

Exercise 12



Index Fossils and Depositional Sediments

After completing this exercise, you will be:

1. acquainted with the key index fossils of selected geological systems; and
2. able to utilize fossil-based age determinations and stratigraphic/structural relationships to work out the sequence stratigraphy and tectonic history of a geologically complex region.

Learning Objectives

The cross section in Figure 12.1 reveals the geological structure and stratigraphy of a hypothetical region. 1-9 illustrate index fossils 189-196, or by identifying 1-9 illustrated on pages 189-196, or by identifying specimens provided by your instructor. Identify specimens to the genus level (except specimen 1c) for which a general name is acceptable by comparing the illustrations provided in the text. Identify species of northeast Canada. Stratigraphers have determined that seven lithostrophic units are exposed in the study area: Chur Group, Terra Madre Formation, Labrador Formation, Percha Shale, Saline Limestone, Paradox Formation, and Pierre Shale. The ages of the units have not yet been determined. To that end, fossils have been collected from nine stratigraphic horizons. These collections are noted (numbers 1-9) on the cross section. In other words, specimens in Fauna 1 were collected from Layer 1 on the cross section, etc.

Figure 12.2. Note: Some lines and columns will be left blank. For example, Fauna 4 contains only two species; hence the data sheet for Fauna 4 will contain information for only two genera.

Determine the age of each fossil present in Figure 12.1 by identifying the fossils present in Fauna

PROCEDURE

PART A

Relative Ages

PROCEDURE

PART A

Relative Ages

Exercise 12

Index Fossils and Depositional Sequences

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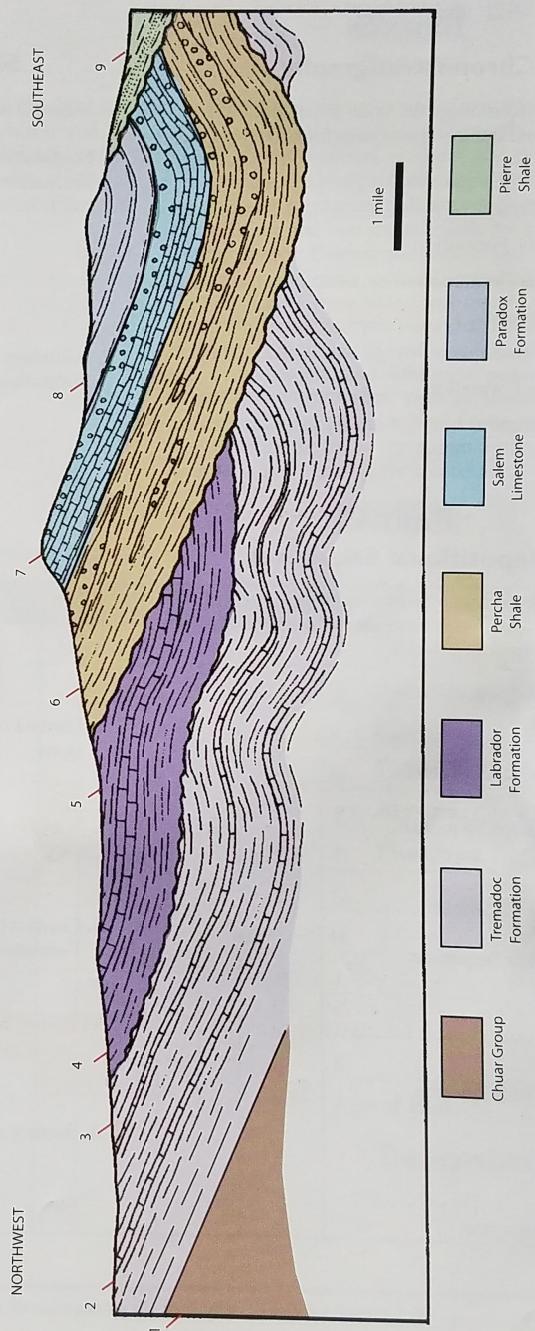


FIGURE 12.1 Cross section of hypothetical field area showing stratigraphic relationships between formations and location of collecting sites for fossil Faunas 1 through 9.

Chronostratigraphy**PART B**

Using information on your fossil data sheets, determine and list the age of each lithostatigraphic unit.

1. Boundary between Chuar Group and Tremadoc Formation
Note the nature of the following surfaces:

Significant Surfaces**PART D****Index Fossils and Depositional Sequences**

1. Chuar Group _____
2. Tremadoc Formation _____
3. Labrador Formation _____
4. Percha Shale _____
5. Salem Limestone _____
6. Paradox Formation _____
7. Pierre Shale _____

Depositional Sequences**PART C**

List the formations that comprise each of the standard North American depositional sequences within this region:

2. Tippecanoe Sequence:**4. Absaroka Sequence:****5. Zuni Sequence:**

6.

Surface at the base of Pierre Shale:

Formation:

5. Contact between Salem Limestone and Paradox

3. Kasakasia Sequence:

stone:

