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U. S. GEOLOGICAL SURVEY

OPEN-FILE REPORT

Plant and Miscellaneous Microfossils from
the Thermopolis and Mowry Shales

by

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This report is preliminary and has not been
edited or reviewed for conformity with
Geological Survey standards or nomenclature

As a part of continuing studies to provide palynological data from critical sequences for comparative biostratigraphic studies, the microfossils from several levels of the Thermopolis Shale and the lower part of the Mowry Shale have been examined and photographed. Six assemblages on four plates are presented.

The samples are from sections measured by A. E. Roberts. They are exposed on the north side of Rocky Creek Canyon in SW $\frac{1}{4}$ sec. 20, T. 2 S., R. 7 E., Gallatin County, Montana.

The stratigraphic position of each assemblage is shown on the accompanying chart.

Copies of this open-file report and plate enlargements may be obtained for the cost of reproduction from the U. S. Geological Survey Library, Denver Federal Center, Denver, Colorado, 80225.

Thermopolis Shale

Total Column = 493'

03512-H = plate 3
437.6' from base

03512-H = plate 2
291.8' from base

03512-H = plate 1
167.2' from base

82.2' from base
03512-A, B, C, D = plate 1
Total of 34.3'
47.11' from base

STRATIGRAPHIC POSITIONS OF ASSEMBLAGES

Measured Sections By A.E. Roberts

Heavy Shale

Total Column = 497'

03513-B = plate 4
18.6' from base
03513-A = plate 4
1 1/2' from base

Scale: 1" = 50'

PLATE 1

EXPLANATION

USGS Paleobotanical locality D3512-A, B, C, D. Thermopolis Shale
47-82 feet from base.

- Figures 1-9: spores of Pteridophyta
10-19: pollen of Gymnospermae
20-28: Monosulcate pollen
29: tricolpate pollen of Angiospermae
30-31: Incertae sedis
32: Dinoflagellata

USGS Paleobotanical locality D3512-H. Thermopolis Shale 167 feet from
base.

- Figures 33-47, 59: spores of Pteridophyta
48-58: pollen of Gymnospermae
60-61: Incertae sedis
62-72: monosulcate pollen
73-80: tricolpate pollen of Angiospermae
81-82: Dinoflagellata

The size of each plate will be approximately 20 x 24 inches, and the
figures will be at about 1000x magnification.

PLATE 2

EXPLANATION

USGS Paleobotanical locality D3512-N. Thermopolis Shale 291 feet from base.

Figures 83-109: spores of Pteridophyta

110-118: pollen of Gymnospermae

119-120: Incertae sedis

121-125: Monosulcate pollen

126-129: tricolpate pollen of Angiospermae

The size of each plate will be approximately 20 x 24 inches, and the figures will be at about 1000x magnification.

PLATE 3

EXPLANATION

USGS Paleobotanical locality D3512-U. Thermopolis Shale 437 feet from base.

- Figures 130-152: spores of Pteridophyta
153-162: pollen of Gymnospermae
163-164: monosulcate pollen
165-170: tricolpate pollen of Angiospermae
171-171' Dinoflagellata
172-172' Hystrichosphaeridae

The size of each plate will be approximately 20 x 24 inches, and the figures will be at about 1000x magnification.

PLATE 4

EXPLANATION

USGS Paleobotanical locality D3513A Mowry Shale 1.5 feet from base.

Figures 173-192: spores of Pteridophyta

193-196: pollen of Gymnospermae

197-198: Monosulcate pollen

199: Incertae sedis

200-205: tricolpate pollen of Angiospermae

USGS Paleobotanical locality D3513-B Mowry Shale 18.6 feet from base.

