

ARTICULO

PALYNOLOGICAL DATING OF THE CARRIZAL FORMATION OF EASTERN VENEZUELA¹
 (DETERMINACION PALINOLOGICA DE LA EDAD
 DE LA FORMACION CARRIZAL DE VENEZUELA ORIENTAL)

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SUMMARY

Palynological study of pre-Cretaceous acritarch assemblages from seven core samples indicates that the Carrizal Formation is of Late Devonian-Early Mississippian age. Similar assemblages, dominated by the occurrence of Gorgonisphaeridium, were recovered from each core, and representative specimens are identified and illustrated on the accompanying plates.

RESUMEN

Un estudio palinológico de los conjuntos acritarcos pre-cretácicos en siete muestras de núcleo indica que la edad de la Formación Carrizal está comprendida entre el Devónico y el principio del Carbonífero. Conjuntos parecidos, dominados por la presencia de Gorgonisphaeridium, se encontraron en todas las muestras. Se ilustran e identifican ejemplares representativos en las láminas adjuntas.

INTRODUCTION

In 1959, twenty-three samples of pre-Cretaceous rocks from eastern Venezuela were submitted by Creole Petroleum Corporation to Jersey Production Research Company for petrographic, x-ray diffraction and paleontologic analyses. The fourteen samples most likely to contain palynomorphs were processed, of which eight were fossiliferous. The assemblages from these samples consisted exclusively of marine microfossils of unknown affinities (acritarchs) and, on the basis of the assemblages, J. W. Funkhouser assigned a Carboniferous age to the samples. Several years later the samples were reprocessed by Esso Production Research Company at the request of A. Salvador, in anticipation that more precise age determinations would be possible because of increased information on acritarchs and because of improved processing techniques which should provide better recovery. The results of the second study are presented in this report.

DISCUSSION

Reprocessing of the samples listed below provided sparse to common acritarch assemblages containing specimens of the forms identified and illustrated by Funkhouser as well as many additional species.

¹ Published by permission of Esso Production Research Company and Creole Petroleum Corporation. Mobil Oil Company de Venezuela kindly consented to mention of data from wells drilled by the Socony-Vacuum Oil Company (Carrizal-1, Suata-1, Tres Matas-1).

The cores studied represent the Carrizal Formation, a unit of hitherto indefinite age encountered sporadically in the Guárico oilfields between the Precambrian basement and the Cretaceous Temblador Group. Stratigraphers have tended to regard the Carrizal Formation as Jurassic-Triassic, but a Paleozoic age has not been excluded: see Stratigraphical Lexicon of Venezuela (1956). The samples include cores from the type section (Carrizal-1) and reference well (Suata-1) cited in the Lexicon, and from three other wells in the vicinity. The following table shows the well depths and lithologies of the cores studied.

Table I - Samples Processed for Palynomorphs

Sample No.	Well	Depth in Feet	Lithology
1.	Carrizal-1	4093-4105	Calcareous, argillaceous, greenish gray siltstone
2.	Carrizal-1	4995-5000	Argillaceous, greenish
3.	Carrizal-1	5012-5019	gray siltstone
4.	Tres Matas-1	2853-2863	
5.	Socororo-1	2079-7081	Silty, micaceous,
6.	Hato Viejo-1	2518-2537	greenish gray claystone
7.	Suata-1	2064-2074	

The genera represented by the largest number of specimens are Gorgonisphaeridium, Michrystridium, and Dictyotidium. Also common in all samples are nondescript, simple bodies with more or less circular outlines and smooth or faintly ornamented walls. Such forms are identified as cysts on the plates. The association of Gorgonisphaeridium and numerous cystoid bodies is apparently typical of mid-Paleozoic acritarch complexes, and it is primarily on this basis that the eastern Venezuela assemblages are considered as Late Devonian-Early Mississippian in age.

No genera indicative of pre-Upper Devonian assemblages (Veryhachium, Leiofusa, Domasia and Multiplicisphaeridium) were identified in the Venezuelan assemblages. Similarly, genera known to occur in Late Paleozoic and Mesozoic assemblages (Solisphaeridium, Filosphaeridium, Wilsonastrum and Cymatiosphaera) are lacking in the studied samples.