4. Contact between Percha Shale and Salem Lime-

2. Tippecanoe Sequence:**4. Absaroka Sequence:****5. Zuni Sequence:**

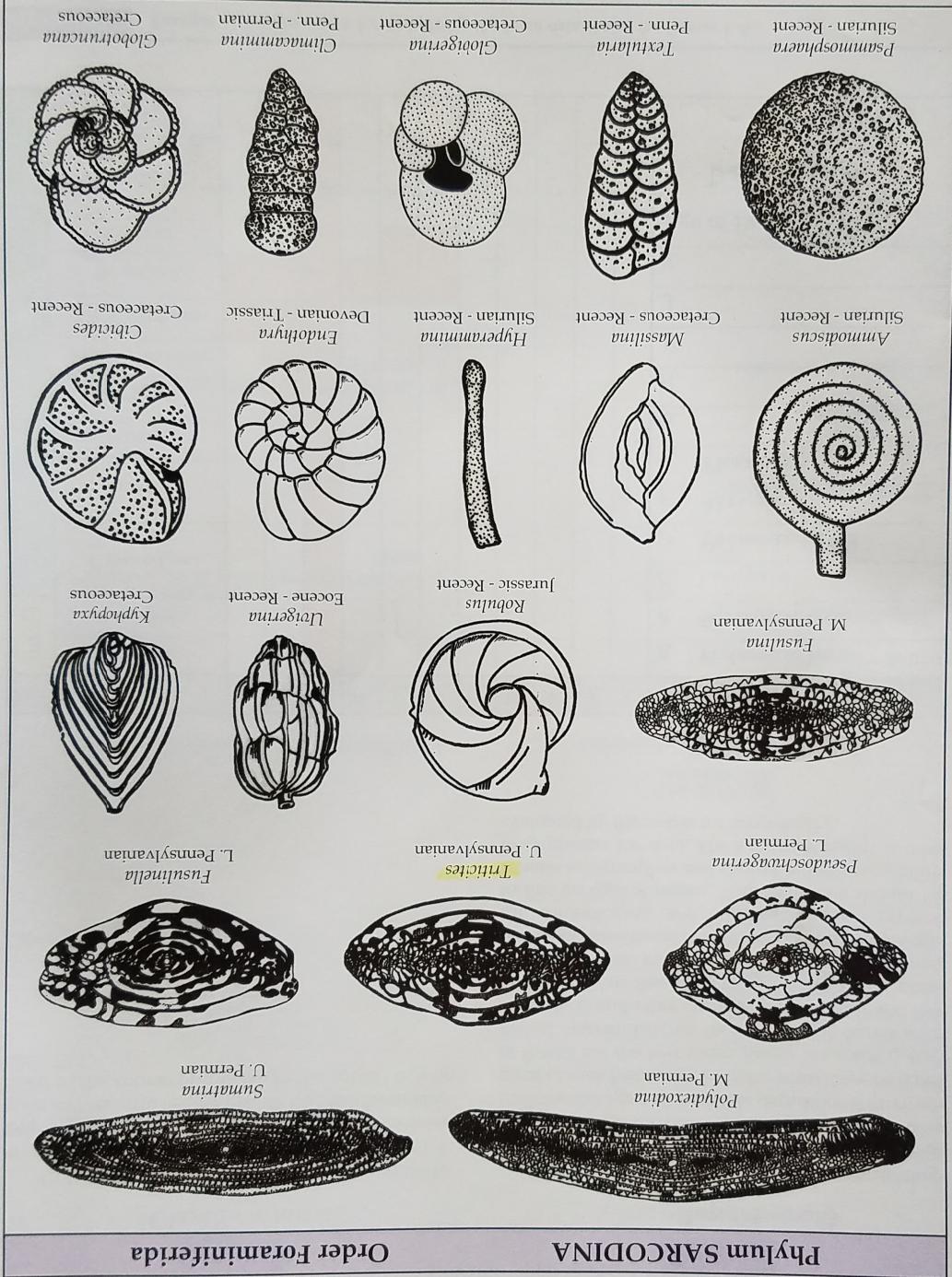
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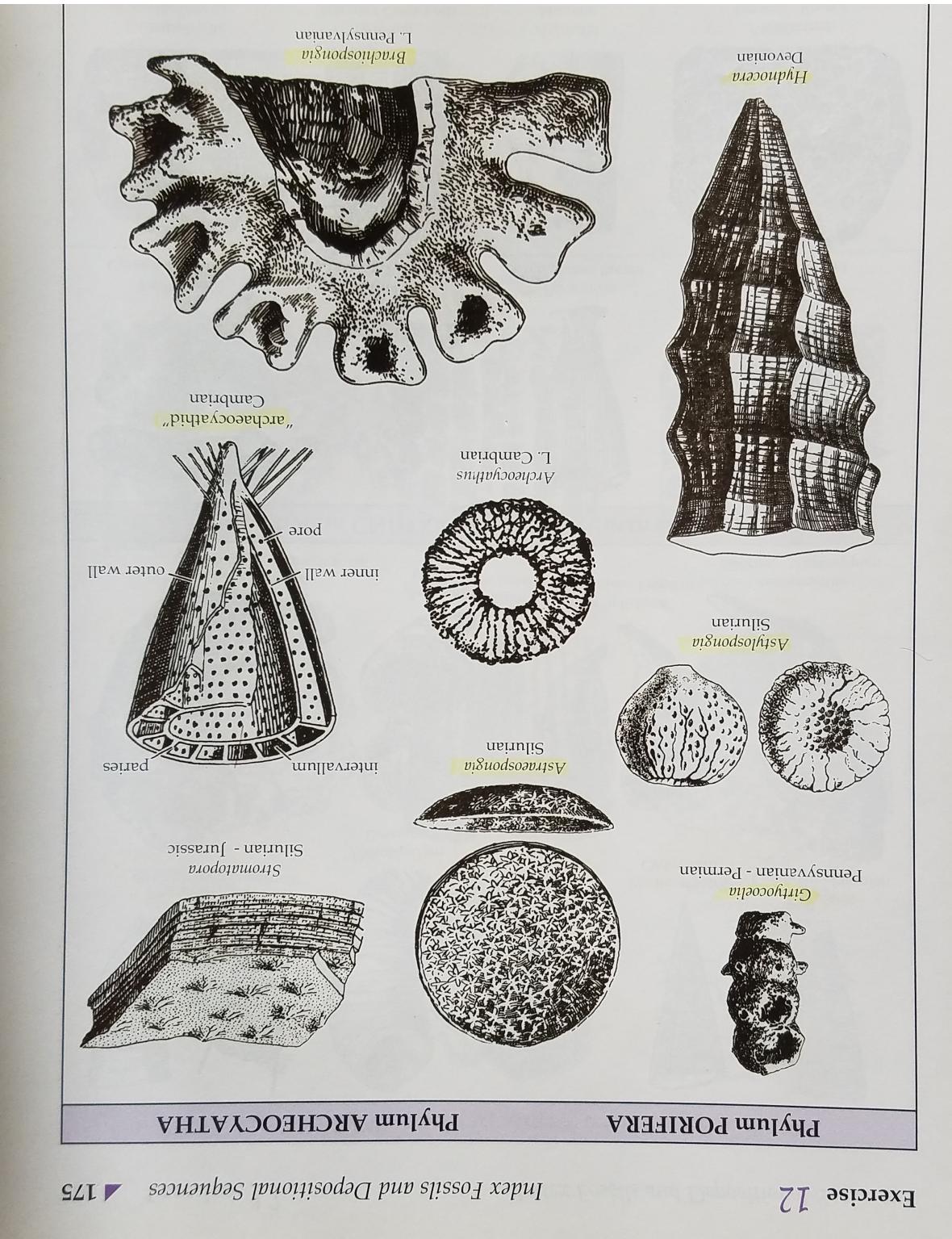
Surface at the base of Pierre Shale:

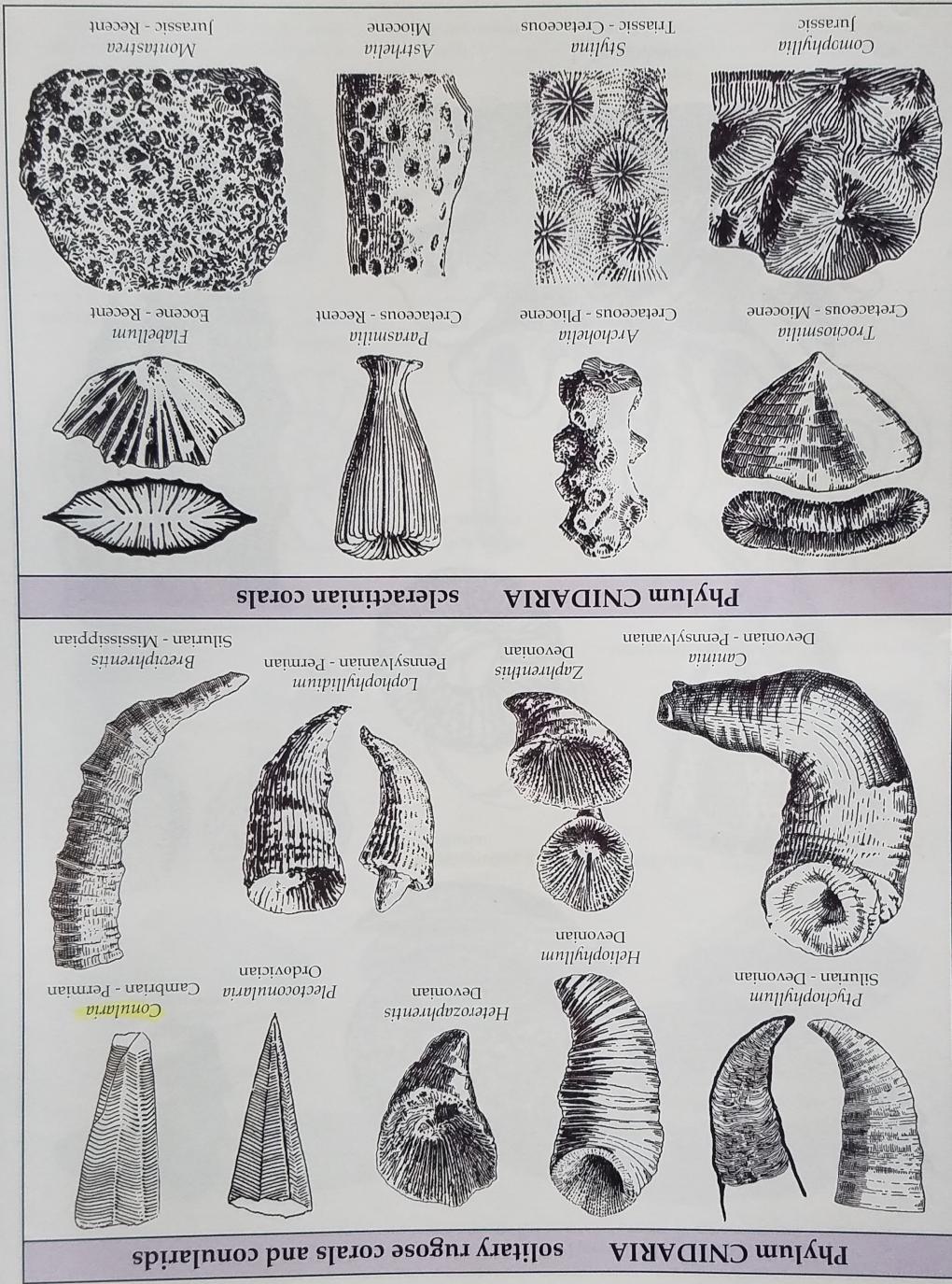
Formation:

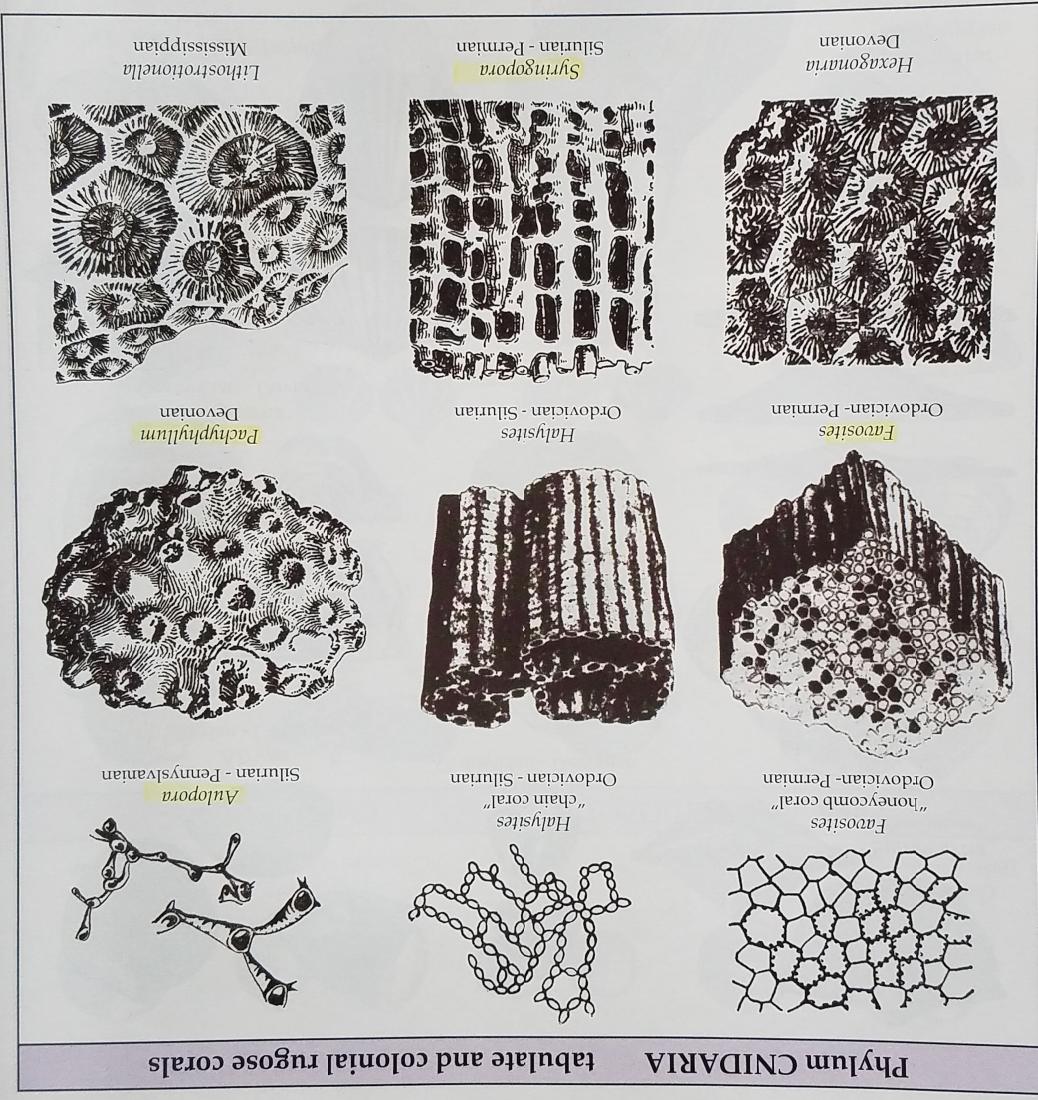
5. Contact between Salem Limestone and Paradox

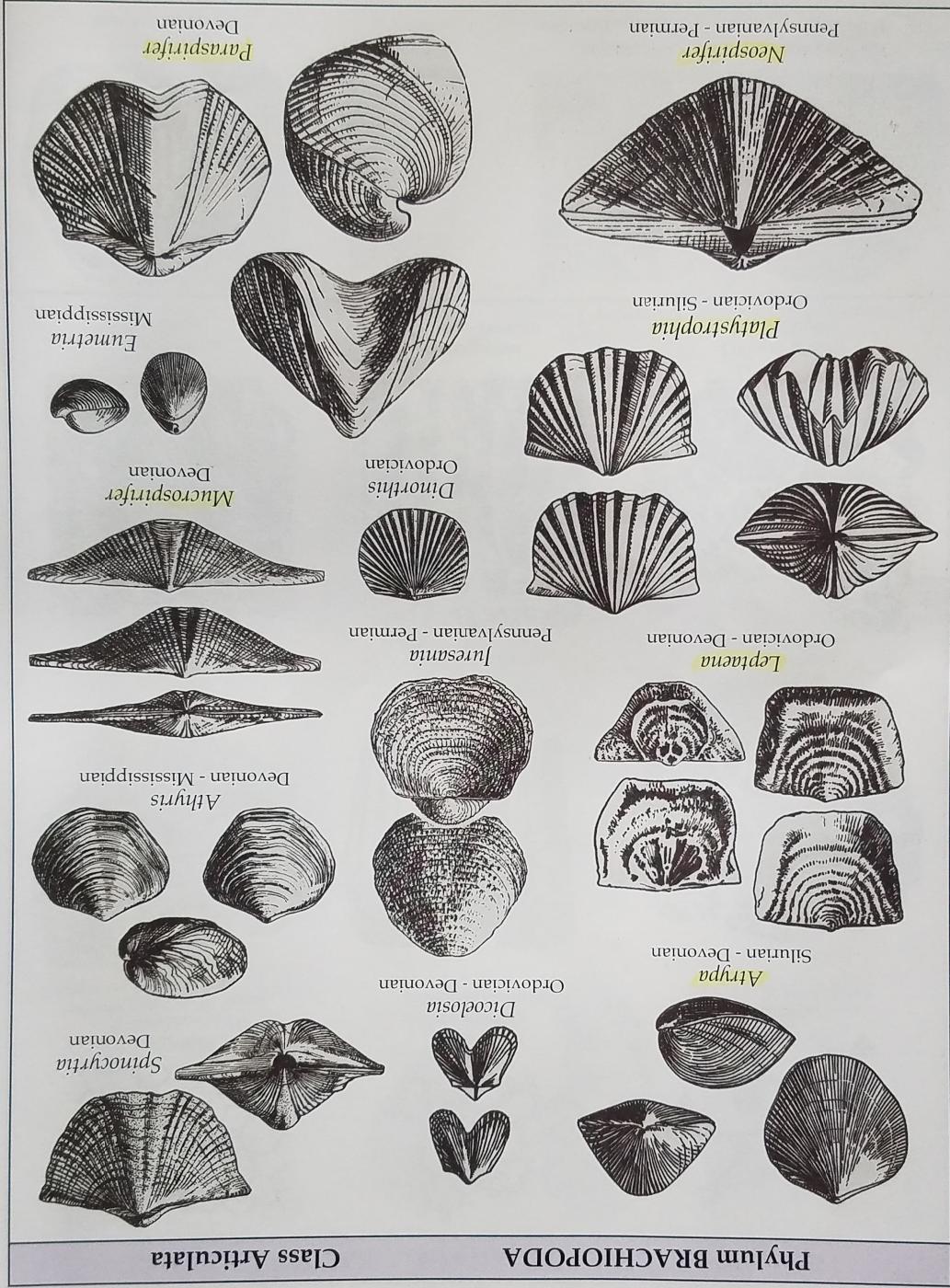
3. Kasakasia Sequence:





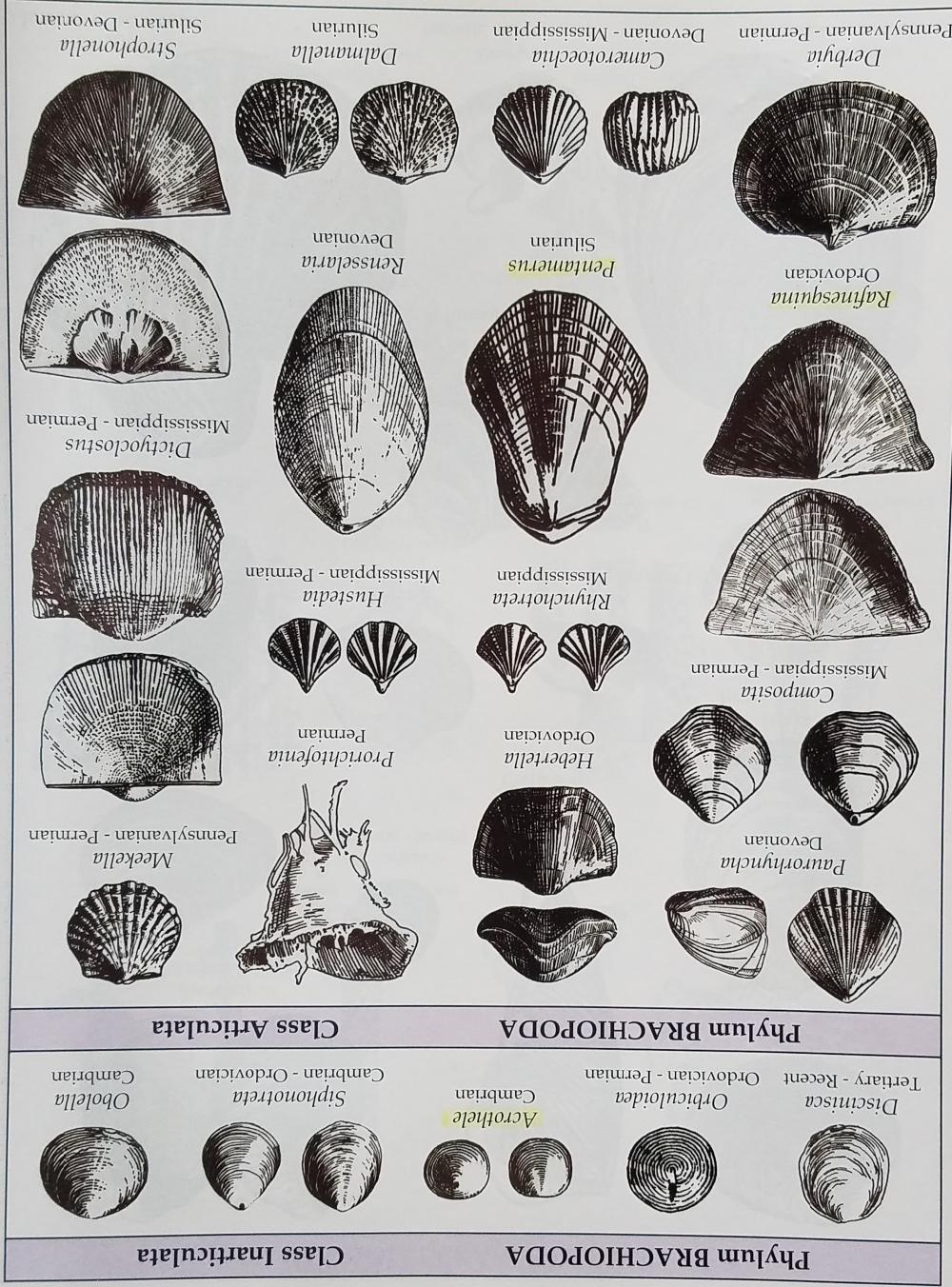


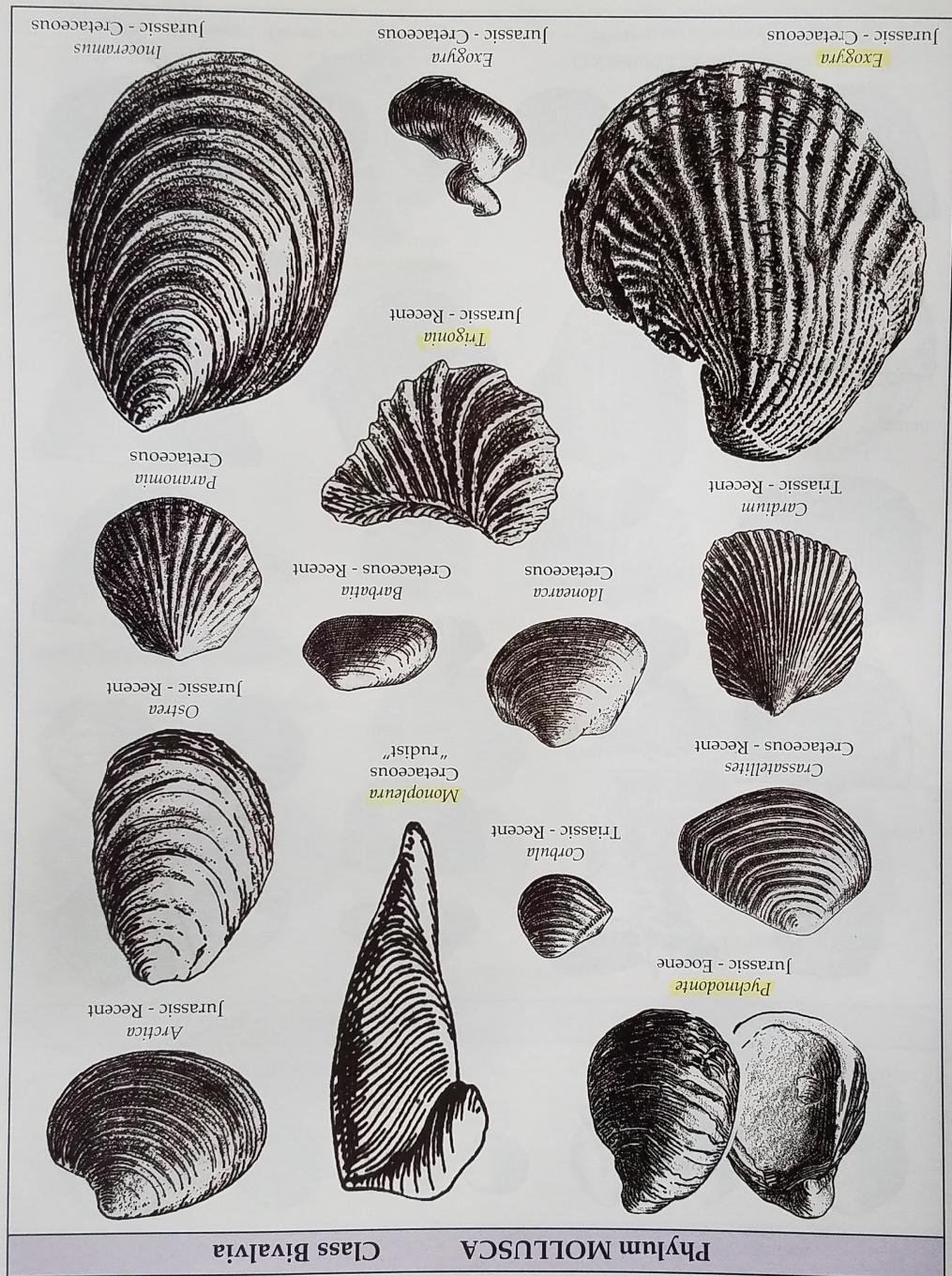