Figures 206-216: spores of Pteridophyta

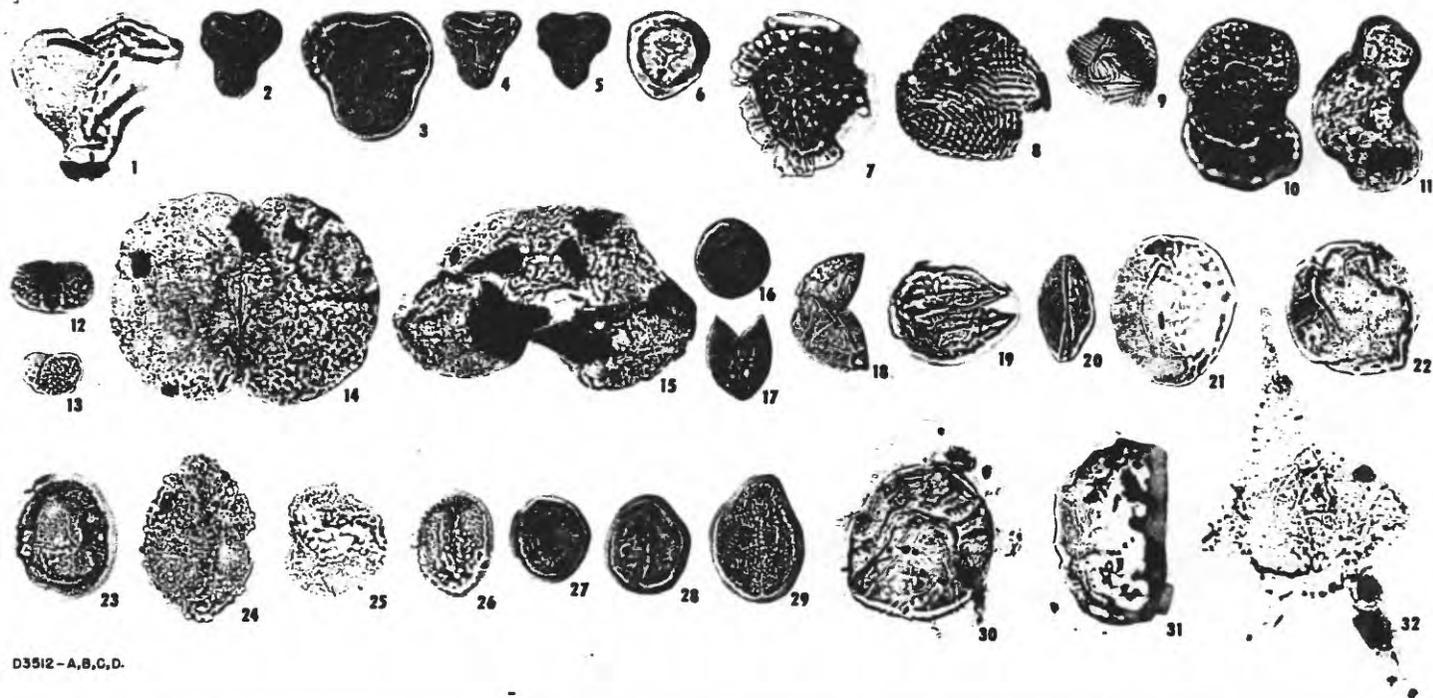
217-222: pollen of Gymnospermae

223-225: Monosulcate pollen

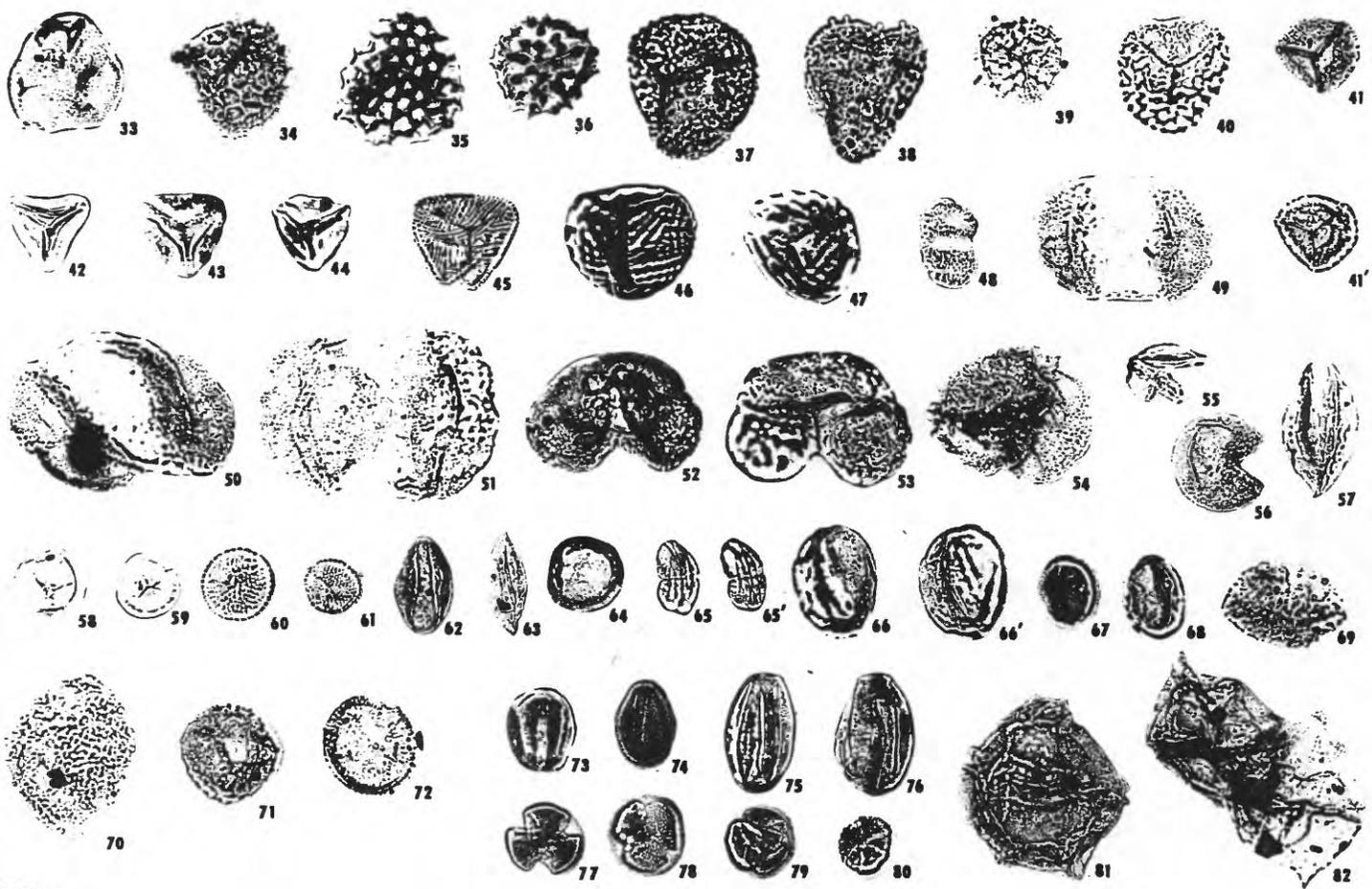
226-228: Incertae sedis

229-232: tricolpate pollen of Angiospermae

The size of each plate will be approximately 20 x 24 inches, and the figures will be at about 1000x magnification.