The same general types of acritarchs were recovered in all the assemblages, although those from the Hato Viejo-1 tended to be somewhat smaller and less strongly ornamented than specimens from the other cores. Long-spined forms of Gorgonisphaeridium are more common in the Suata-1 and Socororo-1 samples, and the relatively short-spined forms are more common in the deepest sample from the Carrizal-1. Cyst-like bodies are present in all samples, and specimens of Dictyotidium, Michrystridium and Leiosphaeridea occur sparingly in most samples.

Preservation of nearly all specimens is fair to poor, and because of this, species identification of most individuals is precluded. The best preserved specimens, identified to the generic level or higher, are illustrated on plates 1-5. As shown by the photomicrographs, the majority of individuals are moderately carbonized, which, under the microscope have a medium to dark brown coloration. The surface textures of many specimens are partly destroyed or altered by the penetration of minute pyrite crystals, and still other specimens are so oxidized that only a thin, diaphanous coat remains.

PLATES AND PLATE DESCRIPTIONS

- PLATE 1. Specimens from Suata-1 at 2064-2074 feet.
- PLATE 2. Specimens from Carrizal-1 at 4093-4105 feet (Figs. 1-5), and from 4995-5000 feet (Figs. 6-10).
- PLATE 3. Specimens from Carrizal-1 at 5012-5019 feet (Figs. 1-8), and from Hato Viejo-1 at 2518-2537 feet (Figs. 9-12).
- PLATE 4. Specimens from Hato Viejo-1 at 2518-2357 feet.
- PLATE 5. Specimens from Tres Matas-1 at 2853-2863 feet (Figs. 1-6), and from Socororo-1 at 7097-7100 feet (Figs. 7-11).

Magnification 1000x, unless stated otherwise.

PLATE 1

Figure

1. Gorgonisphaeridium sp.; la-phase contrast, lb - bright field.
2. Gorgonisphaeridium sp.
3. Gorgonisphaeridium sp.; 3a-phase contrast, lb - bright field.
4. Papillate cyst.
5. Papillate cyst (x640).
6. Gorgonisphaeridium?
7. Papillate cyst.
8. Gorgonisphaeridium? sp.
9. Michrystridium? sp. Specimen shown at two slightly different focus levels.

PLATE 2

1. Leiosphaeridia sp.
2. Lophosphaeridium sp.
3. Lophosphaeridium sp. (x640).
4. Michrystridium? sp.
5. Folded, papillate cyst (x640).
6. Dictyotidium sp. Specimen shown at two focus levels.
7. Papillate cyst (torn specimen).
8. Smooth cyst (specimen corroded).
9. Smooth cyst.
10. Dictyotidium sp.

PLATE 3Figure

1. Smooth cyst.
2. Papillate cyst.
3. Gorgonisphaeridium sp.
4. Gorgonisphaeridium sp.
5. Gorgonisphaeridium sp. (x640).
6. Gorgonisphaeridium sp.
7. Gorgonisphaeridium sp.
8. Gorgonisphaeridium sp.
9. Gorgonisphaeridium sp.
10. Smooth cyst.
11. Papillate cyst.
12. Gorgonisphaeridium sp. (x640).

PLATE 4

1. Finely granulate cyst.
2. Finely granulate cyst.
3. Finely granulate cyst.
4. Finely granulate cyst.
5. Michrystridium sp.
6. Michrystridium sp.
7. Michrystridium sp.
8. Michrystridium sp.
9. Michrystridium sp.
10. Michrystridium sp.
11. Smooth cyst.
12. Smooth cyst.
13. Leiosphaeridea sp.
14. Papillate cyst.
15. Papillate cyst.
16. Smooth cyst.

PLATE 5

1. Smooth cyst.
2. Gorgonisphaeridium sp.
3. Leiosphaeridea sp.
4. Dictyotidium sp.
5. Gorgonisphaeridium sp.
6. Gorgonisphaeridium sp.
7. Smooth cyst.
8. Gorgonisphaeridium sp.
9. Gorgonisphaeridium sp.
10. Gorgonisphaeridium sp.
11. Gorgonisphaeridium sp.; 11a - bright field, 11b - phase contrast.

