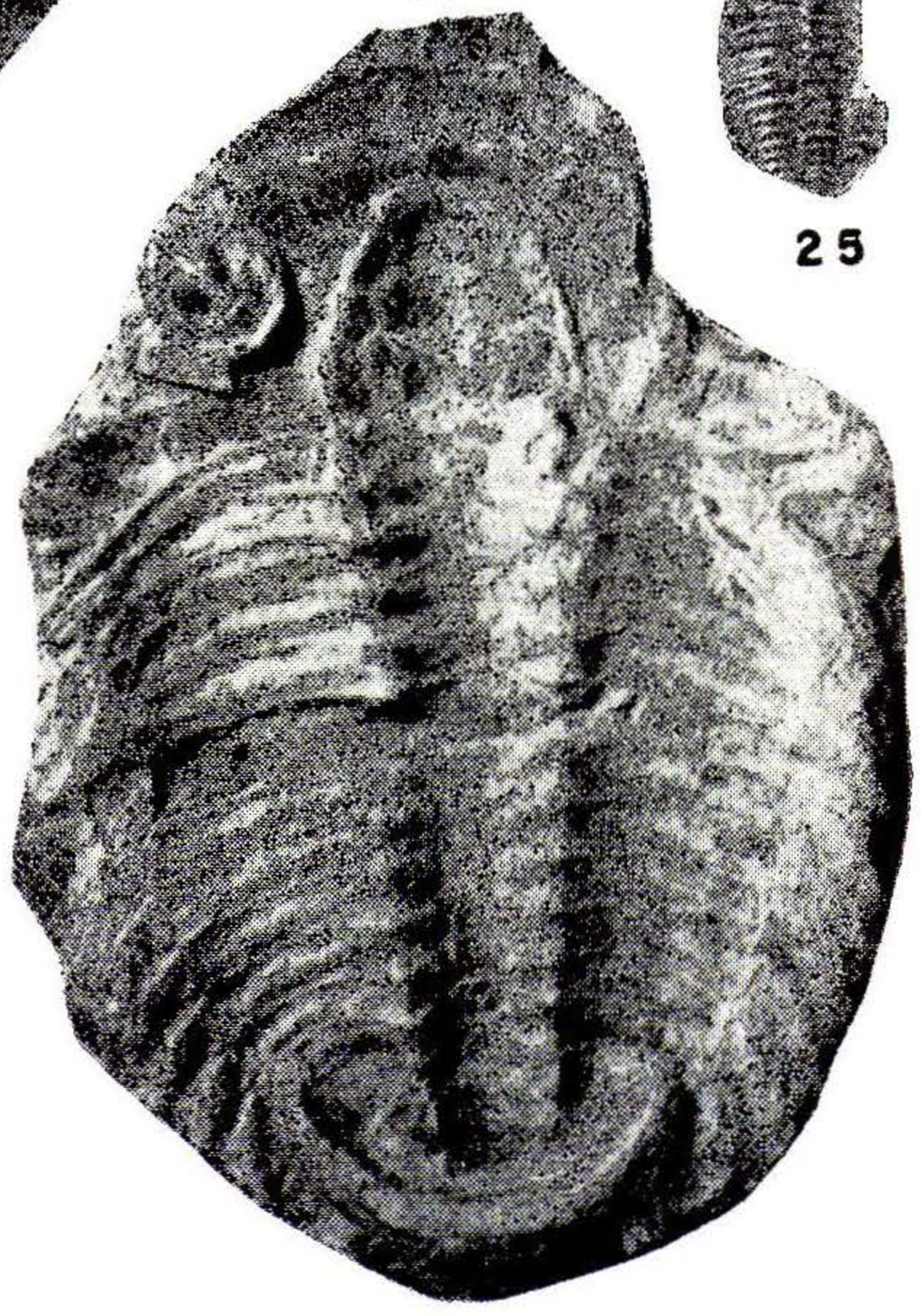
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FOSSILS OF THE CONASAUGA FORMATION

PLATE 2.

FOSSILS OF THE CONASAUGA FORMATION

Explanation

FIGURE

1–4. *Elrathiella buttsi* Resser.
Complete specimens, X 1.
Collected on Spann Farm, western part of Floyd County, Index Map 1, location A.
Specimens 1 and 2 loaned by Shorter College.

5. *Elrathia sp.*
Complete specimen, X 1.
Collected at same location as fig. 1.
Specimen loaned by Shorter College.

6. *Elrathiella buttsi* Resser.
Complete specimen, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1350A.

7, 8. *Armonia elongata* (Walcott).
Complete specimens, X 1.
Collected north of Livingston, Floyd County, Index Map 1, location B.
E. G. M. No. 474.

9, 13. *Coosia superba* (Walcott).
Nearly complete specimens, X 1.
Collected at same location as fig. 1.
Specimen 9 loaned by Shorter College.
Specimen 13 loaned by Mrs. J. S. Benton.

10, 11. *Blania gregaria* (Walcott).
Nearly complete specimen, X 1.
Collected at same location as fig. 1.
Specimen loaned by Shorter College.

12. *Coosia cf. Coosia superba* (Walcott).
Cephalon, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1379.

14. *Elrathiella buttsi* Resser.
Concretion with cephalons of this form, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1397.

FIGURE

15, 17. *Coosia superba* (Walcott).
Genal spine and cephalon, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1378.

16. *Coosia superba* (Walcott).
Pygidium, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1406.

18. *Eteraspis glabra* (Walcott)?
Pygidium, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1380.

19. *Coosia superba* (Walcott).
Cephalon, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1397A.

20, 21. *Tricrepicephalus cedarensis* Resser.
Casts of nearly complete specimens, X 1.
Collected at Cedar Bluff, Alabama.
E. G. M. No. 1398.

22. *Coosella curticei* Resser.
Complete specimen, X 1.
Collected by R. E. Cribb near Oak Grove School, 14 miles east of Dalton, location 1 on map in pocket.
E. G. M. No. 1401.

23. *Asphelaspis hamblensis* Resser.
Complete specimen, X 1.
Collected by R. E. Cribb near south edge of Dalton near Dug Gap Church, location 47 on map in pocket.
E. G. M. No. 1408.

24. *Solenopleurella buttsi* Resser.
Complete specimen, X 1.
Collected by R. E. Cribb at same location as fig. 22.
E. G. M. No. 1320.

25. *Asaphiscus sp.*
Incomplete specimen, X 1.
Collected north of Livingston. Floyd County, at same location as fig. 7.
E. G. M. No. 1411.

CAMBRO ORDOVICIAN SYSTEM

THE KNOX GROUP

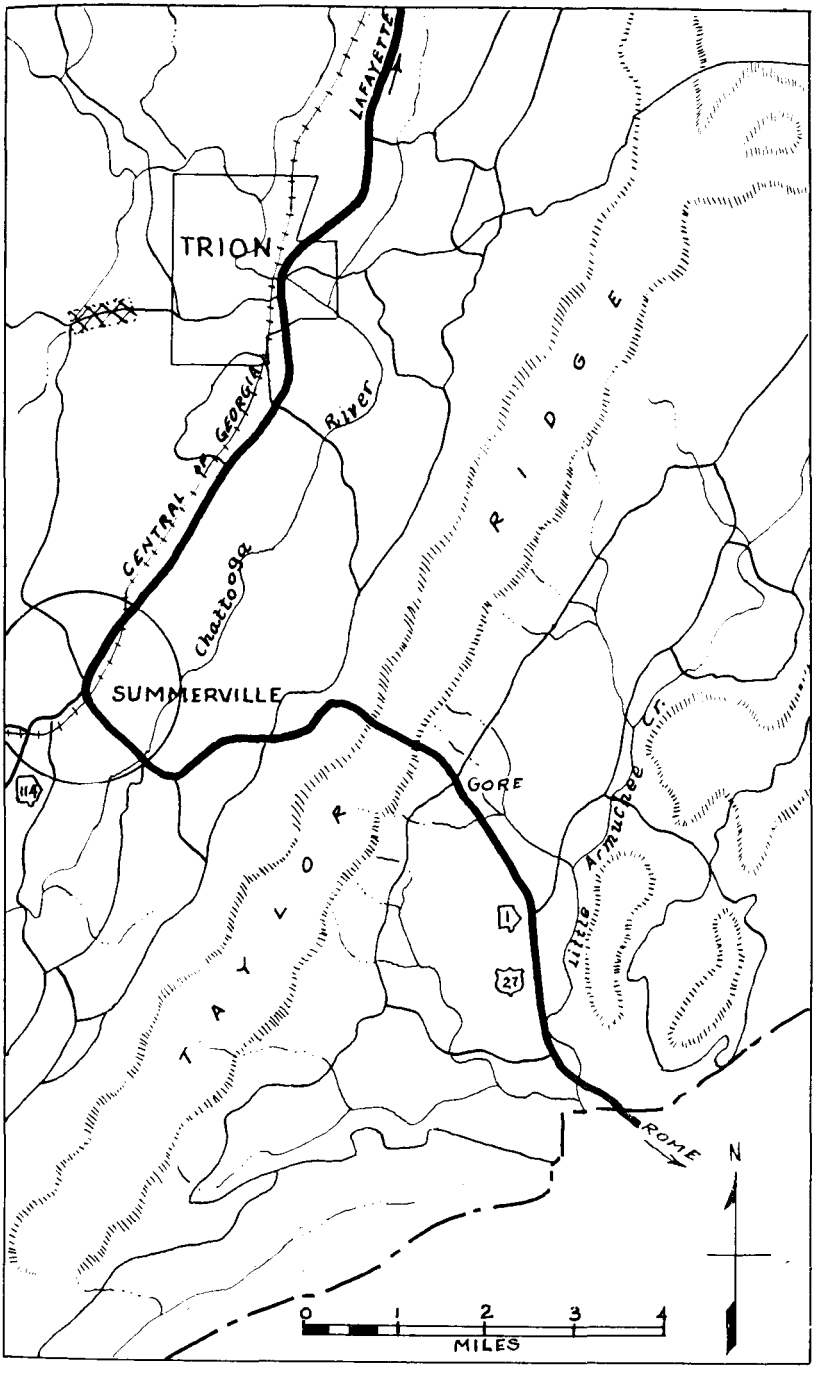
The formations constituting the Knox group are of upper Cambrian and lower Ordovician age. At present, the Copper Ridge formation is considered to be upper Cambrian, and the Chepultepec, the Longview, and the Newala formations to be lower Ordovician. Although Butts separates the Newala from the Knox in Georgia because of its easily recognizable lithology, it is the correlative of the upper Knox formations in Tennessee.

The Knox dolomite comprises one of the most widespread groups in northwestern Georgia. Together with the underlying Rome and Conasauga formations it occupies the eastern one-half of the Paleozoic province.

The strata are composed of massively bedded dolomite and limestone with interbedded chert layers and nodules. The dolomite predominates in the lower part and the limestone is more common in the upper part.

Outcrops of the Knox are rare because of the easily soluble nature of the limestone and dolomite and only can be found as scattered exposures or along the major streams. Normally the group can be recognized by the characteristics of the chert residuum and by its topographic expression.

Seldom are fossils found except preserved in the secondary chert. The fossils figured on plate 3 are from the Longview formation and many of them were collected from two localities; Butts' specimens from an isolated exposure on Bamby's Farm two miles west of Trion and from chert residuum along Chickamauga and Hurricane Creeks in the vicinity of Graysville.



BAMBY'S FARM, 2 MILES WEST OF TRION, GA.

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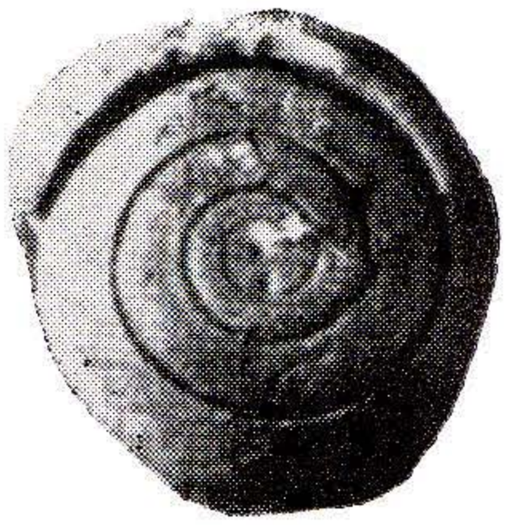

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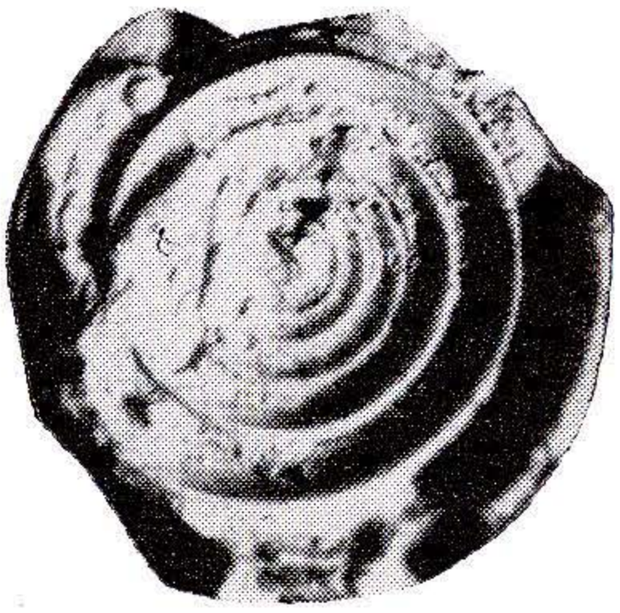

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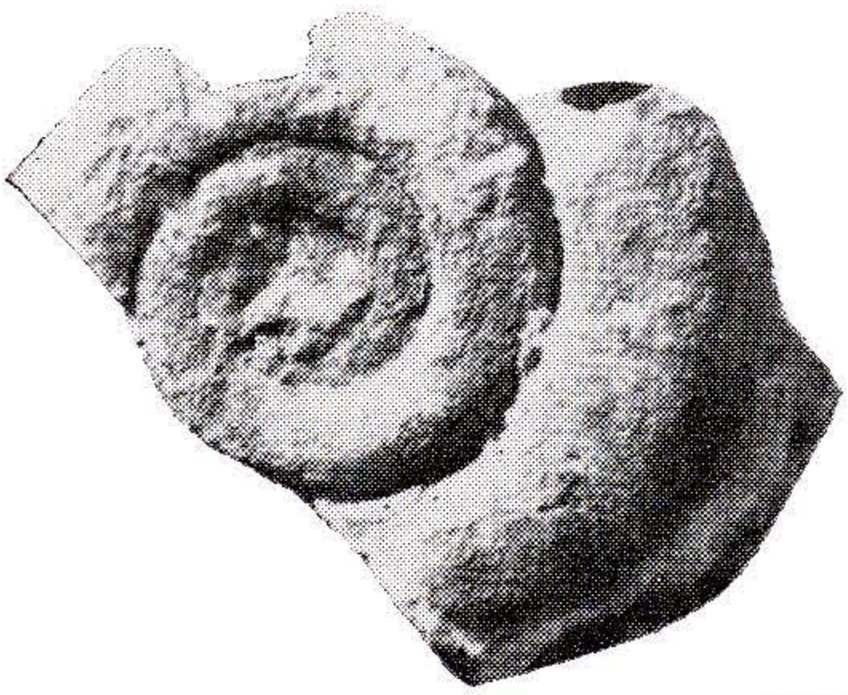

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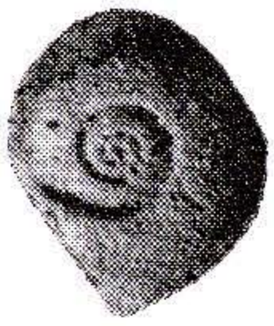

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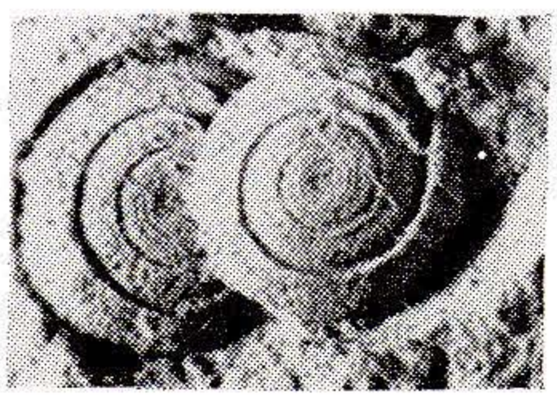

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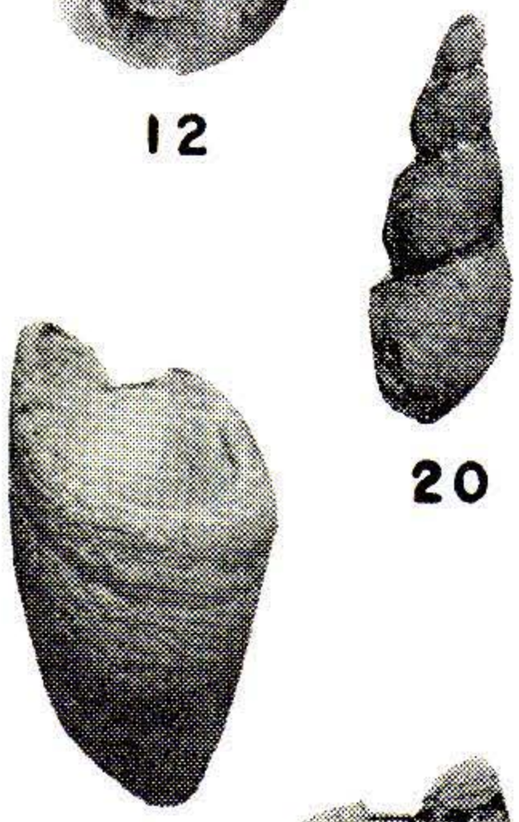

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FOSSILS OF THE KNOX GROUP

PLATE 3.

FOSSILS OF THE KNOX GROUP

Explanation

FIGURE

1. *Lecanospira compacta* (Salter).
   External mold, X 1.
   Collected at intersection of old Alabama Road (Ga. highway 151) and Georgia highway 2, Index Map 3, location A.
   E. G. M. No. 1780.

2. *Ophileta complanata* Vanuxem.
   Internal mold, X 1.
   Collected on Hurricane Creek east of Graysville, location 2 on map in pocket.

3, 4, 6. *Helicotoma tennesseensis* Ulrich and Scofield.
   Internal molds, X 1.
   Collected at same location as fig 2.
   E. G. M. No. 1708.

5. *Lecanospira sigmoidea* Ulrich and Bridge.
   External mold, X 1.
   Collected by C. Butts on Bamby's farm, 2 miles west of Trion, Index Map 2, location indicated by shaded area.
   Locality No. 594 B.

7. *Orospira sp.*
   Internal mold, X 1.
   Collected by C. Butts, same location as fig. 5.

8. *Lecanospira compacta* (Salter).
   Internal mold, X 1.
   Collected by C. Butts, same location as fig. 5.

9. *Lecanospira knoxvillensis,* Butts?
   Internal mold, X 1.
   Collected by C. Butts, same location as fig. 5.

10. *Ophileta cf. Ophileta grandis* Ulrich.
    Internal mold, X 1.
    Collected by C. Butts, same location as fig. 5.

FIGURE

11. *Chepultepecia leisonella* (?)
Internal molds, X 1.
Collected by C. Butts, location unknown.

12. *Ophileta sp.*
Internal mold of umbilical side.
Collected by C. Butts, location same as fig. 5.

13. *Lecanospira cf. Lecanospira salteri* Ulrich and Bridge.
Internal molds in chert, X 1.
Collected by C. Butts, 1½ miles northwest of Taylorsville, location 3 on map in pocket.
Locality No. 593Z.

14. *Ceratopea cf. Ceratopea calceoliformis* Oder.
Ventral view, X 1.
Collected by C. Butts, 1500 feet northeast of Kensington, location 4 on map in pocket.
Locality No. 593X.

15, 19. *Ceratopea sulcata* Oder.
Dorsal and ventral views, X 1.
Collected by C. Butts, one mile south of Chickamauga, location 5 on map in pocket.
Locality No. 593W.

16, 20. *Hormotoma sp.*
Internal molds, X 1.
Collected along L & N railroad east of Graysville, location 6 on map in pocket.
E. G. M. No. 1842.

17. *Orospira sp.*
Internal umbilical mold, X 1.
Collected at same location as fig. 16.
E. G. M. No. 1846.

18. *Helicotoma cf. Helicotoma tennesseensis.*
Internal mold, X 1.
Collected by C. Butts, locality unknown.

21. Slab of chert containing casts of gastropods, X 1.
Collected at same location as fig. 2.
E. G. M. No. 1918.

ORDOVICIAN SYSTEM

LOWER ORDOVICIAN

The Lower Ordovician beds are restricted to the "Newala" formation as presently defined. It overlies the Knox and in some areas the boundary is marked by basal clastics and an unconformity; in other areas the change in lithology from the Knox is transitional.

The beds include finely crystalline, light-gray massive dolomite, coarsely crystalline dark-gray dolomite, red, yellow, and purple mottled argillaceous limestones and gray to black calcilutites. The varicolored strata near the middle are easily identified and are used extensively for commercial building stone.

Very little or no chert occurs in the fresh rock or in the residual soil. Where exposed in open fields the rock weathers to smooth, rounded surfaces possessing a light blue-gray color.

Fossil fragments are abundant in some layers and weathered sections of gastropods frequently can be seen on the surface of the boulders.

MIDDLE ORDOVICIAN

The rocks which comprise the Middle Ordovician are predominantly limestones, but facies of siltstones and shales appear in the lower and upper parts of this group of rocks.

Chert is common throughout the section and occurs as dark gray to black nodular masses very irregular in shape, size, and orientation within the limy strata. The resistance of the chert to weathering allows it to stand out in relief on exposures of the limestones or to accumulate in the residual soils derived from them.

The limestones are dominantly gray in color but frequently strata of dark brown to black calcilutites are interbedded with the limestone.

Near the top of the section a change in facies from limestone to red and yellow siltstones occurs in the eastern part of the Paleozoic area.

Weathered exposures of the Middle Ordovician strata vary from thin-bedded, shard-like surfaces to massive, rounded and fluted boulders.

Fossils are numerous in the limestones but the siltstones and shale strata seldom produce identifiable remains.

According to Butts' terminology of Ordovician formations, the rocks of the "Murfreesboro", "Mosheim", "Lenoir", "Lebanon", "Holston", "Athens", "Tellico", "Ottossee", and "Lowville-Moccasin" formations comprise the Middle Ordovician.

UPPER ORDOVICIAN

The Upper Ordovician section is composed essentially of limestones with interbedded bentonites in the lower part, argillaceous limestones in the middle part, and argillaceous limestones with interbedded siltstones in the upper part. Lithologic changes are both transitional and sudden.

The limestones are fine- to coarse-grained, massive- to thin-bedded, light gray to dark gray in color. The bentonites, interbedded with the limestones, are green to yellowish green in color, friable and are seldom exposed except in quarry faces and in roadcuts. Beneath the bentonites thin beds of gray to brown secondary chert are found replacing the underlying limestones. The chert beds are very resistant to weathering and are, therefore, ideal horizon markers.

The limestones, upon weathering, generally break up into discoidal shards which cover the eroded slopes or are exposed as disconnected boulders with highly fragmented surfaces. Massive strata are frequently exposed as light gray, rounded to fluted boulders which follow the strike.

Fossils are more abundant in this part of the Ordovician than in any other and are well-preserved when replaced by silica.

Butts' formations which have been placed in the Upper Ordovician are the "Trenton", Maysville", and "Sequatchie".

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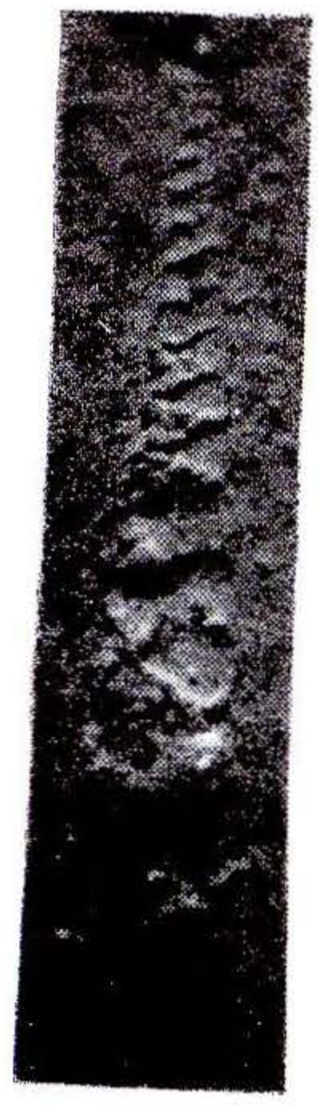

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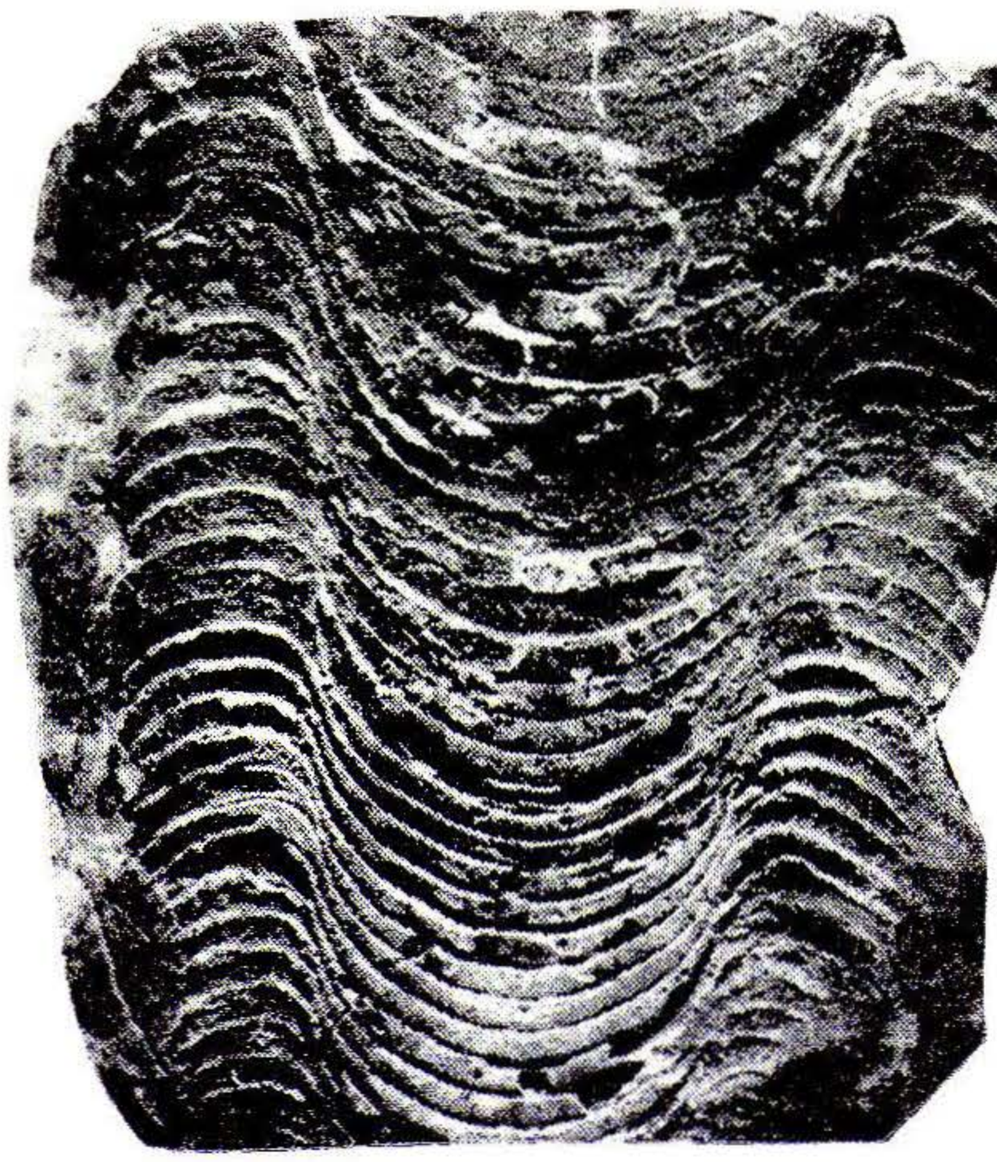

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FOSSILS OF THE LOWER AND MIDDLE ORDOVICIAN FORMATIONS

PLATE 4.

FOSSILS OF THE LOWER AND MIDDLE ORDOVICIAN FORMATIONS

Explanation

FIGURE

1. *Maclurites magnus* Lesueur.
   Cross section of specimen showing whorl, X ½.
   Collected by C. Butts on Tennessee highway 60, ¼ mile north of Georgia state line, location 7 on map in pocket.
   Locality No. 594R.

2. *Coelocaulus linearis* (Billings).
   Weathered cross section showing arrangement of whorls, X 1.
   Collected by C. Butts, 500 feet east of road and 2 miles southwest of Chickamauga, location 8 on map in pocket.
   Locality No. 594E.

3. *Orthoconic cephalopod.*
   Natural cast of cone X ½.
   Collected in Fisher's Quarry south of Chickamauga, location 8 on map in pocket.
   Loaned by Mr. M. L. Fisher.

4. *Gonioceras anceps* Hall.
   Part of specimen showing septal arrangement, X ½.
   Collected by Robert Murphy in Rabbit Valley, 1½ miles north of Ringgold, Index Map 3, location C.
   E. G. M. No. 1894.


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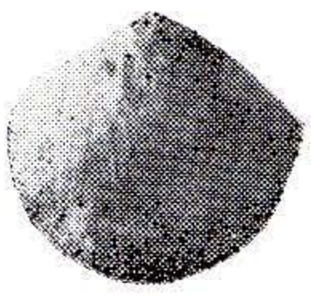
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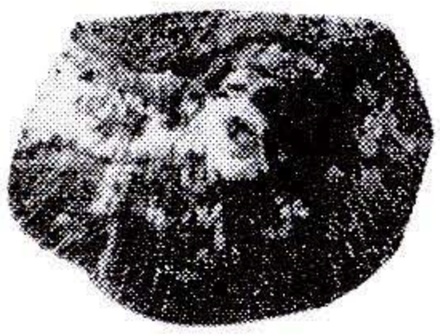
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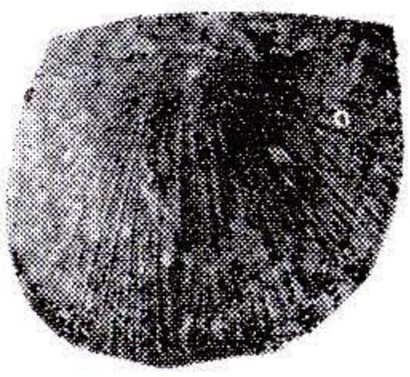
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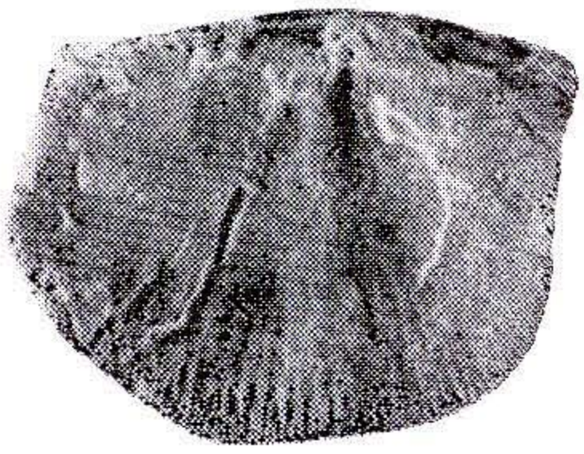
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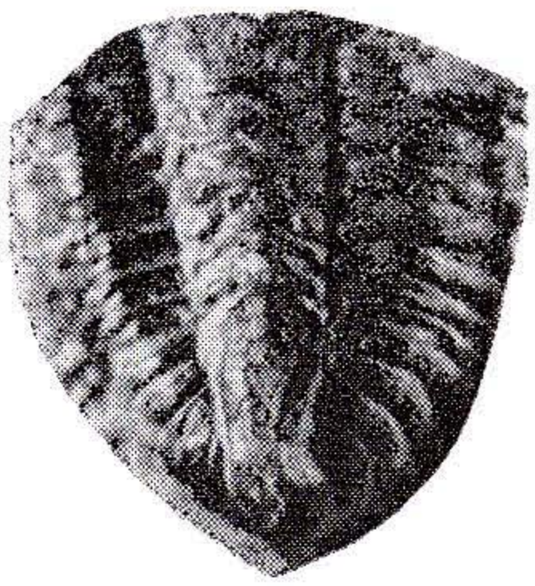
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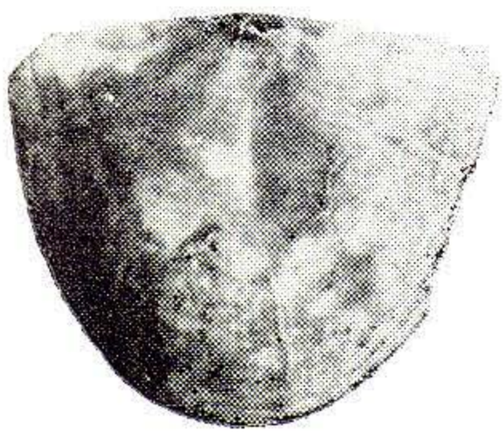
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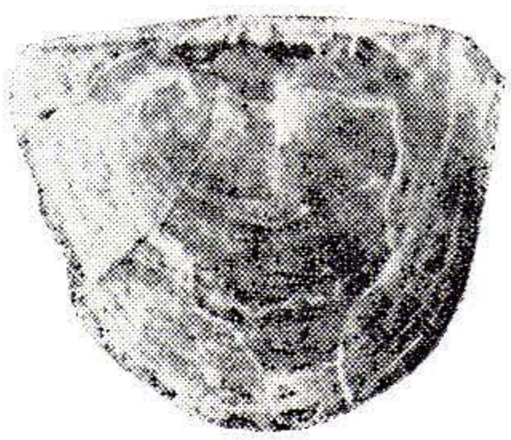
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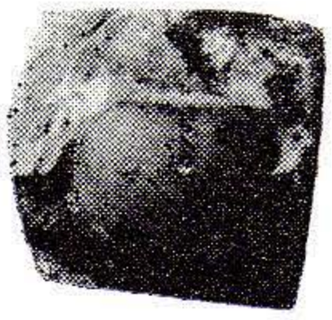
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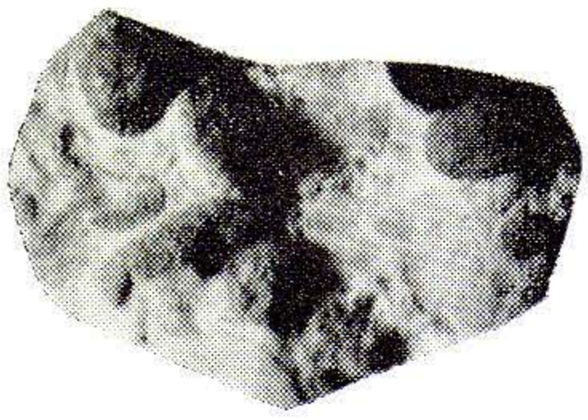
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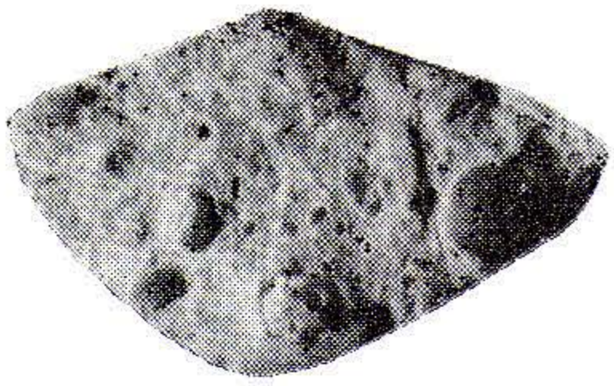
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FOSSILS OF THE MIDDLE ORDOVICIAN FORMATIONS

PLATE 5.

FOSSILS OF THE MIDDLE ORDOVICIAN FORMATIONS

Explanation

FIGURE

1, 2. *Hesperorthis tricenaria* Conrad.
Views of ventral and dorsal valves, X 1.
Collected on eastern boundary of Chickamauga Park, location 9 on map in pocket.
E. G. M. No. 1749.

3. *Archaeorthis elongata* Ulrich and Cooper.
View of ventral valve, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1802.

4. *Orthoambonites eucharis* (?) Ulrich and Cooper.
View of ventral valve, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1737.

5. *Lingula sp.*
External view of valve, X 1.
Collected south of Ringgold on Georgia highway 151, Index Map 3, location A.

6. *Pionodema subaequata* Conrad.
View showing ventral valve, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1754.

7. *Hebertella sp.*
View showing ventral valve, X 1.
Collected on Stringfellow's farm in Rabbit Valley north of Ringgold, Index Map 3, location F.
E. G. M. No. 1743.

8. *Hebertella sp.*
View showing ventral valve, X 1.
Collected at same location as fig. 7.
E. G. M. No. 1743.

9. *Zygospira recurvirostris* Hall.
External view of ventral valve, X 1.
Collected at same location as fig. 7.
E. G. M. No. 1745.

FIGURE

10. *Ancistrorhyncha costata* Ulrich and Cooper.
    External view of dorsal valve, X 1.
    Collected in quarry west of B. M. 120 in Rabbit Valley north of Ringgold, Index Map 3, location E.
    E. G. M. No. 1641.
11. *Rhynchotrema minnesotense* Sardeson.
    External view of ventral valve, X 1.
    Collected on east side of Georgia highway 151 north of Ringgold, Index Map 3, location B.
    E. G. M. No. 1760.
12. *Strophomena filitexta* Hall.
    View showing incomplete valve, X 1.
    Collected in roadcut on Georgia highway 151 north of Ringgold, Index Map 3, location B.
    E. G. M. No. 1713.
13. *Rafinesquina nasuta* Conrad.
    View showing exterior of valve, X 1.
    Collected at same location as fig. 12.
    E. G. M. No. 1803.
14. *Dinorthis (Valcourea) deflecta* Conrad.
    Interval view of valve, X 1.
    Collected near power substation 4 miles north of Ringgold, Index Map 3, location F.
    E. G. M. No. 1647.
15. *Finkelnburgia virginica* Ulrich and Cooper.
    Internal cast, X 1.
    Collected at same location as fig. 10.
    E. G. M. No. 1660.
16. *Calliops cf. Calliops callicephala* (Hall).
    Pygidium, X 1.
    Collected at same location as fig. 10.
    E. G. M. No. 1739.
17. *Bathyurus extans* Hall.
    Pygidium, X 1.
    Collected north of Cloud Springs road in East Ridge Quadrangle, location 11 on map in pocket.
    E. G. M. No. 1728.
18. *Raphistomina sp.*
    Internal cast, X 1.
    Collected at same location as fig. 12.
    E. G. M. No. 1670.

FIGURE

19. *Helicotoma declivis* (Safford).
View of internal cast, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1730.

20. *Trochonema sp.*
Lateral view of internal cast, X 1.
Collected at same location as fig. 12.

21, 22. *Rafinesquina minnesotensis* (Winchell)
Ventral and Dorsal valves, X 1.
Collected at same location as fig. 12.
E. G. M. No. 1845.

23. *Sowerbyella lebanonensis* (Bassler).
Exterior of ventral valve, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1923.

24. *Glyptorthis bellarugosa* (Conrad).
Exterior of ventral valve, X 1.
Collected at same location as fig. 1.

25, 26. *Trocholina sp.*
Leperditia sp.
Internal casts, X 1.
Collected at same location as fig. 10.
E. G. M. No. 1690.

27. *Rhinidictya sp.*
Lateral view of branching zoarium, X 1.
Collected at same location as fig. 10.
E. G. M. No. 1801.

28. *Leperditia sp.*
Complete carapace, X 1.
Collected at same location as fig. 10.
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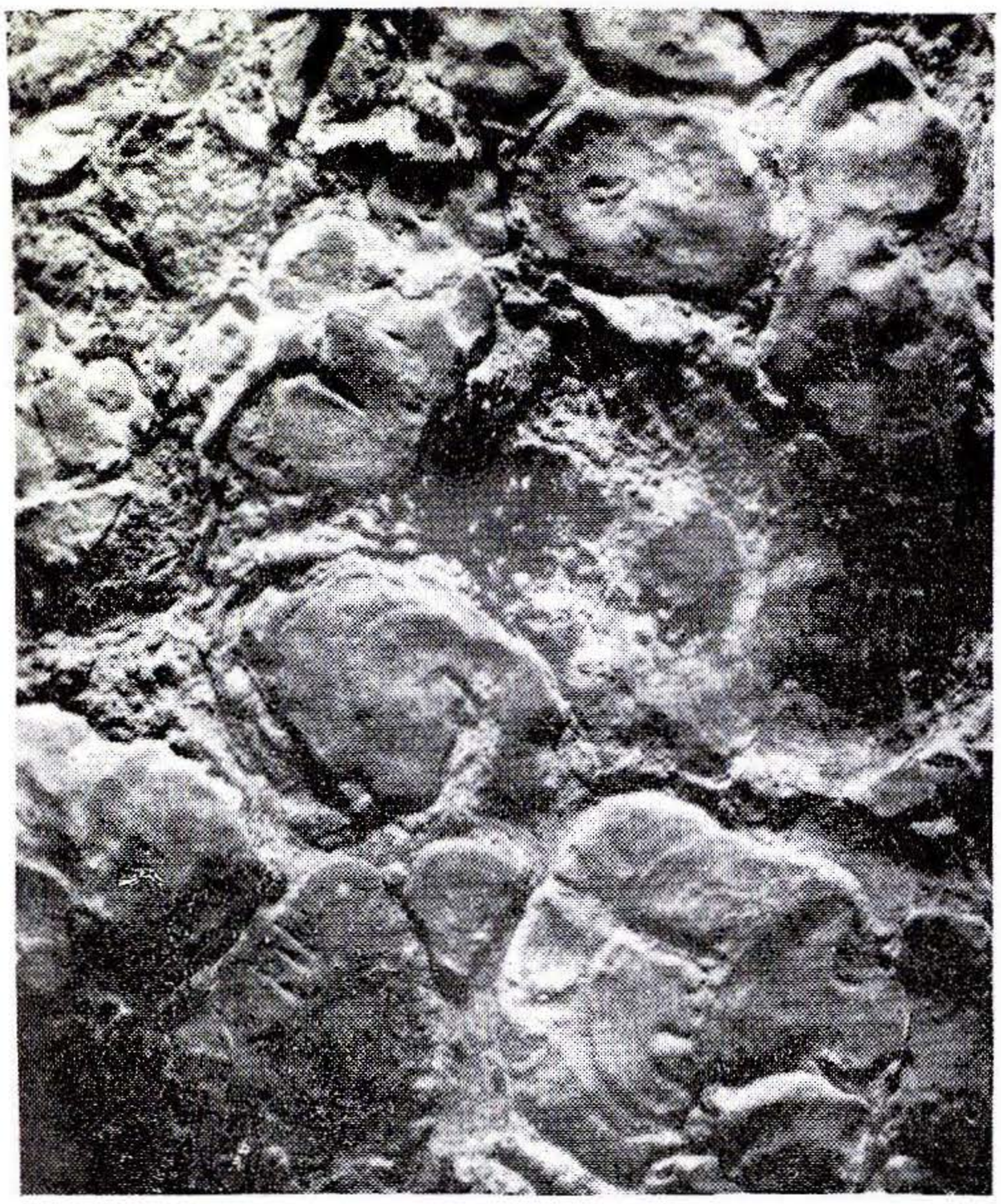
29. *Pelecypod.*
Internal mold, X 1.
Collected at same location as fig. 12.
E. G. M. No. 1840.