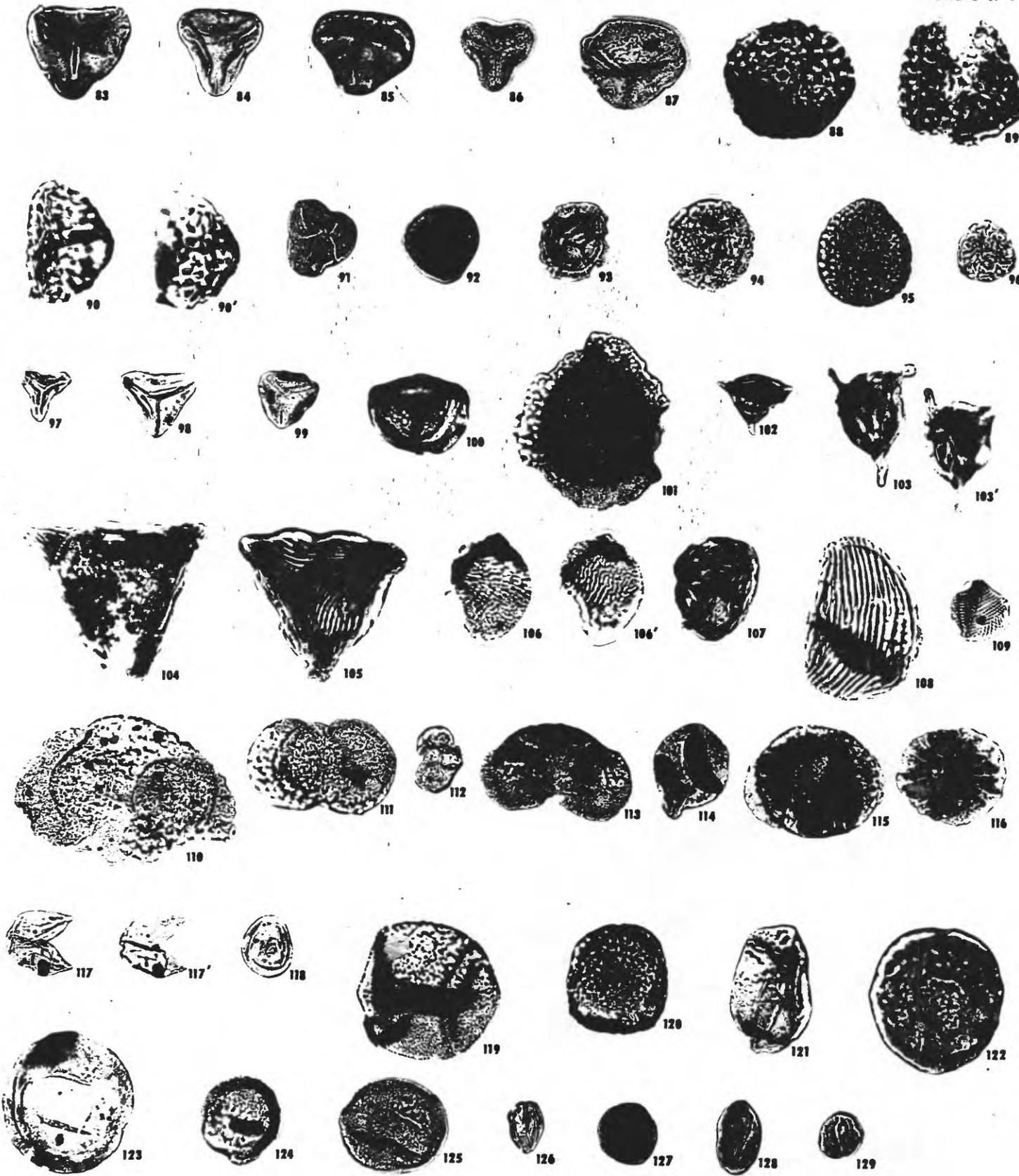
D3512-A,B,C,D.