PLATE 1
Paleozoic Acritarchs, Venezuela

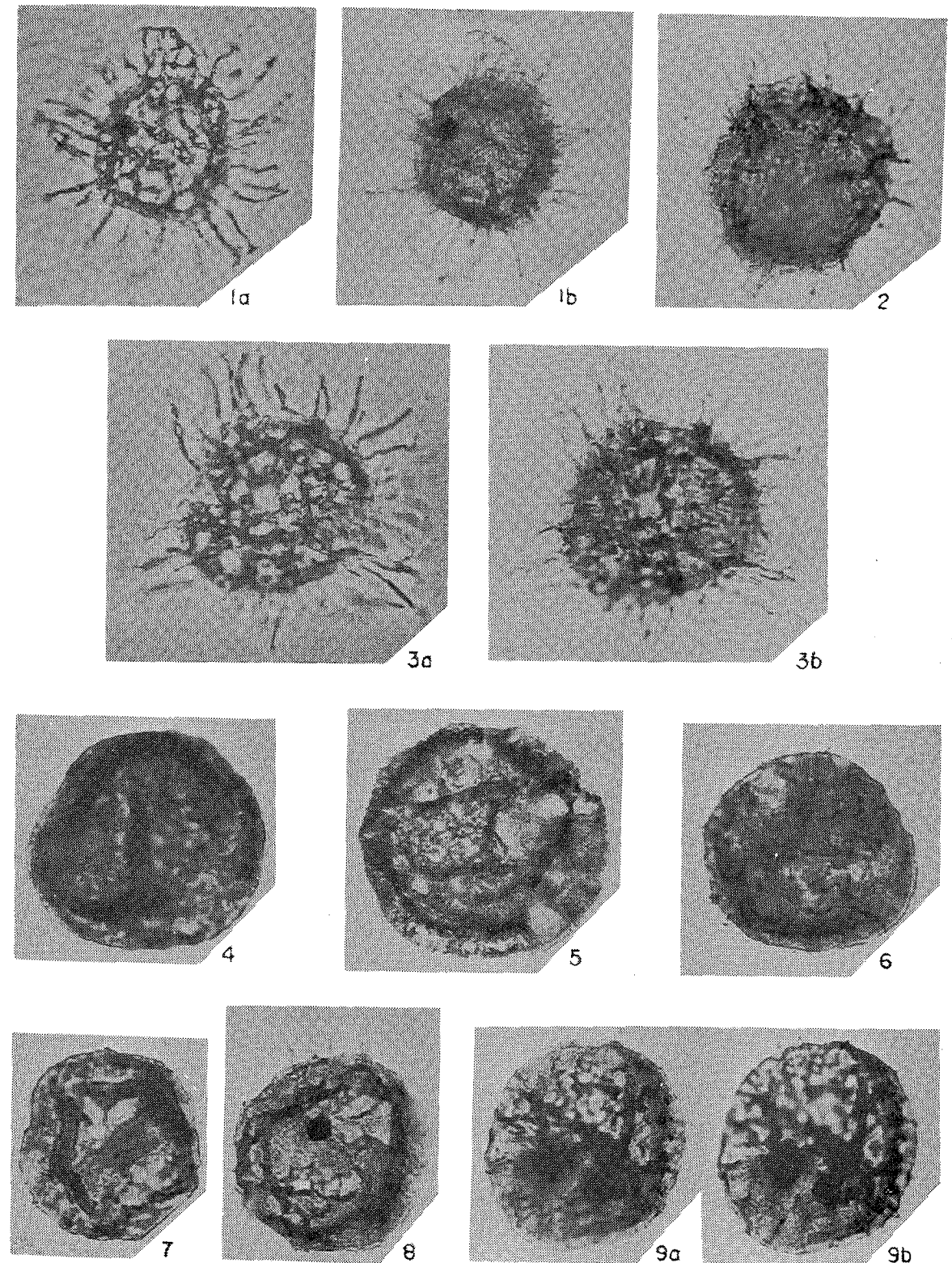


PLATE 2
Paleozoic Acritarchs, Venezuela

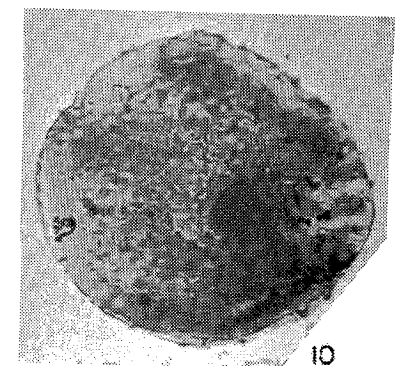
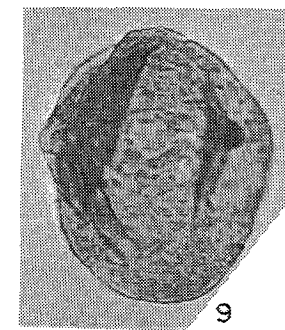
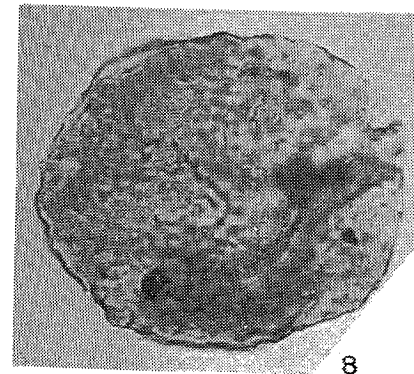
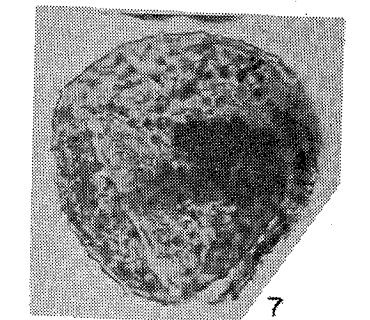