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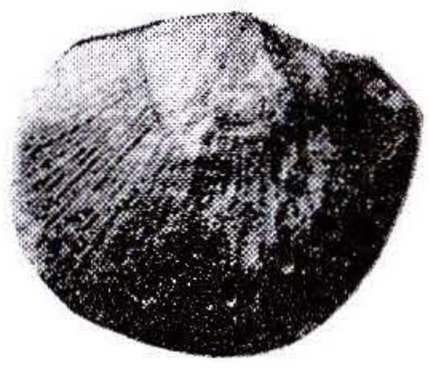

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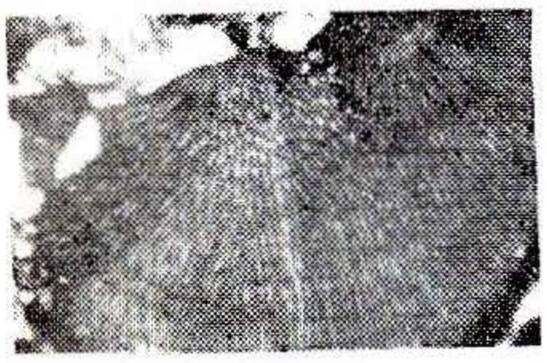

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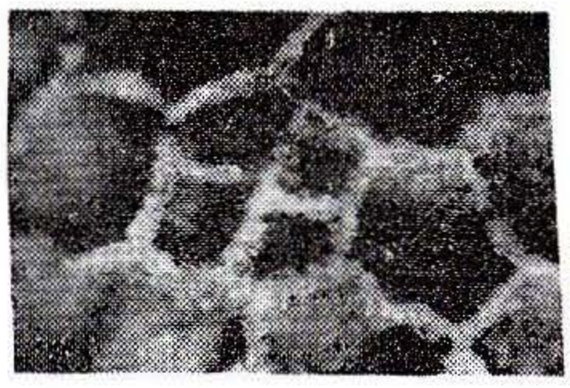

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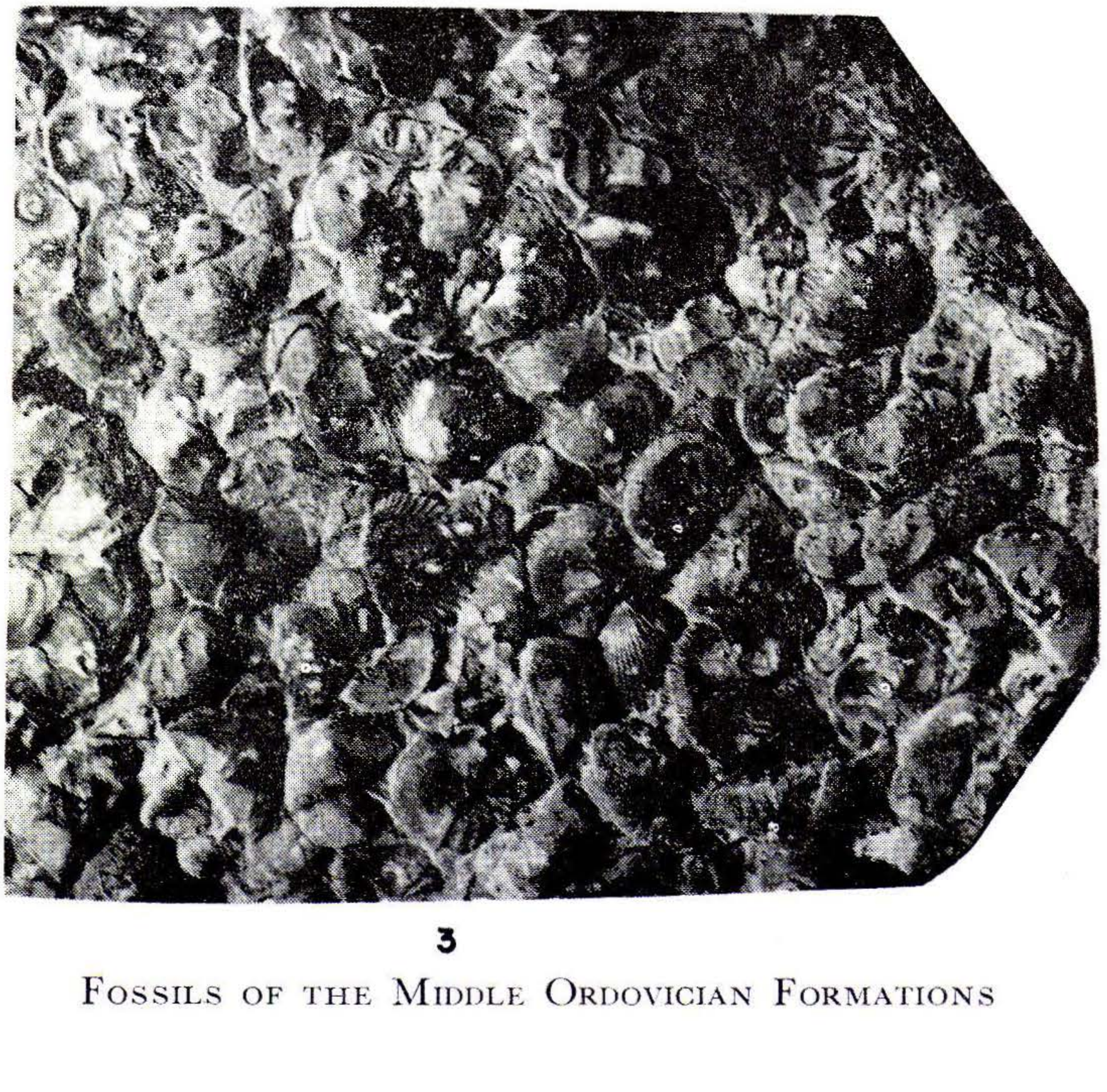

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FOSSILS OF THE MIDDLE ORDOVICIAN FORMATIONS

PLATE 6.

FOSSILS OF THE MIDDLE ORDOVICIAN FORMATIONS

Explanation

FIGURE

1. *Solenopora compacta* Billings.
   View showing colonial structure, X 1.
   Collected by C. Butts, 2½ miles north of Catlett Gap, location 12 on map in pocket.
   Locality No. 595-O.

2. *Solenopora compacta* Billings.
   Polished section showing internal structure, X 30.
   Collected by L. Vest on Mill Creek, northwest corner of the Kensington Quadrangle, location 13 on map in pocket.
   E. G. M. No. 1873.

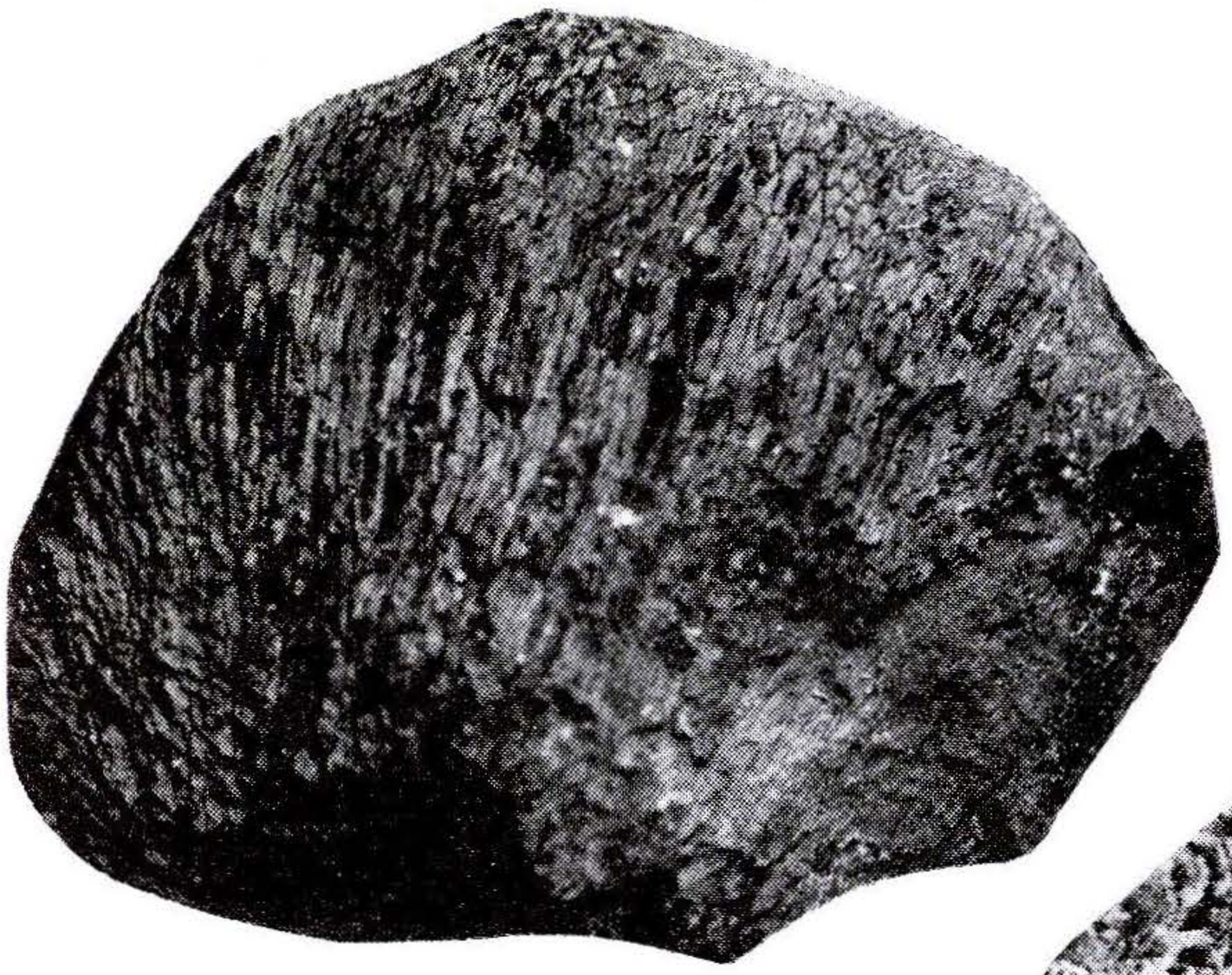
3. *Hesperorthis tricenaria* Conrad and *Sowerbyella lebanonensis* Bassler.
   Slab of limestone showing numerous specimens of both, X 1.
   Collected along railroad in Kensington Quadrangle, east of the McLemore Cove Road, location 14 on map in pocket.
   E. G. M. No. 1922.

4. *Solenopora compacta* Billings.
   Thin section, X 30.
   Collected at same location as fig. 3.

5. *Multicostella sp.*
   Exterior view of ventral valve, X 1.
   Collected at same location as fig. 2.
   E. G. M. No. 1853.

6. *Lophospira sp.*
   Internal mold, X 1.
   Collected by L. Vest south of Viniard Field, Chickamauga Park, location 15 on map in pocket.
   E. G. M. No. 1856.

7. *Tetradium columnare,* Hall.
   Top view of calyx, X 4.
   Collected by L. Vest at same location as fig. 2.
   E. G. M. No. 1881.



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FOSSILS OF THE MIDDLE ORDOVICIAN FORMATIONS

PLATE 7.

FOSSILS OF THE MIDDLE ORDOVICIAN FORMATIONS

Explanation

FIGURE

1, 2. *Tetradium fibratum* Safford.

Fig. 1 shows longitudinal view of the closely packed corallites, X 1.

Collected by R. Murphy in Rabbit Valley north of Ringgold, Index Map 3.

E. G. M. No. 1906.

Fig. 2 is top view of the corallum showing the polygonal shape of the corallites and the four septa, X 1.

Collected by L. Vest in Quarry 1½ miles north of Cooper Heights, location 16 on map in pocket.

E. G. M. No. 1904.

3, 4. *Lichenaria carterensis* (Safford).

Fig. 3 is bottom view of corallum showing the closely packed corallites, X 1.

Fig. 4 is top view of same corallum showing the polygonal shape of the corallites and the complete absence of septa.

Collected by Willis Holland at the intersection of Crawfish Creek and Glass Mill Road, south of Chickamauga, location 17, on map in pocket.

E. G. M. No. 1865.


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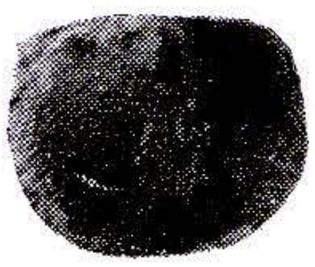
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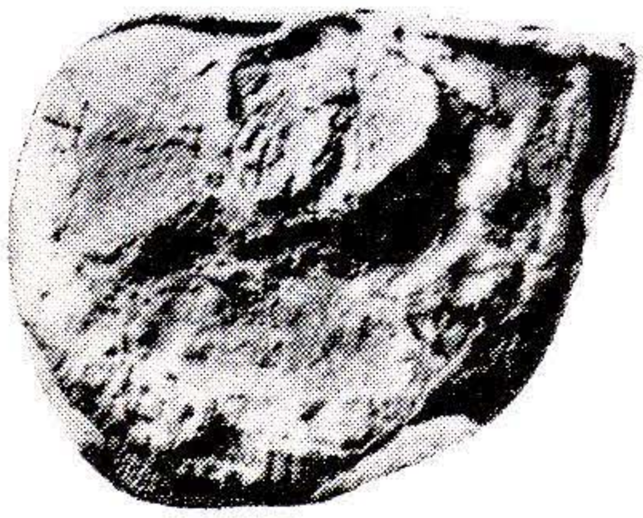
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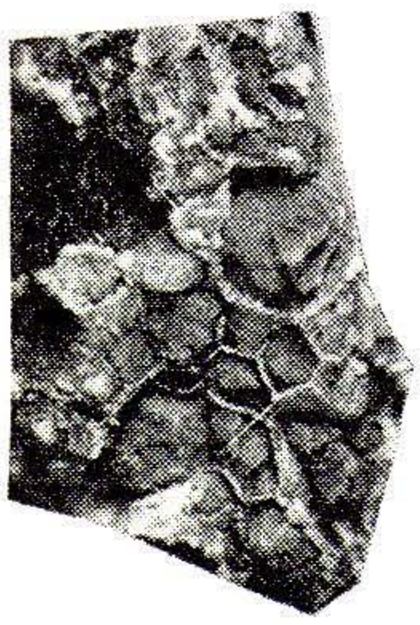
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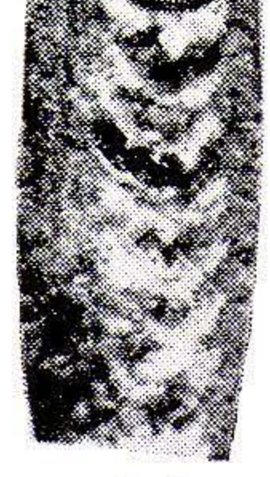
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FOSSILS OF THE MIDDLE ORDOVICIAN FORMATIONS

PLATE 8.

FOSSILS OF THE MIDDLE ORDOVICIAN FORMATIONS

Explanation

FIGURE

1. *Idiostrophia costata* (?)
   External view of ventral valve, X 1.
   Collected in Rabbit Valley, 1½ miles north of Ringgold, Index Map 3, location C.
   E. G. M. No. 1797.

2. *Zygospira recurvirostris* (Hall).
   External view of ventral valve, X 1.
   Collected east of highway in Rabbit Valley, 1½ miles north of Ringgold, Index Map 3, location C.
   E. G. M. No. 1808.

3, 4. *Rhynchotrema minnesotense* Sardeson.
   Views showing exterior of dorsal and ventral valves, X 1.
   Collected at same location as fig. 2.
   E. G. M. No. 1760.

5, 6. *Rhynchotrema increbescens* Hall.
   Views showing dorsal and ventral valves, X 1.
   Collected at same location as fig. 2.
   E. G. M. No. 1748.

7. *Plaesiomys meedsi* (Winchell and Schuchert).
   View showing dorsal valve, X 1.
   Collected in roadcut on Georgia highway 151, north of Ringgold, Index Map 3, location B.
   E. G. M. No. 1763.

8. *Hebertella subjugata* Hall.
   External view of dorsal valve, X 1.
   Collected on eastern boundary of Chickamauga Park, location 9 on map in pocket.
   E. G. M. No. 1736.

9. *Hebertella frankfortensis* Foerste.
   External view of ventral valve, X 1.
   Collected at same location as fig. 8.
   E. G. M. No. 1850.

FIGURE

10. *Lingula sp.*
External view of ventral valve, X 1.
Collected at same location as fig. 7.

11. *Liospira progne* Billings.
Internal cast, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1789.

12. *Heterorthis clytie* Hall.
External view of ventral valve, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1923.

13. *Rafinesquina sp.*
Internal view of ventral valve, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1783.

14. *Hormotoma sp.*
View showing cross section of spire, X 1.
Collected at same location as fig. 7.
E. G. M. No. 1908.

15. *Helicotoma uniangulata* (Hall)
View showing cross section, X 1.
Collected near Pleasant Grove Church in Rabbit Valley, Index Map 3.
E. G. M. No. 1710.

16. *Columnaria halli* Nicholson.
Top view showing size, shape, and arrangement of corallites, X 1.
Collected by L. Vest on Mill Creek in northwest corner of Kensington Quadrangle, location 13 on map in pocket.
E. G. M. No. 1880.

17. *Tetradium columnare* Hall.
Top view of colony showing size and shape of corallites, X 1.
Note the absence of septa.
Collected by L. Vest near head of Chattanooga Creek, location 16 on map in pocket.
E. G. M. No. 1898.

FIGURE

18. *Cupulocrinus humilis* Billings.
Calyx showing the arrangement of basal and radial plates, X 1.
Collected at same location as fig. 7.
E. G. M. No. 1761.

19, 20. *Streptelasma profundum* (Conrad).
Lateral and calicular view, X 1.
Collected by L. Vest at same location as fig. 16.
E. G. M. No. 1852.

21. *Lophospira medialis* Ulrich and Scofield.
Internal cast, X 1.
Collected by L. Vest at same location as fig. 16.
E. G. M. No. 1874.

22. *Lophospira sp.*
Internal cast, X 1.
Collected by L. Vest at same location as fig. 16.
E. G. M. No. 1875.

23. *Hormotoma sp.*
Internal cast, X 1.
Collected by L. Vest in quarry 1½ miles north of Cooper Heights, location 18 on map in pocket.
E. G. M. No. 1872.

24. *Calliops callicephala* (Hall).
Pygidium, X 1.
Collected at same location as fig. 8.
E. G. M. No. 1733.

25. *Pterygomatopus sp.*
Pygidium, X 1.
Collected by C. Butts in quarry 500 feet south of Viniard Field in Chickamauga Park, location 15 on map in pocket.
Locality No. 595-S.

26. *Cryptophragmus antiquatus* Raymond.
Cross section view, X 1.
Collected by L. Vest near Highpoint, Kensington Quadrangle, location 24 on map in pocket.
E. G. M. No. 1869.

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FOSSILS OF THE MIDDLE AND UPPER ORDOVICIAN FORMATIONS

PLATE 9.

FOSSILS OF THE MIDDLE AND UPPER ORDOVICIAN FORMATIONS

Explanation

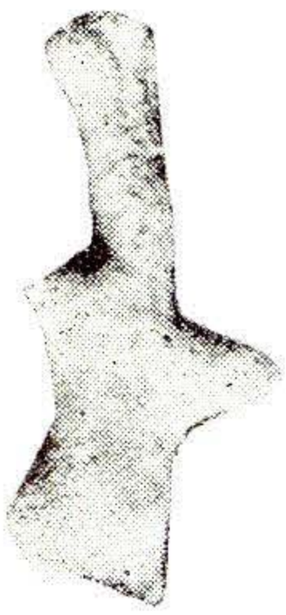
FIGURE

1. *Camarocladia implicatum* Bassler.
   Slab of limestone showing branches of the colony, X 1.
   Collected in Rabbit Valley, south of Ringgold and east of old Alabama Road, location 20 on map in pocket.
   E. G. M. No. 1920.

2. *Lichenaria cf. Lichenaria carterensis* (Safford).
   Basal view of the corallum showing the polygonal corallites and numerous tabulae, X 1.
   Collected in roadcut on old Alabama road north of Ringgold, Index Map 3, location B.
   E. G. M. No. 1892.

3. *Orthoceras sp.*
   Fragment of specimen showing septal arrangement, X 1.
   Collected by Grady Traylor at the junction of McLemore Cove Road and Kensington Road, location 21 on map in pocket.
   E. G. M. No. 1769.

4. *Actinoceras bigsbyi* Bronn.
   Natural cast showing septal arrangement, X 1.
   Collected east of Georgia highway 151, 1½ miles north of Ringgold, Index Map 3, location C.
   E. G. M. No. 1680.



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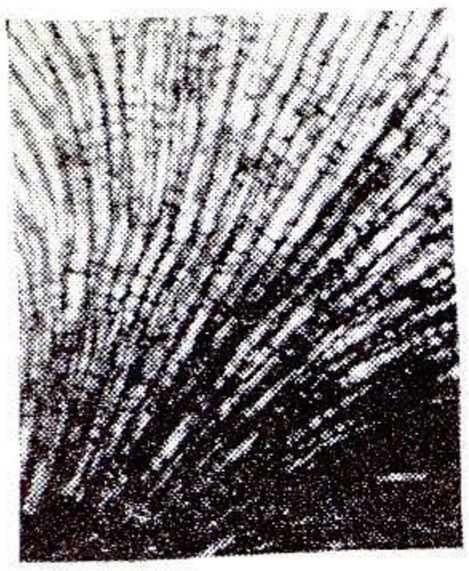

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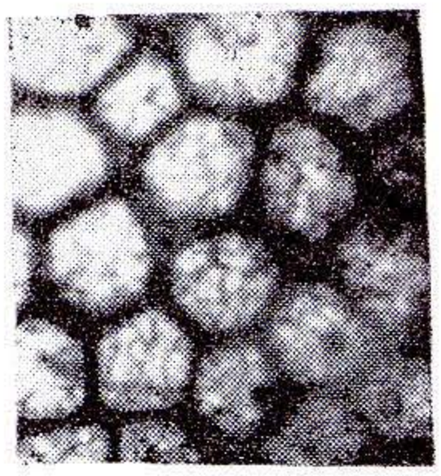

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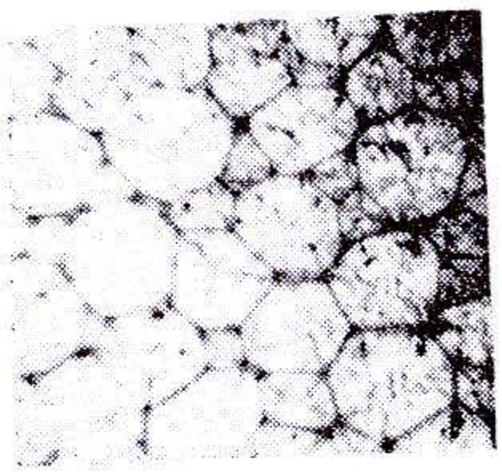

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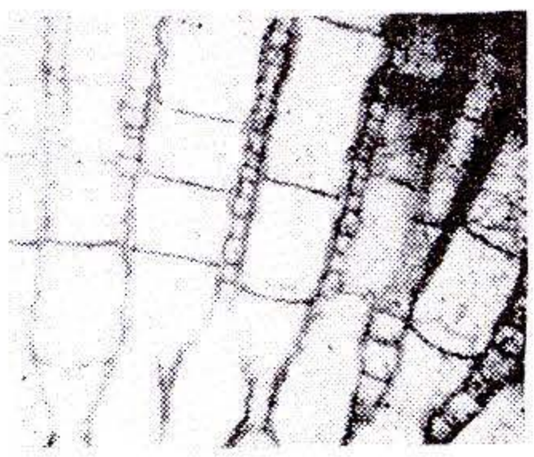

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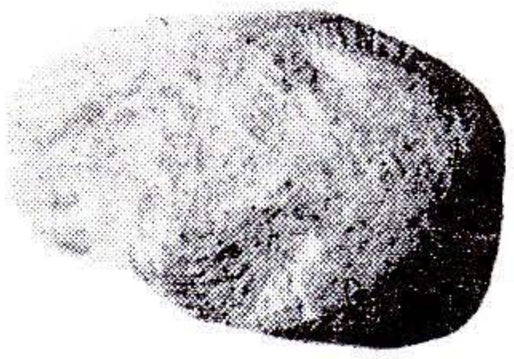

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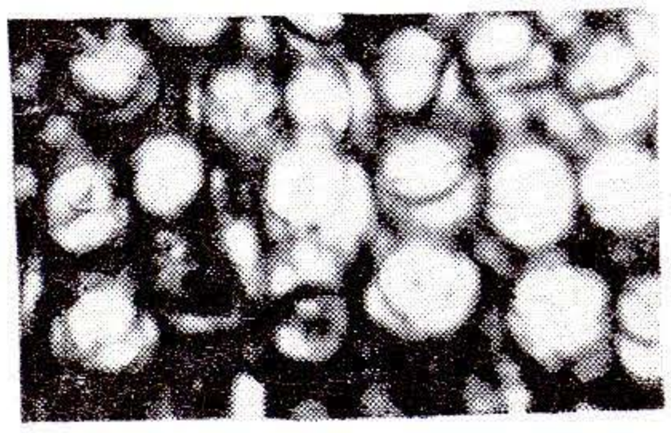

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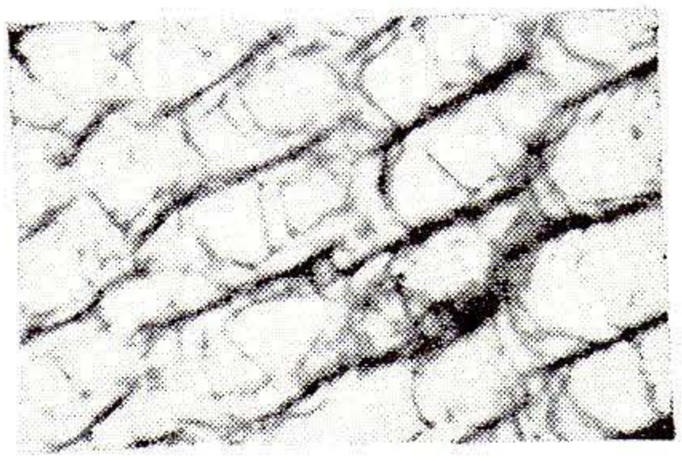

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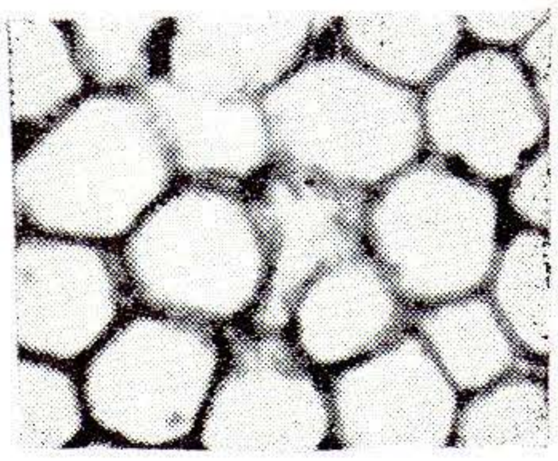

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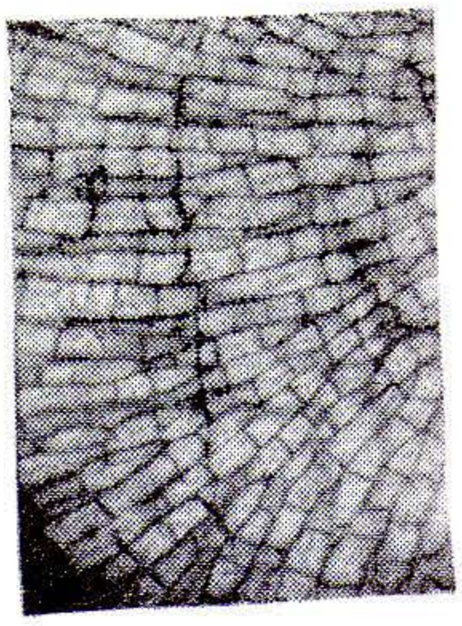

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FOSSILS OF THE MIDDLE AND UPPER ORDOVICIAN FORMATIONS

PLATE 10.

FOSSILS OF THE MIDDLE AND UPPER ORDOVICIAN FORMATIONS

Explanation

FIGURE

1, 2. *Callopora ampla* Ulrich.

Fig. 1 shows typical zoarium, X 1.

Fig. 2 is vertical section showing the arrangement of the diaphragms, X 8.

Collected in roadcut on Georgia Highway 151 north of Ringgold, Index Map 3, location B.

E. G. M. No. 1832.

3–5. *Callopora cf. Callopora ampla* Ulrich.

Fig. 3 shows typical zoarium, X 1.

Fig. 4 is a tangential section of the axial area, X 100.

Fig. 5 is vertical section near the outer edge showing the parallel and almost equally spaced diaphragms, X 100.

Collected at same location as fig. 1.

E. G. M. No. 1813.

6–8. *Callopora incontroversa* Ulrich.

Fig. 6 shows typical zoarium, V 1.

Fig. 7 is a tangential section showing the thin-walled pores and mesopores, X 100.

Fig 8 is a vertical section showing the closely spaced diaphragms in the mesopores and the equal spacing in the zooids, X 100.

Collected at same location as fig. 1.

E. G. M. No. 1828.

9–11. *Mesotrypa infida* Ulrich.

Fig. 9 shows the typical round, convex upper surface, X 1.

Fig. 10 is a tangential view showing the round pores and curved cystiphragms, X 100.

Fig. 11 is a vertical section showing the loose drapeing of the cystiphragms, X 100.

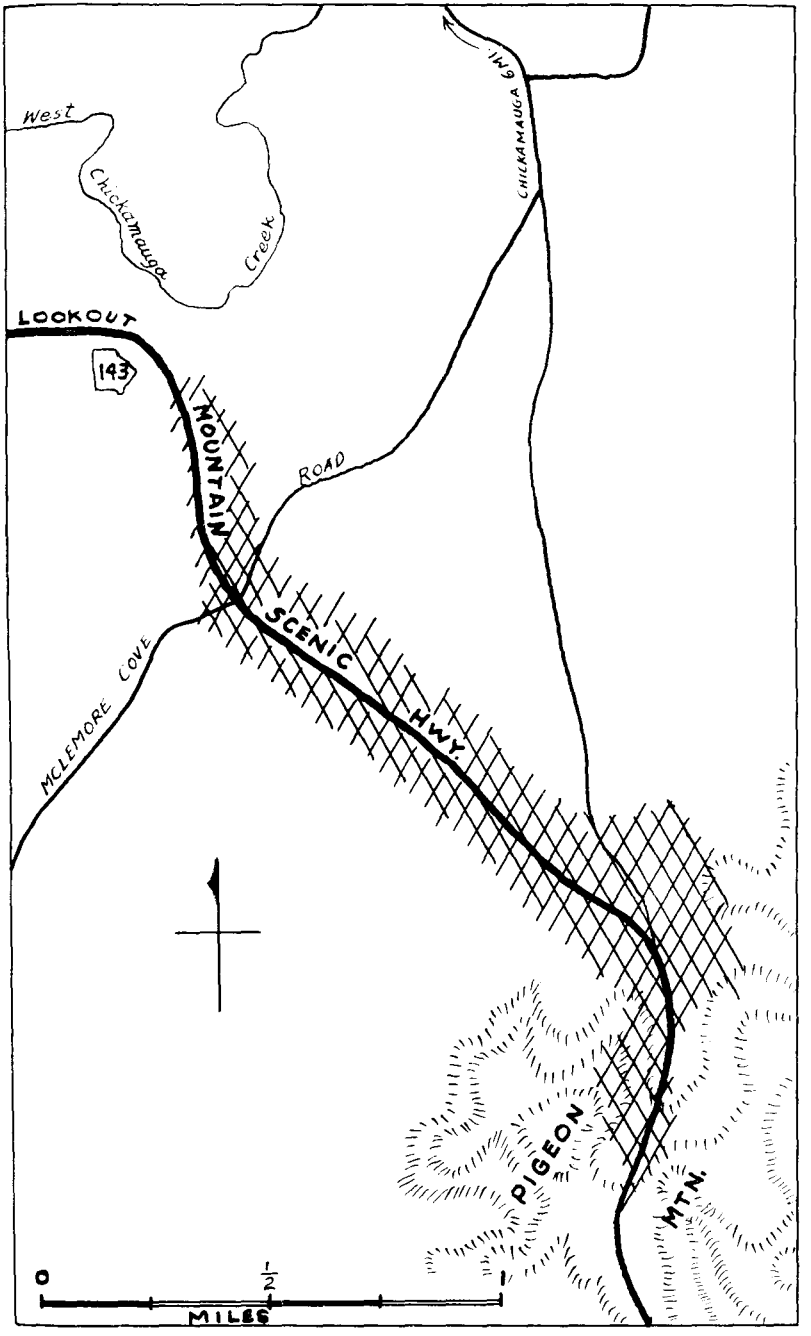
Collected at Pleasant Valley Church, north of Ringgold, Index Map 3.

FIGURE

12–14. *Prasopora cf. Prasopora simulatrix* Ulrich.
Fig. 12 is a top view of the large discoidal zoarium, X 1.
Fig. 13 is a vertical section showing the development of paired cystiphragms about equally spaced, X 100.
Fig. 14 is a vertical view showing the zooids of equal size and shape, X 100.
Collected at same location as fig. 1.
E. G. M. No. 1835.

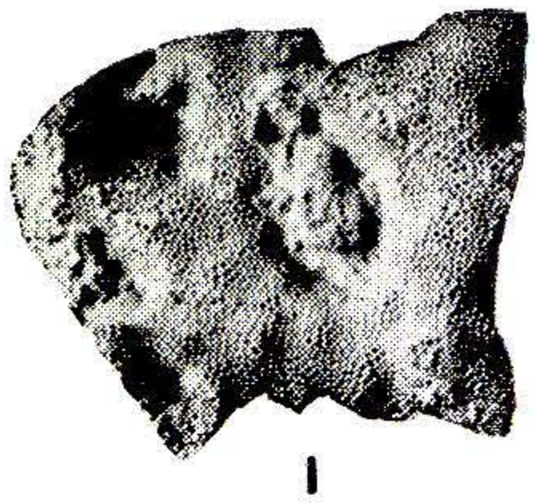
15–17. *Prasopora cf. Prasopora lenticularis* Ulrich.
Fig. 15 and 16 are dorsal and ventral views, X 1. Note the small brachiopod which has been encrusted.
Fig. 17 is a vertical view showing the arrangement of the curved diaphragms and cystiphragms, X 100.
Collected on eastern boundary of Chickamauga Park, location 9 on map in pocket.
E. G. M. No. 1834.

18–19. *Monotrypa intabulata* Winchell and Ulrich.
Fig. 18 is a top view of the discoidal zoarium, X 1.
Fig. 19 is a vertical section showing the arrangement of the diaphragms, X 100.
Collected by Craig Wright on south side of Georgia highway 143 on the west slope of Pigeon Mountain, Index Map 4, location indicated by shaded area.



FOSSIL LOCATIONS ALONG LOOKOUT MTN. SCENIC HWY.

(SHADED AREA)



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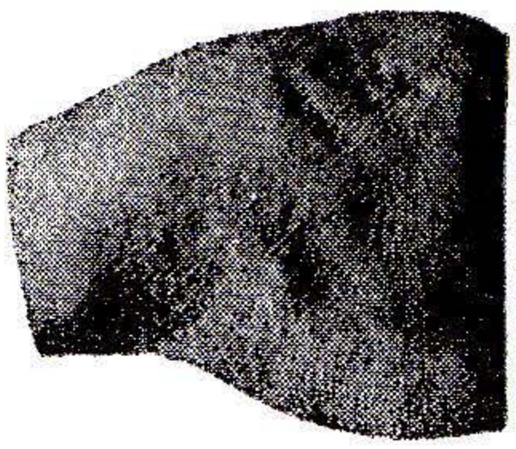

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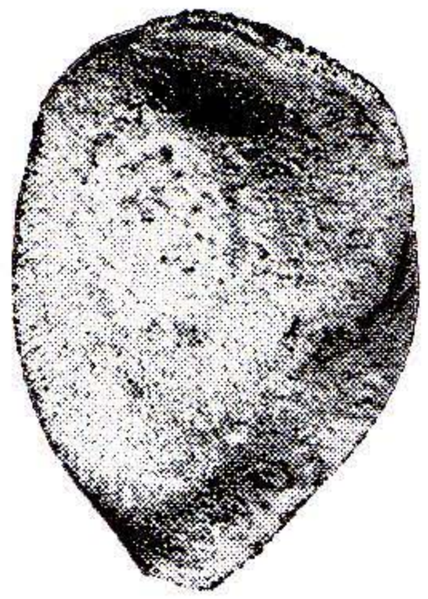

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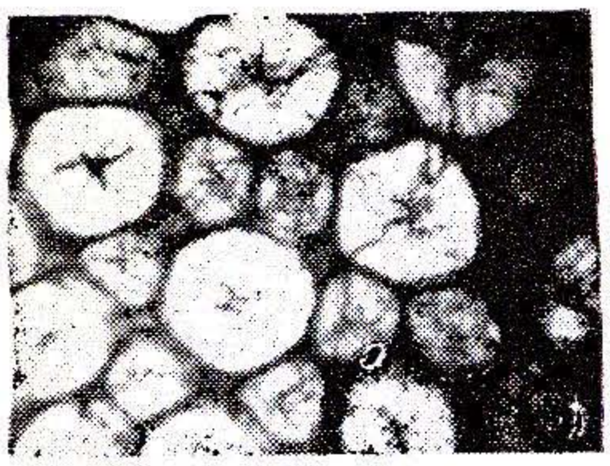

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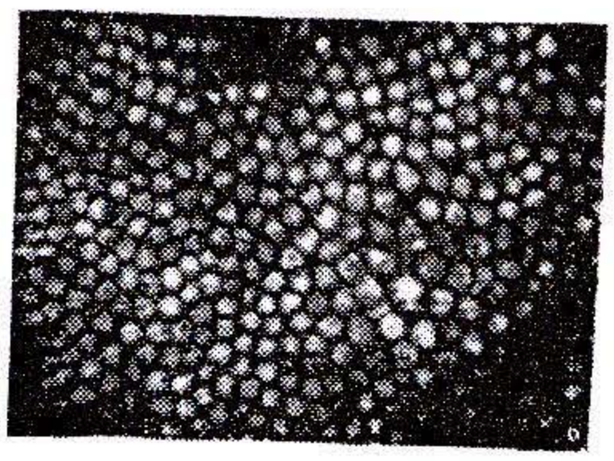

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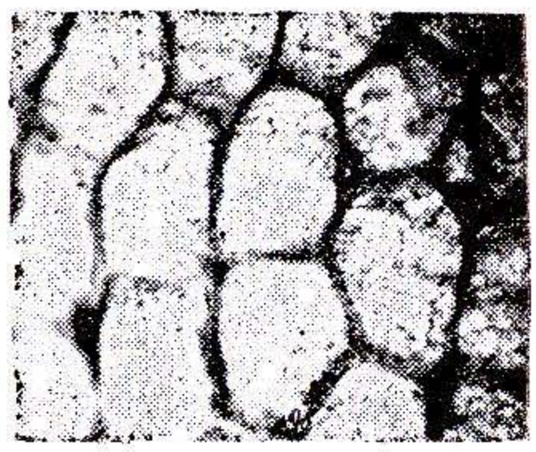

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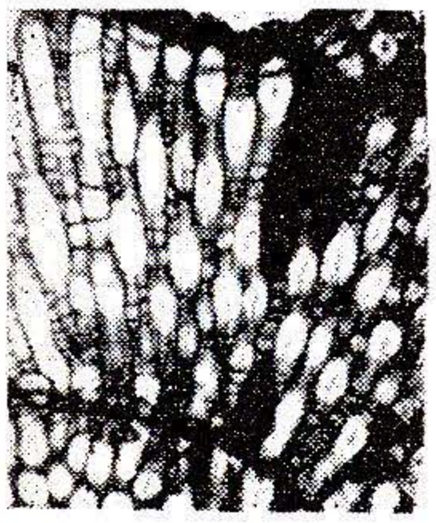

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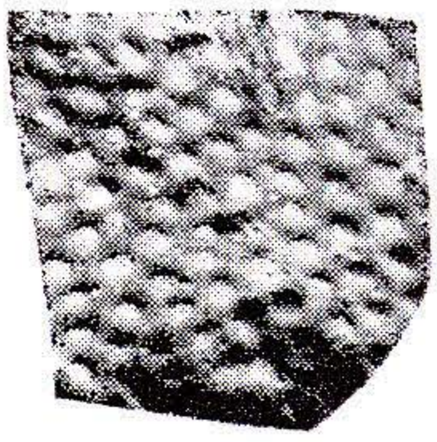

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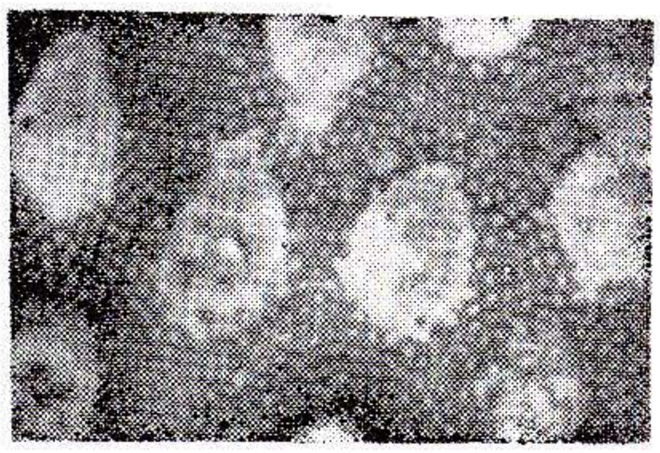

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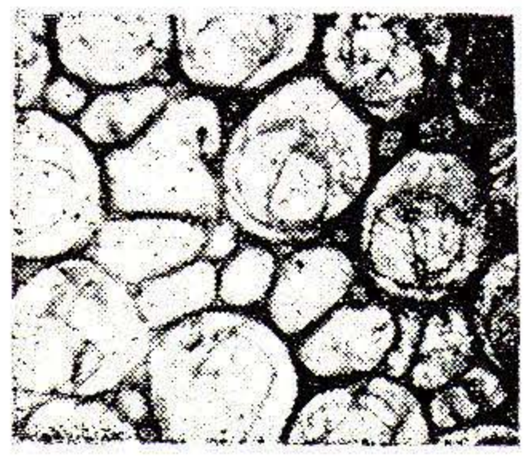

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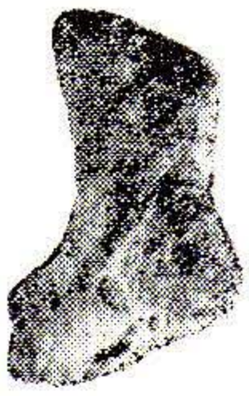

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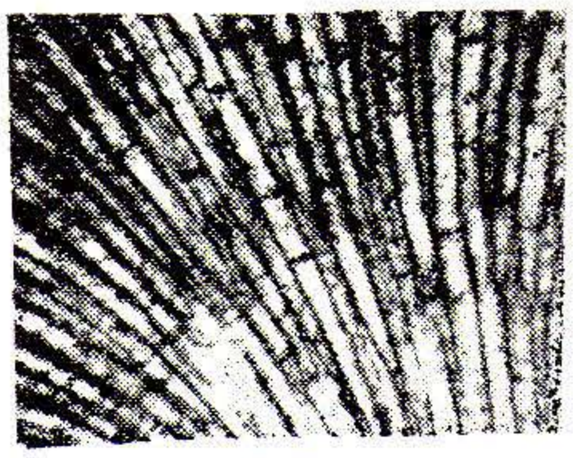

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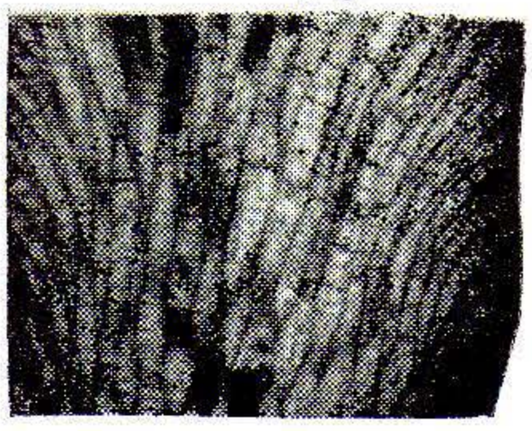

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FOSSILS OF THE MIDDLE AND UPPER ORDOVICIAN FORMATIONS

PLATE 11.

FOSSILS OF THE MIDDLE AND UPPER ORDOVICIAN FORMATIONS

Explanation

FIGURE

1–3. *Batostoma libana* ?
Compressed branches of large zoarium showing small monticules, X 1.
Fig. 2 is a tangential section showing the zooids surrounded by mesopores, X 100.
Fig. 3 is a vertical section and shows an abundance of diaphragms in the mesopores, X 100.
Collected along Georgia highway 151, north of Ringgold, Index Map 3, location indicated by shaded area.
E. G. M. No. 1827.

4–7. *Prasopora patera* ?
Fig. 4 and 5 are top and bottom of the large, discoidal zoarium, X 1.
Fig. 6 and 7 are tangential and vertical sections, X 30.
Collected along the eastern boundary of Chickamauga Park, location 9 on map in pocket.
E. G. M. No. 1829.