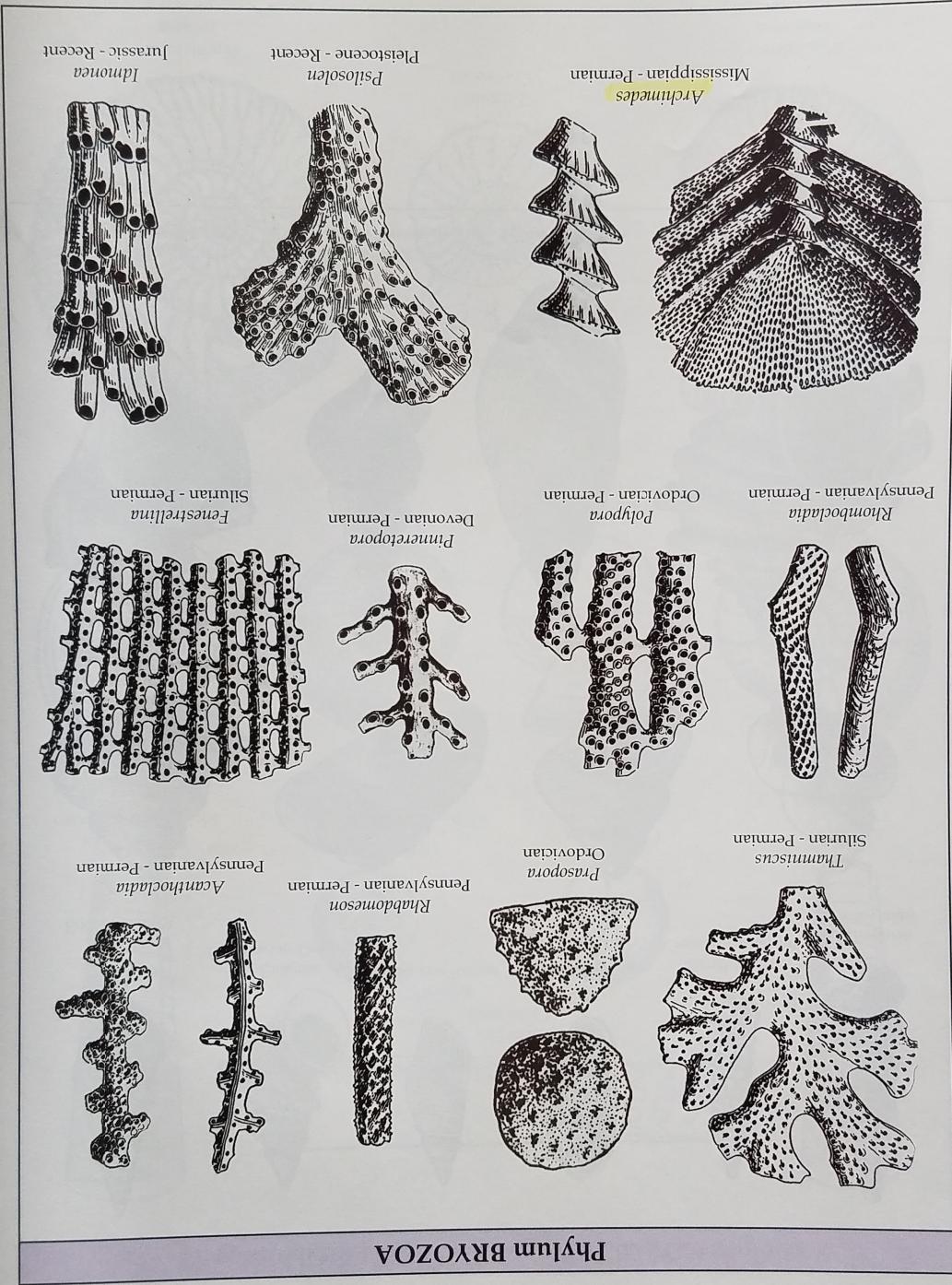


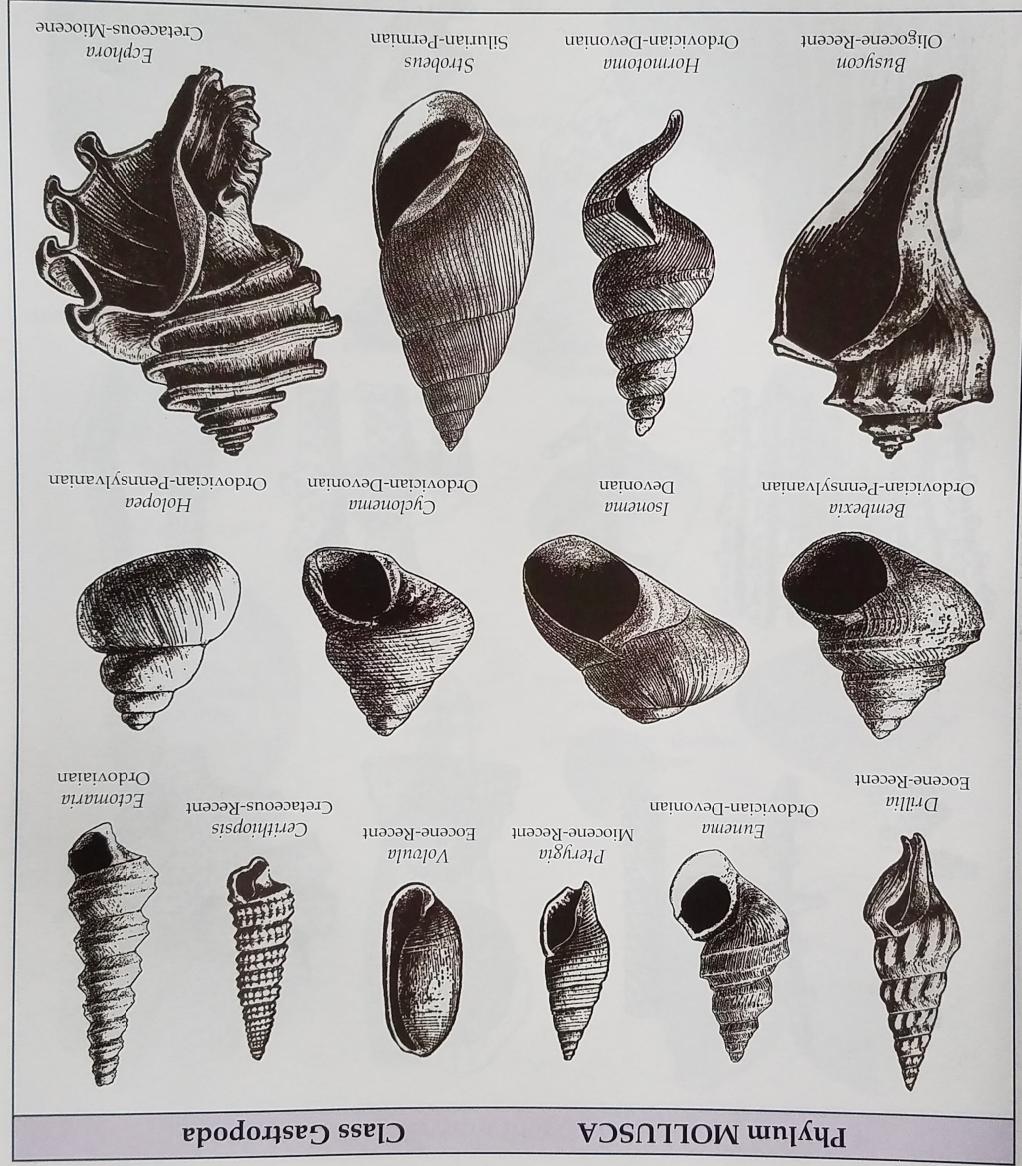