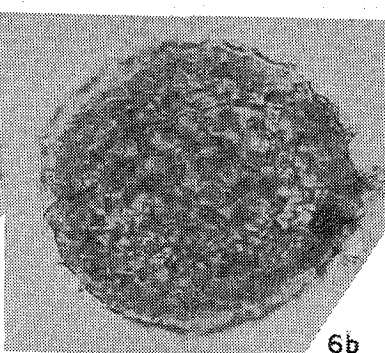
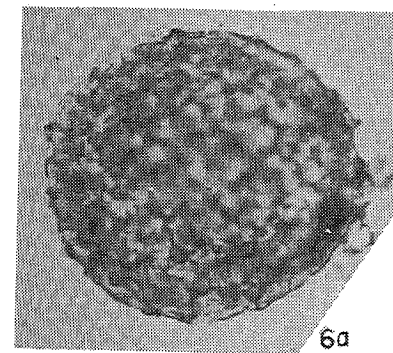
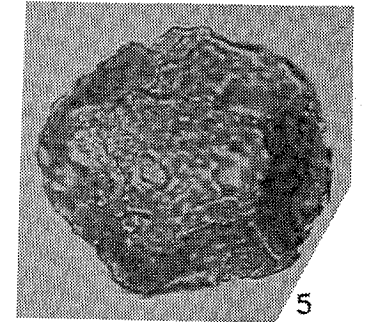
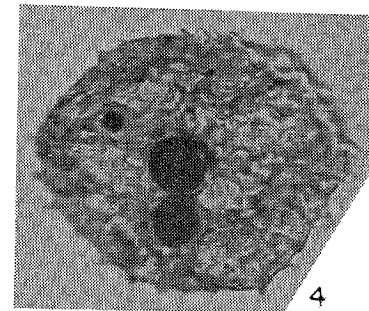
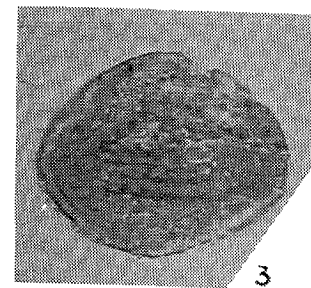
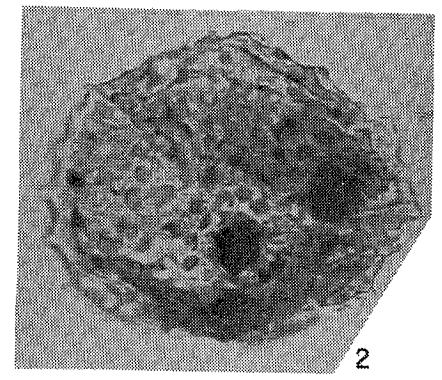
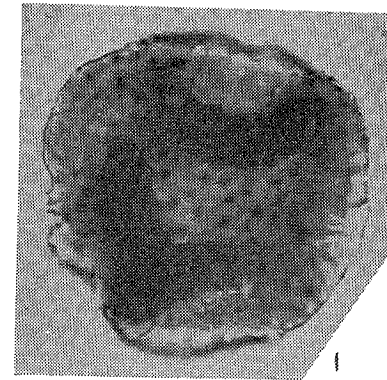