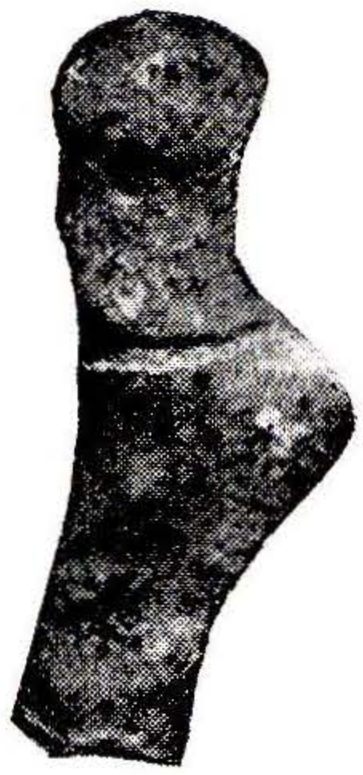
8, 9. *Chasmatopora sublaxa* Ulrich.
Top view of zoarium, X 1 and X 8.
Collected at Pleasant Valley Cemetery in Rabbit Valley, Index Map 3.
E. G. M. No. 1787.

10–12. *Prasopora simulatrix* Ulrich.
Fig. 10 and 11 are top and bottom of the discoidal zoarium, X 1.
Fig. 12 is a tangential section, X 100.
Collected at same location as Fig. 4.

13, 16. *Eridotrypa mutabilis* Ulrich.
Fig. 13 shows the slender, branching cylindrical stems of the zoarium, X 1.
Fig. 16 is a vertical section showing the arrangement of the diaphragms, X 8.
Collected by Craig Wright along Georgia highway 143 on the west slope of Pigeon Mountain, Index Map 4, location indicated by shaded area.

14, 15. *Amplexopora ampla* Ulrich.
Lateral view, X 1 and vertical view, X 8.
Collected at same location as fig. 1.
E. G. M. No. 1826.

17, 18. *Prasopora conoidea* Ulrich.
Lateral and top view of the conical zoarium, X 1.
Collected on north side of Georgia highway 2, 1¼ miles east of McLemore Cove Road, Index Map 4, location indicated by shaded area.
E. G. M. No. 1831.



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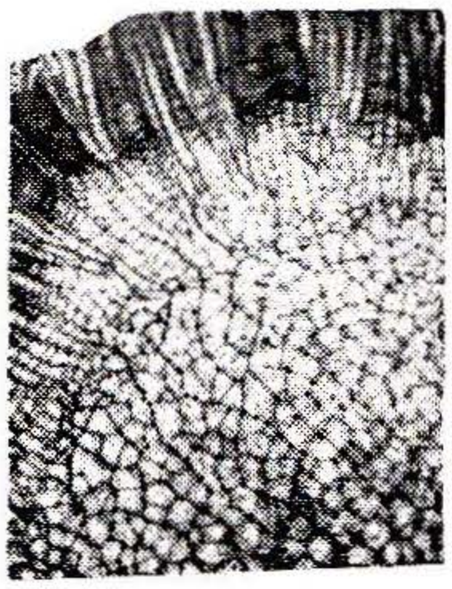

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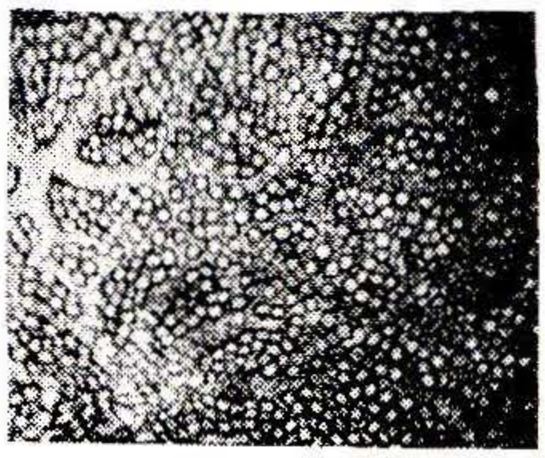

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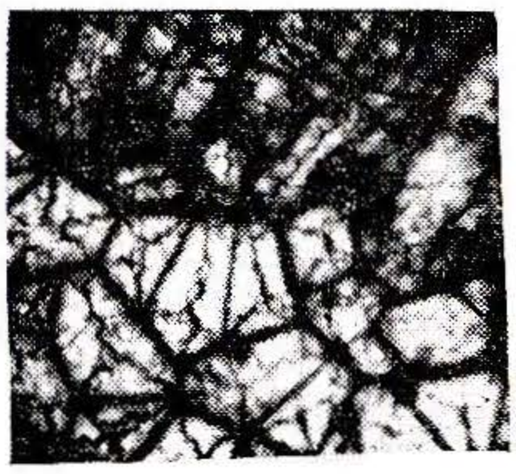

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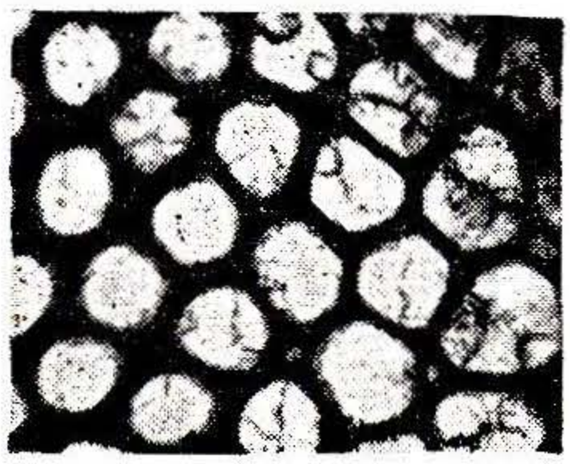

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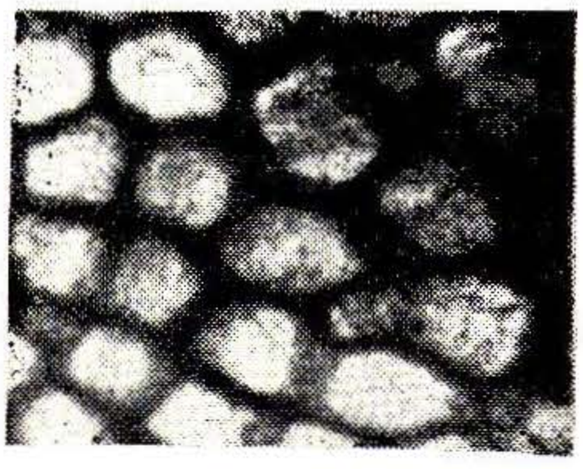

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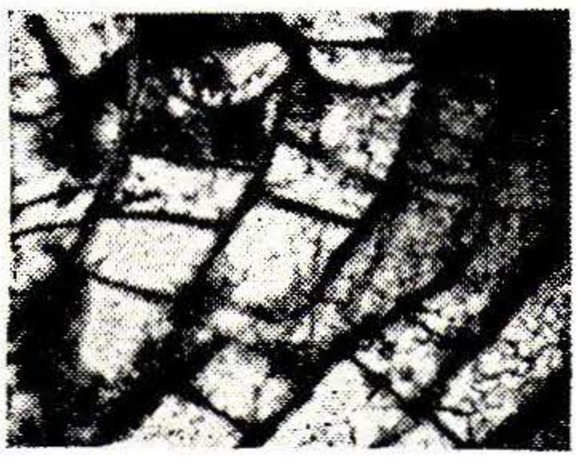

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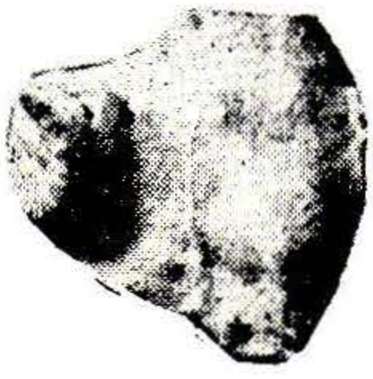

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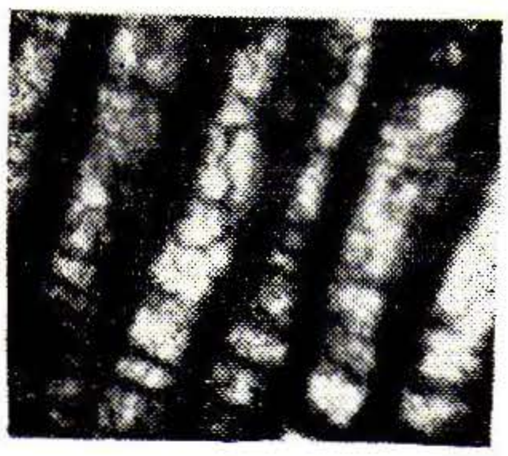

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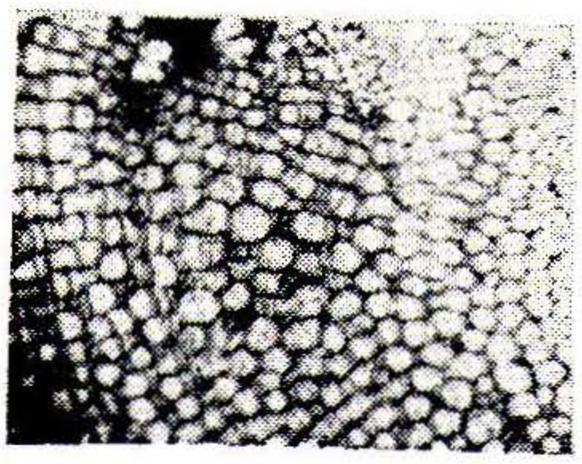

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15

FOSSILS OF THE MIDDLE AND UPPER ORDOVICIAN FORMATIONS

PLATE 12.

FOSSILS OF THE MIDDLE AND UPPER ORDOVICIAN FORMATIONS

Explanation

FIGURE

1–3. *Constellaria vera* Ulrich.

Fig. 1 is a lateral view of the zoarium, X 1.

Fig. 2 and 3 are tangential and vertical sections of fig. 1, showing the arrangement of the diaphragms and monticules, X 8.

Collected on north side of Georgia highway 143, on the west slope of Pigeon Mountain, Index Map 4, location indicated by shaded area.

E. G. M. No. 1837.

4–6. *Constellaria florida* Ulrich.

Fig. 4 is a lateral view of the zoarium showing the closely spaced stellate monticules, X 1.

Fig. 5 and 6 are vertical sections showing the crowded mesopores and diaphragms, X 8.

Collected by Craig Wright on south side of Georgia highway 143, on the west slope of Pigeon Mountain, Index Map 4, location indicated by shaded area.

7–9. *Dekayella simplex* Ulrich.

Fig. 7 is a lateral view of the zoarium, X 1.

Fig. 8 and 9 are tangential and vertical sections, X 100.

Collected at same location as fig. 1.

E. G. M. No. 1836.

10–12. *Homotrypa minnesotensis* Ulrich.

Fig. 10 is a lateral view of the zoarium, X 1.

Fig. 11 and 12 are tangential and vertical sections, X 100.

Collected in roadcut north of Ringgold on Georgia highway 151, Index Map 3, location indicated by shaded area.

E. G. M. No. 1824.

13–15. *Homotrypa cf. Homotrypa subramosa* Ulrich.

Fig. 13 is a lateral view of the zoarium, X 1.

Fig. 14 and 15 are vertical and tangential sections, X 8.

Collected at same location as fig. 10.

E. G. M. No. 1833.

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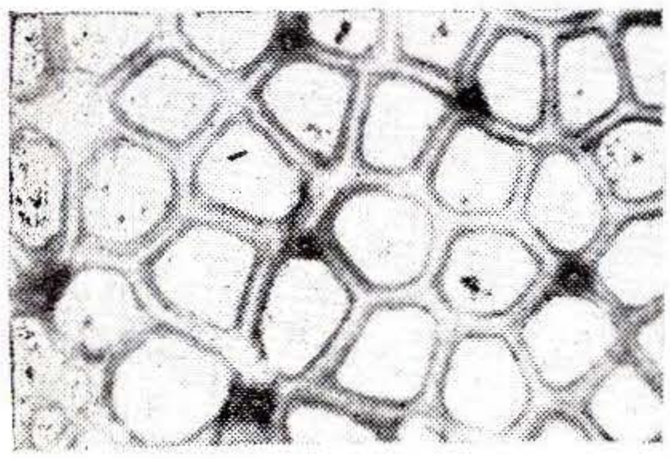

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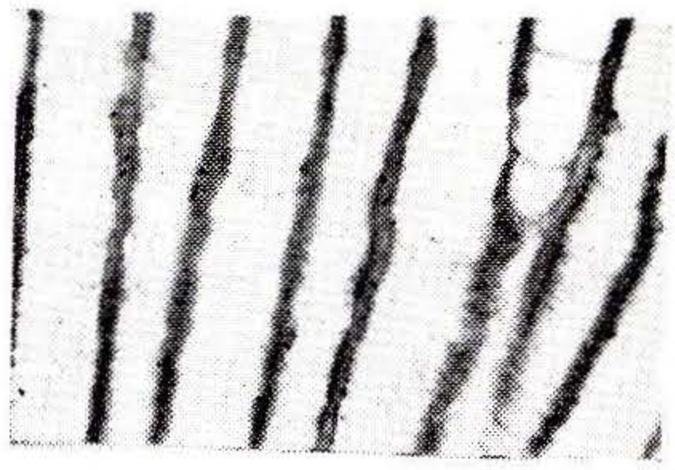

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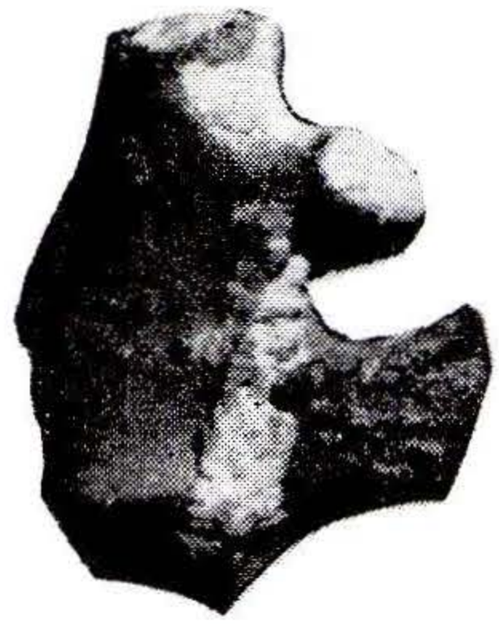

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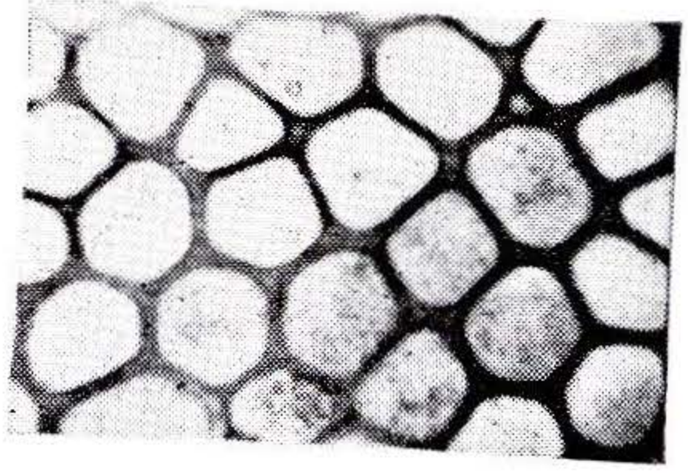

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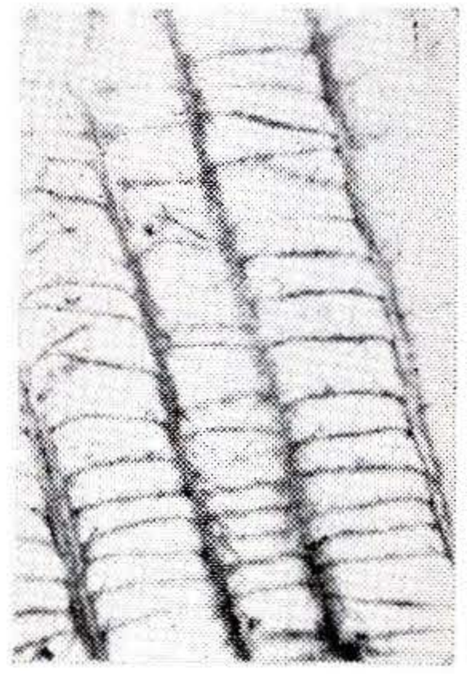

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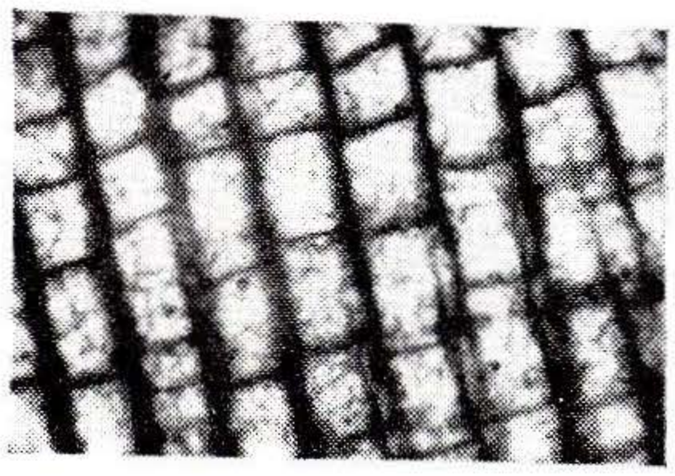

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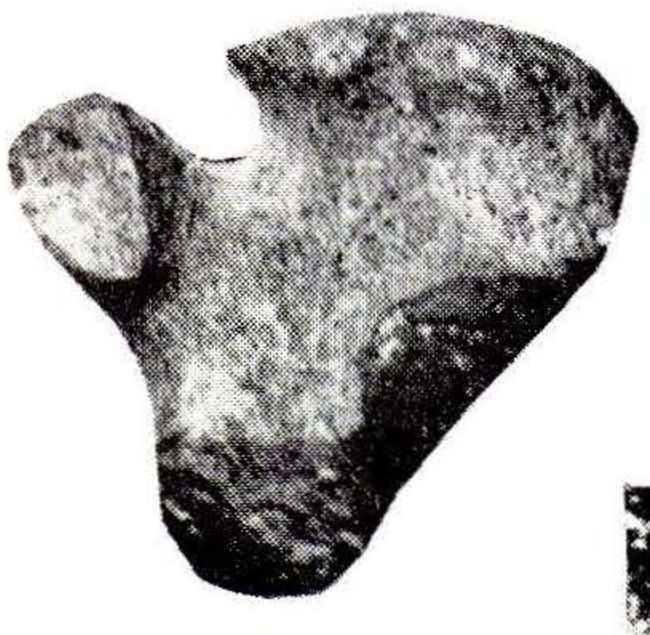

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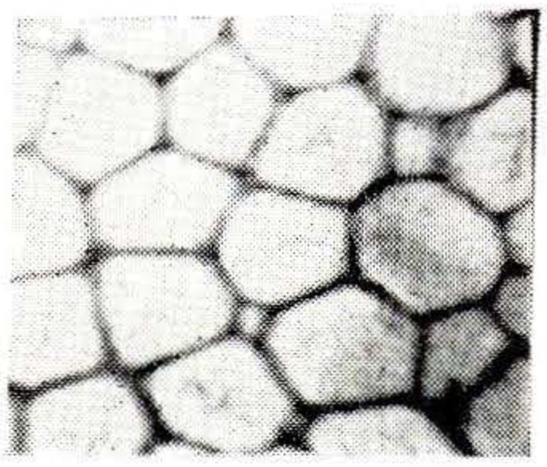

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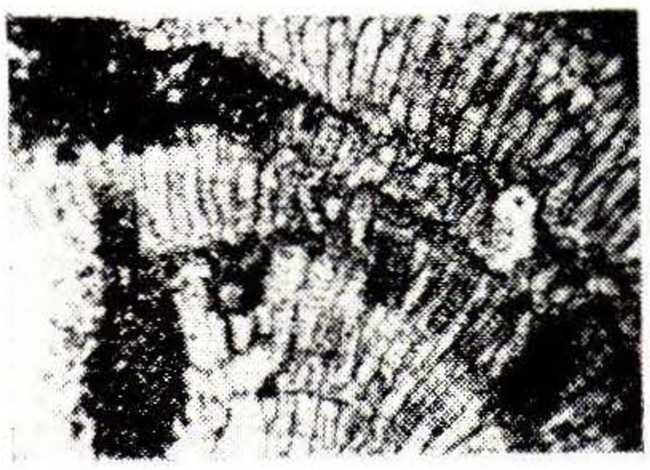

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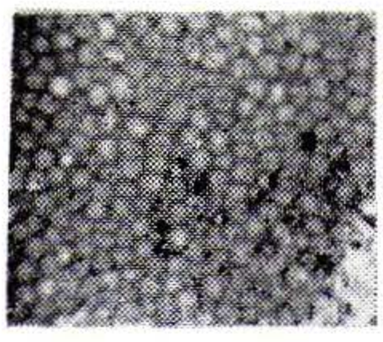

12

FOSSILS OF THE MIDDLE AND UPPER ORDOVICIAN FORMATIONS

PLATE 13.

FOSSILS OF THE MIDDLE AND UPPER ORDOVICIAN FORMATIONS

Explanation

FIGURE

1–3. *Eridotrypa briareus* Nicholson.
Fig. 1 is a lateral view of the zoarium, X 1; Fig. 2 and 3 are tangential and vertical sections, X 100.
Collected by Craig Wright on Georgia highway 143 near McLemore Cove Road, Index Map 4, location indicated by shaded area.
E. G. M. No. 1812.

4–6. *Batostoma decipiens* Ulrich.
Fig. 4 is a lateral view of the zoarium, X 1; Fig. 5 and 6 are tangential and vertical sections, X 100.
Collected near Woods Station, 5 miles south of Ringgold.
E. G. M. No. 1822.

7–9. *Dekayella cf. Dekayella milleri* Ulrich.
Fig. 7 is a lateral view of the massive zoarium, X 1; fig. 8 and 9 are vertical and tangential sections, X 100.
Collected in roadcut along Georgia highway 151 north of Ringgold, Index Map 3, location indicated by shaded area.

10, 11. *Batostoma cf. Batostoma jamesi* (Nicholson).
Fig. 10 is a lateral view of the zoarium, X 1.
Fig. 11 is a vertical section, X 8.
Collected at same location as fig. 9.
E. G. M. No. 1830.

12, 13. *Dekayella ulrichi* Nicholson.
Fig. 13 is a lateral view showing the low monticules, X 1.
Fig. 12 is a tangential section, X 8.
Collected by Craig Wright at the same location as fig. 1.

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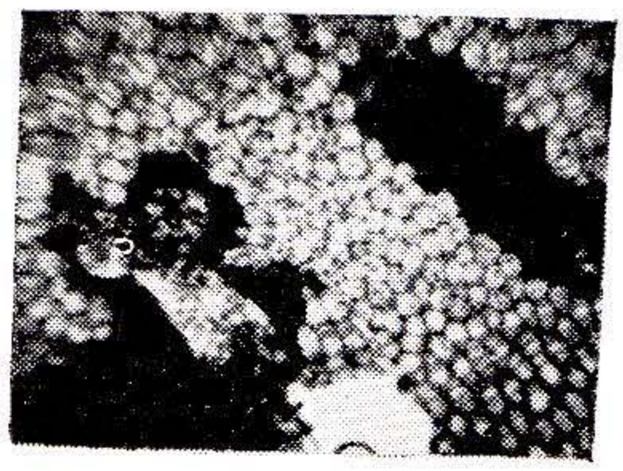

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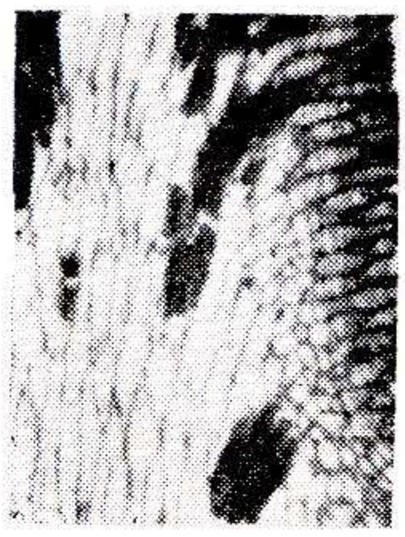

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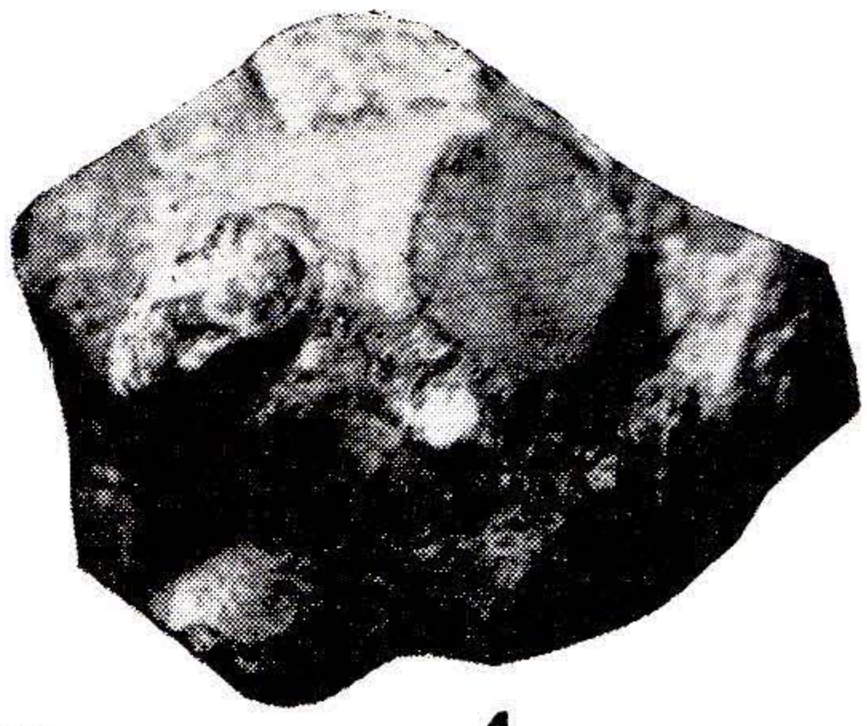

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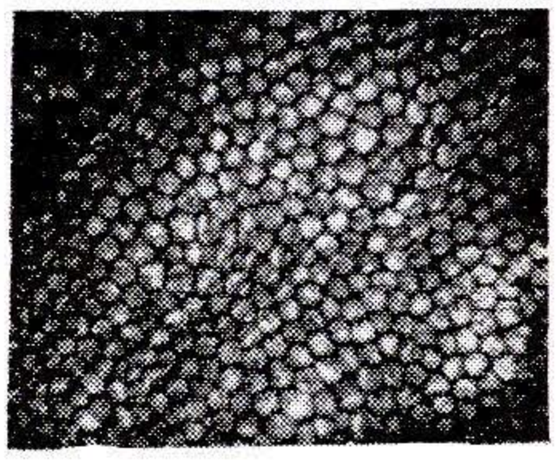

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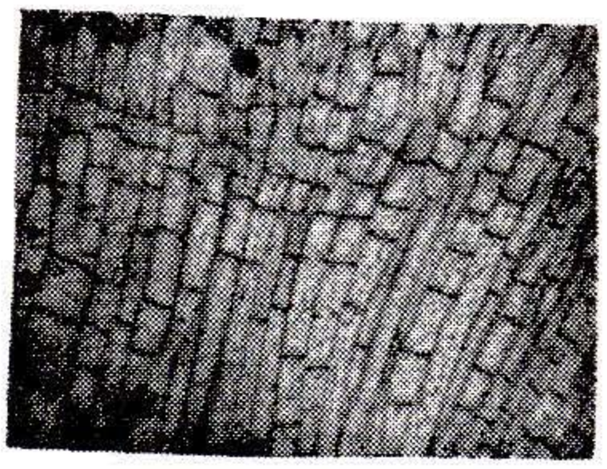

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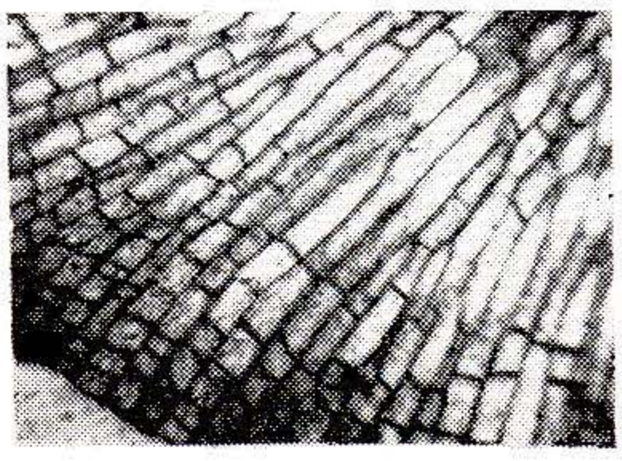

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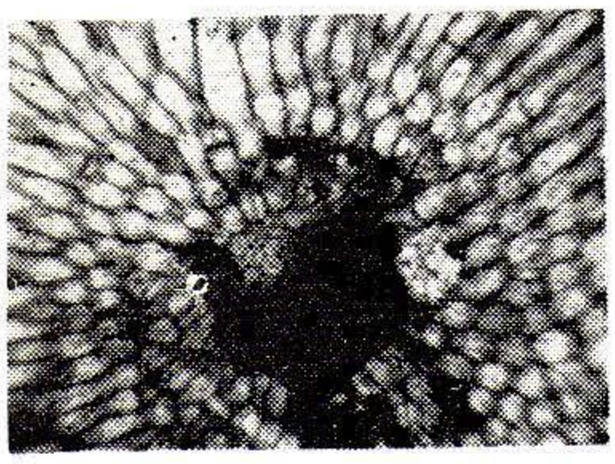

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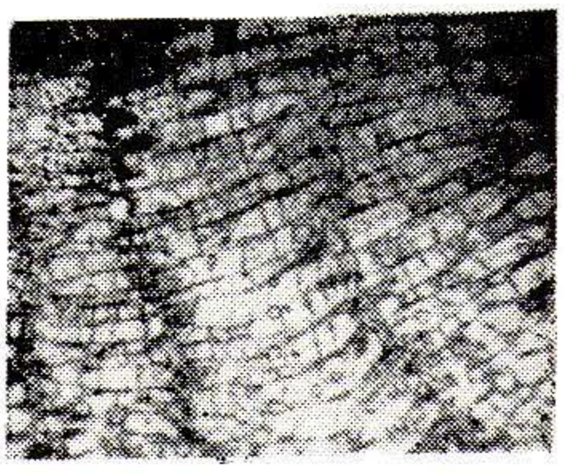

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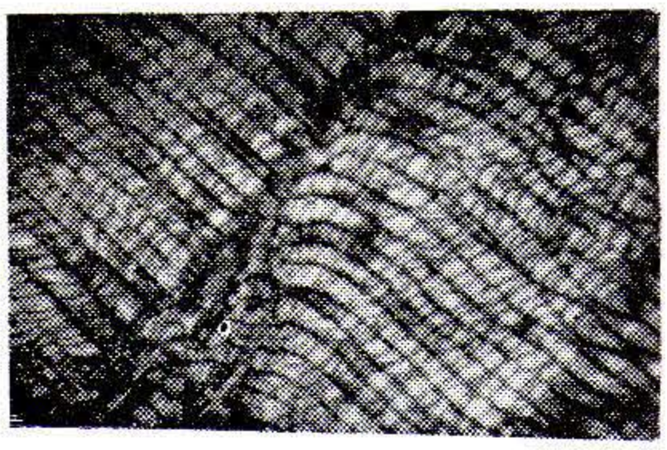

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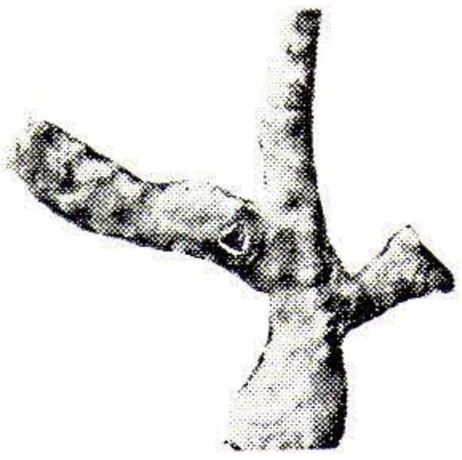

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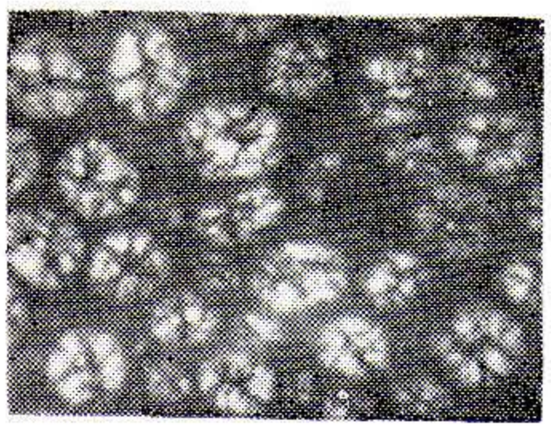

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FOSSILS OF THE UPPER ORDOVICIAN FORMATIONS

PLATE 14.

FOSSILS OF THE UPPER ORDOVICIAN FORMATIONS

Explanation

FIGURE

1–3. *Heterotrypa parvulipora* Ulrich and Bassler.
Fig. 1 is a lateral view of the zoarium, X 1.
Fig. 2 and 3 are tangential and vertical sections, X 8.
Collected by F. T. Ingram near Morganville, location 48 on map in pocket.
E. G. M. No. 1937.

4–6. *Dekayella praenuntia* Ulrich.
Fig. 4 is a lateral view of the massive zoarium, X 1.
Fig. 5 and 6 are tangential and vertical sections, X 8.
Collected by F. T. Ingram 1 mile north of Trenton, location 49 on map in pocket.
E. G. M. No. 1935.

7–9. *Amplexopora columbiana* Ulrich and Bassler.
Fig. 7 is a top view of the zoarium, X 1.
Fig. 8 is a vertical section.
Fig. 9 is an axial section, X 8.
Collected by F. T. Ingram 1½ miles south of Morganville, location 50 on map in pocket.
E. G. M. No. 1934.

10–12. *Monticulopora sp.*
Fig. 10 is a top view of the zoarium, X 1.
Fig. 11 and 12 are vertical and oblique sections, X 8.
Collected by F. T. Ingram on U. S. highway 11, 1½ miles north of the Alabama line, location 51 on map in pocket.
E. G. M. No. 1936.

13, 14. *Hallopora dalei* (Edwards and Haime).
Fig. 13 is a lateral view of the branching, nodose zoarium, X 1.
Fig. 14 is tangential section, X 100.
Collected by F. T. Ingram near Morganville, location 48 on map in pocket.
E. G. M. No. 1928.

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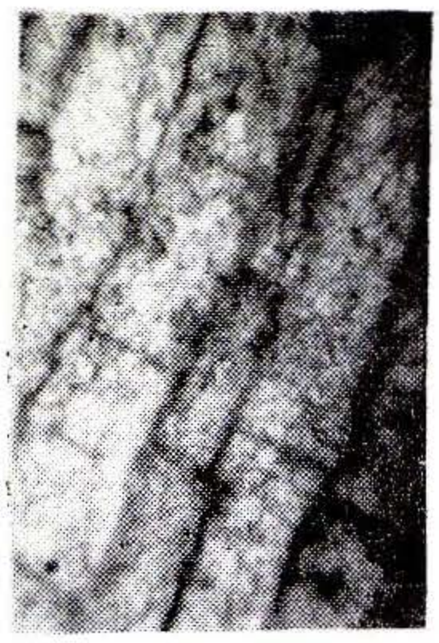

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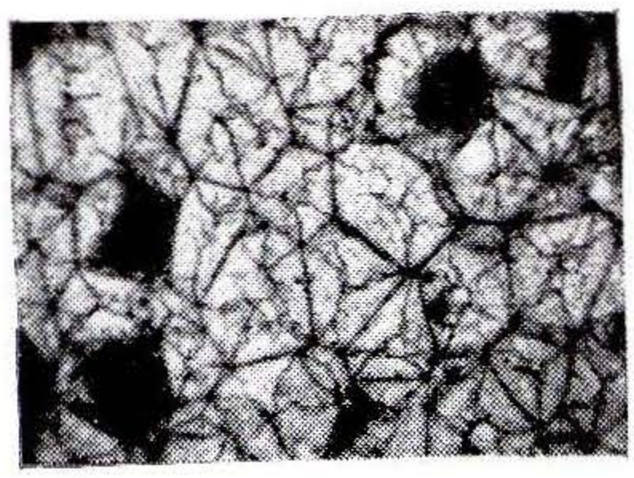

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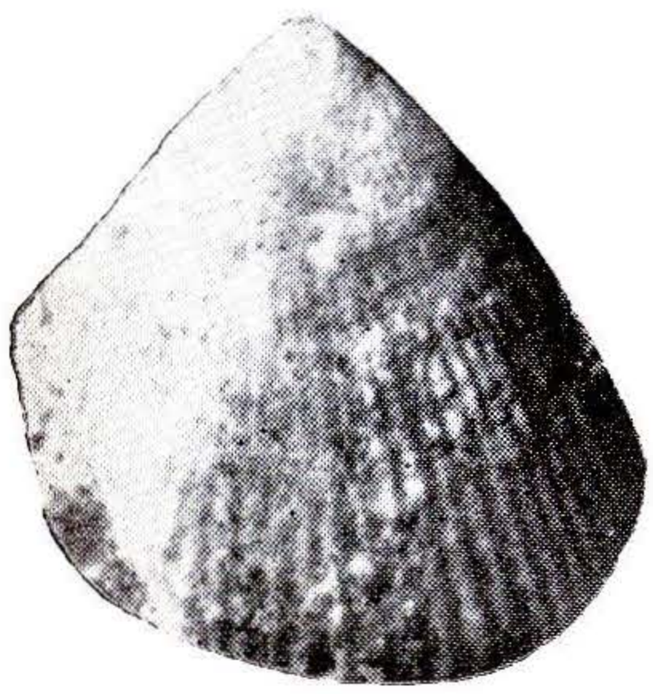

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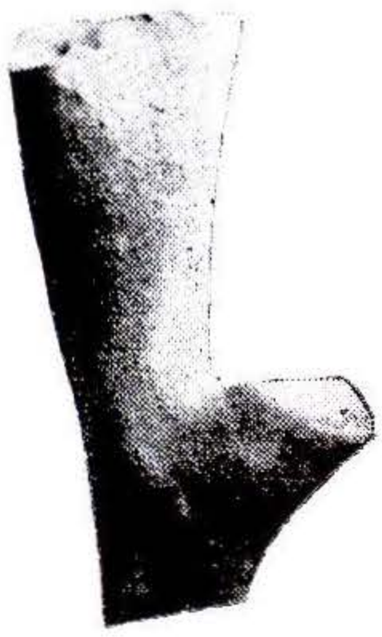

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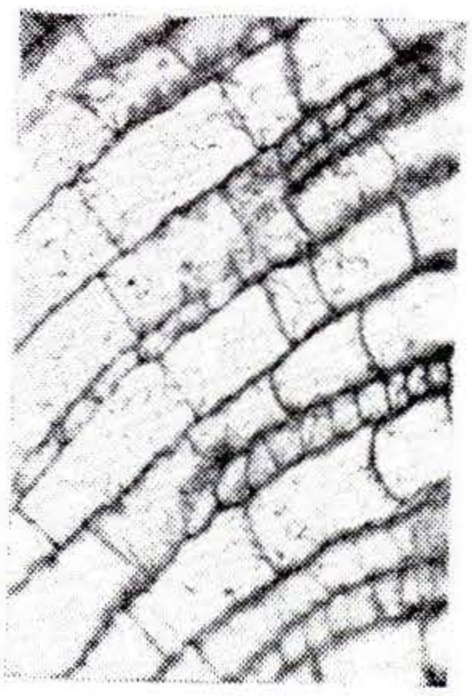

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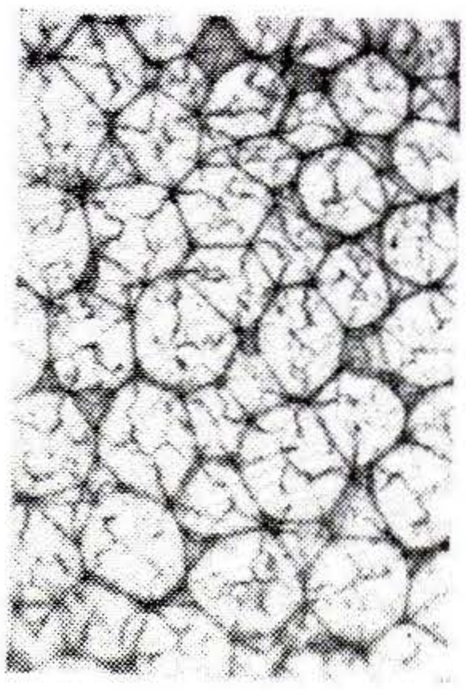

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11

FOSSILS OF THE UPPER ORDOVICIAN FORMATIONS

PLATE 15.

FOSSILS OF THE UPPER ORDOVICIAN FORMATIONS

Explanation

FIGURE

1-3. *Pachydictya foliata* Ulrich.
Fig. 1 is a lateral view of a fragment of the zoarium, X 1.
Fig. 2 and 3 are vertical and tangential sections of the immature area, X 100.
Collected by F. T. Ingram near Rising Fawn, location 52 on map in pocket.
E. G. M. No. 1929.

4. *Michelinoceras sociale* Hall.
Lateral view of part of cone, X 1.
Collected by F. T. Ingram ½ mile west of Cloverdale, location 53 on map in pocket.
E. G. M. No. 1964.

5. *Byssonchia cf. Byssonchia intermedia* (Meek and Worthen).
View of right hand valve, X 1.
Collected by F. T. Ingram at same location as fig. 4.
E. G. M. No. 1963.

6. *Cyrtoceras vallandighami* ?
Lateral view of part of cone, X 1.
Collected by F. T. Ingram at same location as fig. 5.
E. G. M. No. 1965.

7. *Valcouroceras sp.*
Lateral view of part of cone, X 1.
Collected by F. T. Ingram at same location as fig. 5.
E. G. M. No. 1962.

8-10. *Homotrypa sp.*
Fig. 8 is a lateral view of the zoarium, X 1.
Fig. 9 and 10 are vertical and tangential sections, X 100.
Collected by F. T. Ingram near Morganville, location 48 on map in pocket.
E. G. M. No. 1933.

11. *Stromatocerium pustulosum* Safford.
Polished transverse slab, X 1.
Collected by F. T. Ingram 4 miles south of Trenton, location 54 on map in pocket.
E. G. M. No. 1971.