D3512-H

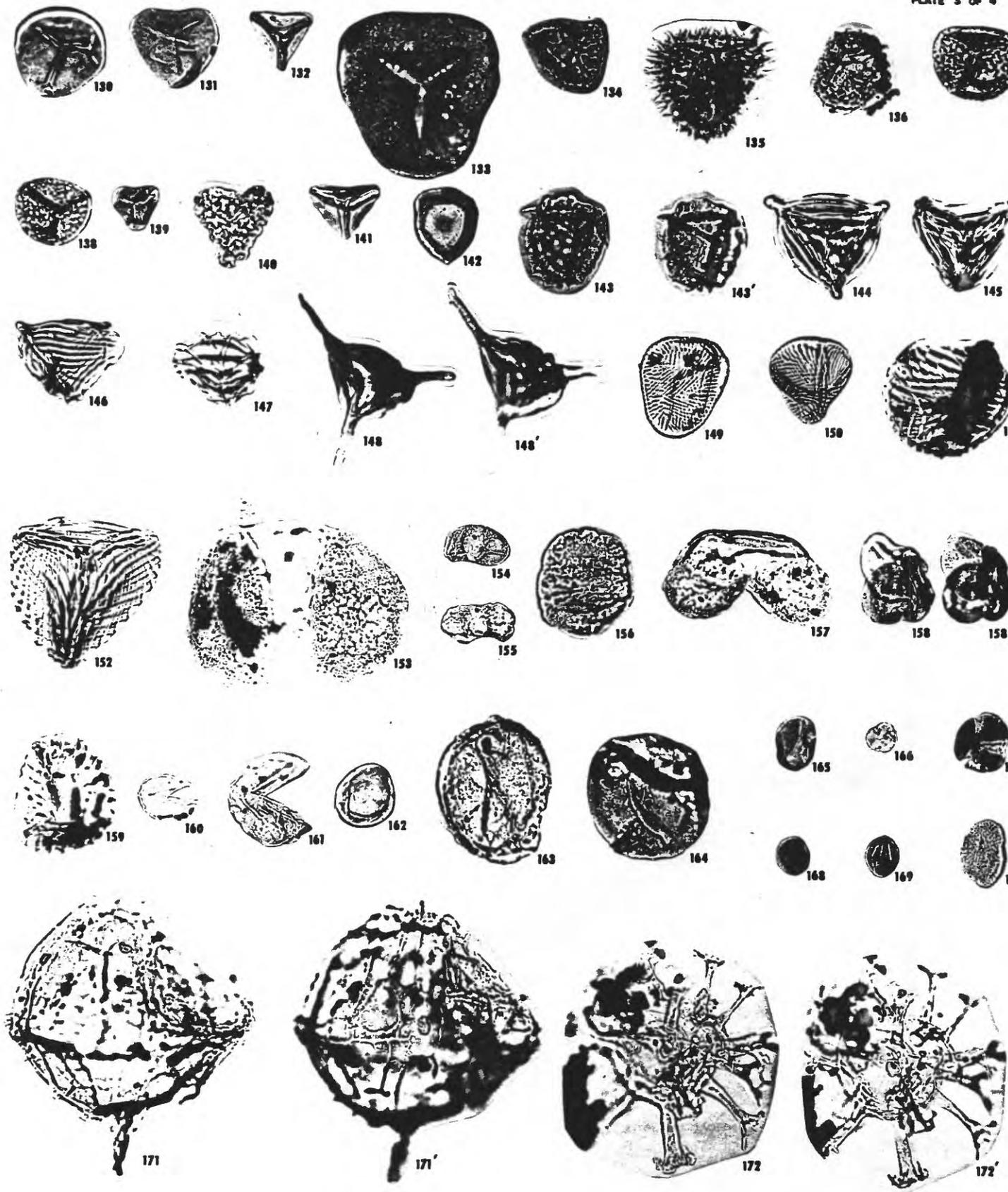
PLANT AND MISCELLANEOUS MICROFOSSILS
FROM THE THERMOPOLIS SHALE
USGS PALEOBOT. LOC. D3512-A,B,G,D,M. (NOT TO BE REPRODUCED)





PLANT AND MISCELLANEOUS MICROFOSSILS
FROM THE THERMOPOLIS SHALE
USGS PALEBOT. LOC. 03512-M. (NOT TO BE REPRODUCED)