PLATE 3
Paleozoic Acritarchs, Venezuela

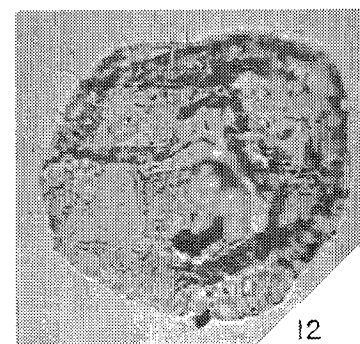
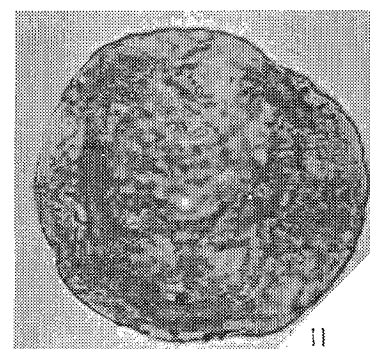
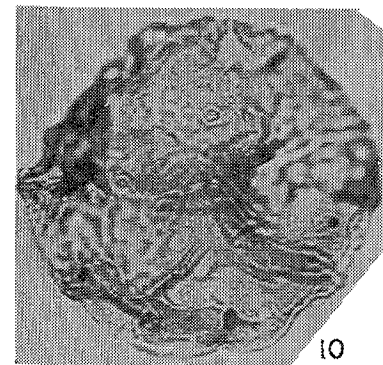
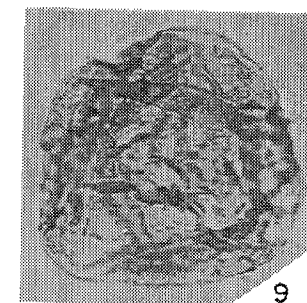
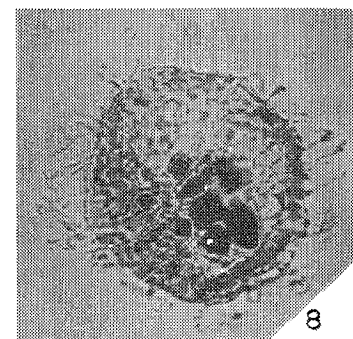
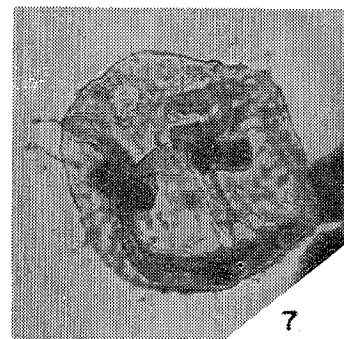
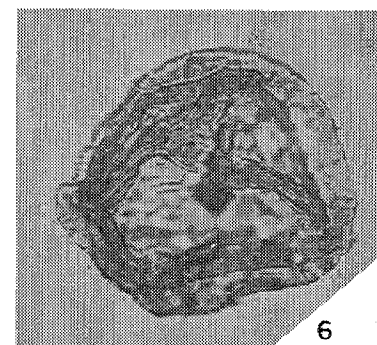
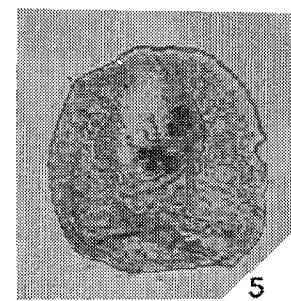
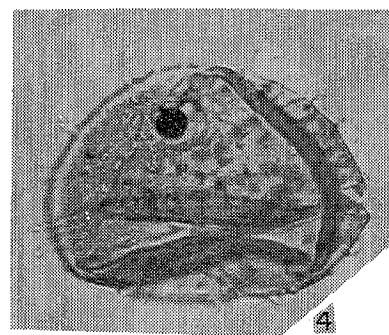
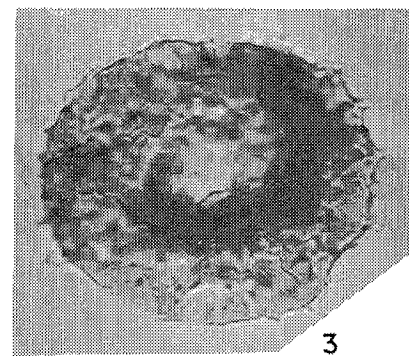
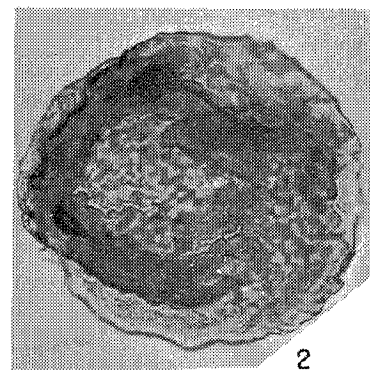
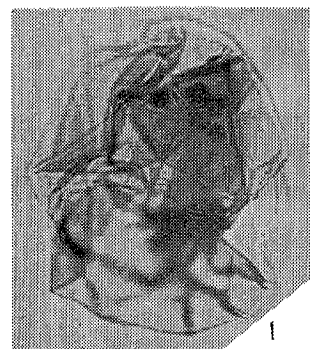
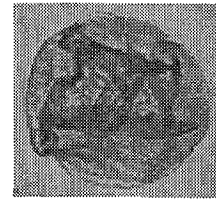
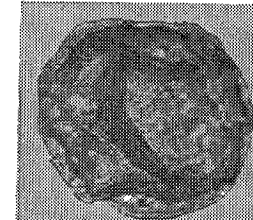