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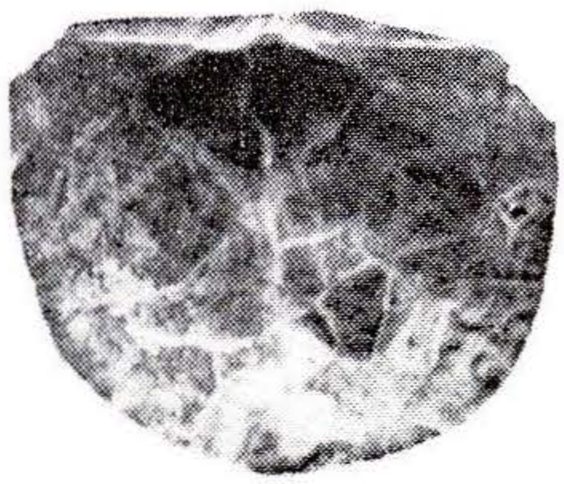

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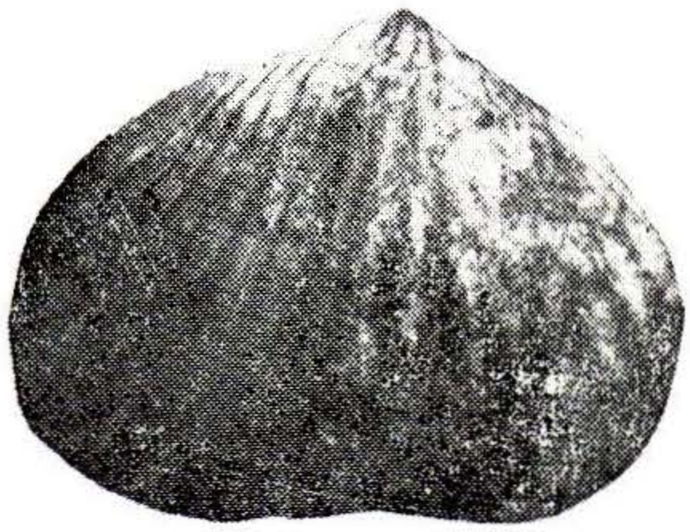

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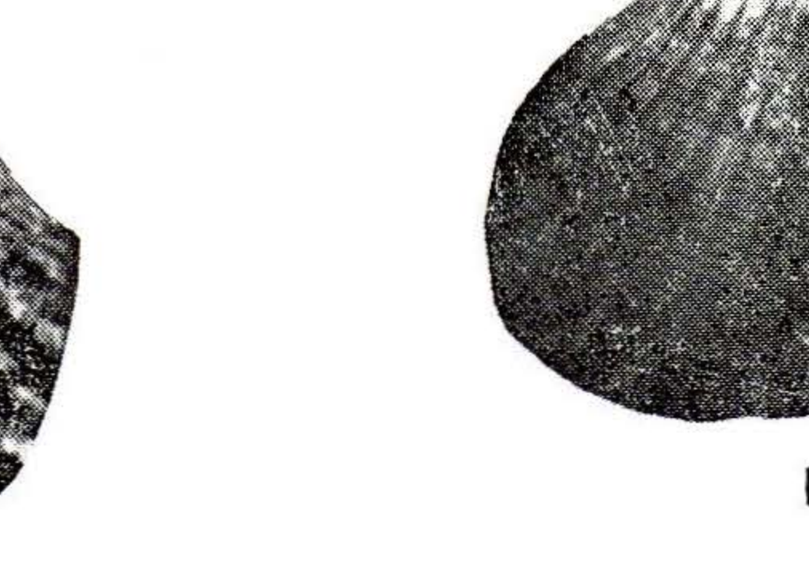

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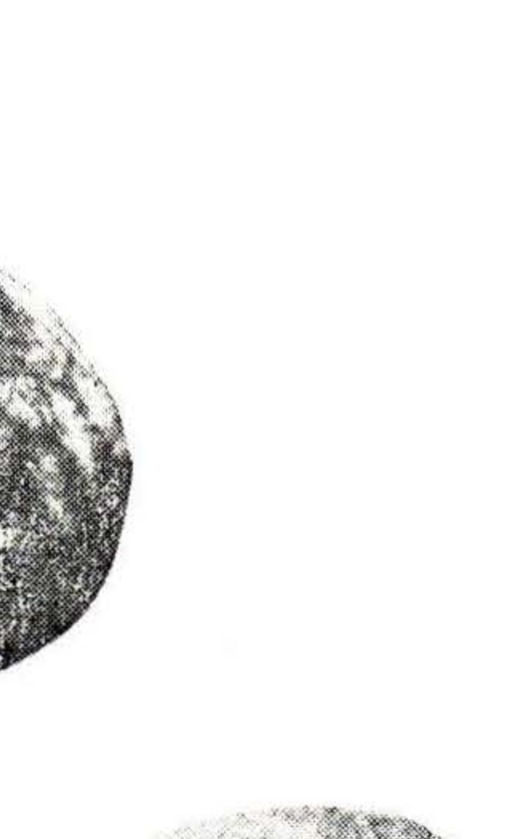

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FOSSILS OF THE UPPER ORDOVICIAN FORMATIONS

PLATE 16.

FOSSILS OF THE UPPER ORDOVICIAN FORMATIONS

Explanation

FIGURE

1. *Dalmanella sp.*
   External view of dorsal valve, X 1.
   Collected by Louis Vest at Haysville, Fort Oglethorpe Quadrangle, location 24 on map in pocket.
   E. G. M. No. 1878.

2. *Platystrophia strigosa* ?
   External view of ventral valve, X 1.
   Collected by Louis Vest at same location as fig. 1.
   E. G. M. No. 1870.

3. *Liospira vitruvia* (Billings).
   Internal cast, X 1.
   Collected by Craig Wright on south side of Georgia highway 143 on the west slope of Pigeon Mountain, Index Map 4, location indicated by shaded area.

4. *Zygospira modesta* Say
   Abnormally wide specimen, X 1.
   Collected by Craig Wright at same location as fig. 3.

5. *Flexicalymene cf. Flexicalymene servaria* (Conrad).
   Well preserved cephalon, X 1.
   Collected by Craig Wright at same location as fig. 3.

6. *Hebertella borealis* (Billings).
   External view of ventral valve, X 1.
   Collected by Louis Vest in quarry north of Cooper Heights, location 18 on map in pocket.
   E. G. M. No. 1887.

7, 8. *Hebertella occidentalis* Hall.
   External views of dorsal and ventral valves, X 1.
   Collected by Louis Vest at same location as fig. 1.
   E. G. M. No. 1885.

9. *Hebertella sinuata* (Hall).
   External view of dorsal valve, X 1.
   Collected by Craig Wright at same location as fig. 3.

FIGURE

10. *Rafinesquina alternata* (Emmons).
External view of dorsal valve, X 1.
Collected by Craig Wright in quarry on east side of McLemore Cove Road, 1 mile north of Georgia highway 143, Index Map 4, location indicated by shaded area.

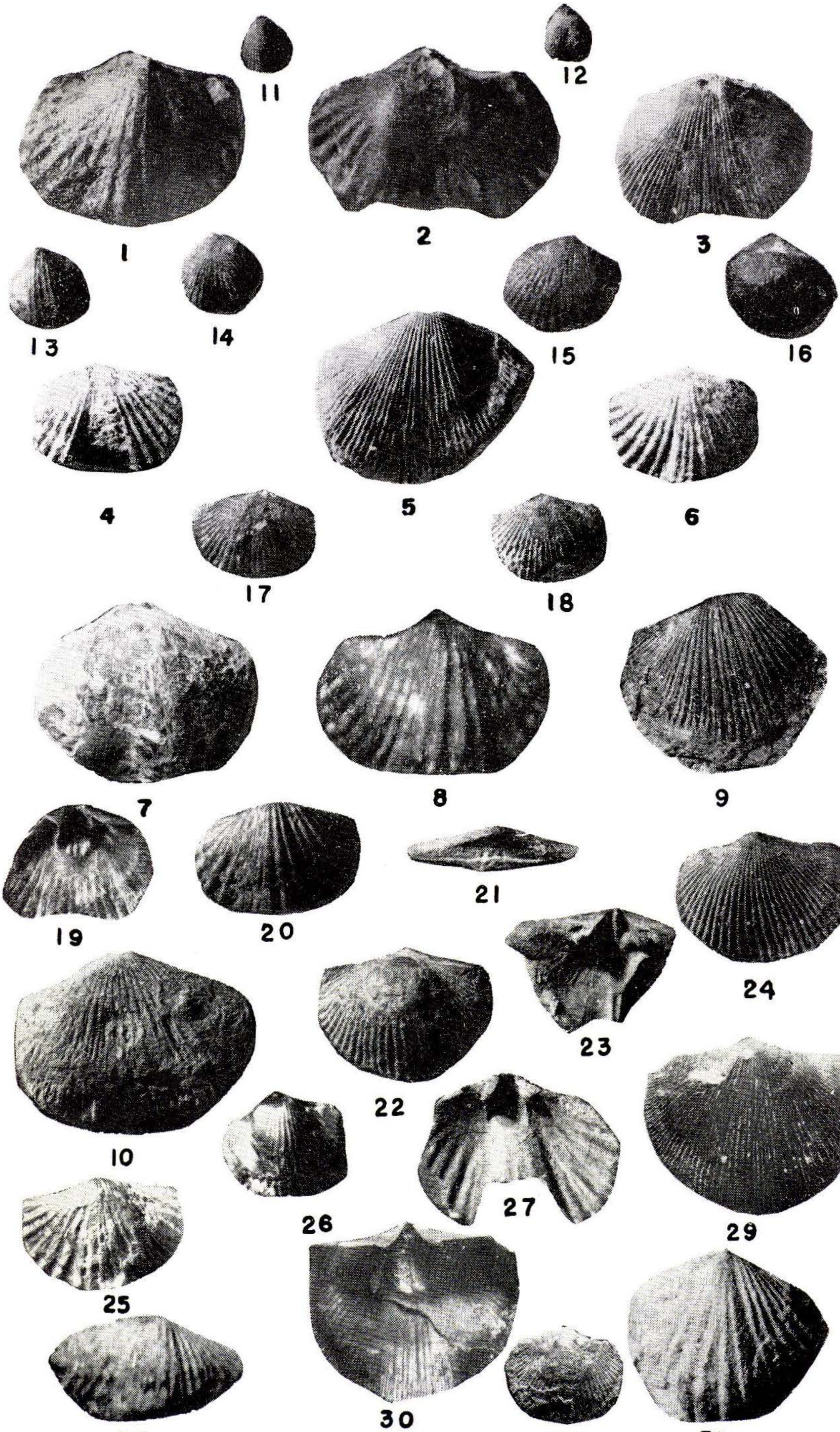
11. *Platystrophia sublaticosta* ?
External view of dorsal valve, X 1.
Collected by Louis Vest at same location as fig. 1.
E. G. M. No. 1891.

12, 13. *Platystrophia ponderosa* Foerste.
External view of dorsal and ventral valves, X 1.
Collected by Robert Crisler on U. S. highway 11, west of Chattanooga, Tenn.
E. G. M. No. 1345.

14. *Hormotoma gracilis* Hall.
Internal cast, X 1.
Collected by Craig Wright at same location as fig. 3.

15. *Hebertella sinuata* Hall.
Ventral valve of abnormally large specimen, X 1.
Collected by Craig Wright at same location as fig. 3.

16. *Orthoceras sp.*
Portion of orthoconic cone, X 1.
Collected by Craig Wright at same location as fig. 1.
E. G. M. No. 1879.



FOSSILS OF THE UPPER ORDOVICIAN FORMATIONS

PLATE 17.

FOSSILS OF THE UPPER ORDOVICIAN FORMATIONS

Explanation

The specimens illustrated on this plate unless otherwise noted were collected by Craig Wright on the south side of Georgia highway 143 on the west flank of Pigeon Mountain. See Index Map 4.

FIGURE

1, 2. *Platystrophia precursor* Foerste.
Views of dorsal and ventral valves, X 1.
E. G. M. No. 1901.

3, 5. *Hebertella sinuata* Hall.
Views of ventral valve, X 1.
E. G. M. No. 1893.

4, 6. *Platystrophia colbiensis mutata* ?
Views of ventral and dorsal valves, X 1.
Collected by F. T. Ingram near Morganville, location 48 on map in pocket.
E. G. M. No. 1932.

7. *Hebertella sinuata* Hall.
View of dorsal valve, X 1.
E. G. M. No. 1893.

8. *Platystrophia precursor* Foerste.
Small specimen, view of dorsal valve, X 1.
E. G. M. No. 1901.

9. *Plectorthis fissicosta* Hall.
View of dorsal valve, X 1.

10. *Hebertella occidentalis* (Hall).
View of ventral valve, X 1.
E. G. M. No. 1885.

11, 12. *Zygospira recurvirostris* (Hall).
Views of ventral and dorsal valves, X 1.
E. G. M. No. 1724.

13, 14. *Zygospira modesta* Say.
Views of dorsal and ventral valves, X 1.
E. G. M. No. 1808.

FIGURE

15, 16. *Hebertella frankfortensis* Foerste.
Views of ventral and dorsal valves, X 1.
E. G. M. No. 1850.

17, 18. *Plectorthis plicatella* (Hall).
Views of ventral and dorsal valves, X 1.
E. G. M. No. 1851.

19. *Hebertella borealis* Billings.
View of ventral interior, X 1.
E. G. M. No. 1887.

20. *Platystrophia juvensis* ?
View of ventral valve, X 1.

21, 22. *Hebertella borealis* Billings.
View of hinge line and dorsal valve, X 1.
E. G. M. No. 1887.

23. *Plectorthis fissicosta* Hall.
View of ventral interior, X 1.

24. *Hebertella borealis* Billings.
View of ventral valve, X 1.
E. G. M. No. 1887.

25. *Platystrophia juvensis* ?
View of dorsal valve, X 1.
Collected by F. T. Ingram near Morganville, location 48 on map in pocket.
E. G. M. No. 1925.

26. *Platystrophia trentonensis* McEwan.
View of dorsal valve, X 1.
Collected by F. T. Ingram near Sulphur Springs, location 53 on map in pocket.
E. G. M. No. 1930.

27. *Platystrophia precursor* Foerste.
View of ventral interior, X 1.

28. *Platystrophia elegantula* ?
View of anterior area, X 1.

FIGURE

29, 30. *Hebertella sinuata* Hall.
External and internal view of dorsal valve, X 1.
Collected by Louis Vest near Haysville, Ft. Oglethorpe Quadrangle, location 24 on map in pocket.
E. G. M. No. 1893.

31. *Orthorhynchula linneyi* (James).
View of ventral valve, X 1.

32. *Hebertella cf. Hebertella frankfortensis* Foerste.
External view of ventral valve, X 1.
Collected by Louis Vest at same location as fig. 29.
E. G. M. No. 1854.

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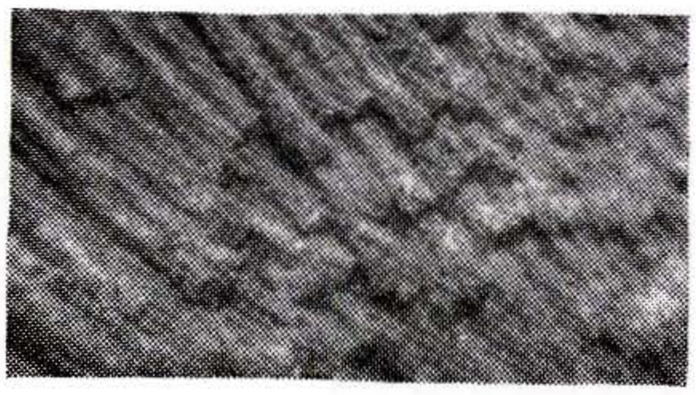

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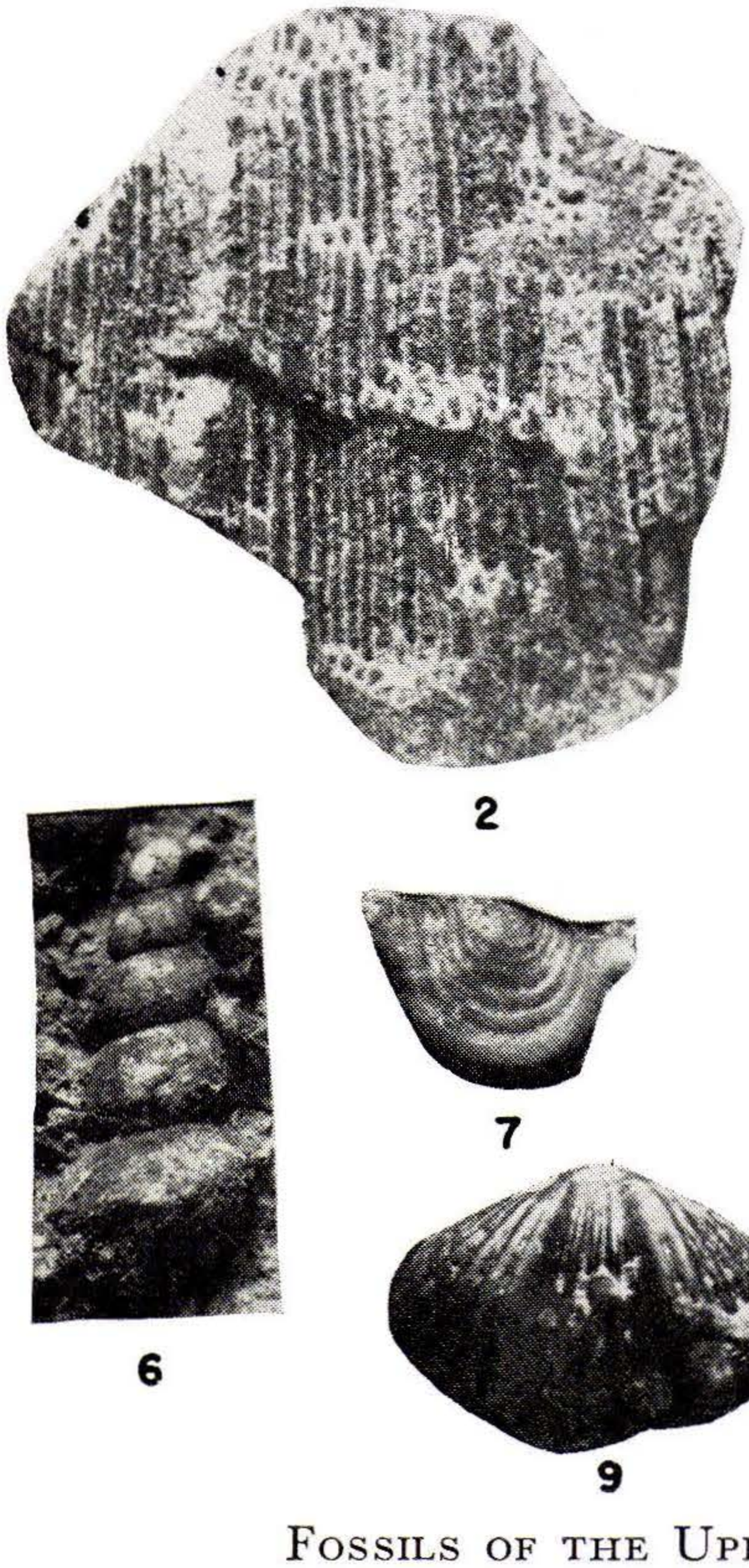

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FOSSILS OF THE UPPER ORDOVICIAN FORMATIONS

PLATE 18.

FOSSILS OF THE UPPER ORDOVICIAN FORMATIONS

Explanation

FIGURE

1. *Favosites cf. Favosites favosus* Goldfuss.
   Top view of colony, X 1.
   Collected by C. Butts on Taylor Ridge between Naomi and Maddox Gap, location 22 on map in pocket.
   Locality No. 597-L.

2. *Paleofavosites sp.*
   Poor specimen showing polygonal character of the corallites, X 1.
   Collected by C. Butts, 2½ miles north of Catlett Gap, Kensington Quadrangle, location 12 on map in pocket.
   Locality No. 595-D.

3. *Hindia parva* Ulrich.
   Ventral view of complete specimen, X 1.
   Collected by Robert Crisler on U. S. highway 11, South of Chattanooga.
   E. G. M. No. 1864.

4. *Hindia parva* Ulrich.
   Cross section, X 30.
   Same location as fig. 3.
   E. G. M. No. 1864.

5. *Leperditia sp.*
   Several specimens in limestone slab, X 1.
   Collected by F. T. Ingram near Morganville, U. S. highway 11, location 23 on map in pocket.
   E. G. M. No. 1847.

6. *Hormotoma gracilis* Whitfield.
   Internal mold, X 1.
   Collected by C. Butts on Crawfish Creek, Kensington Quadrangle, location 17 on map in pocket.
   Locality No. 595-Z.

7. *Leptaena cf. Leptaena richmondensis* Foerste.
   Internal mold of ventral valve, X 1.
   Collected by C. Butts on Georgia highway 143, west side of Maddox Gap, same location as fig. 1.
   Locality 597-L.

FIGURE

8. *Isochilinia nelsoni* Ulrich and Bassler.
   Fragment of carapace, X 1.
   Collected by F. T. Ingram near Morganville, location 48 on map in pocket.
   E. G. M. No. 1847.

9. *Platystrophia laticosta* (Meek).
   External view of ventral valve, X 1.
   Collected by Louis Vest near Haysville, Fort Oglethorpe Quadrangle, location 24 on map in pocket.
   E. G. M. No. 1863.

10. *Cyrtoceras sp.*
    Lateral view showing septal arrangement, X 1.
    Collected by Louis Vest near head of Mud Creek in McLemore Cove, location 25 on map in pocket.
    E. G. M. No. 1857.

11. *Leptaena rhomboidalis* (Wilckens).
    Internal mold of ventral valve, X 1.
    Collected on Georgia highway 143, west slope of Pigeon Mountain, Index Map 4, shaded area.
    E. G. M. No. 1858.

SILURIAN SYSTEM

RED MOUNTAIN FORMATION

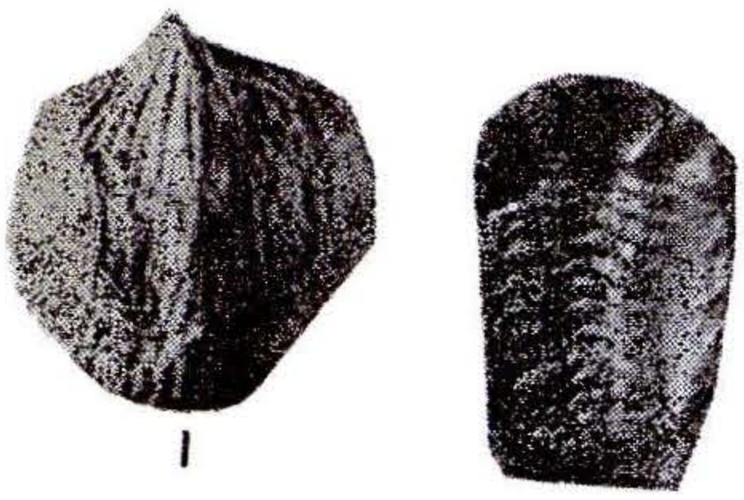
The Silurian beds of the region are composed of sandstones, shales, and limestones. The entire sequence has been grouped together as the Red Mountain formation, although it is known to include beds of both the Upper Albion and the lower Niagaran groups.

The formation cannot be described in general terms because of the variations in lithology and the facies changes from one locality to another. In the easternmost strike belts the beds are predominantly massive conglomeratic sandstones with many crossbedded and ripple marked zones. In the exposures found in Taylor Ridge and White Oak Mountain, the formation is characterized by a lower member of coarse- to medium-grained, buff to red sandstone in both massive and thin layers, a middle member of brown, thin-bedded fissile shale and siltstone, and an upper member of alternating shales, and silty limestones which for the most part are thinly bedded.

In the exposures on the flanks of Pigeon and Lookout Mountains, the formation is composed of thinly bedded shales, siltstones, and silty limestones.

The Red Mountain formation is easily recognized in all areas of occurrence because of the major ridges which result from its resistance to erosion.

Fossils are numerous but normally poorly preserved. Seldom are good specimens found in the sandstone zones but are prolific in the thinly laminated shales. In many instances the fossils are replaced with hematite in the sporadic lenticular occurrences of red iron ore.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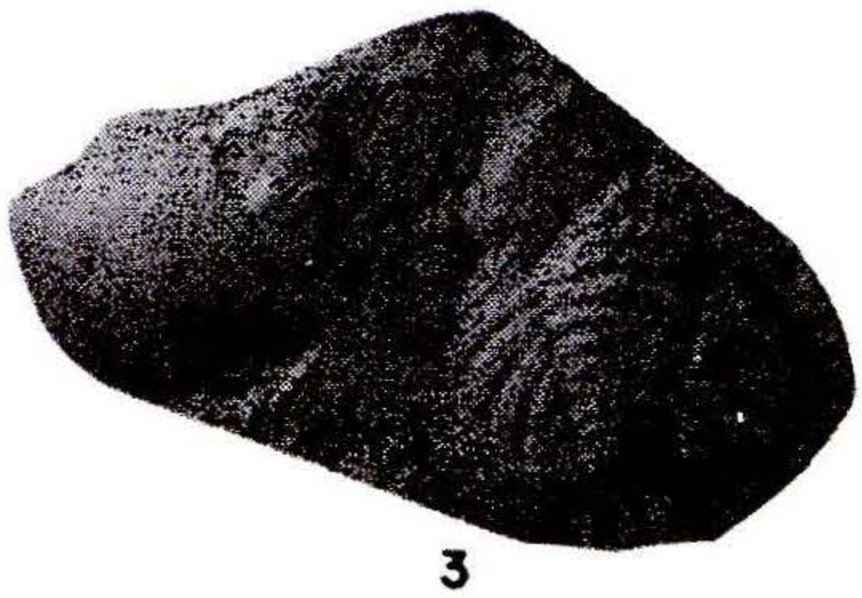
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FOSSILS OF THE RED MOUNTAIN FORMATION

PLATE 19.

FOSSILS OF THE RED MOUNTAIN FORMATION

Explanation

FIGURE

1. *Atrypa reticularis* (Linnaeus).
   External view of ventral valve, X 1.
   Collected in roadcut on Taylor Ridge, east of Ringgold on U. S. highway 41, location 26 on map in pocket.
   E. G. M. No. 1421.

2. *Phacops pulchellus* (Foerste).
   External mold, X 1.
   Collected at same location as fig. 1.
   E. G. M. No. 1564.

3. *Dalmanitina arkansana* (Van Ingen).
   View showing cephalon and pygidium, X 1.
   Collected at same location as fig. 1.
   E. G. M. No. 1424.

4. *Calymene sp.*
   View of complete specimen, X 1.
   Collected at same location as fig 1.
   E. G. M. No. 1848.

5. *Anoplotheca hemispherica* (Sowerby).
   Slab showing internal and external molds, X 1.
   Collected at same location as fig. 1.
   E. G. M. No. 590.

6. *Prasopora sp.*
   View showing cross section, X 1.
   Collected at same location as fig. 1.

7, 8. *Platystrophia sp.*
   Ventral and dorsal valves, X 1.
   Collected seven miles southwest of Chattanooga on Birmingham Road, location 23 on map in pocket.

9. *Rhipidomella sp.*
   View of ventral valve, X 1.
   Collected at same location as fig. 7.
   E. G. M. No. 1422.

FIGURE

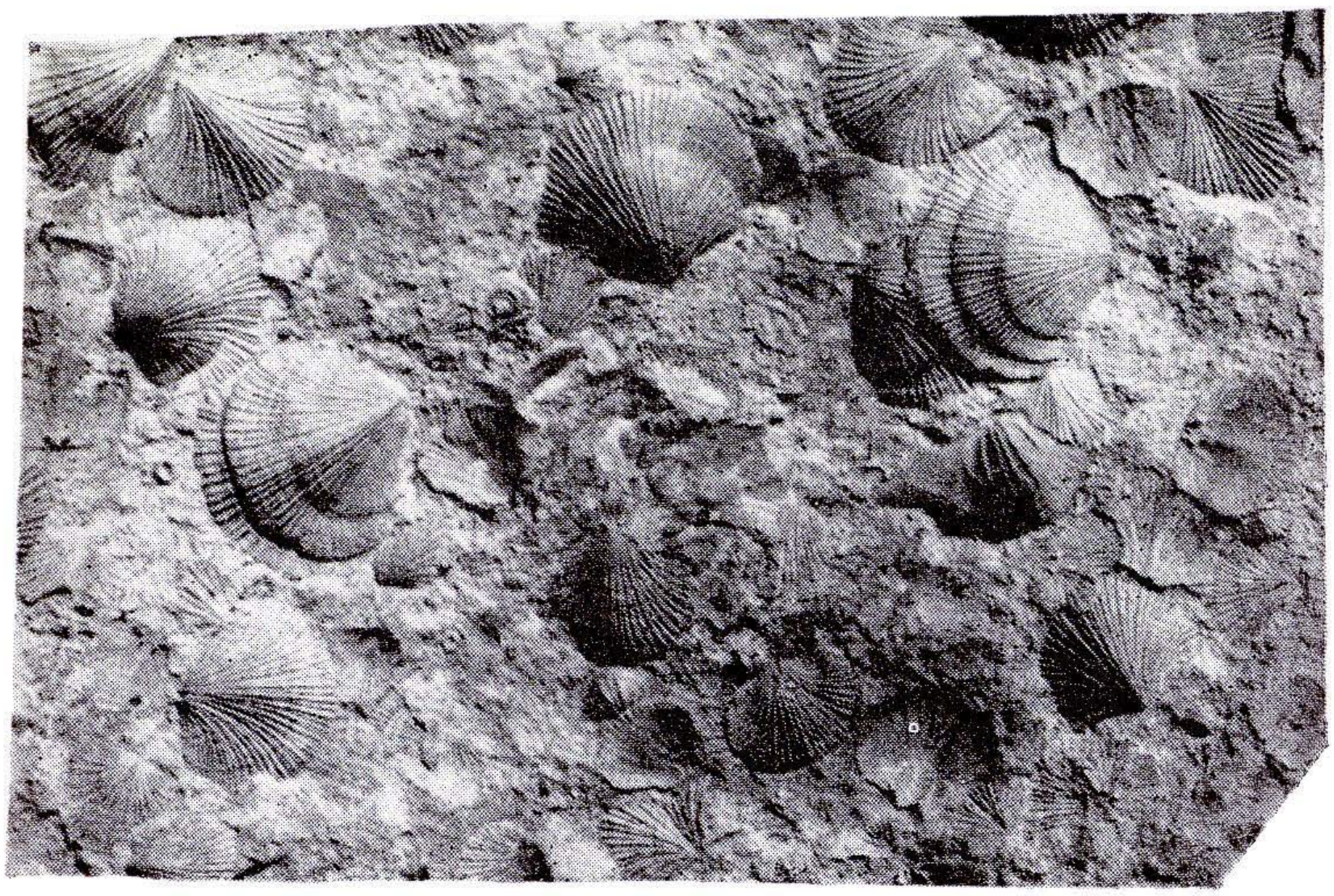
10–12. *Dalmanella multisecta* ?
Views of dorsal and ventral valves and hinge line, X 1.
Collected at same location as fig. 7.
E. G. M. No. 1423.

13. *Calymene cf. Calymene ragdesi* Foerste.
Cephalon, X 1.
Collected at same location as fig. 7.
E. G. M. No. 1425.

14. *Hormotoma subulata* (Conrad).
Natural cast, X 1.
Collected on Horseleg Mountain near Rome, location 27 on map in pocket.
E. G. M. No. 1916.

15. *Calymene platys* ?
Cephalon, X 1.
Collected at same location as fig. 7.
E. G. M. No. 1921.

16. *Campophyllum sp.*
Lateral view of corallum, X 1.
Collected in Sugar Valley, location 28 on map in pocket.



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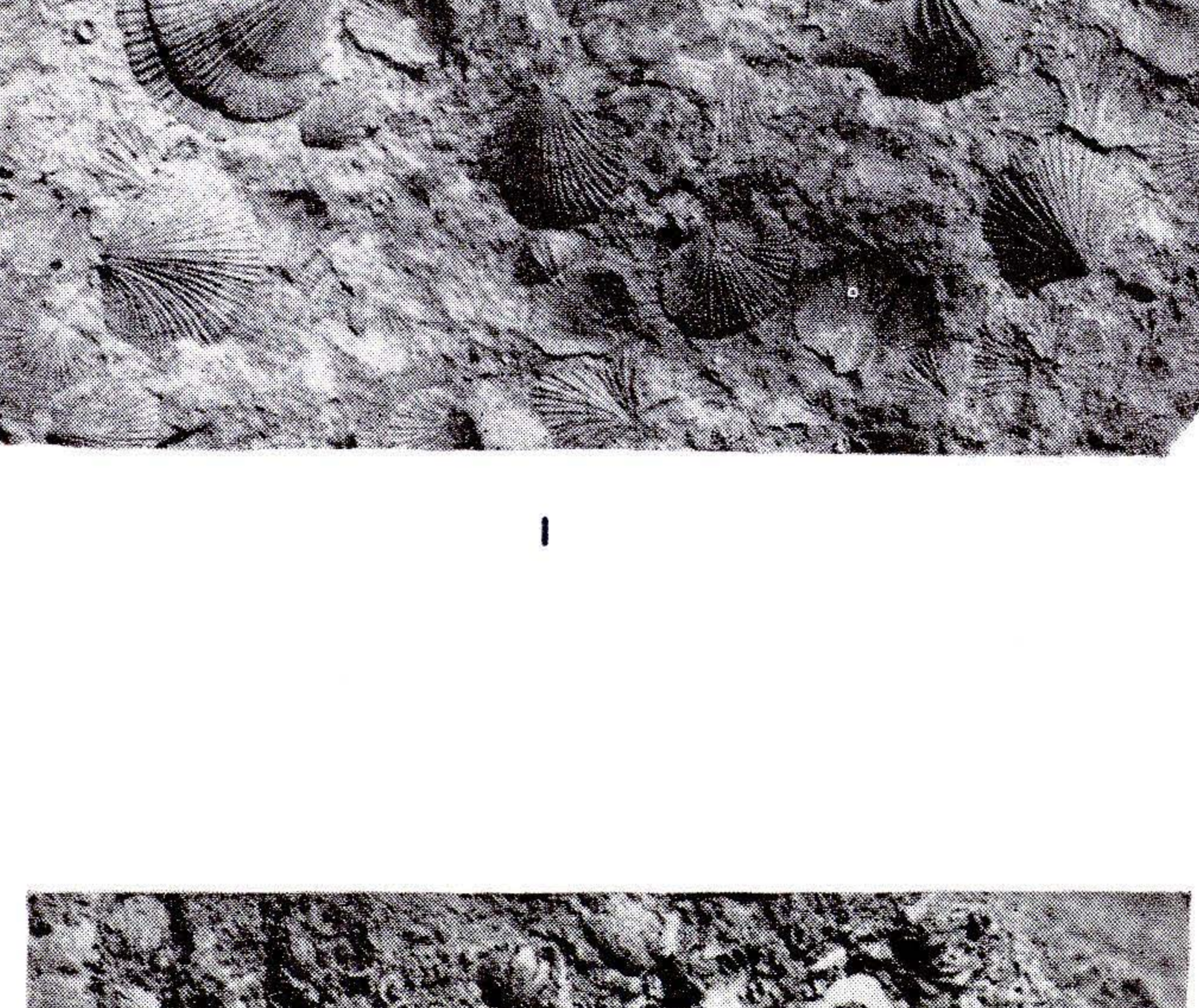

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FOSSILS OF THE RED MOUNTAIN FORMATION

PLATE 20.

FOSSILS OF THE RED MOUNTAIN FORMATION

Explanation

FIGURE

1. *Dalmanella elegantula* (Dalman).
   Dalmanella edgewoodensis Savage.
   Slab showing internal casts of both dorsal and ventral valves, X 1.
   Collected on Georgia highway 143 near Catlett Gap, location 29 on map in pocket.
   E. G. M. No. 1921.

2. *Dalmanella edgewoodensis* Savage.
   Slab showing internal molds, X 1.
   Collected at same location as fig. 1.
   E. G. M. No. 1917.

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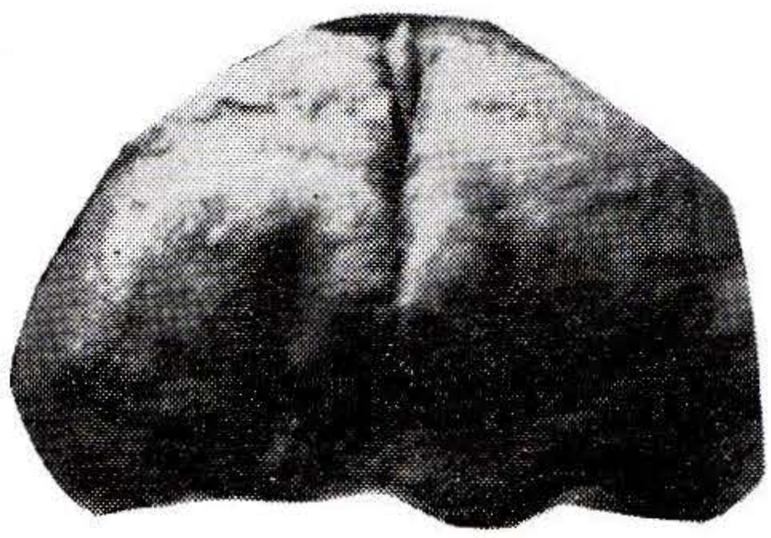

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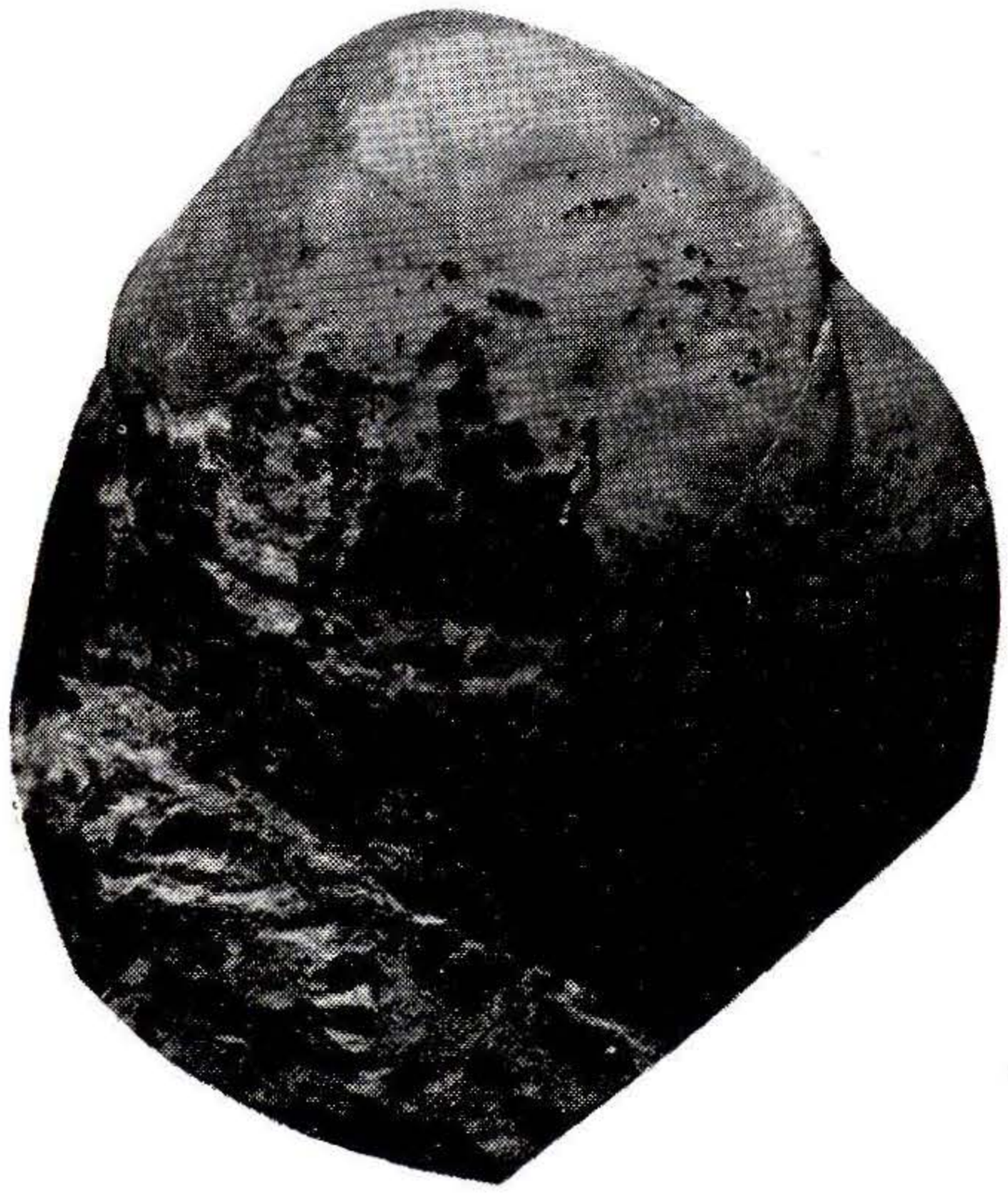

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FOSSILS OF THE RED MOUNTAIN FORMATION

PLATE 21.

FOSSILS OF THE RED MOUNTAIN FORMATION

Explanation

FIGURE

1. *Calymene celebra* Raymond.
   Ventral view of complete specimen, X 1.
   Collected by F. T. Ingram south of Trenton, location 30 on map in pocket.

2. *Pentamerus oblongus* Sowerby.
   Part of internal mold of ventral valve, X 1.
   Collected by C. Butts on east slope of Turnip Mountain, ½ mile northeast of Coosa, location 31 on map in pocket.
   Locality No. 598-A.

3. *Pentamerus oblongus* Sowerby.
   Internal mold of ventral valve, X 1.
   Collected by Bill Clement on the west side of Lookout Mountain, in Johnson's Crook, location 32 on map in pocket.
   E. G. M. No. 1919.

4. *Eospirifer radiatus* Sowerby.
   Internal mold of ventral valve, X 1.
   Collected on Georgia highway 143 in Catlett Gap, location 29 on map in pocket.
   E. G. M. No. 1920.

5. *Hormotoma sp.*
   Impressions of internal cast in sandstone, X 1.
   Collected at same location as fig. 4.
   E. G. M. No. 1916.

6. *Dalmanella meeki* ?
   External cast of ventral valve, X 1.
   Collected by C. Butts ½ mile west of Wauhatchee, Tennessee.
   Locality No. 596-X.

7. *Isotelus cf. Isotelus brachycephalus* Foerste.
   Incomplete specimen, X ½.
   Collected by F. T. Ingram on southern railroad 1½ miles south of Trenton, location 55 on map in pocket.
   E. G. M. No. 1977.

DEVONIAN AND MISSISSIPPIAN SYSTEMS

ARMUCHEE CHERT

The formation was named by Hayes for exposures around Armuchee, Floyd County. It is overlain by the Chattanooga Shale of Devonian and/or Mississippian age and is correlated with the Frog Mountain sandstone of Alabama. Butts assigns it to Onondaga age (1948).

The Armuchee formation is the most restricted in its outcrop occurrence of any of the Paleozoic strata. Only four outcrops in Georgia are known to the authors: *1.* on west side of Shorter College Campus on Horseleg Mountain; *2.* on railroad, two-thirds of a mile west of Lavender Station; *3.* on U. S. highway 27, three-fourths of a mile northwest of Gore; and *4.* in roadcut on Horn Mountain, five miles west of Sugar Valley.

Two distinct lithologic units make up the formation. The lower zone is composed of bedded brown to buff chert which weathers to a sugary texture. The upper zone is a yellow, coarse-grained ferruginous to cherty sandstone.

The few poorly preserved fossils which are present are restricted to the upper part of the Armuchee.

CHATTANOOGA SHALE

The Chattanooga Shale outcrops extensively in the Southern Appalachians and is dated in Georgia as Devonian-Carboniferous by the United State Geological Survey.

The lower part is composed of thinly laminated black carbonaceous shale and the upper part, which is known as the Maury member, is composed of dark-gray to green shale containing round phosphatic nodules. The Chattanooga overlies the Red Mountain formation except locally where it rests unconformably on the Armuchee Chert.

The fauna of the Chattanooga Shale is made up of microscopic conodonts and an occasional *Lingula.*

FORT PAYNE CHERT

The Fort Payne was named for its typical development at Fort Payne, Alabama. It is composed of limestone, argillaceous limestone, shales, and chert. In different areas it has a different appearance. In some localities it exhibits the characteristics of a typical limestone, massively bedded and

containing geodes; in other areas the amount of chert has increased to about 50 percent and is in the form of nodules and thin beds intercalated with limestone; but perhaps the most typical and certainly the most easily recognized is the thin to massively bedded black chert shown in figure 41-B.

Although fossils are difficult to find in the fresh exposures of the Fort Payne, they are abundant in the chert residuum and soil derived from it. The specimens are silicified and the presence of abundant large crinoid stems can be relied on as marking the Fort Payne horizon.

FLOYD SHALE

The Floyd formation is a very fossiliferous, massively bedded, black, calcareous shale. It is restricted in occurrence to the southern part of the Paleozoic Province and seems to represent a magna facies equivalent to all the formations from the Fort Payne through the Gasper of the northern and western parts of the area. The exact stratigraphic relationships have not been worked out in detail.

Although the fossils of this formation are grouped with those of the Fort Payne, it is not to be implied that they are exact age equivalents.

ST. LOUIS LIMESTONE

The St. Louis limestone overlies the Fort Payne and although the contact has not been seen the relationship seems to be conformable. The formation is composed of massively bedded, dark- to light-gray, fine-grained limestone. In the lower half almost round black chert nodules four to six inches in diameter are common. In the upper part chert is not as abundant and occurs mostly as an incrustation on the outcrops.

Good exposures of the St. Louis occur on the east flank of Lookout Mountain and on the west flank of Pigeon Mountain. Exposures are rare in the easternmost strike belt between Taylor Ridge and Cherokee Ridge.

The St. Louis is marked by the occurrence of *Lithostrotionella castelnaui* and *Lithostrotion proliferum*. Good specimens may be found in the soil or in fresh exposures.

STE. GENEVIEVE AND GASPER LIMESTONES

The lithology and faunal suites of the two formations are so similar that they are discussed together although the Gasper formation overlies the Ste. Genevieve. Both formations are notable for the massively bedded ooliths interbedded with coarsely crystalline limestones and the almost complete absence of chert.