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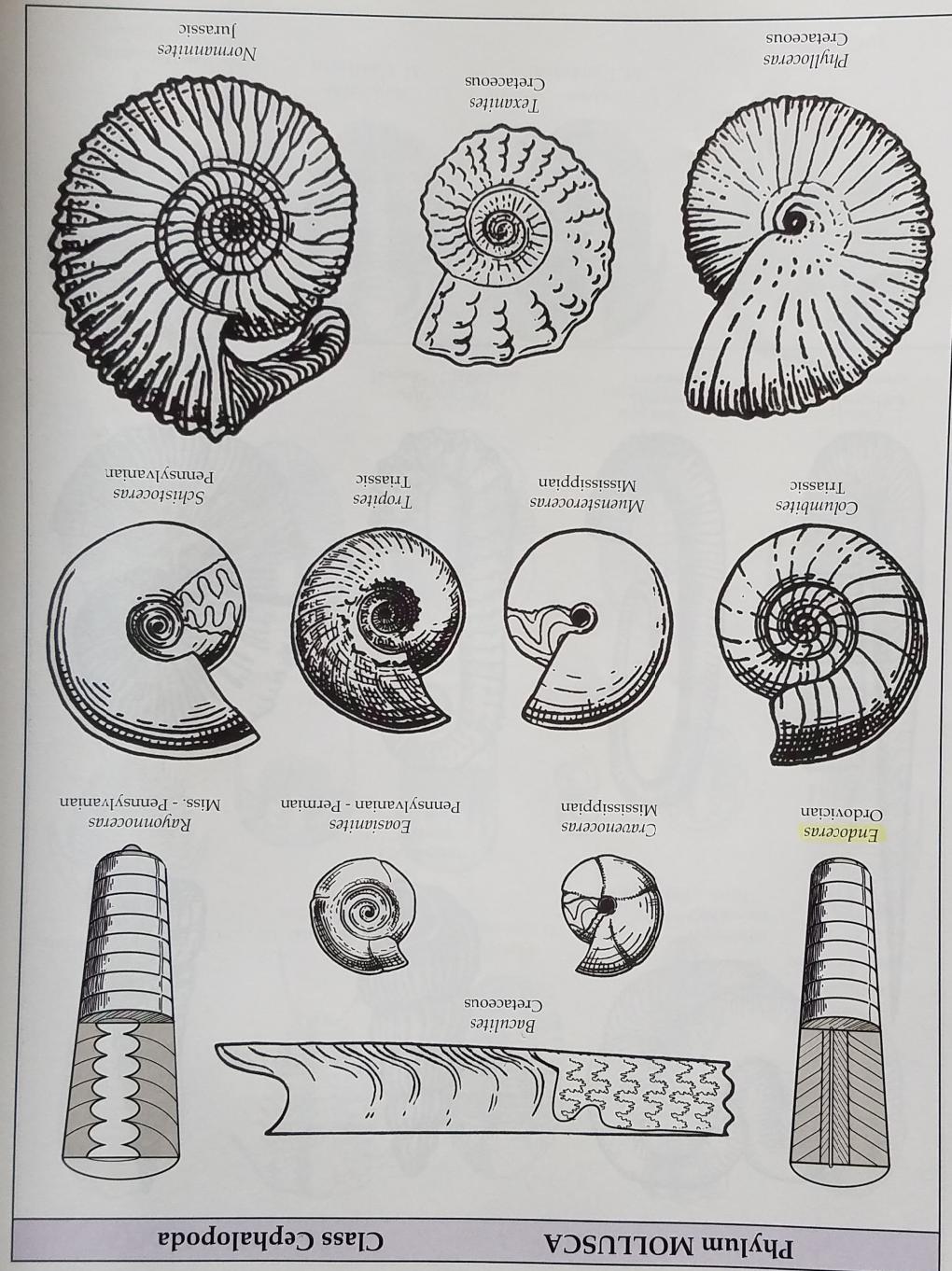