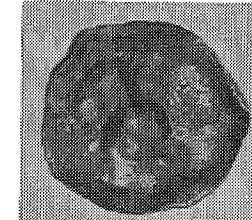
PLATE 4
Paleozoic Acritarchs, Venezuela



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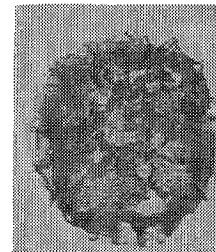
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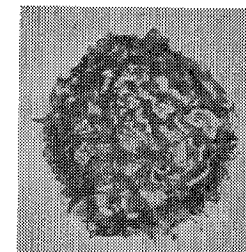
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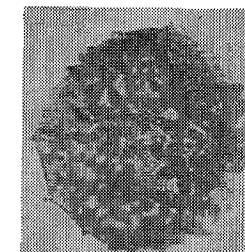
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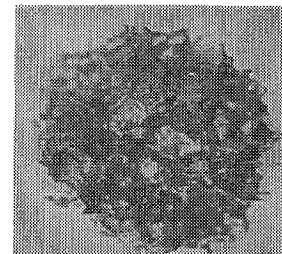
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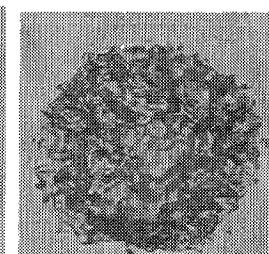
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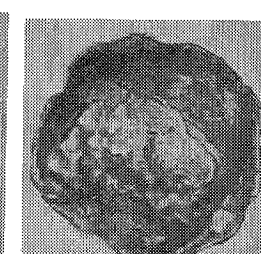
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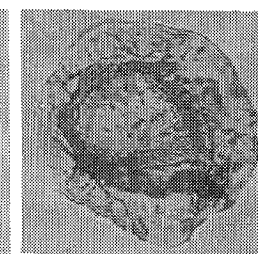
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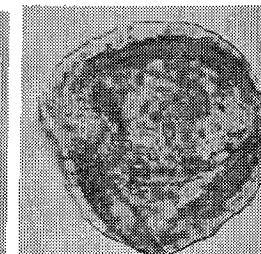
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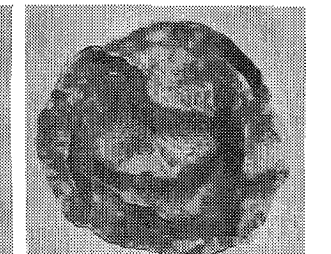
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PLATE 5
Paleozoic Acritarchs, Venezuela