Excellent exposures of all the Mississippian formations with the exception of the Floyd Shale can be seen on the roadcuts along Georgia highway 143 between Cooper Heights and Trenton on both the eastern and western flanks of Lookout Mountain. Although the outcrops are fresher in the Lookout-Pigeon Mountain area, weathering has been retarded by the overlying Pennsylvanian sandstones and the steep slopes of the Mountain and consequently fossil collecting is not too good. Fossil collecting is excellent in the Cherokee Ridge and the Little Sand Mountain areas because of the presence of the deep residual soil which encloses the silicified fossils.

GOLCONDA AND HARTSELLE FORMATIONS

The Golconda and Hartselle sandstone together are about 25 feet thick and are composed of shale, thinly bedded argillaceous limestones, and sandstone. They are exposed on the north end of Lookout Mountain but have not been identified positively in the area east of Ringgold.

This report does not include any fossils from these horizons.

BANGOR LIMESTONE

This formation is named for its development at Bangor, Blount County, Alabama. Charles Butts in his work in Alabama restricted the term "Bangor" to the limestone above the Hartselle sandstone and below the Pennington shale. This definition is used here.

The Bangor limestone is composed of massively bedded gray limestones, thinly bedded brownish-gray limestones, and gray to buff calcareous shales. The limestone often is found as massive ledges or benches on the flanks of the mountains which are capped with Lookout sandstone.

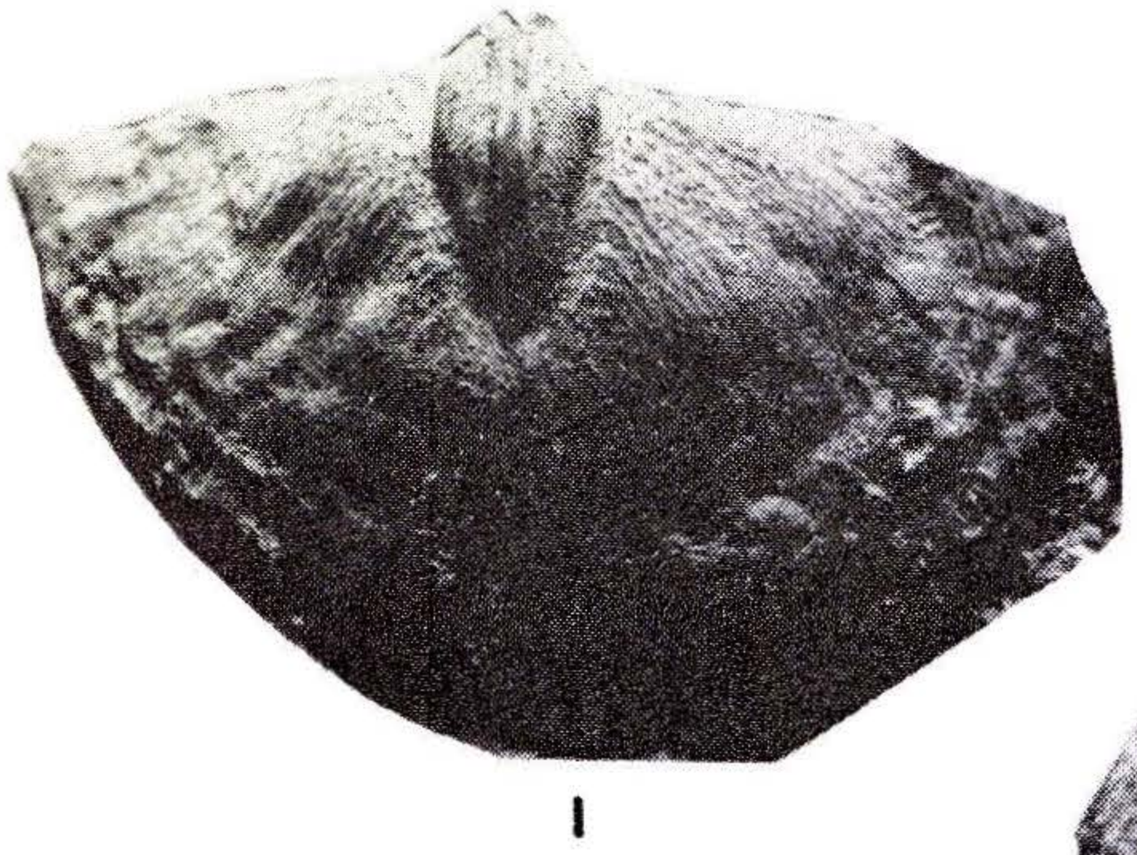
Fossils are plentiful but not nearly so abundant as in the Gasper and the Ste. Genevieve.

PENNINGTON SHALE

Overlying the Bangor limestone and underlying the Gizzard member of the Lookout formation is approximately 100 feet of greenish gray, brown, yellow, thinly laminated shales.

The top of the Pennington formation can be separated easily from the overlying Gizzard shale on Little Sand Mountain and on the east flank of Lookout Mountain because of a massive sandstone member at the base of the Gizzard. However, the problem is more difficult on the west side of Lookout Mountain because of the absence of the sandstone member. Here the top of the Pennington is placed above the highest invertebrate fossils and below the appearance of plant remains.

The Pennington Shale carries abundant specimens of *Fenestrellina* and a few brachiopods which have been replaced by limonite.



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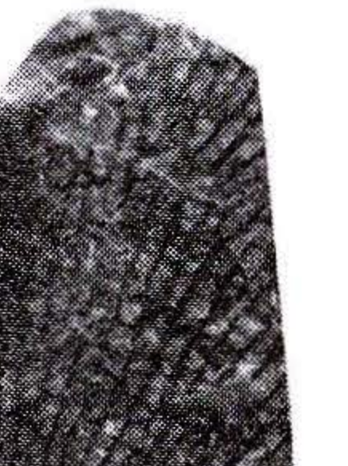

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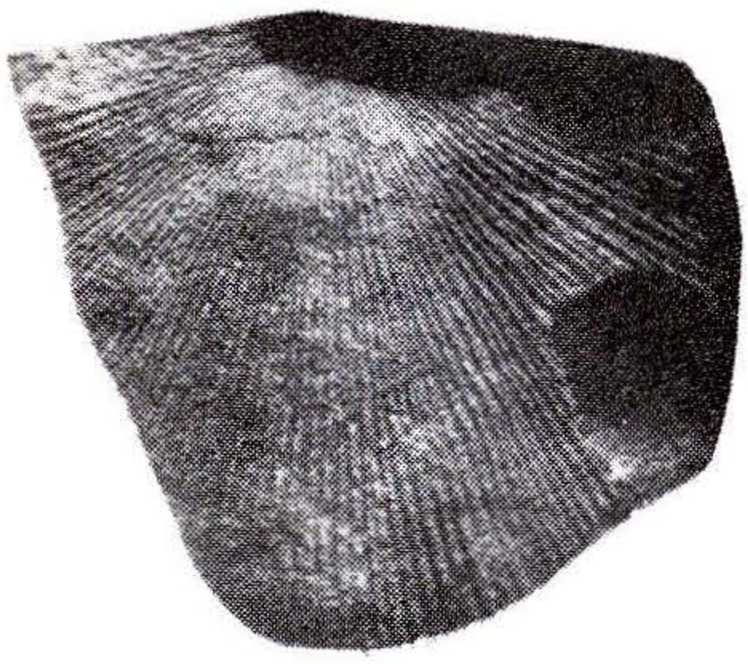

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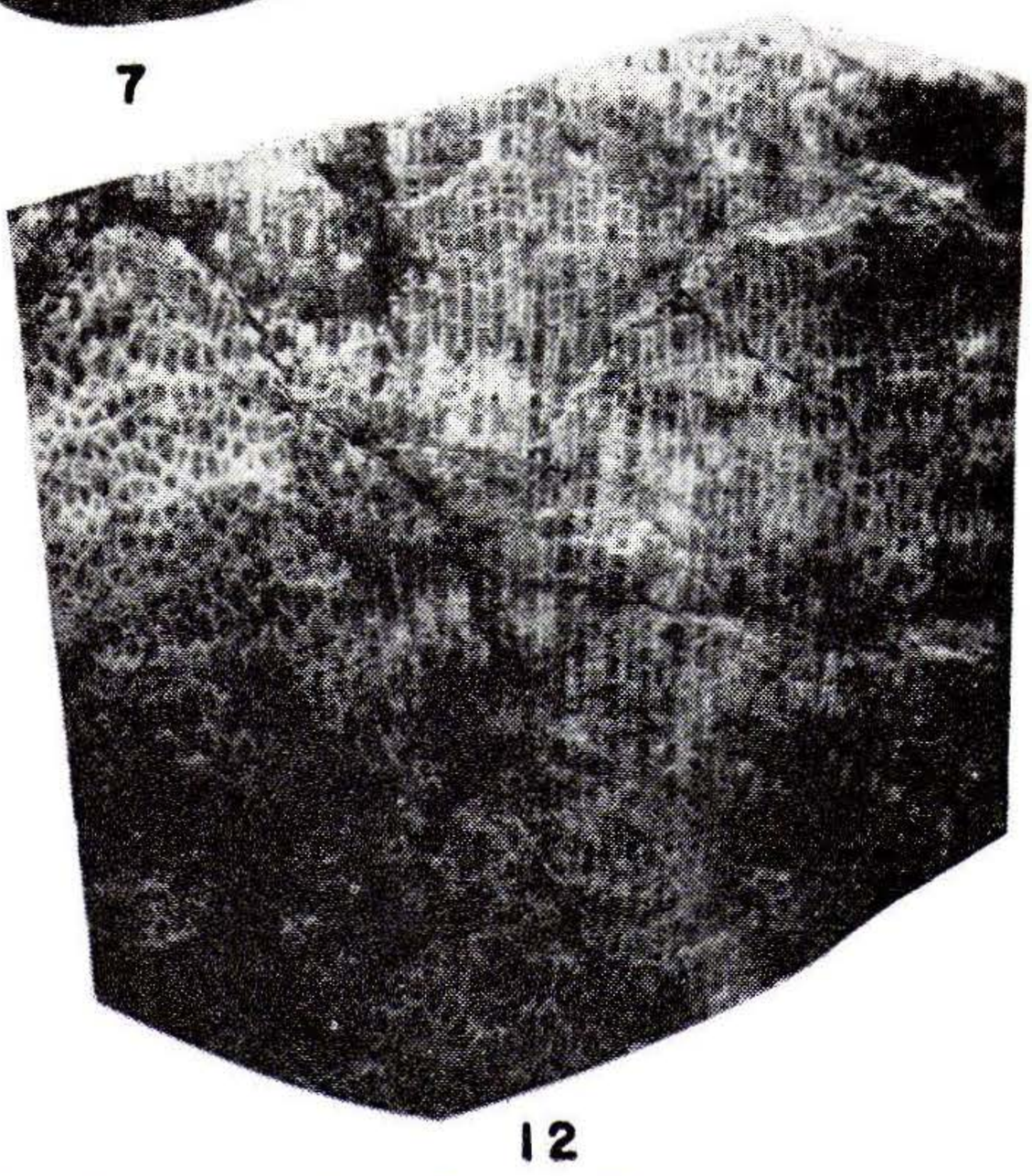

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FOSSILS OF THE ARMUCHEE CHERT, THE FORT PAYNE, AND THE FLOYD SHALE FORMATIONS

PLATE 22.

FOSSILS OF THE ARMUCHEE CHERT, THE FORT PAYNE, AND THE FLOYD SHALE FORMATIONS

Explanation

FIGURE

1. *Spirifer grimesi* Hall.
   View of ventral valve, X 1.
   Collected by C. Butts in quarry on Dry Creek, east of Summerville road, 3 miles north of Rome, location 33 on map in pocket.
   Locality No. 599-N.

2. *Spirifer divaricatus* Hall.
   View of ventral valve, X 1.
   Collected by C. Butts.
   Locality unknown.

3. *Orthotetes keokuk* Hall.
   External mold of ventral valve, X 1.
   Collected by C. Butts.
   Locality unknown.

4. *Platymerella sp.*
   Cast of ventral valve, X 1.
   Collected by C. Butts on ridge of Horseleg Mountain about 3 miles southwest of Rome, location 34 on map in pocket.
   Locality No. 597-P.

5. *Productus wortheni* Hall.
   Cast of ventral valve, X 1.
   Collected by C. Butts.
   Locality No. 598-X.

6. *Orthotetes cf. Orthotetes kaskaskiensis* (McChesney).
   External mold of ventral valve, X 1.
   Collected on east slope of Horseleg Mountain, Floyd County, location 35 on map in pocket.

7. *Fenestrellina regalis* (Ulrich)?
   View showing arrangement of the zoarium, X 1.
   Collected by C. Butts at same location as fig. 1.

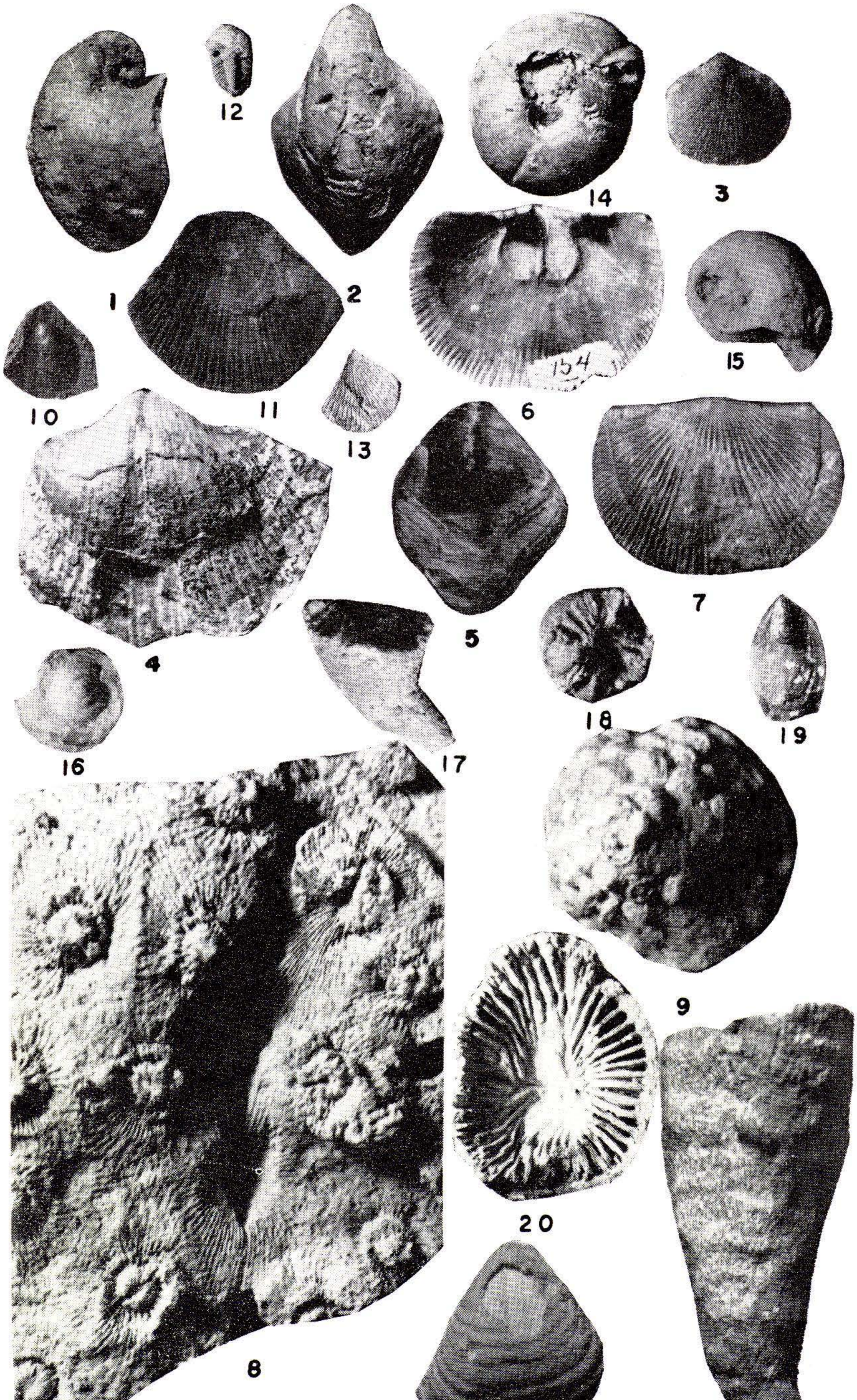
FIGURE

8. *Unidentified trilobite pygidium.*
   External mold, X 1.
   Collected at same location as fig. 6.
   E. G. M. No. 1923.

9, 10. *Agassizocrinus ovalis* Miller & Gurley.
   Top and bottom view of calyx, X 1.
   Collected by C. Butts, ½ mile northwest of Huffaker, approximately 5 miles northwest of Rome, location 36 on map in pocket.
   Locality No. 599-Z.

11. *Anoplia nucleata* Hall.
   External mold, X 1.
   Collected by C. Butts.
   Locality 599-Y.

12. *Favosites cf. Favosites helderbergiae* Hall.
   Cross section showing arrangement of tabulae, X 1.
   Collected at the same location as fig. 6.
   E. G. M. No. 1921.



FOSSILS OF THE FLOYD SHALE AND THE FORT PAYNE CHERT FORMATIONS

PLATE 23.

FOSSILS OF THE FLOYD SHALE AND THE FORT PAYNE CHERT FORMATIONS

Explanation

FIGURE

1 - 2. *Platyceras sp.*
Lateral and top view of internal mold, X 1.
Collected on S. E. flank of Taylor Ridge along U. S. highway 27 near Gore, Georgia, location 37 on map in pocket.
E. G. M. No. 326.

3. *Diaphragmus cestiensis* (Weller).
External view of ventral valve, X 1.
Collected at the Rome City Airport, location 38 on map in pocket.
E. G. M. No. 879.

4. *Spirifer grimesi* Hall.
External view of ventral valve, X 1.
Collected in the Berry School Quarry north of Rome and east of U. S. highway 27, location 39 on map in pocket.
E. G. M. No. 1375.

5. *Composita subquadrata* (Hall).
External view of compressed ventral valve, X 1.
Collected at same location as fig. 4.
E. G. M. No. 144.

6, 7. *Athyris lamellosa* (L'Eveille).
Internal and external view of dorsal valve, X 1.
Collected at same location as fig. 4.
E. G. M. No. 154.

8. *Philipsaster gigas* Billings.
Top view of part of colony, X 1.
Collected from residuum south of Chickamauga Creek on south side of U. S. highway 41 in Salem Valley, location 40 on map in pocket.
E. G. M. No. 1926.

9. *Teleocrinus sp.*
Basal view, X 1.
Collected near Gore on U. S. highway 27 at same location as fig. 1.
E. G. M. No. 1638.

FIGURE

10. *Lingula melie* Hall.
    Cast of ventral valve, X 1.
    Collected at same location as fig. 3.
    E. G. M. No. 161.

11. *Deltopecten sp.*
    Interior mold of right valve, X 1.
    Collected 4 miles northeast of Armuchee, location 41 on map in pocket.

12. *Unidentified trilobite.*
    Nearly complete specimen, X 1.
    Collected on east slope of Taylor Ridge in Houston Valley, location 42 on map in pocket.
    E. G. M. No. 1525.

13. *Aviculopecten sp.*
    Interior of left valve, X 1.
    Collected at same location as fig. 12.
    E. G. M. No. 1519.

14. *Lyrogoniatites newsomi georgiensis* (Miller and Furnish).
    Internal mold of complete whorl, X 1.
    Collected at the Rome City Airport at same location as fig. 2.
    E. G. M. No. 1317.

15. *Cephalopod sp.*
    Internal mold, X 1.
    Collected in Cherokee Valley, 1 mile north of U. S. highway 41, Index Map 3.
    E. G. M. No. 1440.

16. *Gastropod sp.*
    Internal cast, X 1.
    Collected near Armuchee at same location as fig. 11.

17, 18. *Caninia corniculum* (Miller).
    Lateral and calicular view, X 1.
    Collected on Taylor Ridge at same location as fig. 1.

19. *Lingula carbonaria* Shumard.
    View of incomplete ventral valve, X 1.
    Collected at same location as fig. 12.
    E. G. M. No. 1925.

FIGURE

20, 21. *Triplophyllum cliffordanum* (Milne-Edwards, and Haime).
Calicular and lateral view, X 1.
Showing arrangement and central fusion of the septa and the thin epitheca.
Collected near Armuchee at same location as fig. 11.
E. G. M. No. 1359.

22. *Productella sp.*
External view of ventral valve, X 1.
Collected on Georgia highway 143 in west Armuchee Valley, location 43 on map in pocket.
E. G. M. No. 1459.

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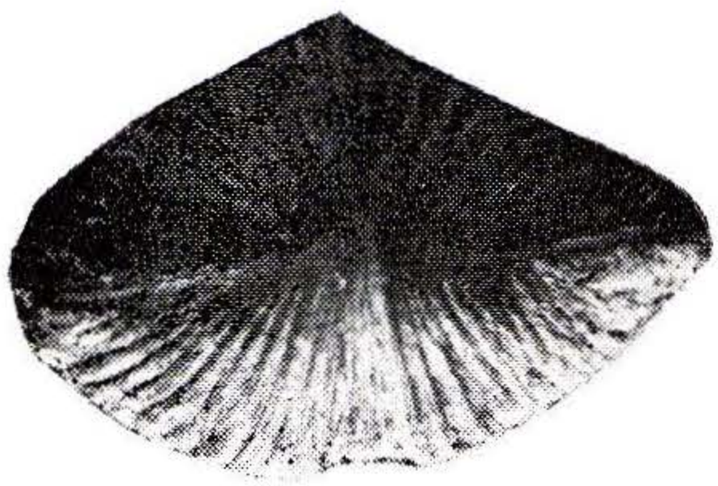

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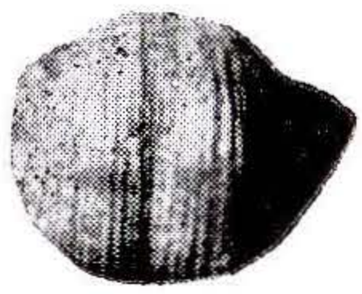

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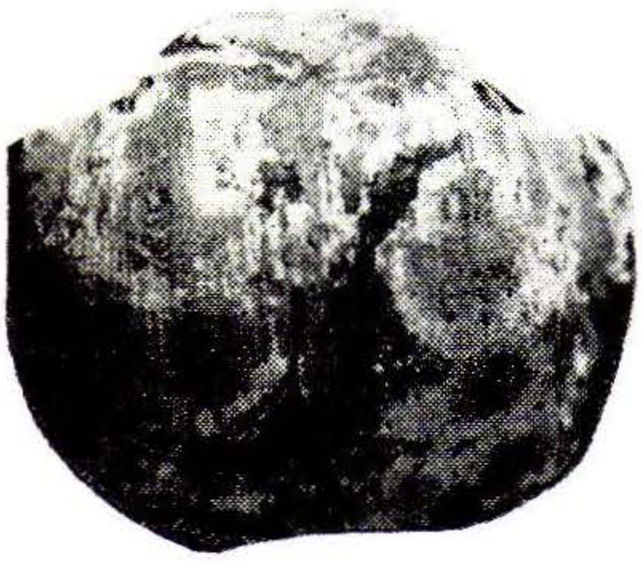

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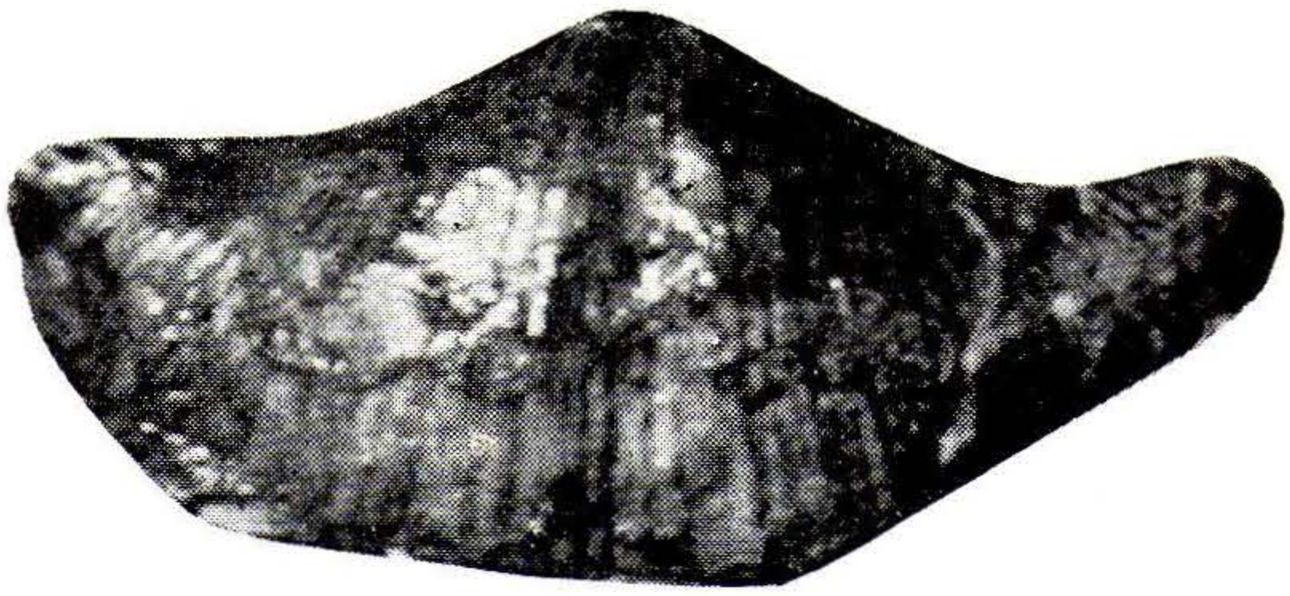

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FOSSILS OF THE FLOYD SHALE AND THE FORT PAYNE CHERT FORMATIONS

PLATE 24.

FOSSILS OF THE FLOYD SHALE AND THE FORT PAYNE CHERT FORMATIONS

Explanation

FIGURE

1. *Spirifer pellaensis* Weller.
   External view of ventral valve, X 1.
   Collected in West Armuchee Valley, location 43 on map in pocket.
   E. G. M. No. 1478.

2. *Spirifer pellaensis* Weller.
   View of hinge line, X 1.
   Collected by C. Butts, ½ mile southeast of Gore, location 37 on map in pocket.
   Locality No. 599-Y.

3. *Platycrinus penicillus* Meek and Worthen.
   External view of ornamented basal plates, X 1.
   Collected by C. Butts, ½ mile southeast of Crystal Springs, location 44 on map in pocket.
   Locality No. 600-D.

4. *Spirifer sp.*
   External view of ventral valve, X 1.
   Collected on Georgia highway 143 in West Armuchee Valley at same location as fig. 1.
   E. G. M. No. 1479.

5. *Dictyoclostus inflatus* (McChesney).
   External view of ventral valve, X 1.
   Collected at same location as fig. 1.
   E. G. M. No. 1431.

6. *Dictyoclostus burlingtonensis* (Hall).
   External view of ventral valve, X 1.
   Collected at same location as fig. 1.
   E. G. M. No. 1576.

7. *Spirifer sp.*
   View of ventral valve, X 1.
   Collected in Houston Valley, location 42 on map in pocket.

FIGURE

8. *Aviculopecten sp.* (?).
   Internal mold of right hand valve, X 1.
   Wings are missing. Collected in Houston Valley at same location as fig 7.
   E. G. M. No. 1519.

9. *Uncinulus cf. Uncinulus stricklandi* ?
   View of ventral valve, X 1.
   Collected by C. Butts on east slope of Turnip Mountain ½ mile northeast of Coosa, location 31 on map in pocket.
   Locality No. 598-A.

10. *Productus inflatus* McChesney.
    External view of ventral valve, X 1.
    Collected by C. Butts at same location as fig 2.

11. *Spirifer grimesi* Hall.
    Incomplete specimen, X 1.
    Hinge line of ventral valve, with poorly defined sulcus and faint costations.
    Collected about 4 miles east of Armuchee, location 41 on map in pocket.
    E. G. M. No. 1325.


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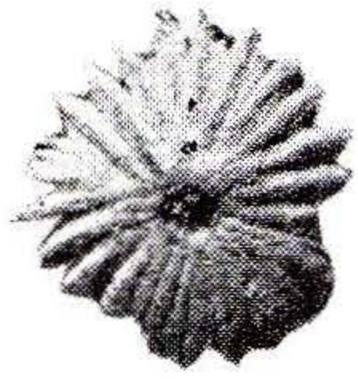
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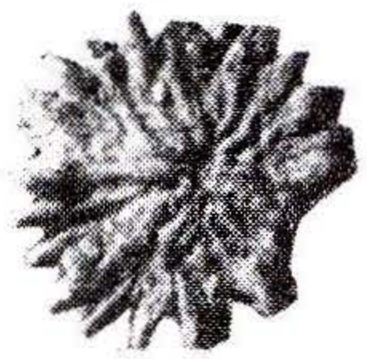
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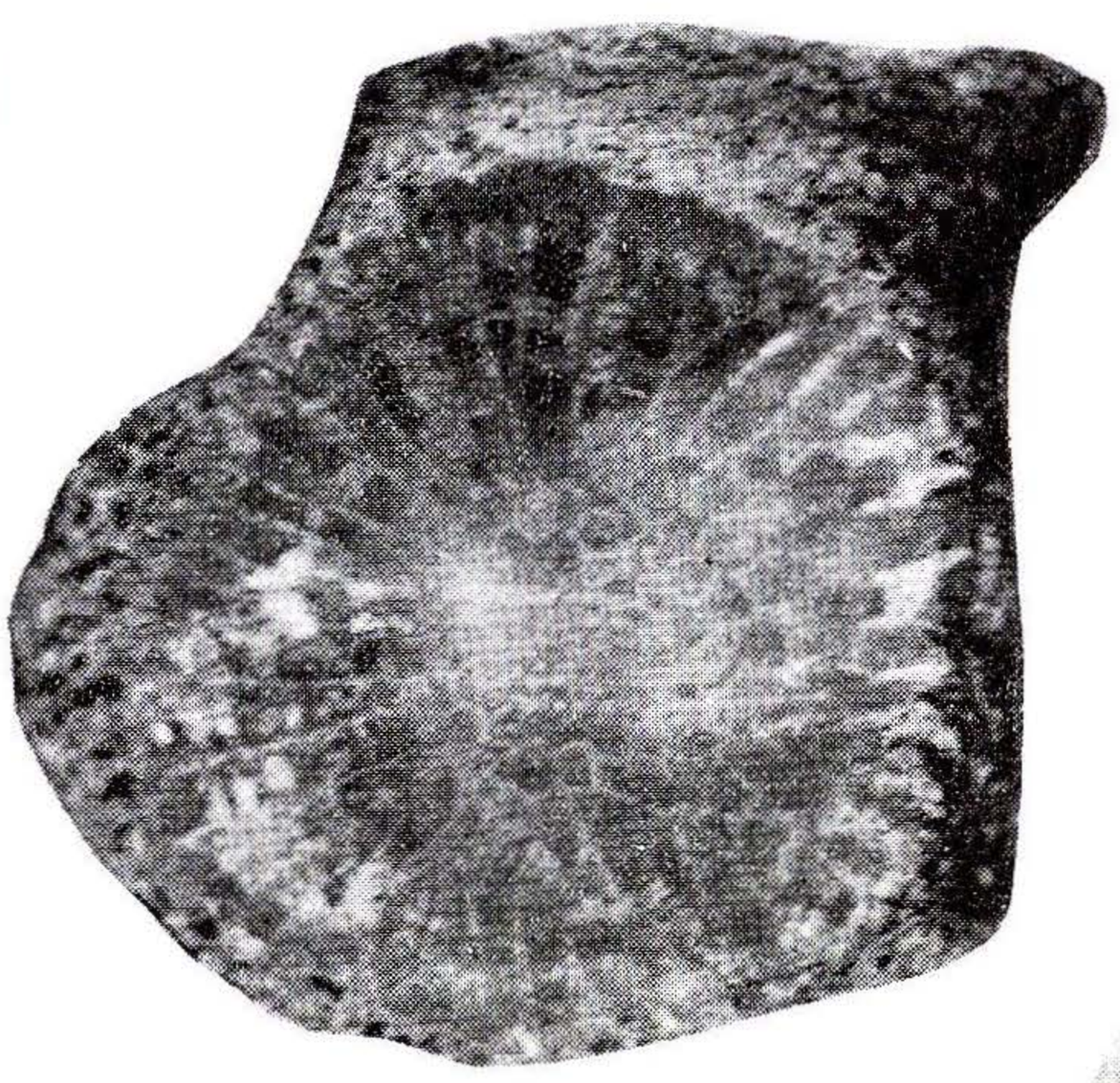
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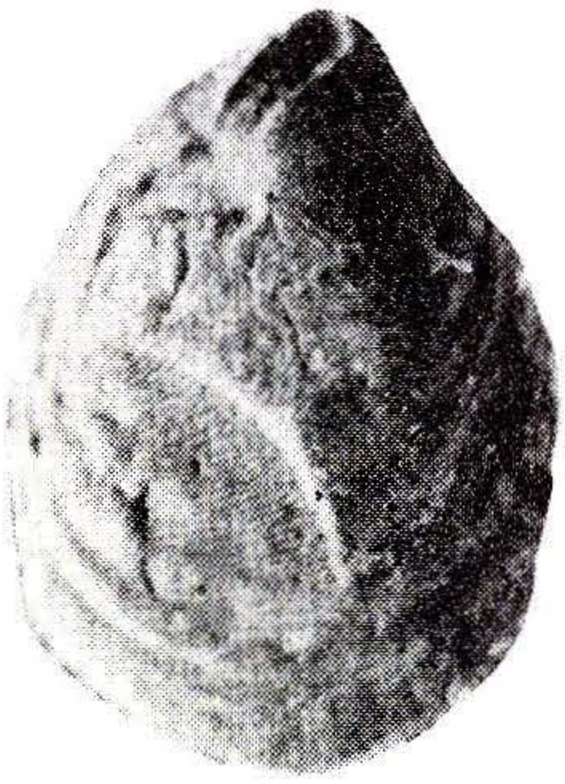
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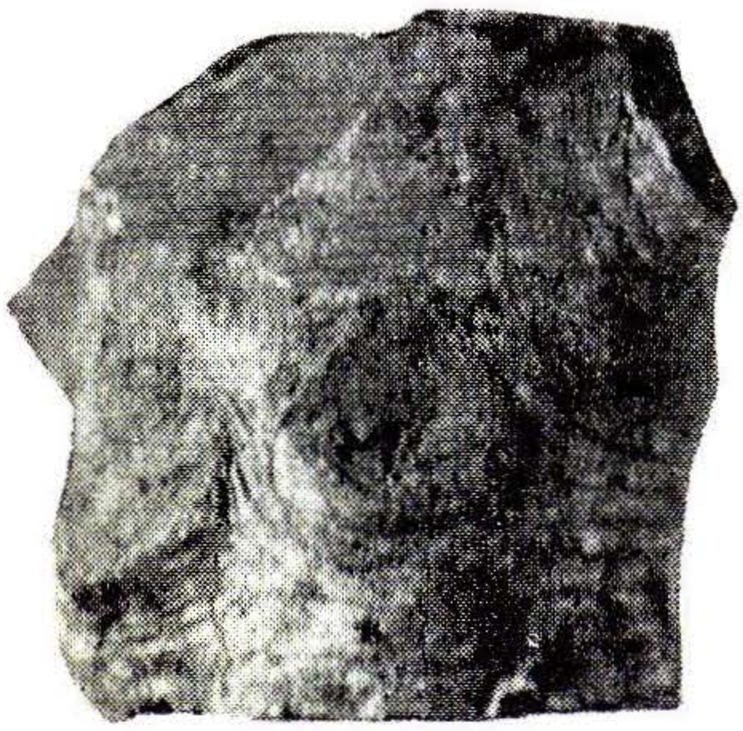
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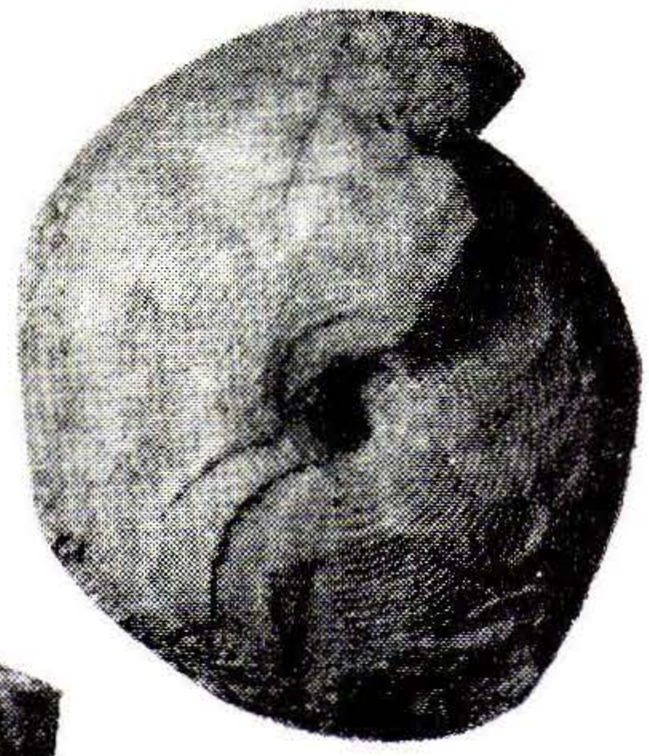
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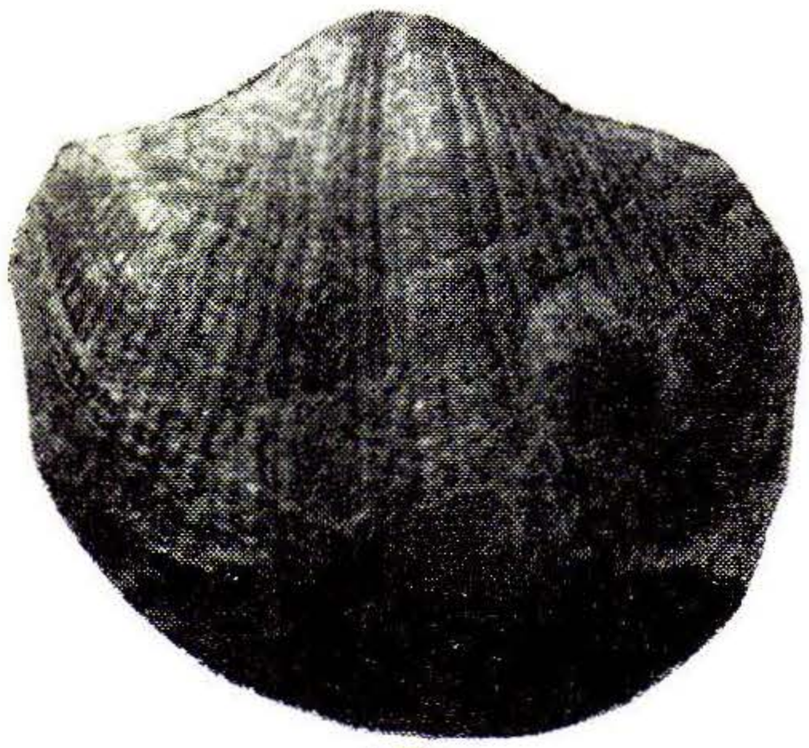
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FOSSILS OF THE FORT PAYNE CHERT FORMATION

PLATE 25.

FOSSILS OF THE FORT PAYNE CHERT FORMATION

Explanation

FIGURE

1–3. *Pentremites cava* Ulrich.
Lateral, top, and basal views, X 1.
Collected in Cherokee Valley one mile north of U. S. Highway 41, Index Map 5, location C.
E. G. M. No. 1632.

4. *Allocatillocrinus rotundus* Moore.
Basal plates, X 1.
Collected at same location as fig. 1.

5–7. *Hadrophylum ovale* Bassler.
Top, basal, and side views, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1365.

8. *Dielasma arkansanum* Weller.
External view of ventral valve, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1435.

9. *Penniretopora sp.*
Lateral view of zoarium, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1542.

10. *Streblopteria cooperensi* (?).
View showing left valve, X 1.
Collected on east slope of Taylor Ridge in Houston Valley, location 42 on map in pocket.
E. G. M. No. 1430.

11. *Favosites turbinatus* (Billings).
Incomplete corallum, X 1.
Note close spacing and polygonal shape of corallites on polished face.
Collected at same location as fig 10.
E. G. M. No. 1635.

FIGURE

12. *Eumetria verneuiliana* (Hall).
    External view of ventral valve, X 1.
    Collected in north end of west Armuchee Valley on Georgia highway 143, location 43 on map in pocket.
    E. G. M. No. 1634.

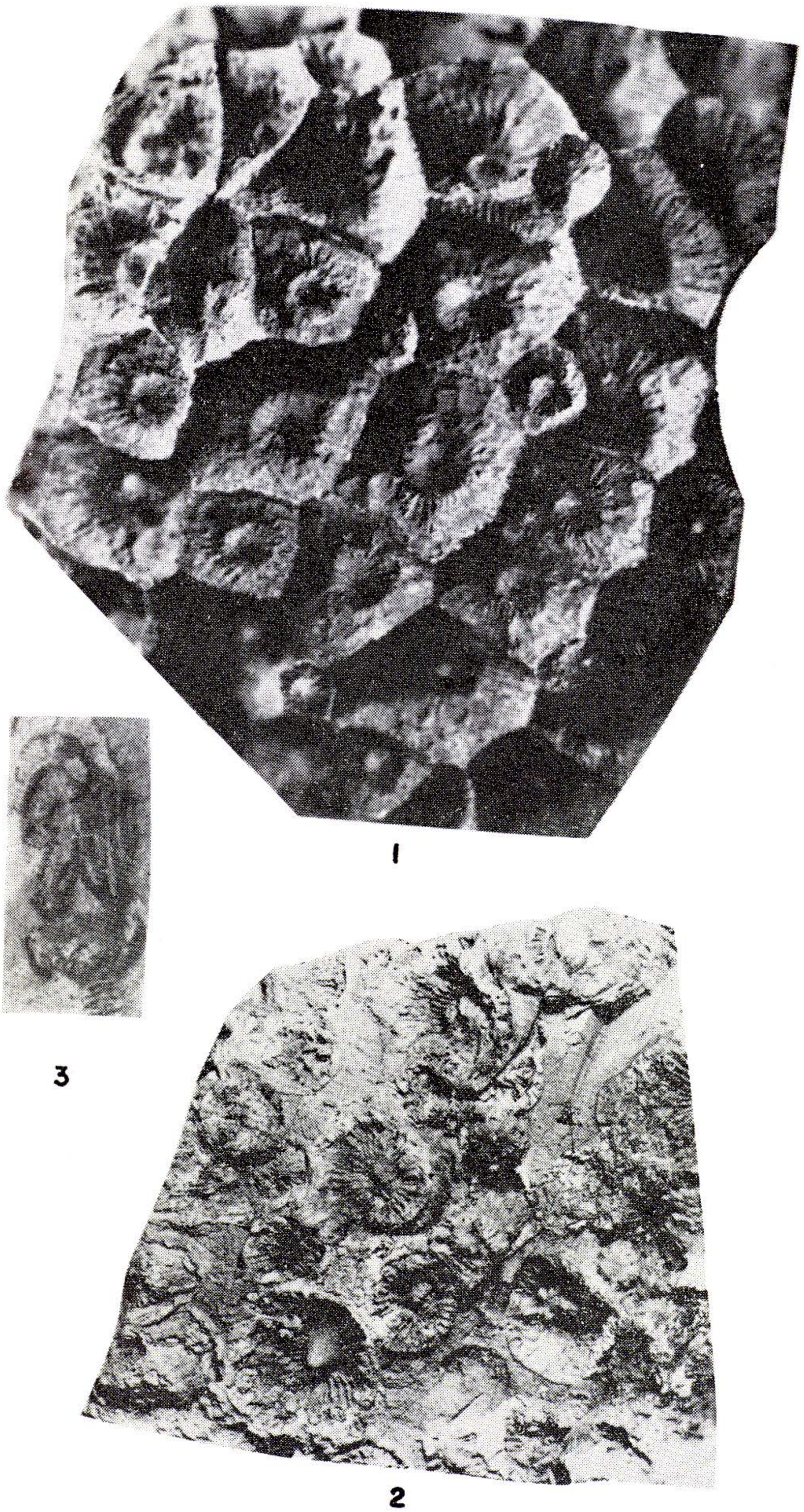
13. *Crinoid stem.*
    Silicified replacement, X 1.
    This specimen shows places of attachment of the cirri.
    Collected on east slope of Taylor Ridge at Sugartown, location 40 on map in pocket.
    E. G. M. No. 1922.