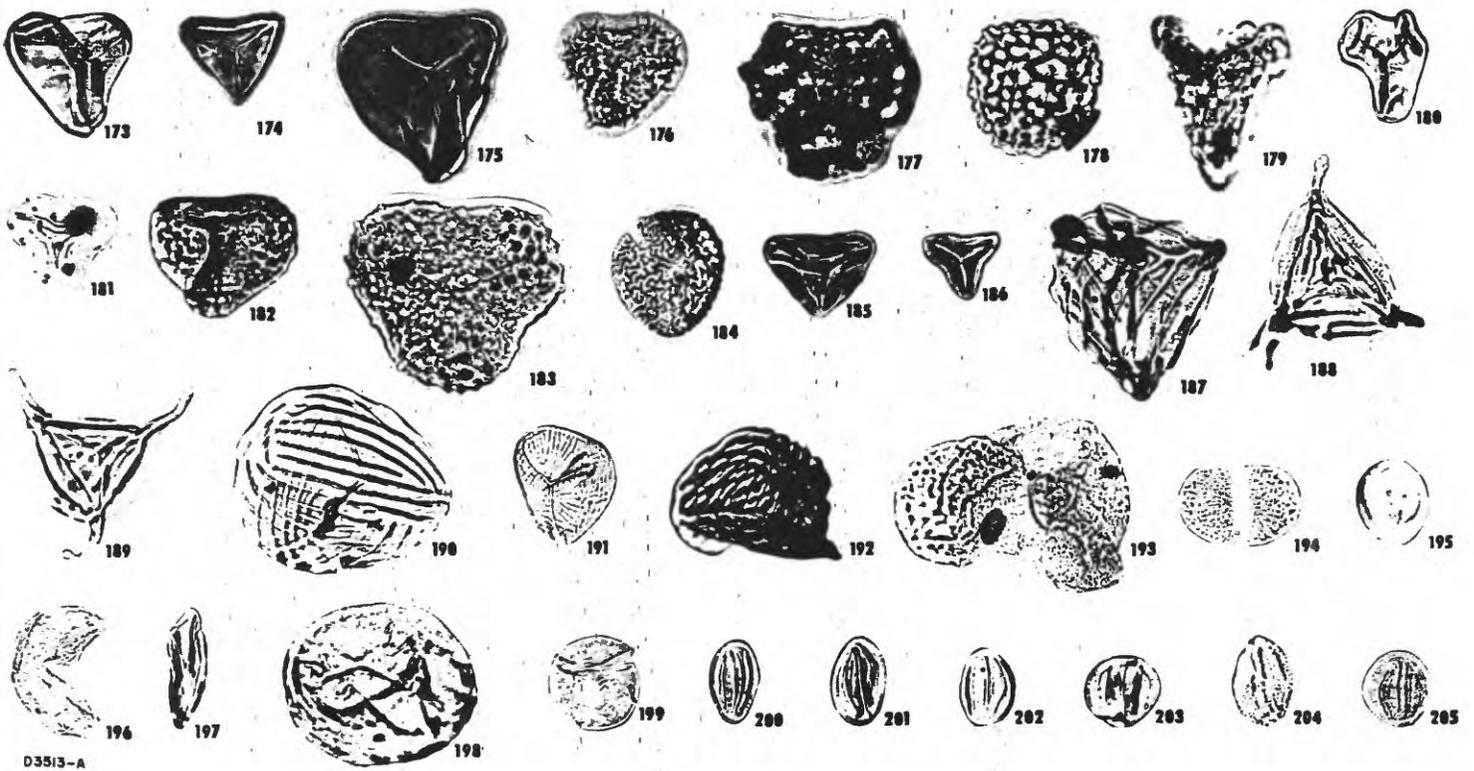
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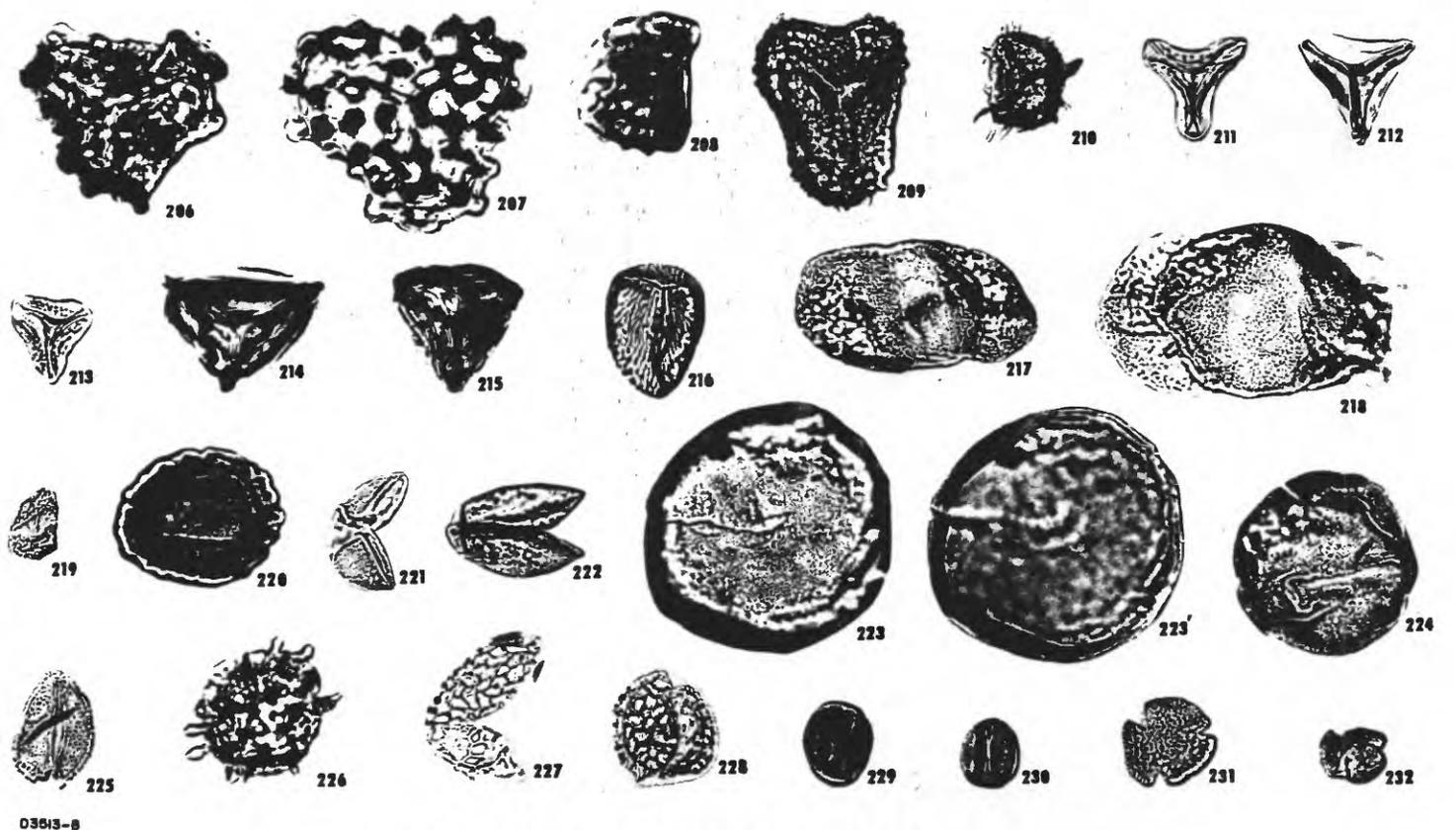
PLANT AND MISCELLANEOUS MICROFOSSILS
FROM THE THERMOPOLIS SHALE

USGS. PALEBOT. LOG. DESIG.-U. (NOT TO BE REPRODUCED)

0 10 20 30 40 50 MICRONS



D3513-A



D3513-B

PLANT AND MISCELLANEOUS MICROFOSSILS
FROM THE MOWRY SHALE
USGS PALEOBOT. LOC. D3513-A, B. (NOT TO BE REPRODUCED)