14. *Goniatites kentuckiensis* Miller.
    Internal mold, X 1.
    Specimen shows complete involute whorl, ornamentation, and sutures.
    Collected in west Armuchee Valley, location 43 on map in pocket.
    E. G. M. No. 1636.

15. *Dielasma illinoisensis* (Weller).
    External view of ventral valve, X 1.
    Collected at same location as fig. 12.
    E. G. M. No. 1633.

16. *Spirifer leidyi* Norwood and Pratten.
    External view of ventral valve, X 1.
    Collected at same location as fig. 12.
    E. G. M. No. 1927.

17. *Spirifer grimesi* Hall.
    External view of ventral valve, X 1.
    Collected at same location as fig. 12.
    E. G. M. No. 1352.



FOSSILS OF THE ST. LOUIS FORMATION

PLATE 26.

FOSSILS OF THE ST. LOUIS FORMATION

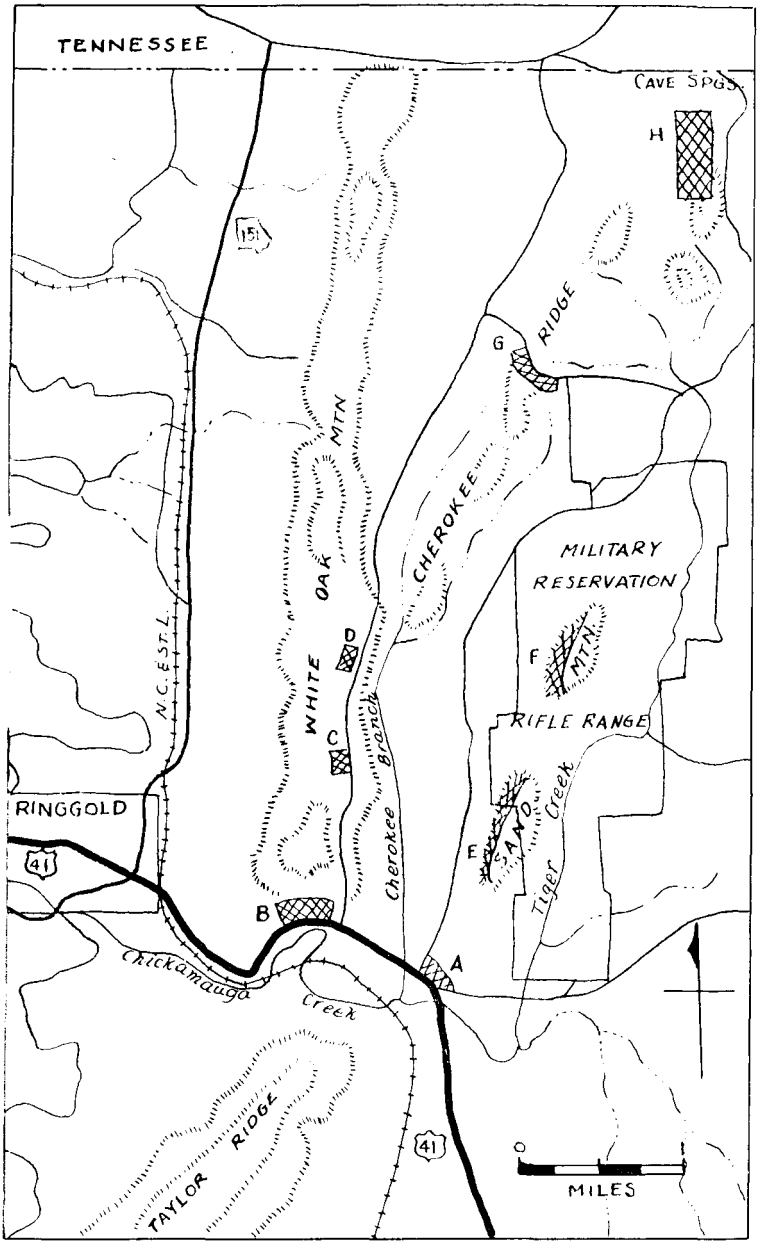
Explanation

FIGURE

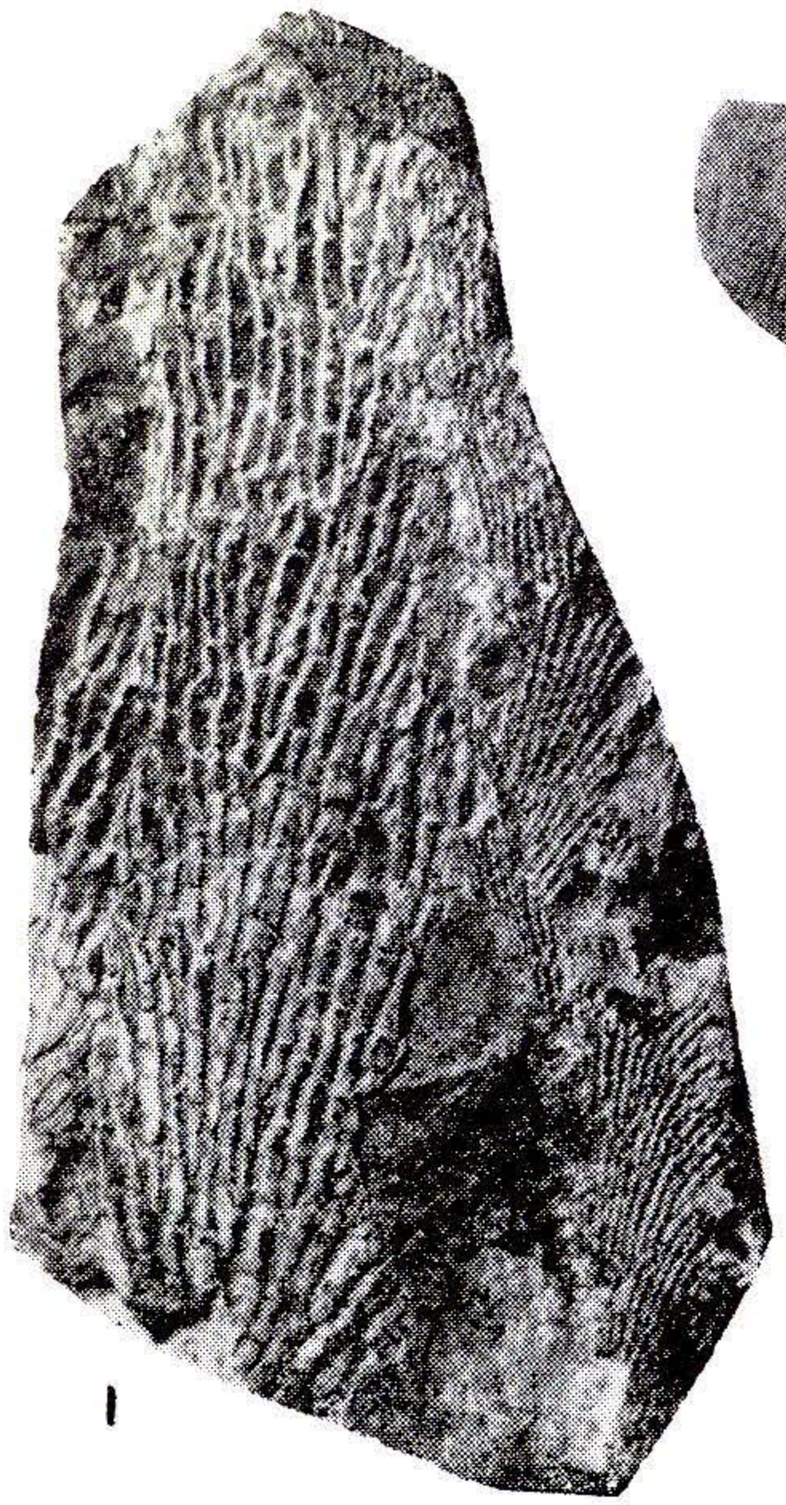
1. *Lithostrotionella castelnaui* Hayasaka.
   Calicular view, X 1.
   Part of a large composite corallum, calices variable in size and prismatic with central columella projection.
   Collected on the south side of Chickamauga Creek in Cherokee Valley; 1½ miles south of U. S. highway 41. Location 45 on map in pocket.
   E. G. M. No. 1574.

2. *Lithostrotion proliferum Hall.*
   Calicular view, X 1.
   Part of a large composite corallum, corallites cylindrical and variable in size; well-developed columella.
   Collected at same location as fig. 1.
   E. G. M. No. 27.

3. *Platycrinites hemisphericus* (Meek and Worthen).
   Complete calyx, X 1.
   Collected by W. Moore on east side of Lookout Mountain, location 56 on map in pocket.
   E. G. M. No. 1976.



A- OLD STONE CHURCH, KEITH RD. AND U.S. HWY. 41
B- ROADCUT AT SHOOKVILLE, GA.
C- FIELD W. OF CHEROKEE VALLEY RD. 1 MI. N. U.S. HWY. 41
D- FIELD N. OF CHEROKEE VALLEY CHURCH
E- FRY'S QUARRY, SALEM VALLEY RD.
F- S.W. SLOPE OF LITTLE SAND MTN.
G- CHEROKEE RIDGE GAP
H- EROSION GULLIES AT CAVE SPRINGS



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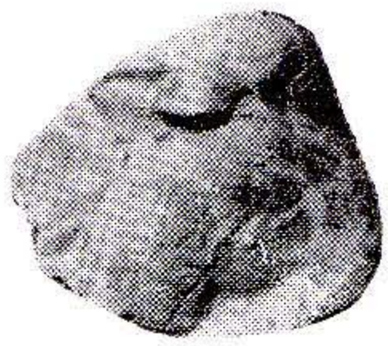

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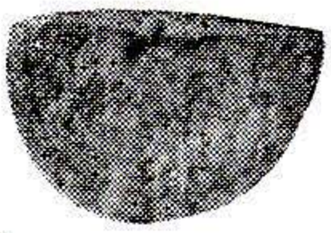

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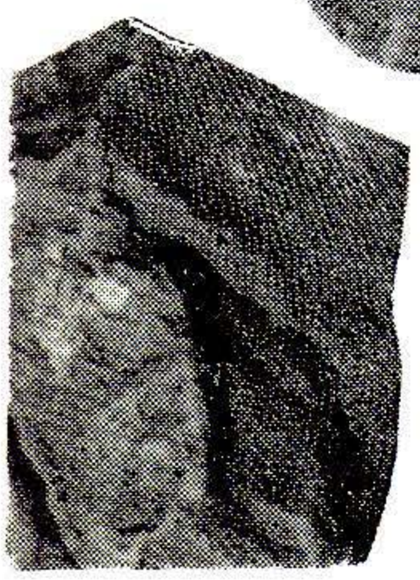

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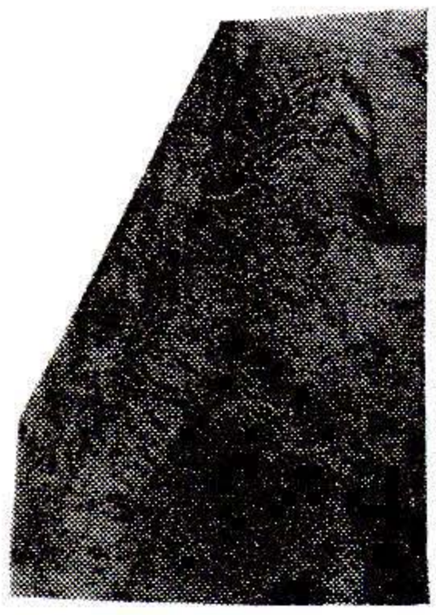

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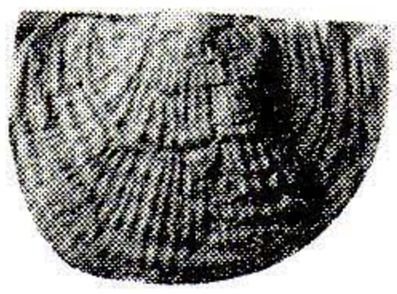

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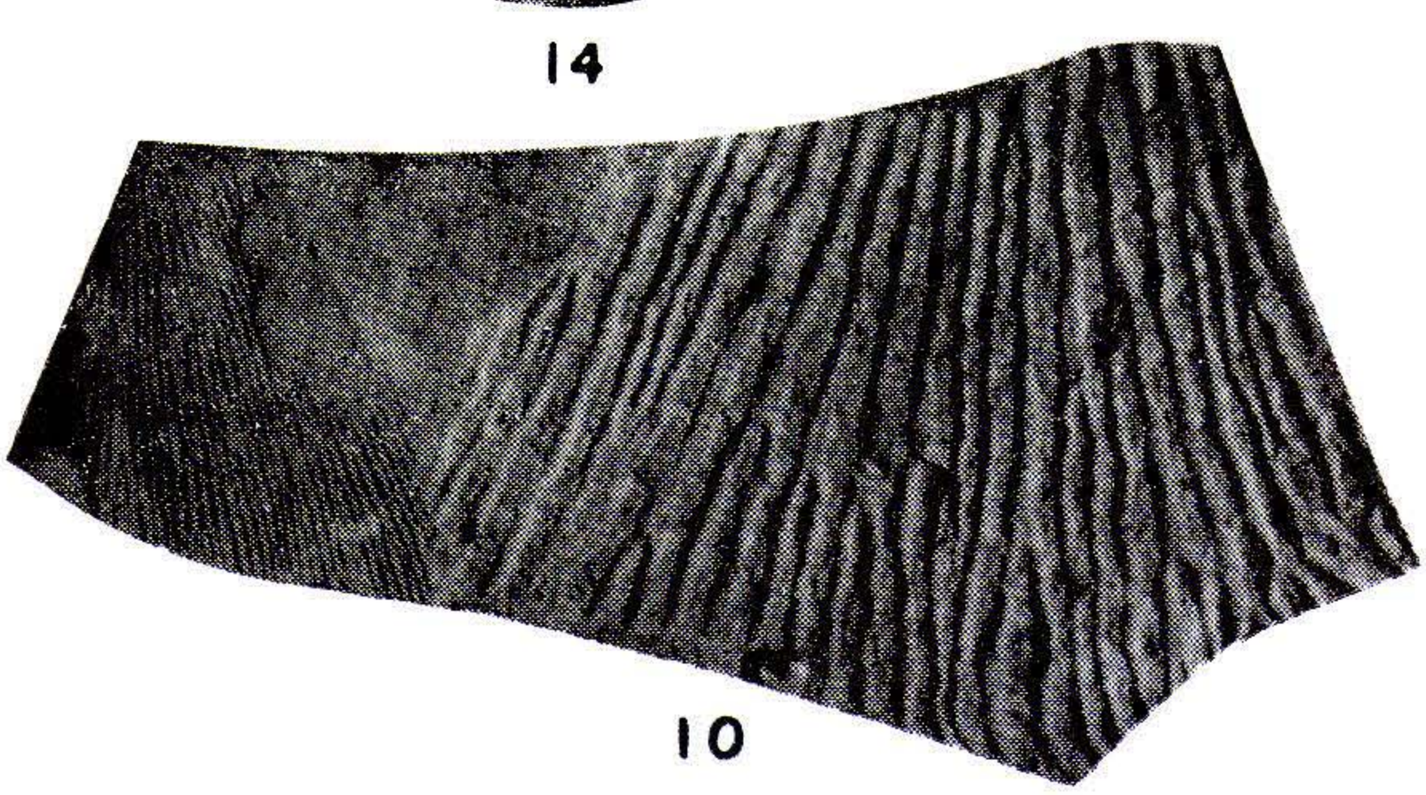

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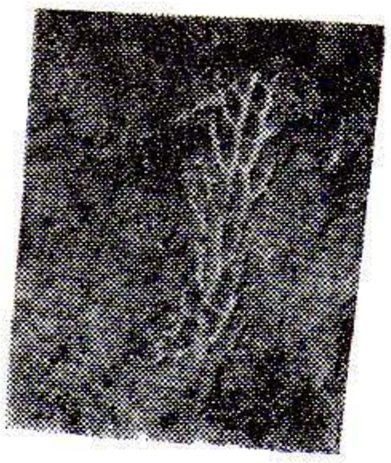

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FOSSILS OF THE STE. GENEVIEVE AND THE GASPER FORMATIONS

PLATE 27.

FOSSILS OF THE STE. GENEVIEVE AND THE GASPER FORMATIONS

Explanation

FIGURE

1. *Phyllopora sp.*
   Mold of reverse face of frond, X 1.
   Collected along the road in front of Cherokee Church; 1½ miles north of U. S. highway 41 in Cherokee Valley, Index Map 5, location D.
   E. G. M. No. 1530.

2. *Chonetes sp.*
   External view of ventral valve, X 1.
   Collected from basal argillaceous limestone of the Gasper formation on the east side of Cherokee ridge, 3 miles north of U. S. highway 41, Index Map 5, location G.

3. *Cleiothyridina sublamellosa* (Hall).
   External view of dorsal valve, X 1.
   Specimen flattened by compression of the shale.
   Collected at same location as fig. 2.
   E. G. M. No. 1928.

4. *Composita subquadrata* (Hall).
   View of flattened specimen, X 1.
   The specimen has been distorted so that the ventral valve is overlapping the dorsal valve.
   Collected at same location as fig. 2.
   E. G. M. No. 1353.

5. *Fenestrellina serratula* (Ulrich).
   Mold of reverse face of frond showing the arrangement of the branches, X 1 .
   Collected at same location as fig. 1.
   E. G. M. No. 1533.

6. *Fenestrellina sp.*
   Mold of reverse face of frond, X 1.
   Collected at same location as fig. 1.
   E. G. M. No. 1610.

FIGURE

7. *Fenestrellina sp.*
   Mold of reverse face of frond, X 1.
   Collected at same location as fig. 1.

8. *Fenestrella sp.*
   Reverse face of frond showing sinuous branches and dissepiments, X 1.
   Collected at same location as fig. 1.

9. *Cystodictya cf. Cystodictya ovatipora* (Hall).
   External impression of the zoarium, X 1.
   Collected at same location as fig. 1.
   E. G. M. No. 1504.

10. *Phyllopora sp.*
    Mold of reverse face of frond, showing the arrangement of the branches, X 1.
    Collected at same location as fig. 1.
    E. G. M. No. 1530.

11. *Fenestrellina altidorsata* (Ulrich and Bassler).
    Fragment of zoarium showing branches and dissepiments, X 1.
    Collected at same location as fig. 1.

12. *Chonetes chesterense* Weller.
    External view of ventral valve, X 1.
    Specimen has been distorted by flattening.
    Collected at same location as fig. 2.
    E. G. M. No. 1578.

13. *Spiriferina subspinosa* Weller.
    Much flattened and distorted specimen, X 1.
    Collected at same location as fig. 2.
    E. G. M. No. 1552.

14. *Dictyoclostus inflatus* McChesney.
    External mold of ventral valve, flattened and distorted, X 1.
    Collected at same location as fig. 2.
    E. G. M. No. 1602.

FIGURE

15. *Pentremites cf. Pentremites welleri* Ulrich.
Flattened and distorted specimen, X 1.
Collected at same location as fig. 2.
E. G. M. No. 1591.


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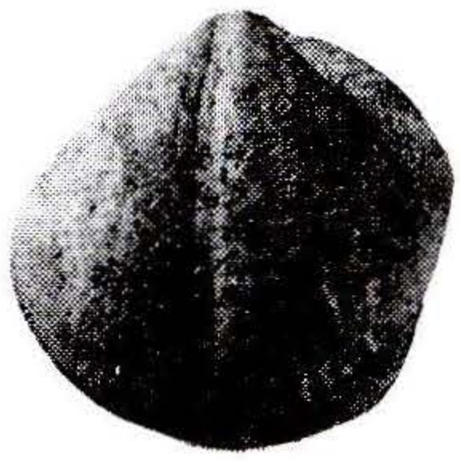
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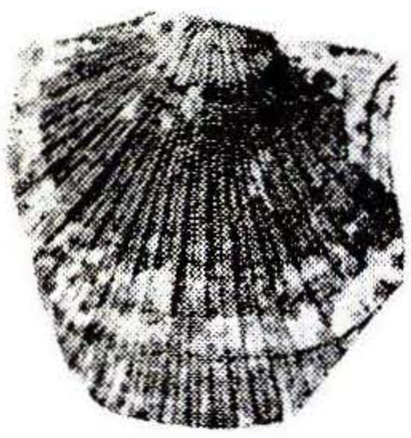
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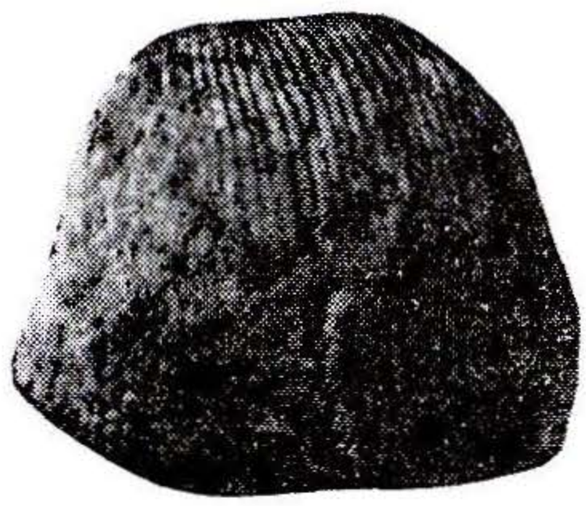
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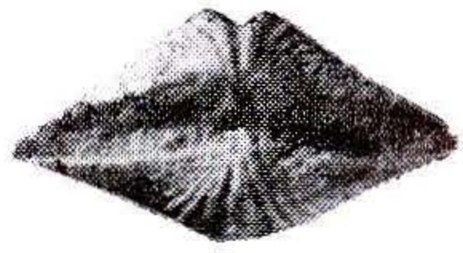
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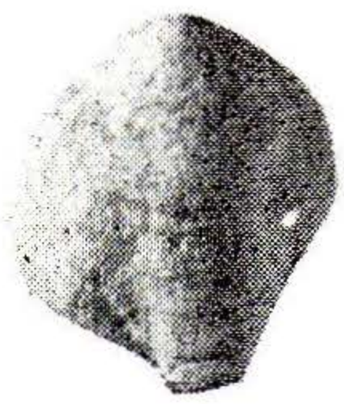
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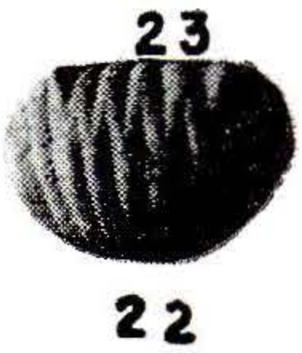
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FOSSILS OF THE STE. GENEVIEVE AND THE GASPER FORMATIONS

PLATE 28.

FOSSILS OF THE STE. GENEVIEVE AND THE GASPER FORMATIONS

Explanation

The specimens illustrated on this plate were collected on the north end of Cherokee Ridge just south of the Tennessee-Georgia line. The locality is known as Cave Springs. See Index Map 5, location H.

FIGURE

1–3. *Cleiothyridina sp.*
Ventral, hinge, and anterior views, X 1.
E. G. M. No. 1348.

4. *Brachythyris chesterensis* (Girty).
Ventral exterior, X 1.
E. G. M. No. 1432.

5. *Orthotetes kaskaskiensis* (McChesney).
View of incomplete ventral valve, X 1.
E. G. M. No. 1436.

6, 7. *Dictyoclostus inflatus* (McChesney).
Ventral and lateral views, X 1.
E. G. M. No. 1288.

8. *Spirifer increbescens* Hall.
View of ventral valve, X 1.
E. G. M. No. 1433.

9. *Spirifer leidyi* Norwood and Pratten.
View showing exterior of dorsal valve, X 1.
E. G. M. No. 1622.

10–12. *Spirifer transversa* (McChesney).
Ventral and dorsal valves, and hinge line, X 1.

13. *Marginicinctus marginicinctus* (Prout).
View of incomplete specimen, X 1.
E. G. M. No. 1442.

14–16. *Spiriferina subspinosa* Weller.
Views of dorsal, ventral, and hinge line, X 1
E. G. M. No. 1439.

FIGURE

17, 23. *Eumetria vera* (Hall).
View of ventral and dorsal valves, X 1.
E. G. M. No. 1307.

18–20. *Composita subquadrata* (Hall).
Views of dorsal, ventral, and hinge line, X 1.
E. G. M. No. 1353.

21, 22. *Rhynchopora beecheri* Gregor.
View of ventral valve and anterior margin, X 1.
E. G. M. No. 1295.

24. *Spiriferina spinosa* Norwood and Pratten.
View of exterior of ventral valve, X 1.
E. G. M. No. 1453.

25. *Productella sp.*
View of ventral valve, showing presence of spines, X 1.
E. G. M. No. 1584.

26, 27. *Composita subtilita* Shepard.
Exterior view of two ventral valves, X 1.
E. G. M. No. 1444.

28. *Chonetes chesterense* Weller.
View of ventral valve, with spines along hinge line, X 1.
E. G. M. No. 1441.

19. *Cleiothyridina sublamellosa* (Hall).
View of dorsal valve, X 1.
E. G. M. No. 1446.

30. *Gastropod.*
Internal cast, X 1.
E. G. M. No. 1620.

31. *Straparollus sp.*
Part of whorl, X 1.
E. G. M. No. 1923.

FIGURE

32. *Straparollus cf. Straparollus planodorsatus* (Meek and Worthen).
Internal cast, X 1.
Collected by C. Butts 100 yards north of Hollow Pope Creek, 1½ miles west-northwest of Hooker, location 19 on map in pocket.
Locality No. 600-B.

33. *Composita subquadrata* (Hall).
Weathered specimen showing brachidial supports, X 1.
E. G. M. No. 1349.


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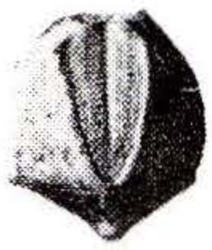
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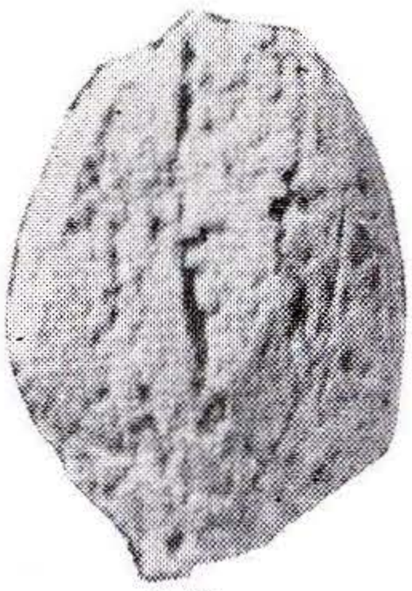
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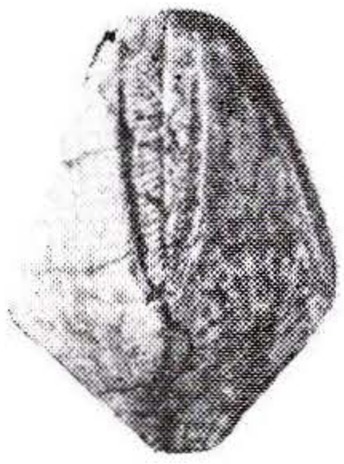
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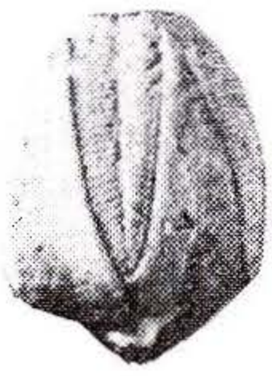
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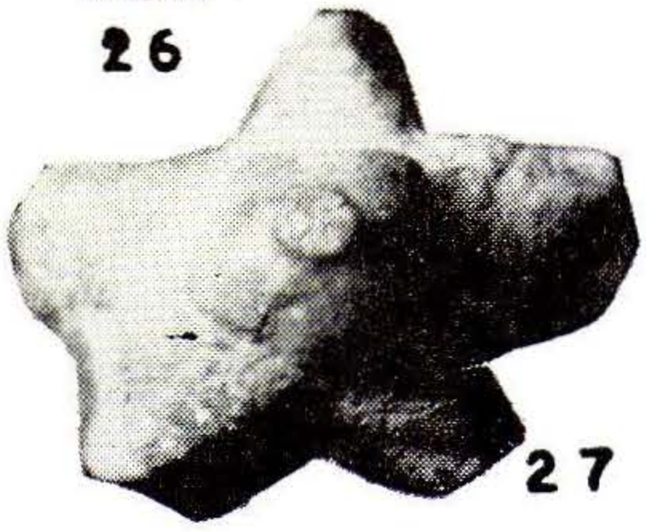
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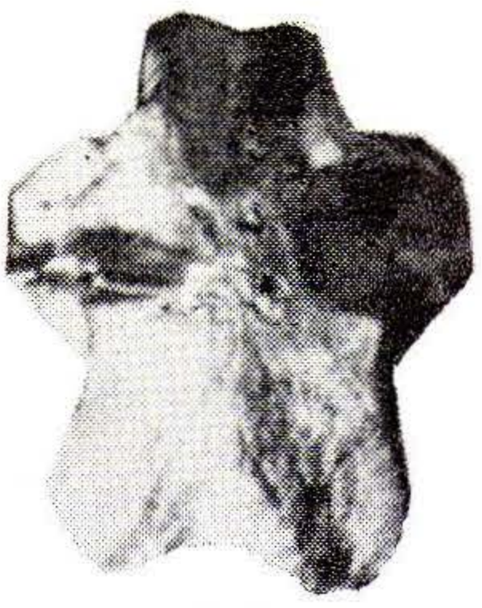
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FOSSILS OF THE STE. GENEVIEVE AND THE GASPER FORMATIONS

PLATE 29.

FOSSILS OF THE STE. GENEVIEVE AND THE GASPER FORMATIONS

Explanation

All the specimens figured on this plate, unless otherwise stated, were collected on the north end of Cherokee Ridge, just south of the Tennessee-Georgia line. The locality is known as Cave Springs. See Index Map No. 5, location H.

FIGURE

1–3. *Pentremites gemmiformis* Hambach.
Lateral, top, and basal views, X 1.
E. G. M. No. 1619.

4. *Pentremites cherokeens* Hall.
Lateral view, X 1.
E. G. M. No. 1482.

5–7. *Pentremites princetonensis* Ulrich.
Lateral, top, and basal views, X 1.
E. G. M. No. 1464.

8. *Pentremites symmetricus* Hall.
Lateral view, X 1.
E. G. M. No. 1475.

9. *Pentremites welleri* Ulrich.
Lateral view, X 1.
E. G. M. No. 1480.

10. *Pentremites spicatus* Ulrich.
Lateral view, X I.

11. *Pentremites foshi* Ulrich.
Lateral view, X 1.
E. G. M. No. 1465.

12. *Pentremites pyriformis* Say.
Lateral view, X 1.
E. G. M. No. 1.

13. *Pentremites pulchellus* Ulrich.
Lateral view, X 1.
E. G. M. No. 1484.

FIGURE

14–16. *Pentremites conoideus* Hall.
Lateral, top, and basal views, X 1.
E. G. M. No. 1546.

17–19. *Pentremites okawensis* Weller.
Lateral, top, basal views, X 1.

20. *Pentremites buttsi* Ulrich.
Lateral view, X 1.
E. G. M. No. 1498.

21. *Pentremites canalis* Ulrich.
Lateral view, X 1.
E. G. M. No. 1483.

22. *Pentremites patei* Ulrich.
Lateral view, X 1.
E. G. M. No. 1466.

23. *Pentremites godoni* (DeFrance).
Lateral view, X 1.
E. G. M. No. 1485.

24. *Pentremites pyramidatus* Ulrich.
Lateral view, X 1.
E. G. M. No. 1487.

25. *Pentremites pinguis* Ulrich.
Lateral view, X 1.
E. G. M. No. 1496.

26. *Talarocrinus inflatus* Ulrich.
Basal plates, X 1.
E. G. M. No. 1509.

27–29. *Pentremites gianteus* Allen and Lester.
Basal, lateral, and top views, X 1.
Collected on the west flank of Little Sand Mountain, Salem Valley, 1 mile north of U. S. highway 41, Index Map 5, location E.
E. G. M. No. 3.

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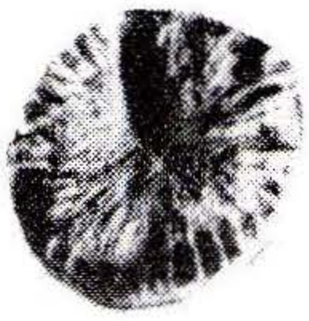

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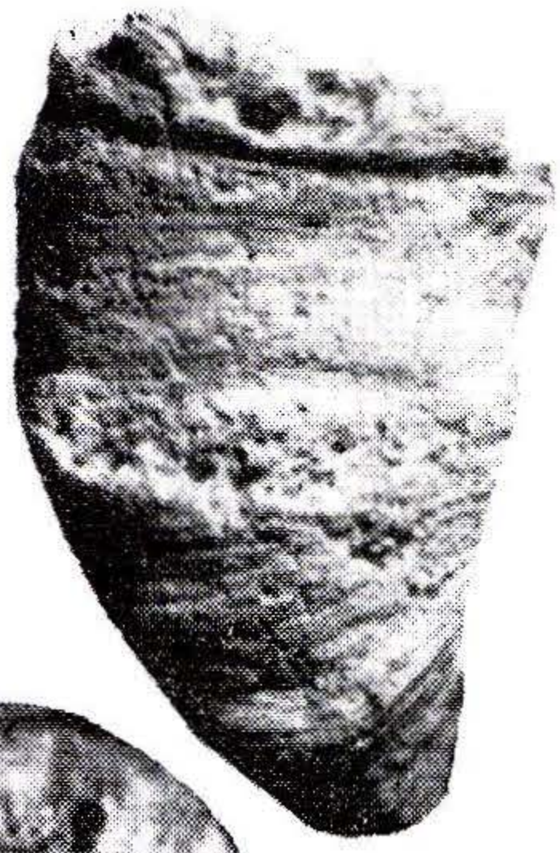

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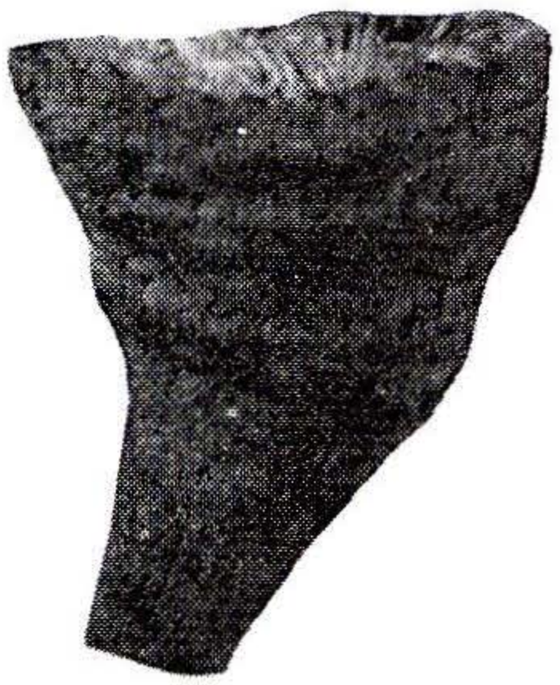

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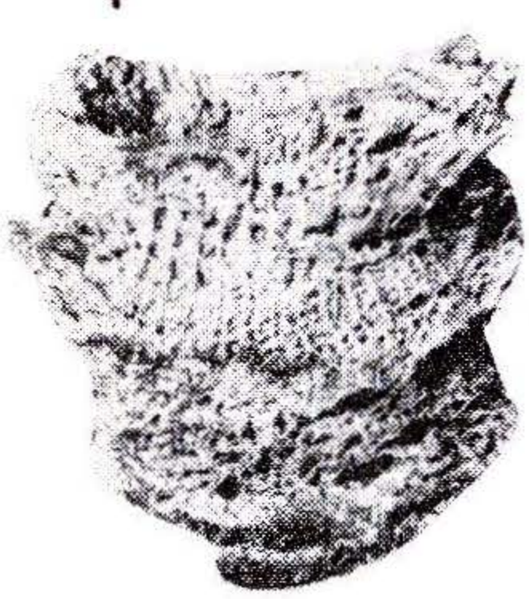

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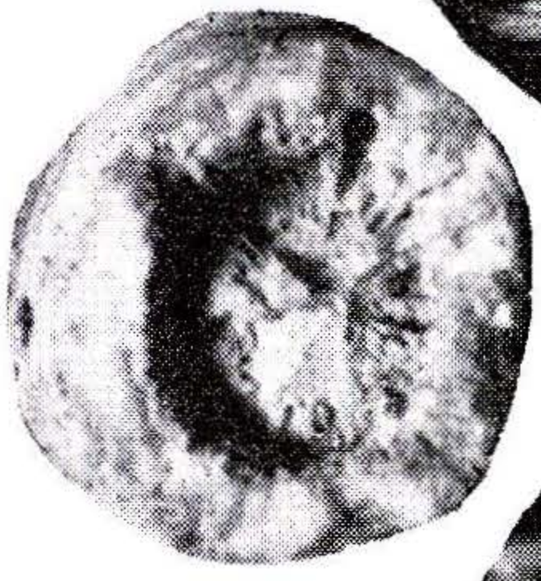

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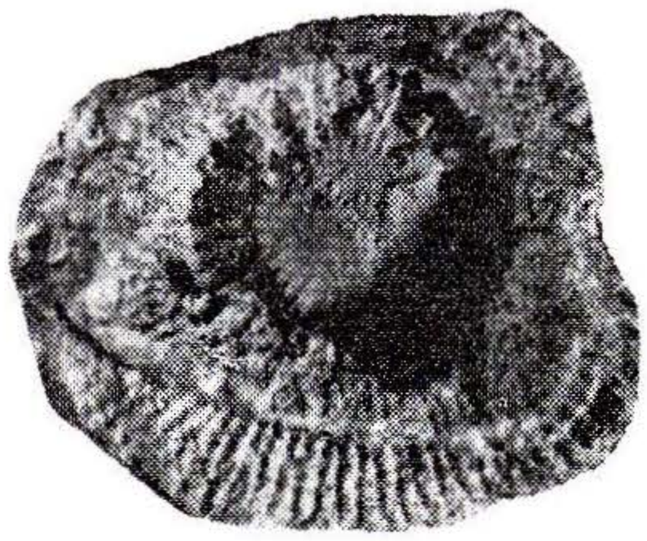

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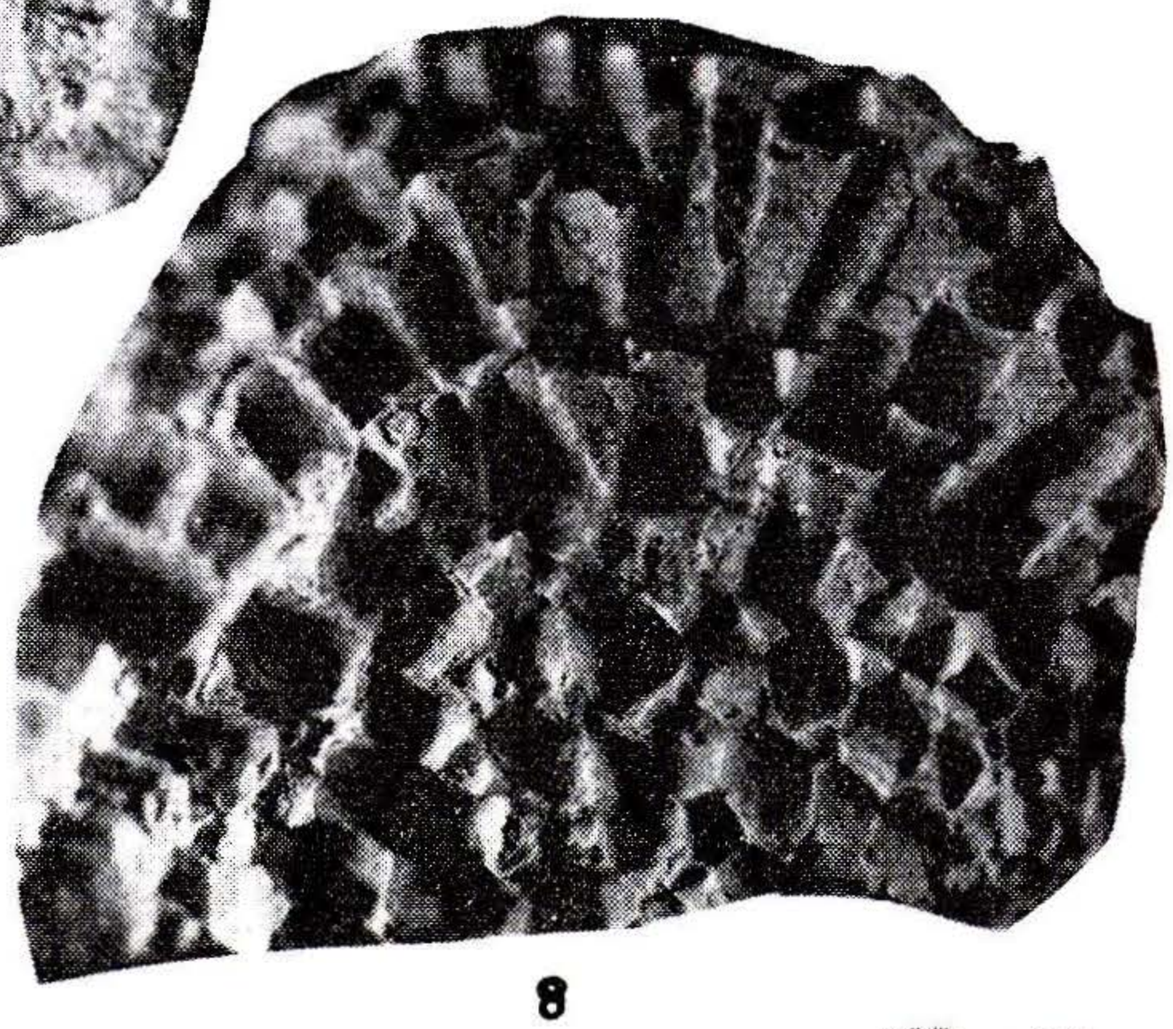

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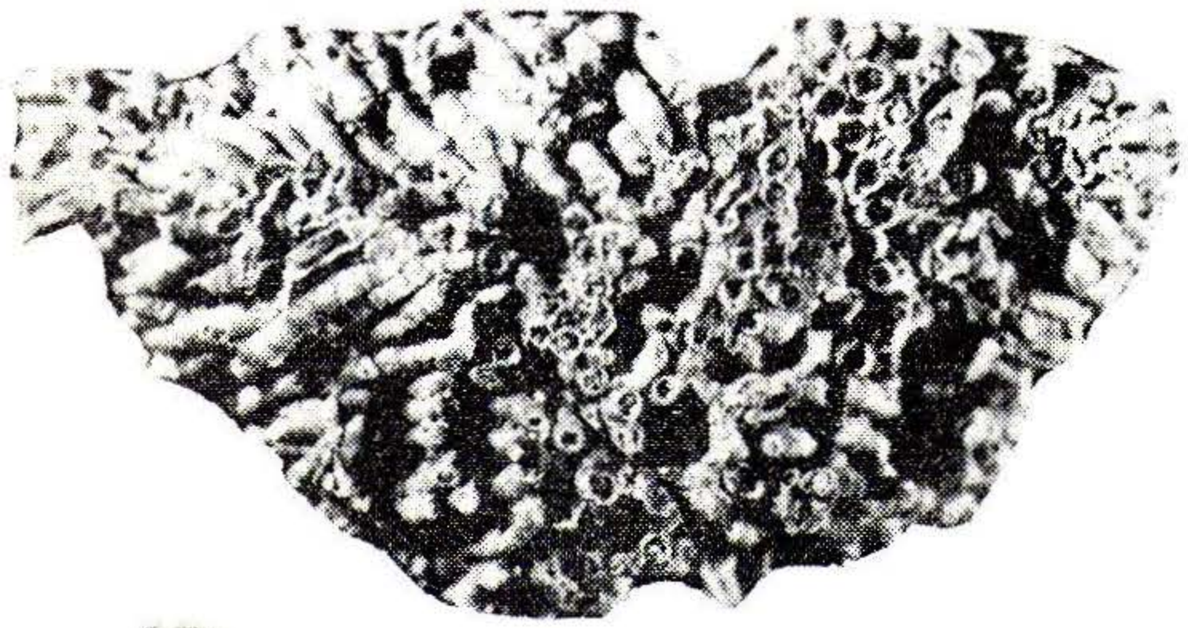

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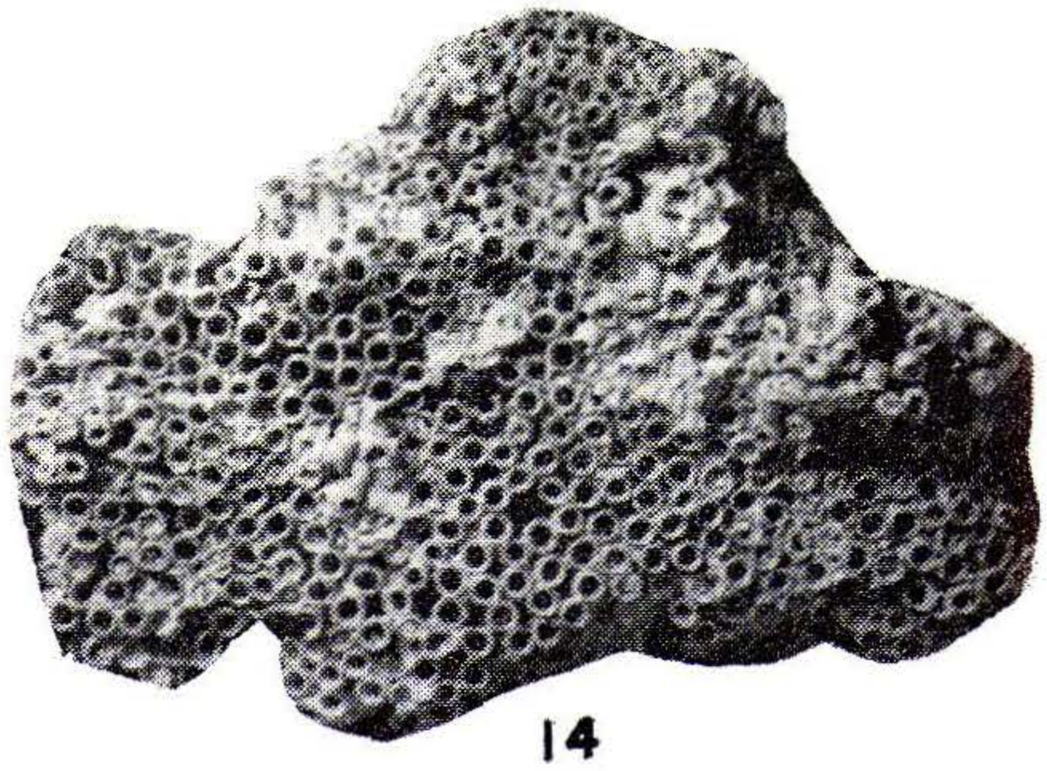

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FOSSILS OF THE STE. GENEVIEVE AND THE GASPER FORMATIONS

PLATE 30.

FOSSILS OF THE STE. GENEVIEVE AND THE GASPER FORMATIONS

Explanation

FIGURE

1, 2. *Zaphrentis sp.*
Lateral and calicular views, X 1.
Note the thin epitheca with septa showing in fig. 1 and the strong septa and pronounced fossula in fig. 2.
Collected on the north end of Cherokee Ridge near Cave Springs, Index Map 5, location H.
E. G. M. No. 1517.

3, 4. *Caninia sp.*
Lateral and calicular views, X 1.
The epitheca of the corallum is heavy and rugose, the calyx is depressed with the strong septa meeting in the center.
Collected at same location as fig. 1.
E. G. M. No. 1601 A.

5. *Menophylum princetonensis* Ulrich.
Large corallum with thin epitheca and well-developed septa, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1603.

6, 7. *Zaphrentis cf. Zaphrentis carinata* Worthen.
Lateral and calicular views showing deep calyx bottomed by single flat tabula; numerous dissepiments and carinae, X 1.
Collected in Salem Valley, 3 miles north of U. S. highway 41, Index Map 5, location G.
E. G. M. No. 1565.

8. *Pleurodictyum cf. Pleurodictyum convexum* (Orbigny).
View of large corallum showing arrangement, polygonal shape, and tabulae in the corallites, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1355.

9. *Triplophylum spinulosum* Milne-Edwards and Haime.
Lateral view of corallum showing spines arranged around the thin epitheca, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1291.

FIGURE

10. *Clinophylum chouteauensis* (Miller).
Calicular view of a poorly preserved specimen showing primary and secondary cycles of septa and prominent cardinal fossula, X 1.
Collected at same location as fig. 1.

11. *Syringopora virginica* Butts?
Top view of the corallum, X 1.
Collected on the north end of Cherokee Ridge, Index Map 5, location H.
E. G. M. No. 1566.

12, 15. *Cystelasma quinqueseptatum* Ulrich.
Lateral and calicular view, X 1.
Note the deep calyx, well-developed primary septa, and the rugose epitheca.
Collected at same location as fig. 1.
E. G. M. No. 1358.

13. *Pleurodictyum cf. Pleurodictyum convexum* (Orbigny)
Small fragment of colony showing polygonal corallites, X 1.
Collected at same location as fig 1.
E. G. M. No. 1513.

14. *Michelina subramosa* Ulrich.
Large corallum composed of compacted, small, round corallites, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1310.

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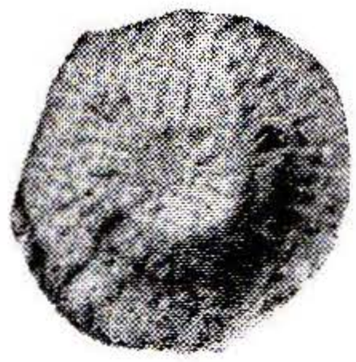

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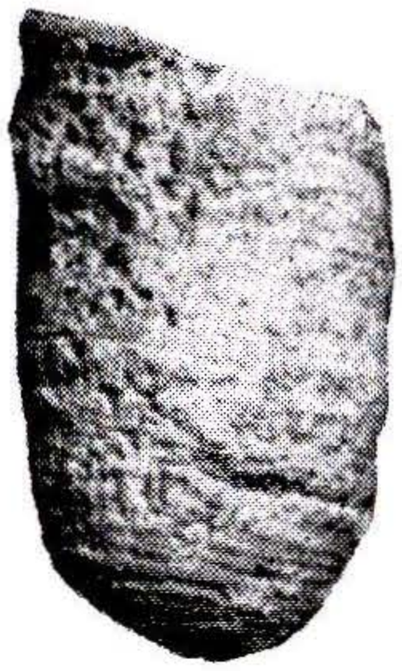

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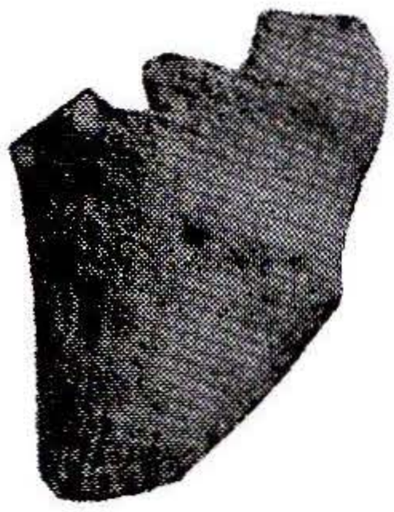

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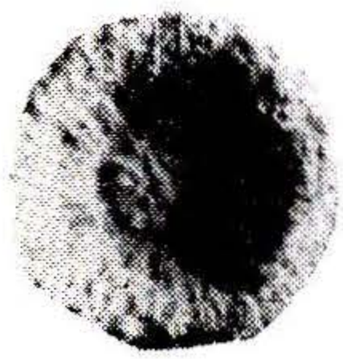

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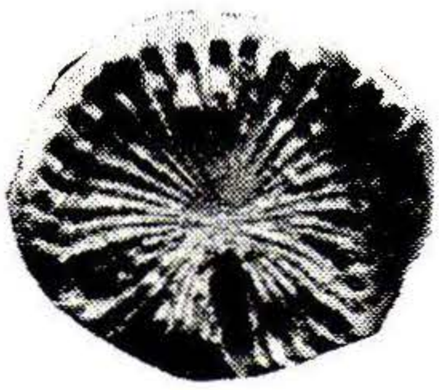

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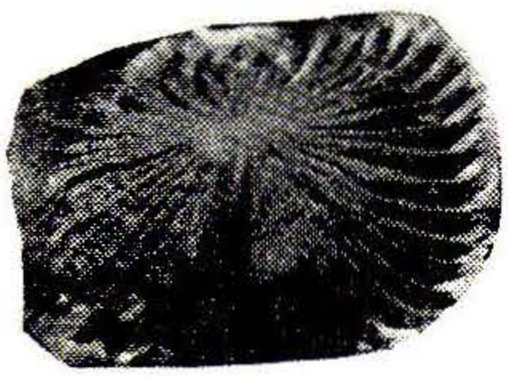

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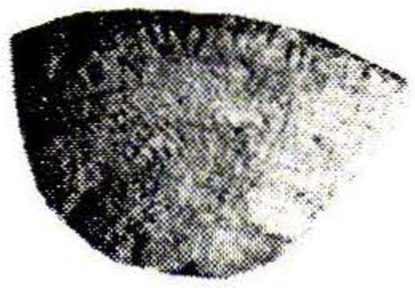

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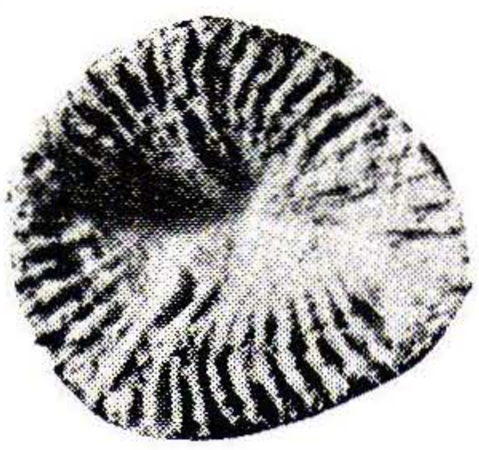

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FOSSILS OF THE GASPER FORMATION

PLATE 31.

FOSSILS OF THE GASPER FORMATION

FIGURE

1, 2. *Campophylum gasperense* Butts.

Calicular and lateral view showing the short septa, depressed calyx, and thin epitheca of the corallite, X 1.

Collected at Cave Springs on the north end of Cherokee Ridge, Index Map 5, location H.

E. G. M. No. 1315.

3, 4. *Unidentified coral.*

Calicular and lateral view showing shape of the corallum and the arrangement of septa. Note the development of the fossula and the alar fossulae, X 1.

Collected on U. S. highway 41 at the Old Stone Church, 2 miles east of Ringgold, Index Map 5, location A.

E. G. M. No. 1354.

5, 6. *Amplexus cf. Amplexus hamiltoniae* Hall.

Calicular and lateral view showing shape of the corallum and the short, strong septa. Note the deep calyx, X 1.

Collected on east slope of Cherokee Ridge, 3 miles north of U. S. highway 41, Index Map 5, location G.

E. G. M. No. 1363.

7, 8. *Zaphrentis sp.*

Calicular and lateral view showing shape of the corallum and the strong septa extending to the center of the calyx. Note well-developed cardinal fossula, X 1.

Collected at same location as fig. 5.

E. G. M. No. 1594.

9, 10. *Amplexus cf. Amplexus hamiltoniae* Hall.

Calicular and lateral view showing tapered and crooked corallum and the deep calyx with strong septa, X 1.

Collected at same location as fig. 1.

E. G. M. No. 1567.

FIGURE

11. *Cleistopora sp.* ? (Michelin).
Top view of corallum showing shape and regular annulations within the corallites, X 1.
Collected by C. Butts on the north end of Cherokee Ridge just south of the Georgia-Tennessee line, Index Map 5, location H.
Location No. 599-S.

12. *Pleurodictyum sp.*
Oblique view of corallum, X 1.
Collected at same location as fig 1.
E. G. M. No. 1839.

13. *Lithostrotion sp.*
Lateral view of corallum, X 1.
Collected by F. T. Ingram on west flank of Lookout Mountain, location 57 on map in pocket.
E. G. M. No. 1844.

14, 16. *Zaphrentis radicosa* Butts?
Calicular and lateral view of corallum, X 1.
Collected by C. Butts, 1 mile west of Cedar Grove, location 58 on map in pocket.
Locality No. 599-U.

15, 17. *Triplophylum dalei* (Milne-Edwards and Haime).
Calicular and lateral view of corallum, X 1.
Collected at same location as fig. 1.
E. G. M. No. 1841.

18, 19. *Triplophylum compressus* (Milne-Edwards and Haime).
Lateral and calicular view of corallum, X 1.
Collected by C. Butts about ½ mile southeast of Crystal Springs, location 44 on map in pocket.
Locality No. 600-D.

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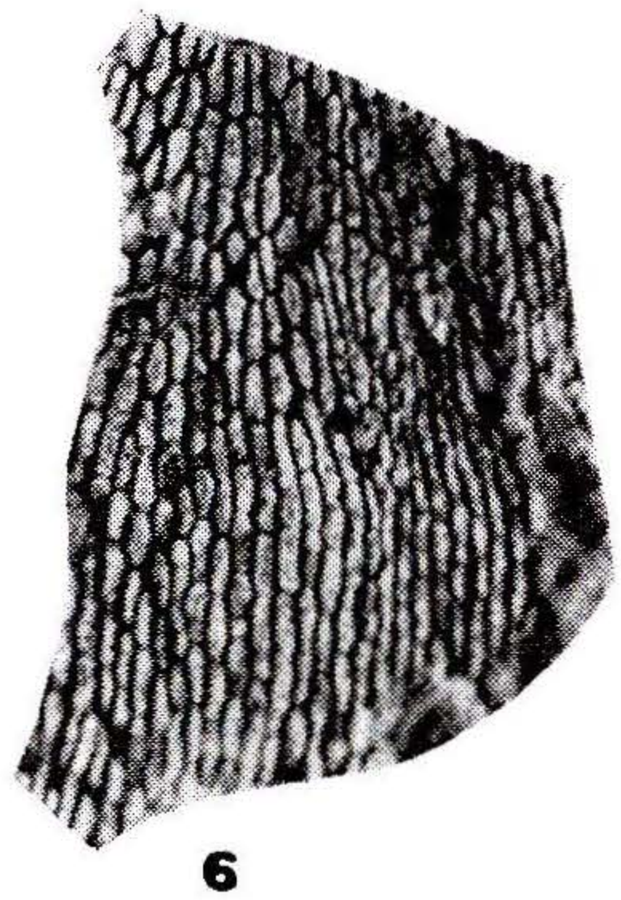

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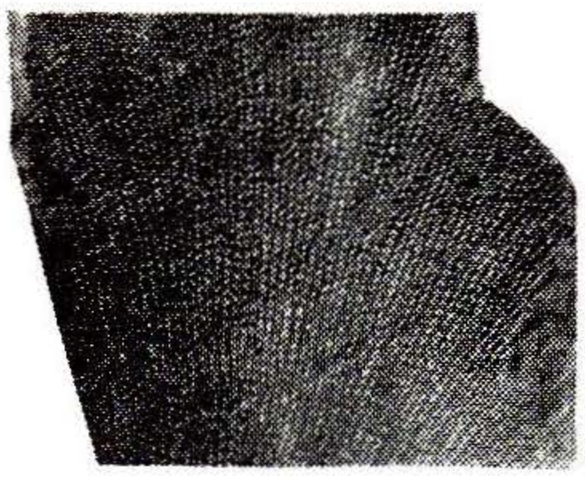

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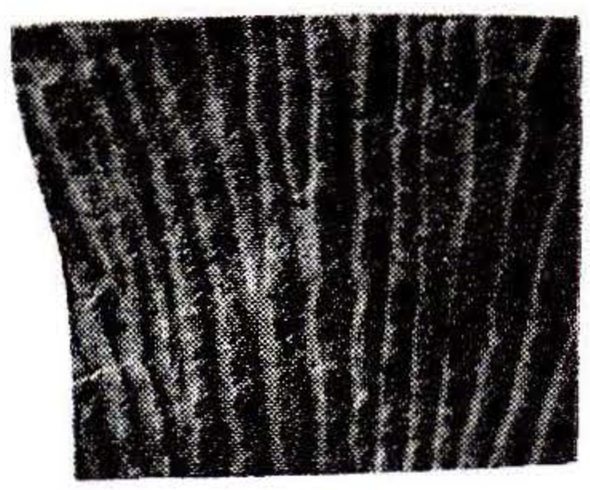

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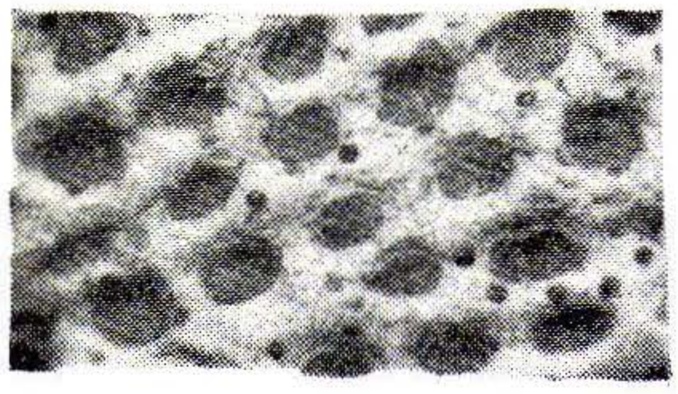

13

FOSSILS OF THE GASPER FORMATION

PLATE 32.

FOSSILS OF THE GASPER FORMATION

Explanation

FIGURE

1. *Archimedes swallovanus* Hall.
   Lateral view of spiral, X 1.
   Collected on slope of Little Sand Mountain east of Ringgold, Index Map 5, location F.
   E. G. M. No. 1477.

2. *Archimedes magnus* Condra and Elias.
   Lateral view of spiral, X 1.
   Collected at same location as fig. 1.
   E. G. M. No. 1492.

3. *Archimedes invaginatus* Ulrich.
   Lateral view of spiral, X 1.
   Collected at same location as fig. 1.
   E. G. M. No. 1628.

4. *Archimedes confertus* Ulrich.
   Lateral view of spiral, X 1.
   Collected at same location as fig. 1.
   E. G. M. No. 1528.

5. *Phyllopora sp.*
   View showing zoarial arrangement, X 1.
   Collected on east slope of Cherokee Ridge in Salem Valley, Index Map 5, location G.
   E. G. M. No. 1530.

6. *Fenestrellina sp.*
   View showing zoarial arrangement, X 1.
   Collected at same location as fig. 5.
   E. G. M. No. 1610.

7. *Fenestrellina tenax* (Ulrich).
   View showing zoarial arrangement, X 1.
   Collected at same location as fig. 5.
   E. G. M. No. 1536.

FIGURE

8. *Fenestrellina sp.*
   View showing zoarial arrangement, X 1.
   Collected at same location as fig. 5.
   E. G. M. No. 1538.

9. *Fenestrellina santi-ludowici* Prout.
   View showing zoarial arrangement, X 1.
   Collected at same location as fig. 5.
   E. G. M. No. 1533.

10. *Meekopora clausa* Ulrich.
    View of fragment showing pore structure, X 1.
    Collected at Cave Springs at north end of Cherokee Ridge, Index Map 5, location H.

11. *Lyropora ranosculum* Ulrich.
    Non-cellular zoarial supports, X 1.
    Collected at same location as fig. 10.
    E. G. M. No. 1491.

12. *Septopora subquadrans* Ulrich.
    Top view showing arrangement of zoarium, X 1.
    Collected by C. Butts 100 yards north of Hollow Pope Creek, 1½ miles west-northwest of Hooker, location 19 on map in pocket.
    Locality No. 600-B.

13. *Septopora subquadrans* Ulrich.
    Zoarial arrangement, X 30.
    Same specimen as fig. 12.

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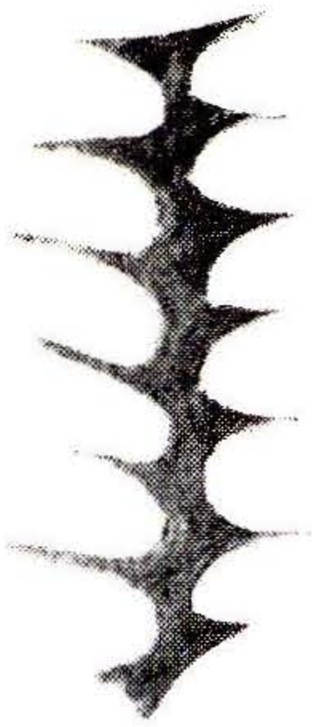

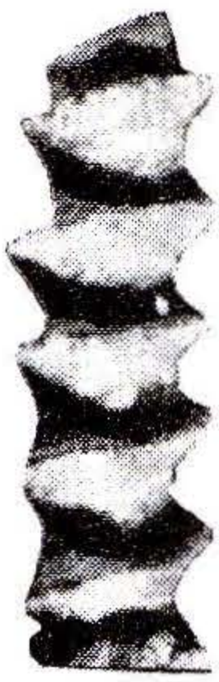

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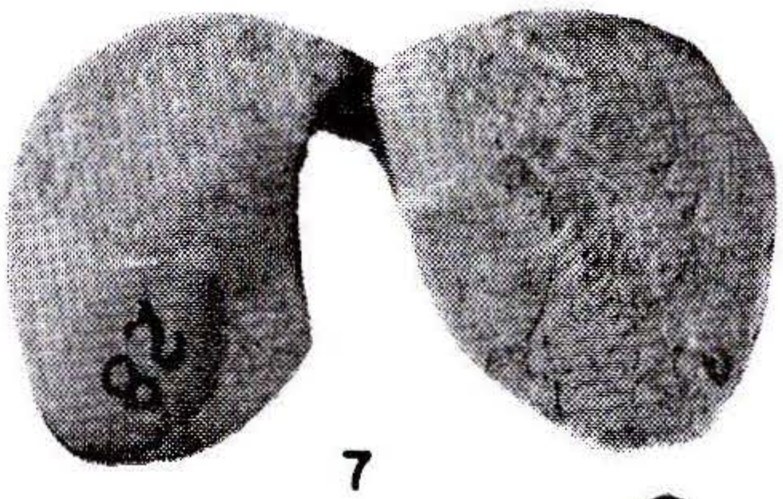

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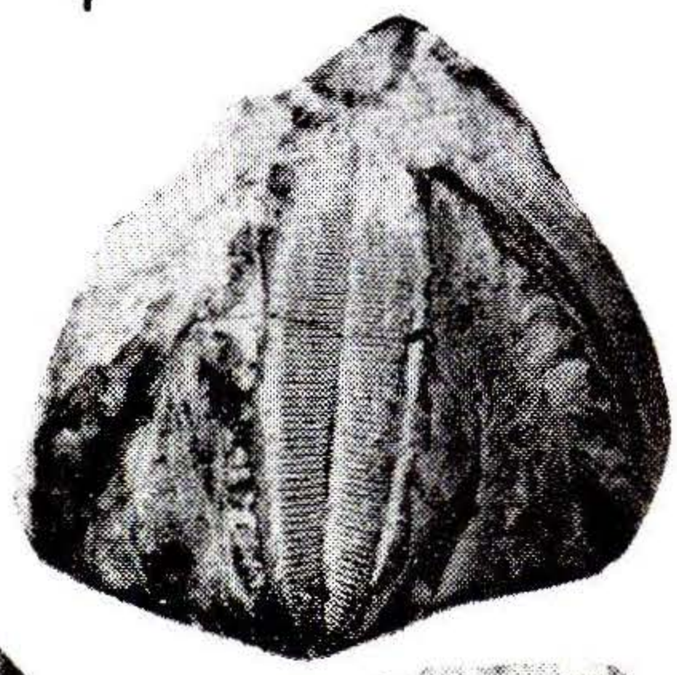

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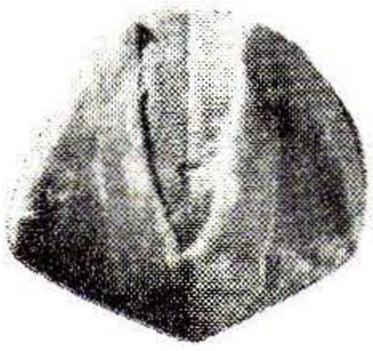

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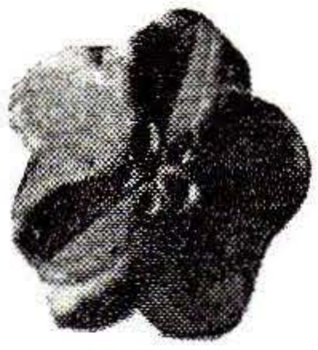

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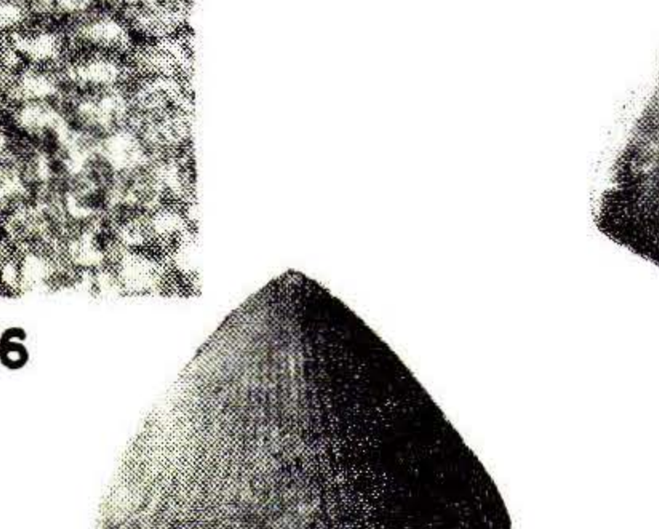

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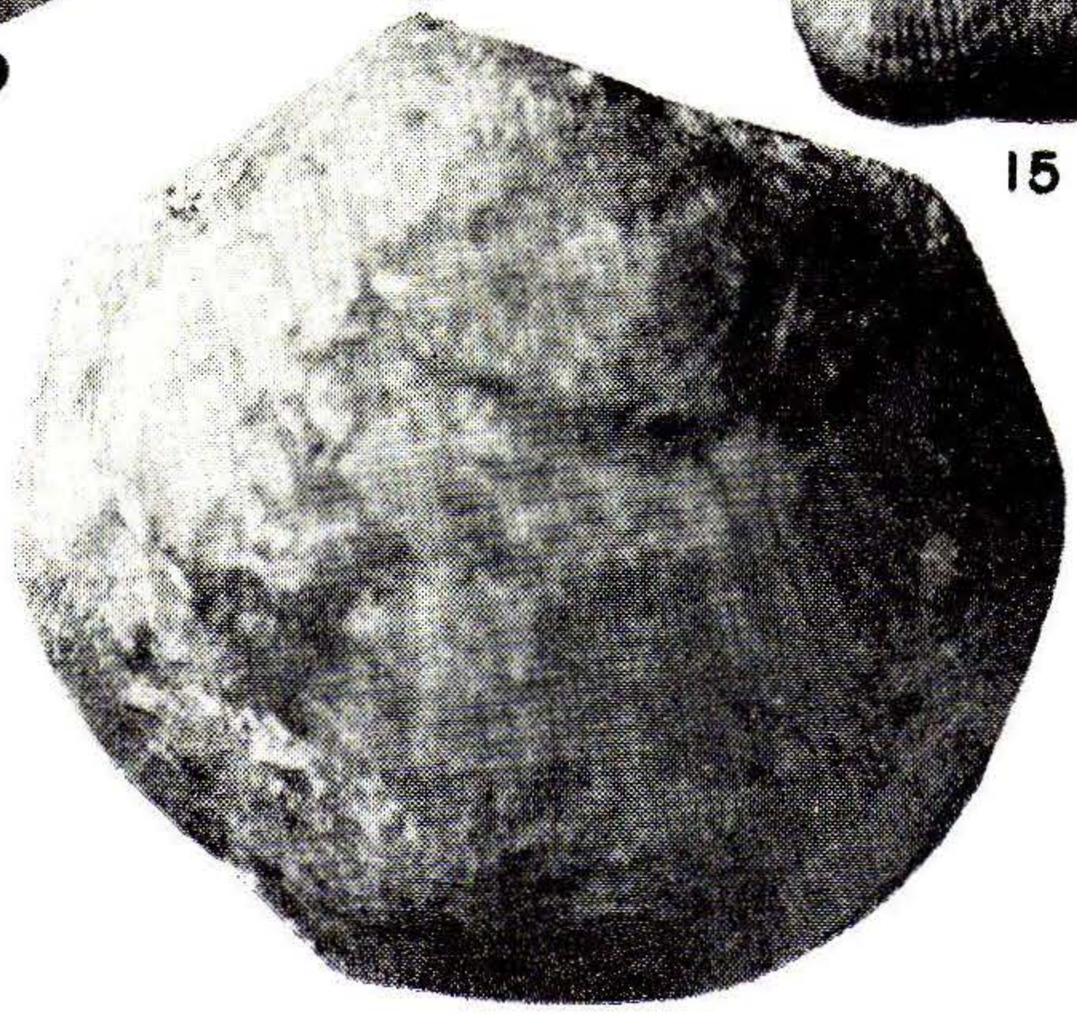


13

FOSSILS OF THE BANGOR AND THE PENNINGTON FORMATIONS

PLATE 33.

FOSSILS OF THE BANGOR AND THE PENNINGTON FORMATIONS

Explanation

All fossils illustrated on this plate were collected on Little Sand Mountain, east of Ringgold. See Index map No. 5, location F.

FIGURE

1. *Archimedes magnus* Condra and Elias.
   Lateral view of spiral, X 1.
   E. G. M. No. 1492.

2. *Archimedes sp.*
   Lateral view of spiral, X 1.
   E. G. M. No. 20.

3. *Archimedes lunatus* Condra and Elias.
   Lateral view of spiral, X 1.
   E. G. M. No. 22.

4. *Archimedes halli* Condra and Elias.
   Lateral view of spiral, X 1.
   E. G. M. No. 21.

5. *Euconospira sp.*
   Lateral view, X 1.
   E. G. M. No. 12.

6. *Archimedes stowanowi* (?)
   Top view showing fronds attached to spiral, X 1.
   E. G. M. No. 23.

7. *Nuculites triqueter* Conrad.
   Internal cast, X 1.
   E. G. M. No. 28.

8. *Pentremites sp.*
   Lateral view, X 1.
   E. G. M. No. 6.

9, 10. *Pentremites spicatus* Ulrich.
   Lateral and top view of calyx, X 1.
   E. G. M. No. 1.

FIGURE

11. *Perditocardinia dubia* (Hall).
View of ventral valve, X 1.
E. G. M. No. 1637.

12. *Orthotetes kaskaskiensis* McChesney.
View of dorsal valve, X 1.
E. G. M. No. 1608.

13. *Marginirugus magnus* (Meek and Worthen).
View of ventral valve, X 1.
E. G. M. No. 1531.

14. *Spirifer sp.*
View of ventral valve, X 1.

15. *Dictyoclostus inflatus* (McChesney).
View of ventral valve, X 1.
E. G. M. No. 1555.

PENNSYLVANIAN SYSTEM

LEE GROUP

The Pennsylvania strata in Georgia are of Pottsville age and are divided into five formations: The Lookout sandstone consisting of the Gizzard shale and the Sewanee conglomerate members, the Whitwell shale, the Bonair sandstone, the Vandever shale, and the Rockcastle sandstone. These formations have an aggregate thickness of 950-1000 feet.

Fossils occur in all of the formations of the Lee Group and each will be briefly discussed. However, the plant remains figured on the following plates all are from the Vandever shale and the Rockcastle sandstone. Practically all of the coal mining on Lookout Mountain has been in the Durham basin in seams of the Rockcastle formation and where waste material is piled up into dumps the collecting is excellent.

GIZZARD MEMBER

This is the lower member of the Lookout formation and it lies disconformably on the Pennington shale. The Gizzard is composed of greenish to yellowish, fissile shales with thin interbedded sandstones and siltstones. This member is prominent in outcrops because of the large concretions which frequently occur in the lower part.

SEWANEE CONGLOMERATE

The Sewanee conglomerate is the top member of the Lookout formation and is composed mainly of highly crossbedded, massive, conglomeratic sandstones. It forms the palisades on the rim of Lookout Mountain.

WHITWELL SHALE

On Lookout Mountain, according to Renshaw (unpublished thesis), the Whitwell shale is only a few feet thick at the northern end of the mountain and pinches southward, being absent in Johnson's Crook, although it has been recognized in drill holes at Durham. It is composed of about 2½ feet of black carbonaceous shale and fine-grained white sandstone.

BONAIR SANDSTONE

The Bonair sandstone is comprised of very thinly bedded, highly-cross-bedded sandstone. Near the base it becomes more massive but retains its fine sandstone texture.

VANDEVER SHALE

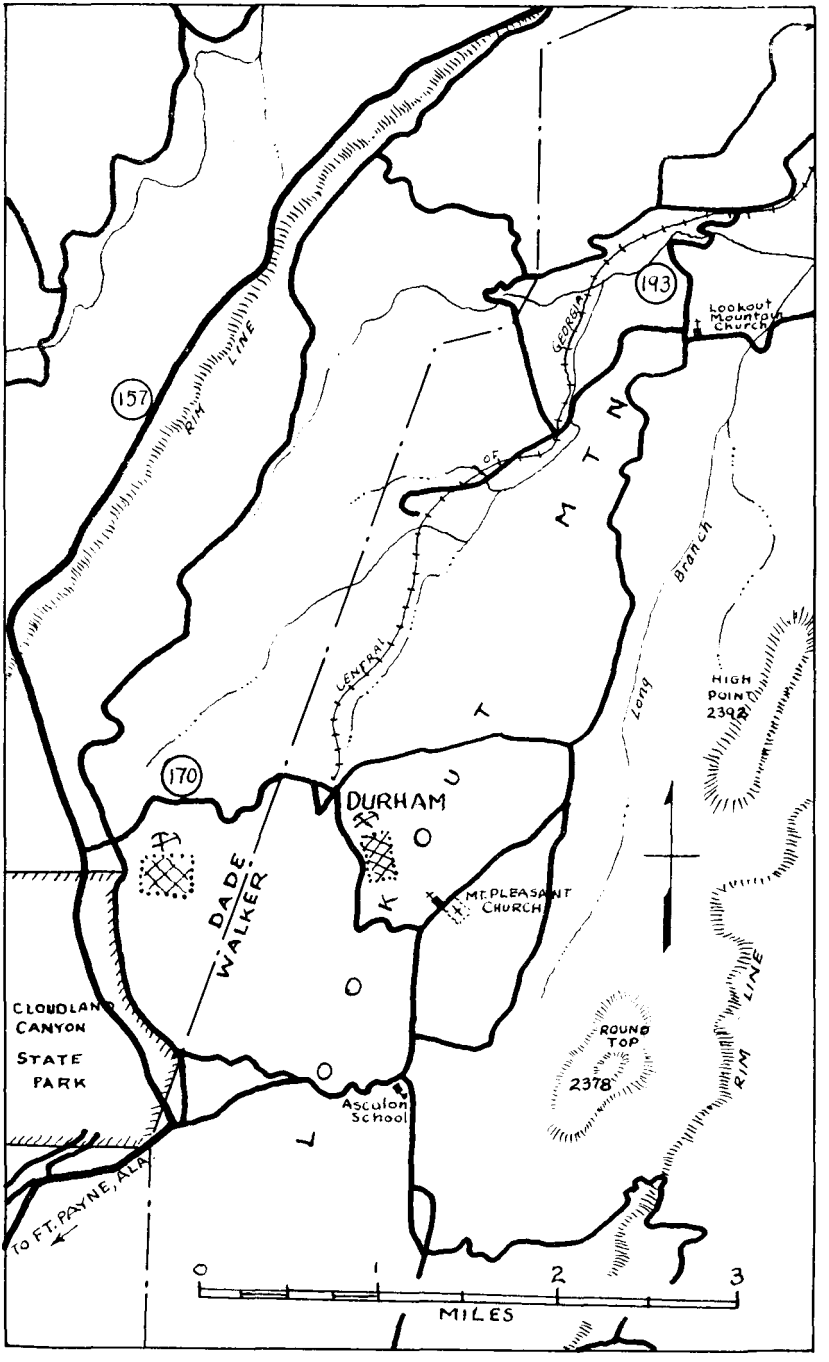
Wilmarth (1938, p. 2232) defines the Vandever shale as "somewhat ferruginous sandy and clay shale with heavy sandstone beds in lower half. Thickness 200 feet."

Renshaw (unpublished thesis) reports the Vandever as about 170 feet thick and composed of a sequence of thin fissile green and brown shales with a few brown sandstones and siltstone beds.

ROCKCASTLE SANDSTONE

The Rockcastle was named by M. R. Campbell in 1898 for exposures along the Rockcastle River in Kentucky.

On Lookout Mountain the thin, crossbedded, medium-grained and well-sorted sandstone is interbedded with shales and coal seams. The shales carry a very prolific flora.



COAL MINE DUMPS AT DURHAM, GA. (SHADED AREAS)

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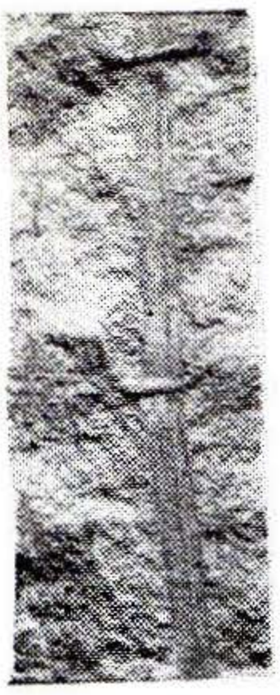

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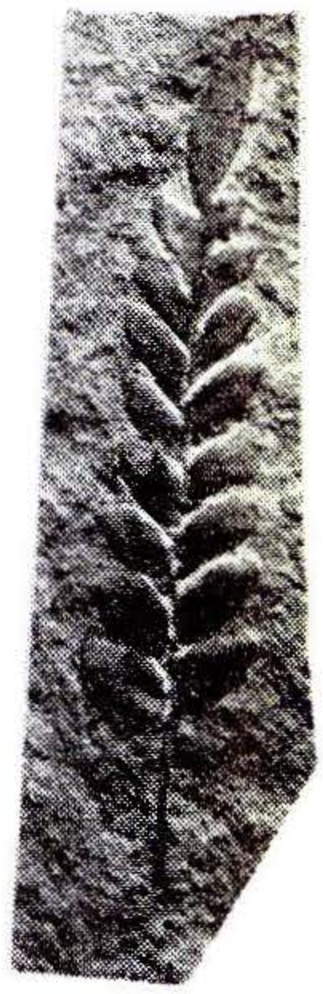

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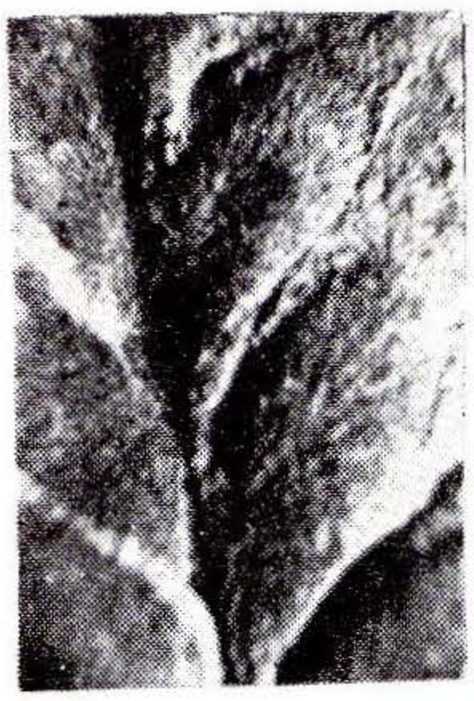

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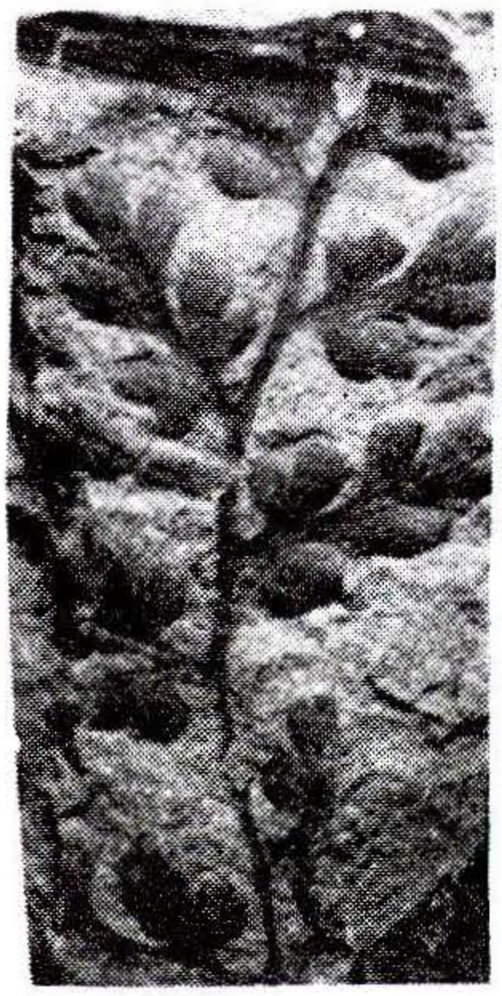

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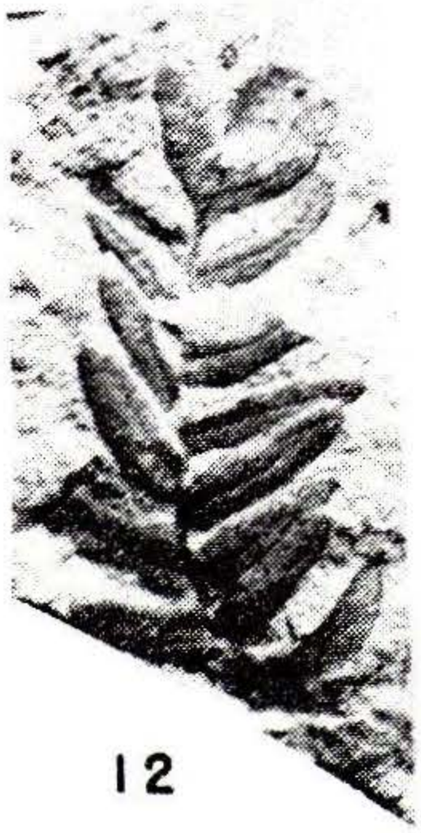

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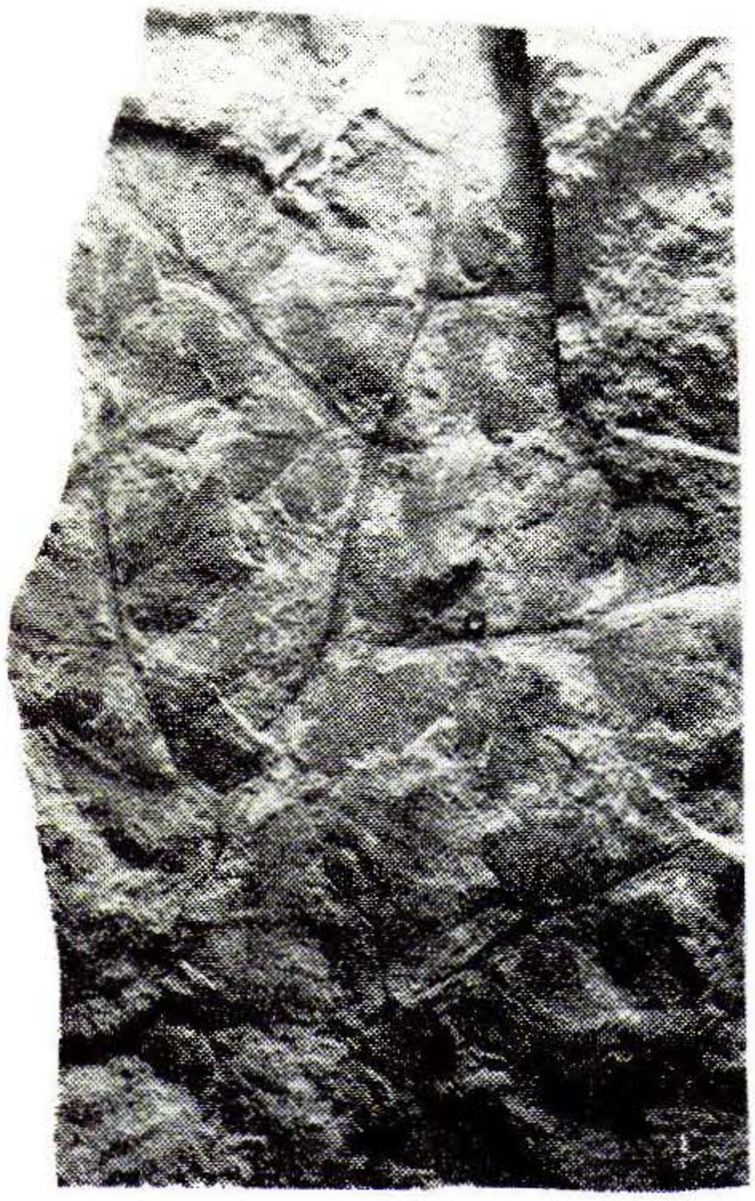

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Plant Fossils of the Vandever and the Rockcastle Formations

PLATE 34.

PLANT FOSSILS OF THE VANDEVER AND THE ROCKCASTLE FORMATIONS

Explanation

Specimens illustrated on this and subsequent plates were collected on a coal mine dump near Durham, Georgia. The location of the mine is shown on the accompanying Index Map No. 6.

FIGURE

1–3. *Annularia sp.*
Incomplete specimens, X 1.
E. G. M. No. 2027.

4. *Alethopteris sp.*
Terminal portion of frond, X 1.
Pinnules lanceolate, alternately attached, bilobed near attachment.
E. G. M. No. 2051.

5, 6. *Neuropteris pocahontas* White.
Single frond, X 1.
Pinnules symmetrical in shape, alternately attached. The terminal pinnule attached at end of stem is about twice as long as other pinnules. Normally pinnules to the side of frond are attached alternately.
Enlarged part of fig. 5, X 4.
Shows venation in the pinnules and angle of attachment.
E. G. M. No. 2009.

7, 8. *Eremopteris cf. Eremopteris microphylla* Lesquereaux.
Incomplete specimen, X 1.
Trilobate pinnules each attached to rachis by a short stem.
Enlarged part of fig. 7, X 4.
Shows venation and angle of attachment.
E. G. M. No. 2026.

9, 10. *Sphenopteris deltiformis* Kidaton.
Fragments of several fronds, X 1.
Pinnules are trilobate, alternately attached with both smooth and ragged edges. Angle of attachment about 50°.
Enlarged part of fig. 9, X 4.
Showing venation of pinnule and angle of attachment.

FIGURE

11. *Archeopteris sp.*
    Incomplete frond, X 1.
    Lobate pinnules alternately attached to stem.
    E. G. M. No. 2617.

12. *Pecopteris elliptica?*
    Incomplete frond, X 1.
    Pinnules small, lobate, attached alternately to delicate rachis, central nerve prominent.
    The terminal pinnule is multilobate.
    E. G. M. No. 2001.

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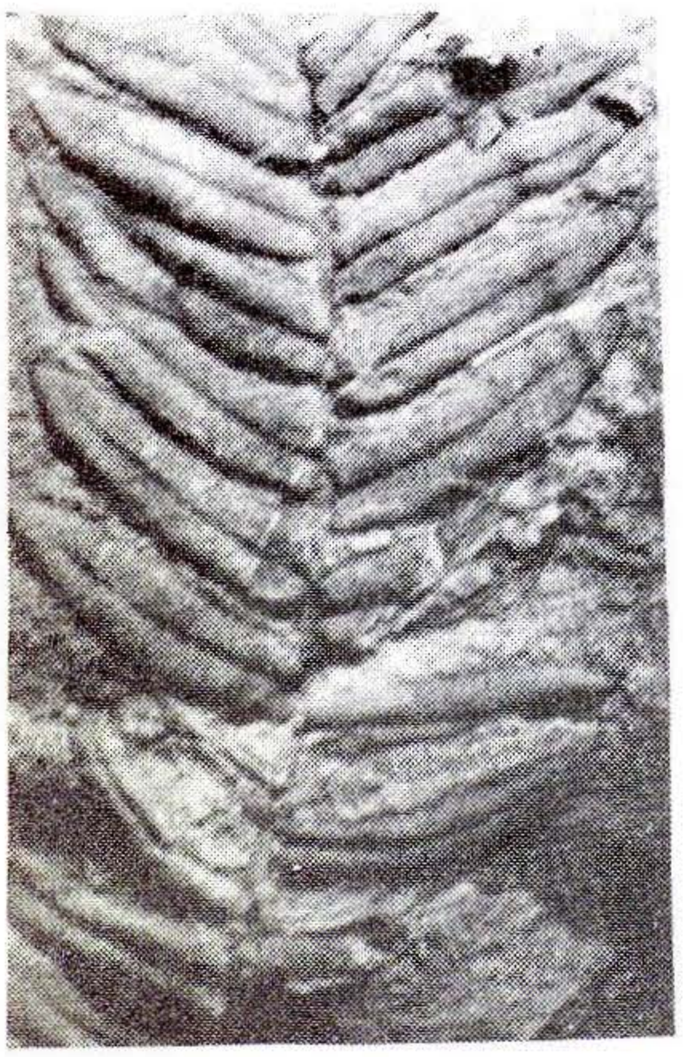

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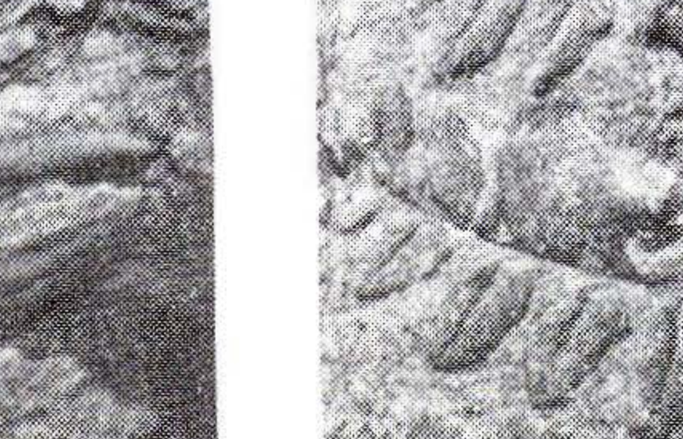

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PLANT FOSSILS OF THE VANDEVER AND THE ROCKCASTLE FORMATIONS

PLATE 35.

PLANT FOSSILS OF THE VANDEVER AND THE ROCKCASTLE FORMATIONS

Explanation

FIGURE

1. *Alethopteris lonchitica* Brogniart.
   Incomplete frond, X 1.
   Long, lanceolate pinnules alternately attached to rachis without stem, terminal pinnule compound.
   E. G. M. No. 2022.

2. *Pecopteris sp.*
   Incomplete frond, X 1.
   Pinnules lanceolate attached alternately to rachis without stem.
   E. G. M. No. 2007.

3. *Alethopteris cf. Alethopteris lonchitica* Brogniart.
   Fragmental frond, X 1.
   Sinuous rachis extending through terminal pinnule.
   The pinnules are strongly ribbed and veined, about 15mm long.
   Terminal pinnule about 25mm long.
   E. G. M. No. 2026.

4, 5. *Neuropteris biformis* Lesquereaux.
   Fragmental frond, X 1.
   Pinnules alternately arranged and irregularly spaced. Prominent median nerve. Leaves attached to delicate rachis without stem.
   Fig. 5 enlarged view of pinnule attachment, X 4.
   E. G. M. No. 2012.

6. *Neuropteris flexuosa* Sternberg.
   External mold of single frond, X 1.
   Ovate pinnules with well-defined veining. The pinnules attach opposite to one another. The terminal pinnule is larger than laterals, not ovate and is acute at the distal end.
   E. G. M. No. 2025.

7. *Neuropteris sp.*
   Specimen showing several fronds, X 1.
   Pinnules short, lobate, terminal pinnule compound with median nerve prominent. About 10 pinnules to the frond. Fronds are attached to rachis alternately at varying angles.
   E. G. M. No. 2023.

FIGURE

8. *Sphenopteris hoeninghausi* Brogniart.
   Delicate frond, X 1.
   Trilobed pinnules which attach to stem opposite or almost opposite each other. The terminal pinnule may be formed of 2 lobes instead of three.
   E. G. M. No. 2002.

9. *Callipteridium cf. Callipteridium membranaceum* Lesquereaux.
   Frond symmetrical and tapering. Pinnules exhibit strong nervation and are attached to rachis with very short stem, 18-20 pinnules per complete frond, X 1.
   E. G. M. No. 2027.

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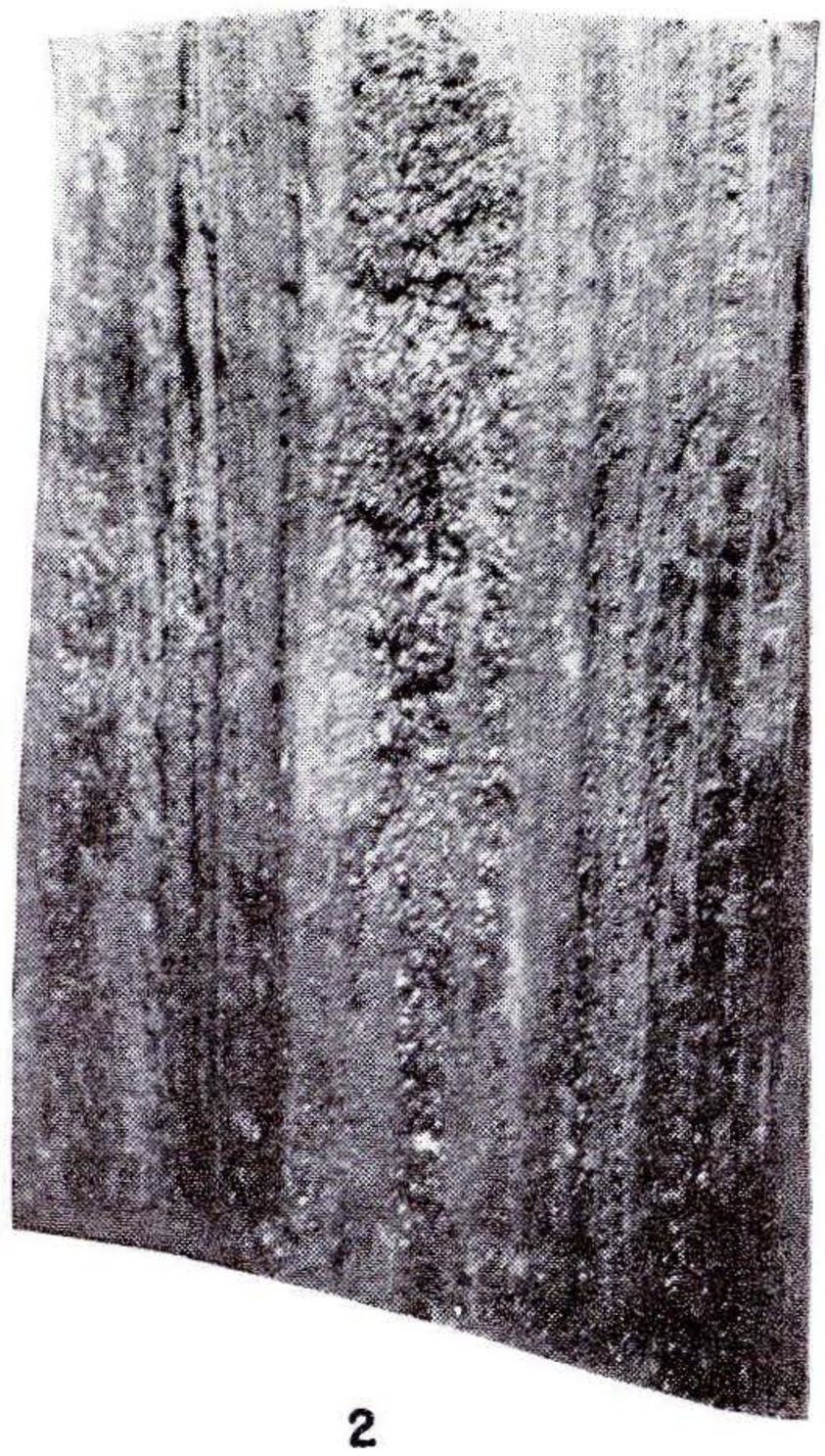

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PLANT FOSSILS OF THE VANDEVER AND THE ROCKCASTLE FORMATIONS

PLATE 36.

PLANT FOSSILS OF THE VANDEVER AND THE ROCKCASTLE FORMATIONS

Explanation

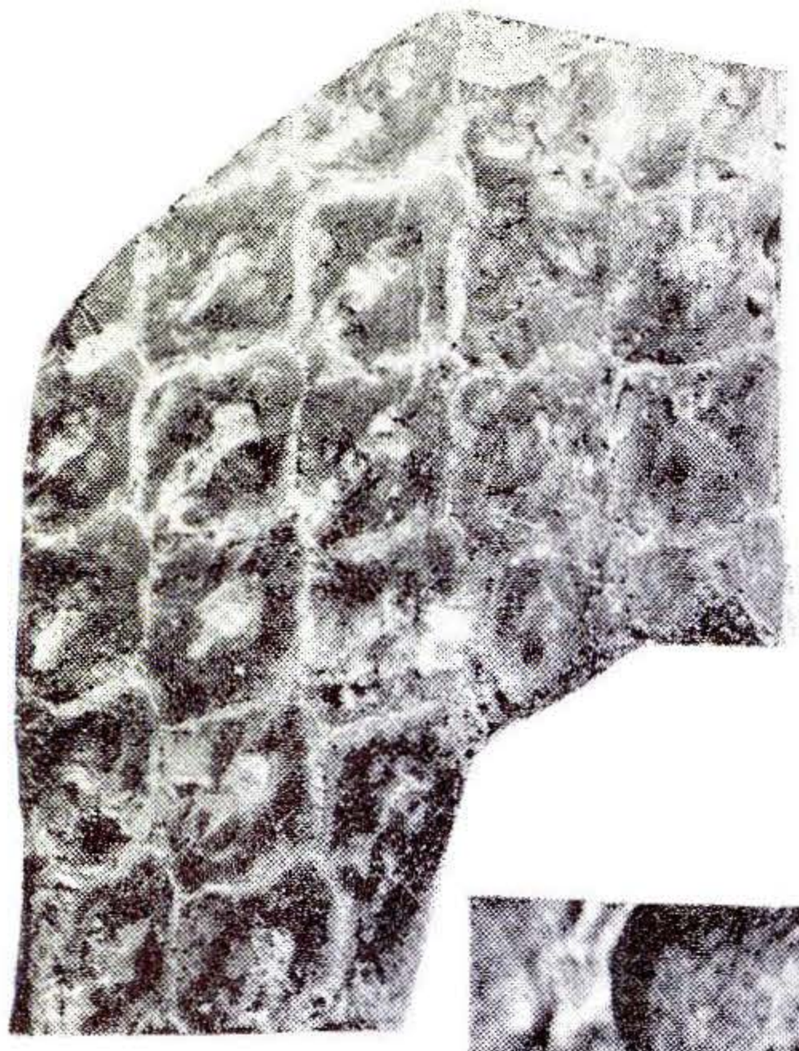
FIGURE

1. *Calamites suckowi* Brogniart.
   Internal mold of ridged pith cast, X 1.
   E. G. M. No. 2011.

2. *Calamites sp.*
   Internal pith cast, X 1.
   E. G. M. No. 2050.

3. *Cordaites communis* Lesquereaux.
   Internal mold, X 1.
   E. G. M. No. 2015.

4. *Sigillaria sp.*
   Internal pith cast, X 1.
   E. G. M. No. 2010.



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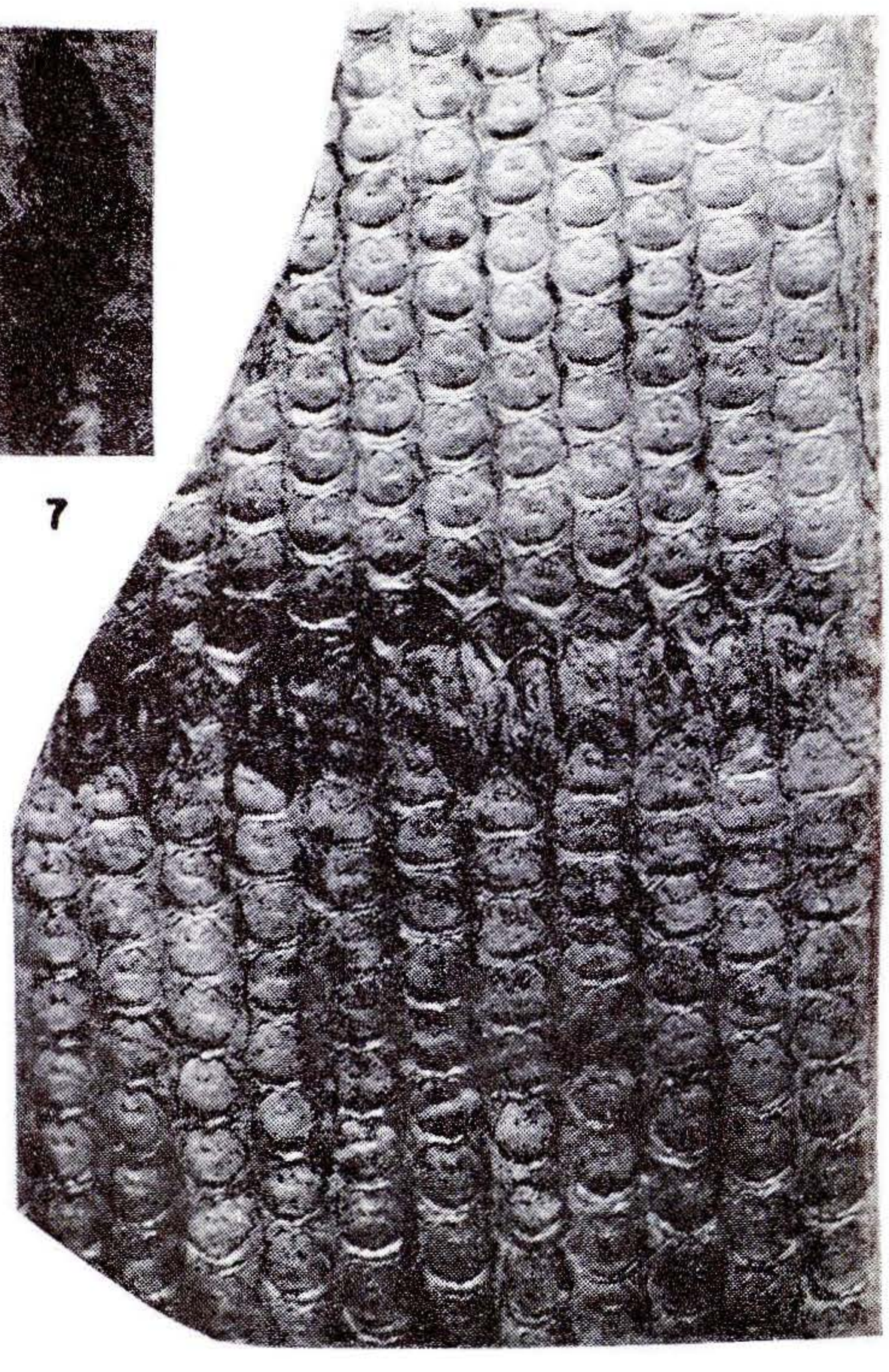

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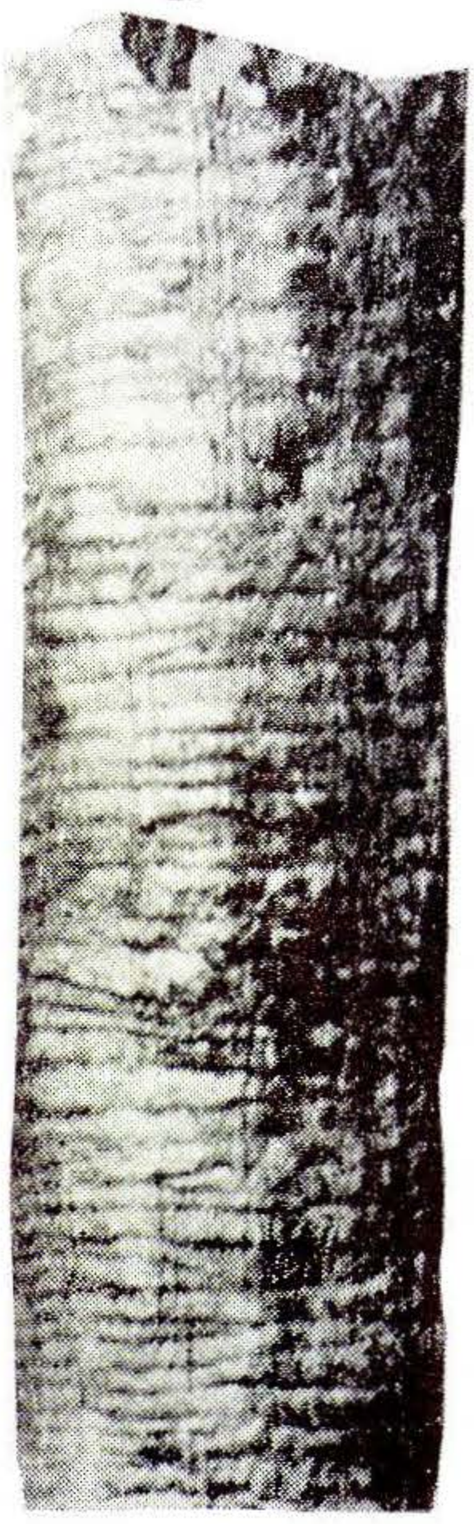

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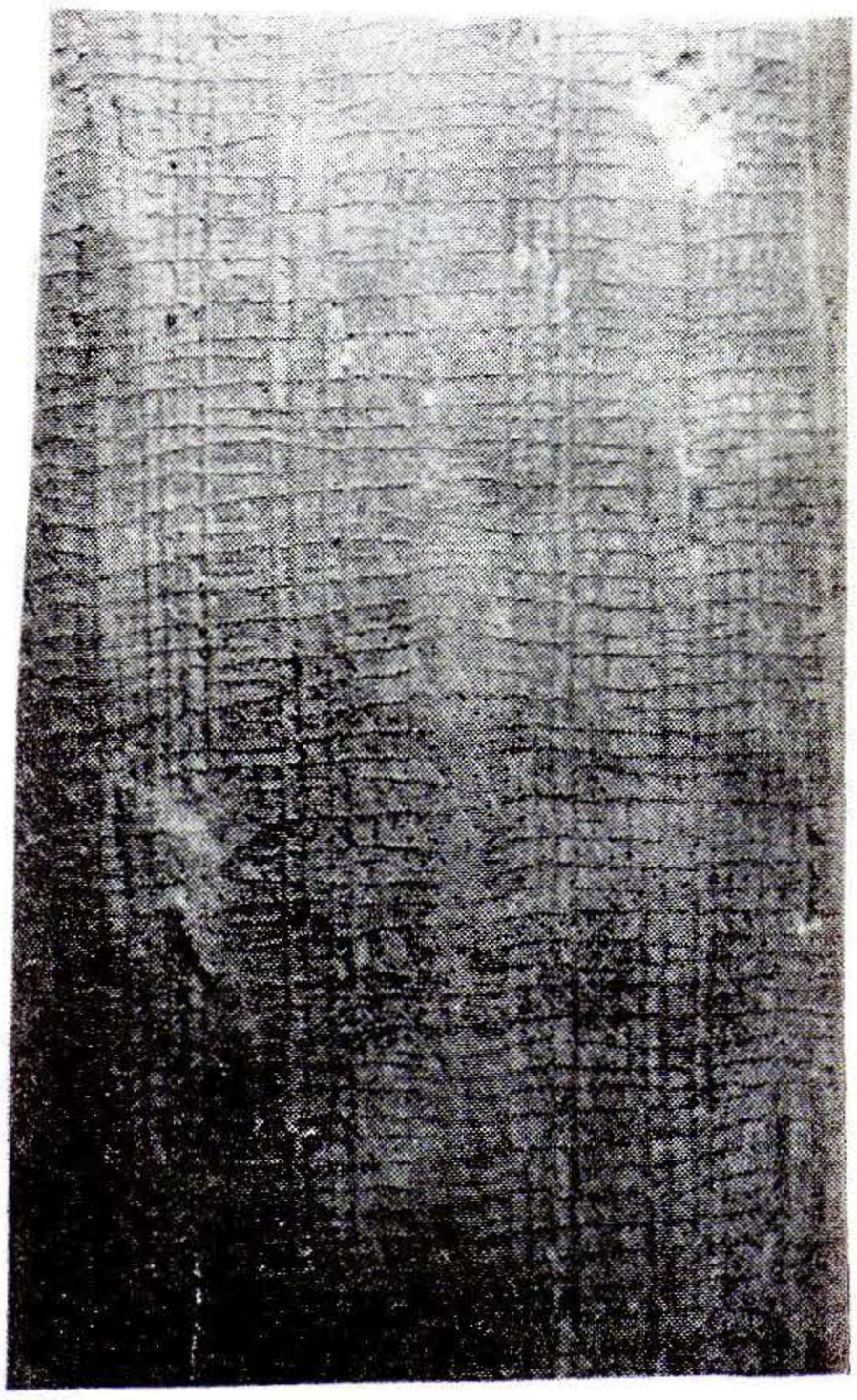


6

PLANT FOSSILS OF THE VANDEVER AND THE ROCKCASTLE FORMATIONS

PLATE 37.

PLANT FOSSILS OF THE VANDEVER AND THE ROCKCASTLE FORMATIONS

Explanation

FIGURE

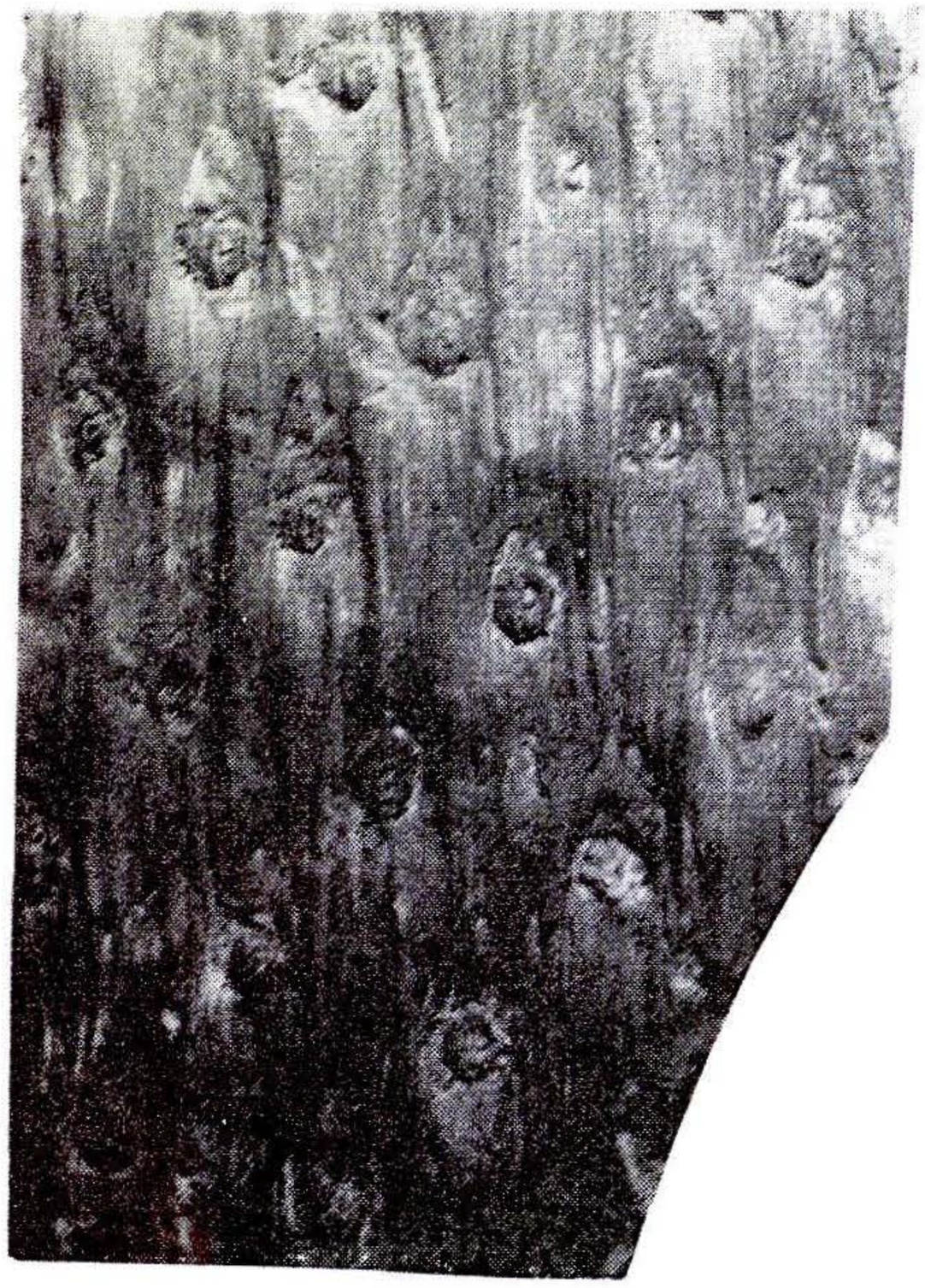
1, 2. *Lepidodendron sp.*
Rhombic bolsters, X 1.
These are about 8mm on a side. Leaf scars are rhombic with an ovate groove extending from one corner of the rhomb. Fig. 2 is an enlarged view of a single scar, X 4.
E. G. M. No. 2003.

3, 4. *Sigillaria mammillaris* (?) Brogniart.
Impression of large fragment, X 1.
Slightly raised ribs. Leaf bolsters separated by slightly concave transverse furrows about 1 millimeter in width. Leaf scars less than 1 centimeter in diameter. Fig. 4 is an enlarged view of the leaf bolsters showing leaf scars, X 4.
E. G. M. No. 2021.

5. *Cordaites serpens,* Lesquereaux.
Internal pith core, X 1.
E. G. M. No. 2005.

6. *Cordaites sp.*
Internal pith cast, X 1.
E. G. M. No. 2060.

7. *Macrostachya sp.*
Cone, X 1.
E. G. M. No. 2006.



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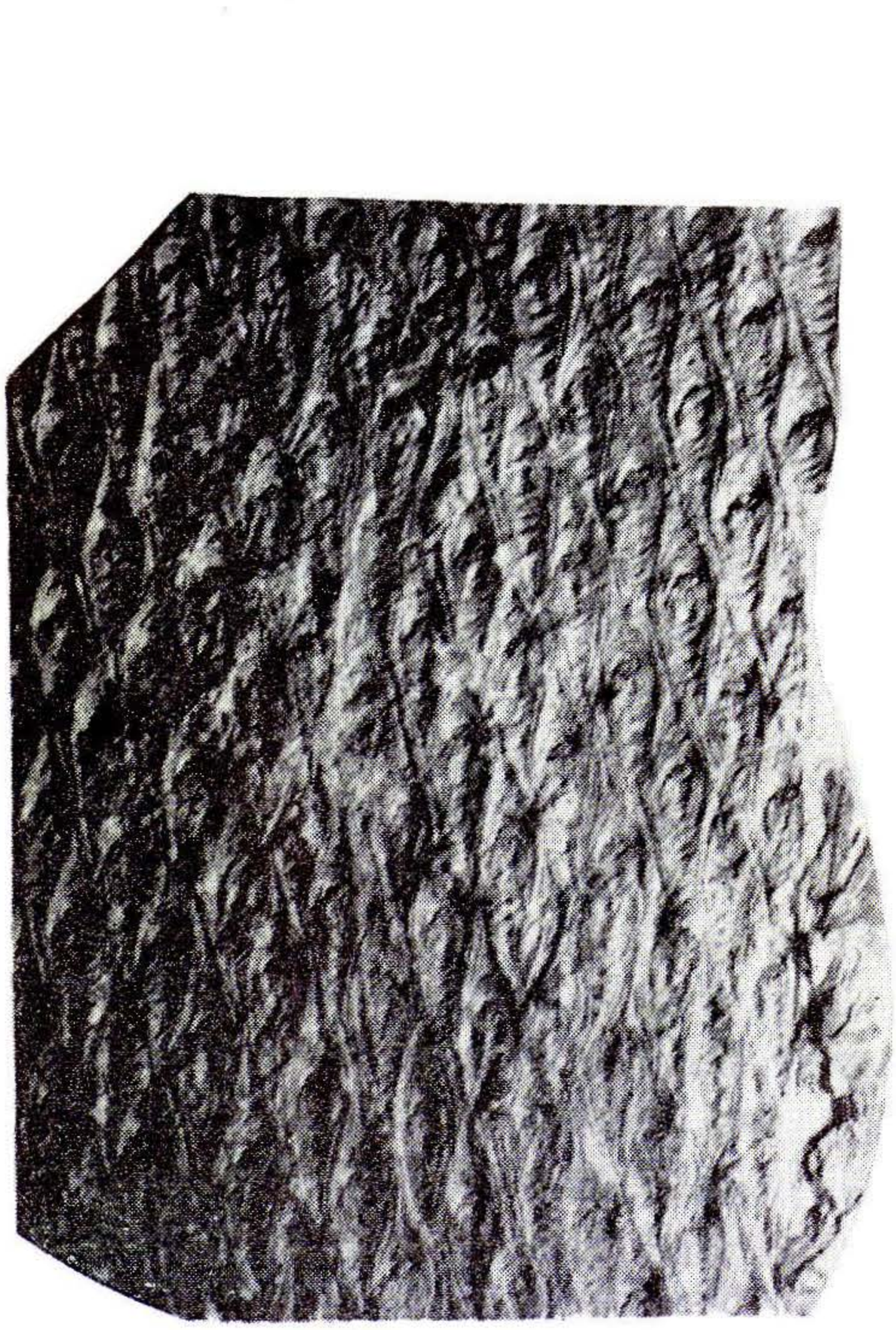

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PLANT FOSSILS OF THE VANDEVER AND THE ROCKCASTLE FORMATIONS

PLATE 38.

PLANT FOSSILS OF THE VANDEVER AND THE ROCKCASTLE FORMATIONS

Explanation

FIGURE

1. *Lepidodendron rimosum* Sternberg.
   Large fragment, X 1.
   Leaf bolsters fusiform with tails not joining but running side by side for part of the length. Bolsters of low relief except for leaf scars. The leaf scars are well-elevated, and slightly rhombic.
   E. G. M. No. 2014.

2. *Neuropteris plicata* Sternberg.
   Incomplete frond, X 1.
   Pinnules alternate, lobate, distinct venation, attached with short cordate base to a fairly stout rachis. Terminal pinnule lanceolate.
   E. G. M. No. 2009.

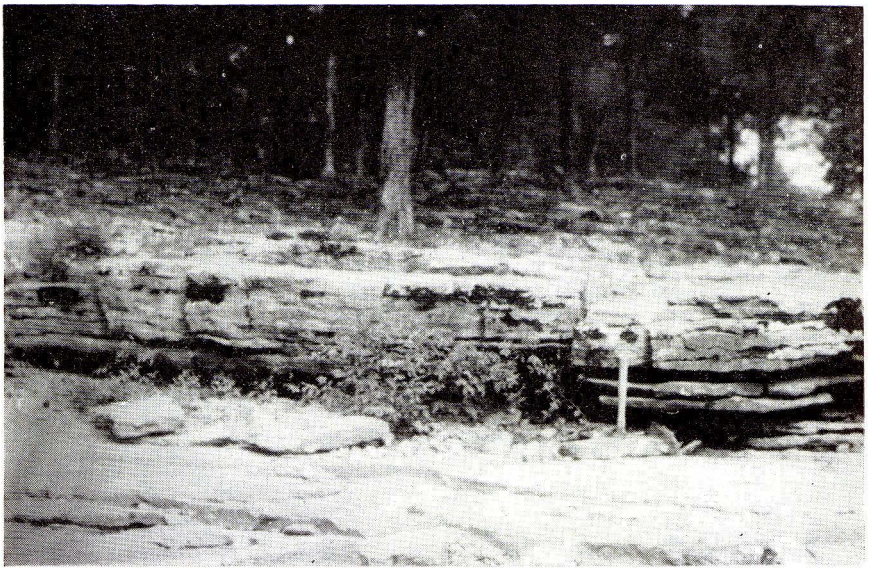
3. *Lepidodendron sp.*
   Large fragment, X 1.
   Interior cast of stem showing the oblique arrangement of leaf bolsters.

4. *Lepidodendron sp.*
   Frond, X 1.
   Many slender, straight leaves with smooth shield below the leaf scars.
   E. G. M. No. 2016.

ILLUSTRATIVE PLATES

(A) View of Middle Ordovician limestones exposed in ditch on east side of Georgia highway 151, four miles north of Ringgold.

(B) View of Middle Ordovician limestones in roadcut on east side of Georgia highway 151, 1½ miles north of Ringgold.



(A) Exposure of Middle Ordovician limestones in quarry on east boundary of Chickamauga Park.

(B) Exposure of Upper Ordovician limestones on south side of Georgia highway 143, west flank of Pigeon Mountain.

(A) Alternating shales and siltstones of the Red Mountain formation, north side of U. S. highway 41, 1 mile east of Ringgold.

(B) Fort Payne Chert exposed on east side of U. S. highway 27 on flank of Taylor Ridge near Gore.

(A) Erosion ditches in deep red soil overlying the Gasper and the Ste. Genevieve limestone. North end of Cherokee Ridge at the Tennessee-Georgia line. The locality is known as Cave Springs.

(B) Shale waste on coal mine dump, 1 mile east of Durham.

INDEX

SELECTED REFERENCES

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1. Bassler, R. S. (1932) The Stratigraphy of the Central Basin of Tennessee, Tenn. Geol. Survey Bull. 38.

2. Bassler, R. S. (1950) Faunal Lists and Descriptions of Paleozoic Corals, G. S. A. Memoir 44.

3. Bell, W. A. (1943) Carboniferous Rocks and Fossil Floras of Northern Nova Scotia, Canada Geological Survey Mem. 238.

4. Butts, Charles (1926) Geology of Alabama, The Paleozoic Rocks, Ala. Geol. Survey Spec. Rept. 14.

5. Butts, Charles (1941) Geology of the Appalachian Valley in Virginia, Va. Geol. Survey Bull. 52.

6. Butts, Charles and Gildersleeve, B. (1948) Geology and Mineral Resources of the Paleozoic Area in Northwest Georgia, Ga. Geol. Survey Bull. 54.

7. Condra, G. E. and Elias, M. K. (1944) Study and Revision of Archimedes (Hall), G. S. A. Spec. paper 53.

8. Easton, W. H. Corals from the Chouteau and Related Formations of the Mississippi Valley, Ill. Geol. Survey Rept. of Investigations, No. 97.

9. Fontaine, Wm. M. and White, I. C. (1880) The Permian or Upper Carboniferous Flora of West Virginia and S. W. Pennsylvania, Second Geol. Survey of Penn.

10. Hall, James (1859) Natural History of New York, Part VI, Paleontology Vol. 1, 2, and 3.

11. Jillson, W. R. et. al. (1931) The Paleontology of Kentucky, Ky. Geol. Survey.

12. Lesquereux, Leo (1870) Atlas of the Coal Flora of Pennsylvania, Second Geol. Survey of Penn.

13. Lesquereux, Leo (1866) Description of Plants, Ill. Geol. Survey Vol. 2.

14. Schuchert, Chas. (1897) A Synopsis of American Fossil Brachiopoda, U. S. Geol. Survey Bull. 87.

15. Shimer, H. W. and Shrock, R. R. (1943) Index Fossils of North America, John Wiley & Sons, New York.

16. Ulrich, E. O. (1890) Geological Survey of Illinois, Geol. Survey of Ill. Vol. 8.

17. Ulrich, E. O. et. al. (1895) The Geology of Minnesota, Geol. Survey of Minn. Vol. III.

18. Ulrich, E. O., Foerste, A. F. and Miller, A. K. (1943) Ozarkian and Canadian Cephalopods, G. S. A. Spec. paper No. 49.

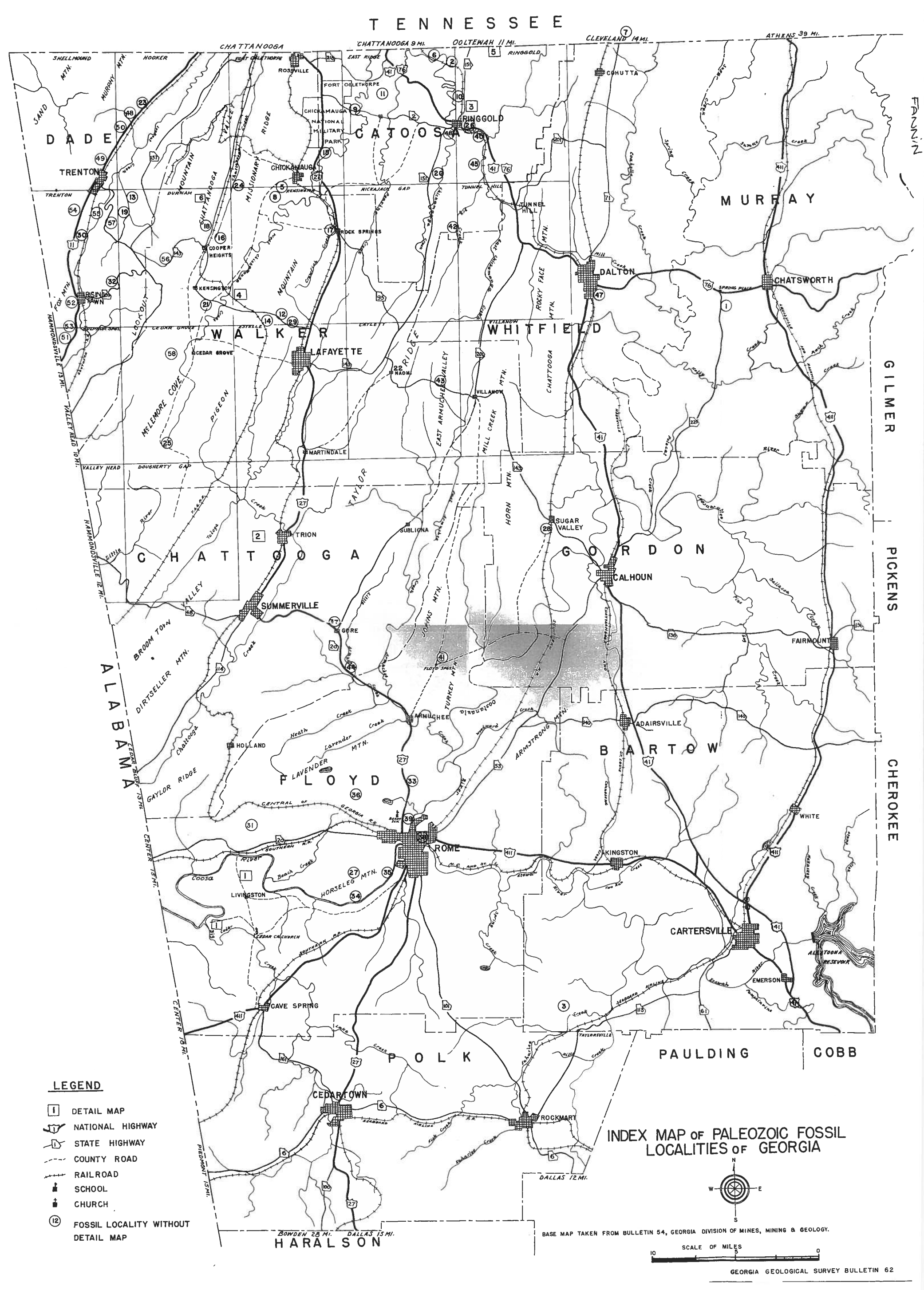
19. Wilson, C. W. Pre-Chattanooga Stratigraphy in Central Tennessee, Tenn. Geol. Survey, Bull. 56.

20. White, David (1893) Flora of the Outlying Carboniferous Basins of Southwestern Missouri, U. S. Geol. Survey Bull. 98.

21. White, D. (1899) Fossil Flora of the Lower Coal Measures of Missouri, U. S. Geol. Survey Mono. 37.

22. Wilmarth, M. G. (1938) Lexicon of Geologic Names of the United States, U. S. Geol. Survey Bull. 896.

INDEX MAP OF PALEOZOIC FOSSIL LOCALITIES OF GEORGIA



LEGEND

- [1] DETAIL MAP
- (1) NATIONAL HIGHWAY
- 1 STATE HIGHWAY
- COUNTY ROAD
- RAILROAD
- SCHOOL
- CHURCH
- (12) FOSSIL LOCALITY WITHOUT DETAIL MAP

BASE MAP TAKEN FROM BULLETIN 54, GEORGIA DIVISION OF MINES, MINING & GEOLOGY.

SCALE OF MILES
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GEORGIA GEOLOGICAL SURVEY BULLETIN 62