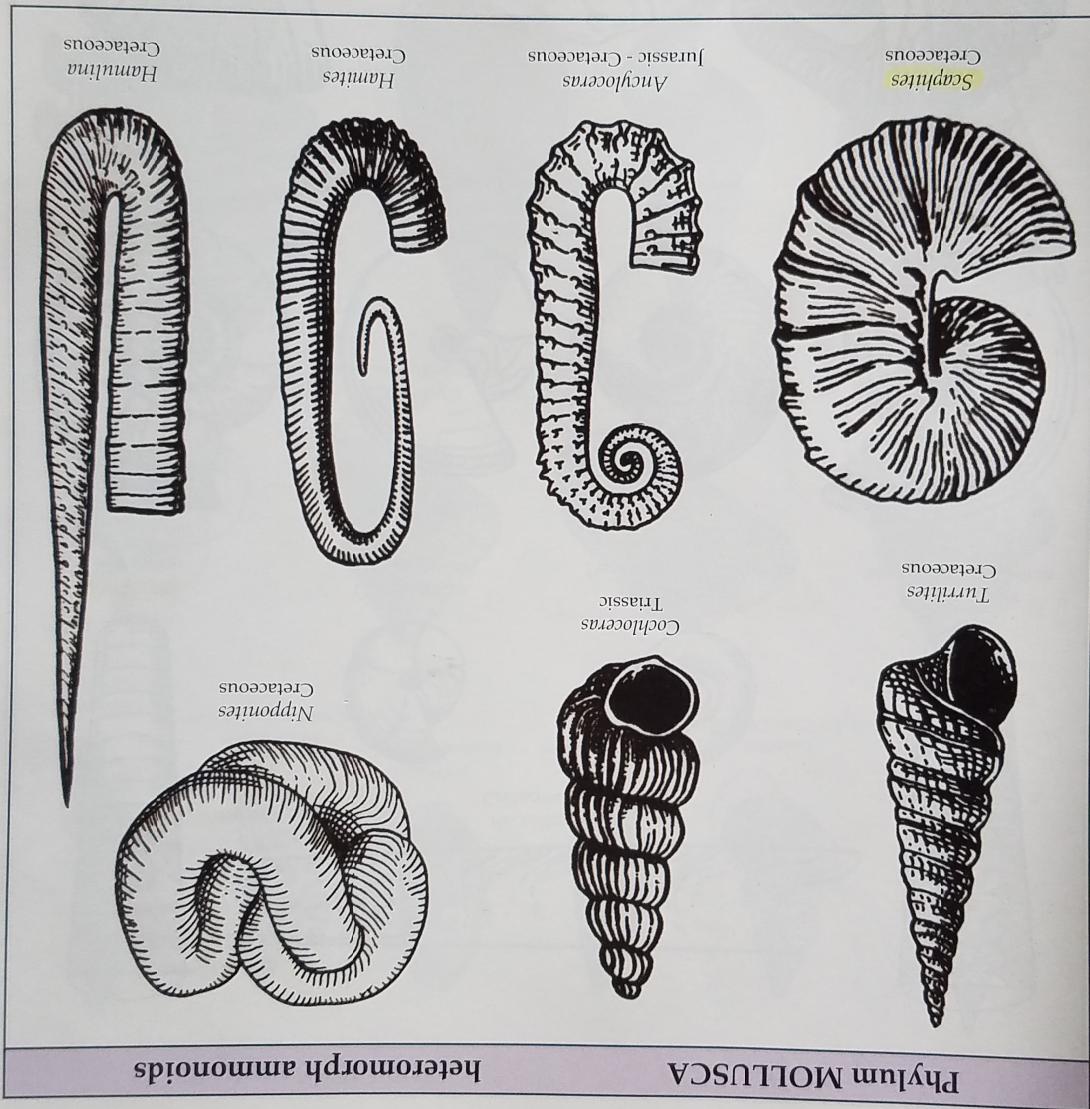


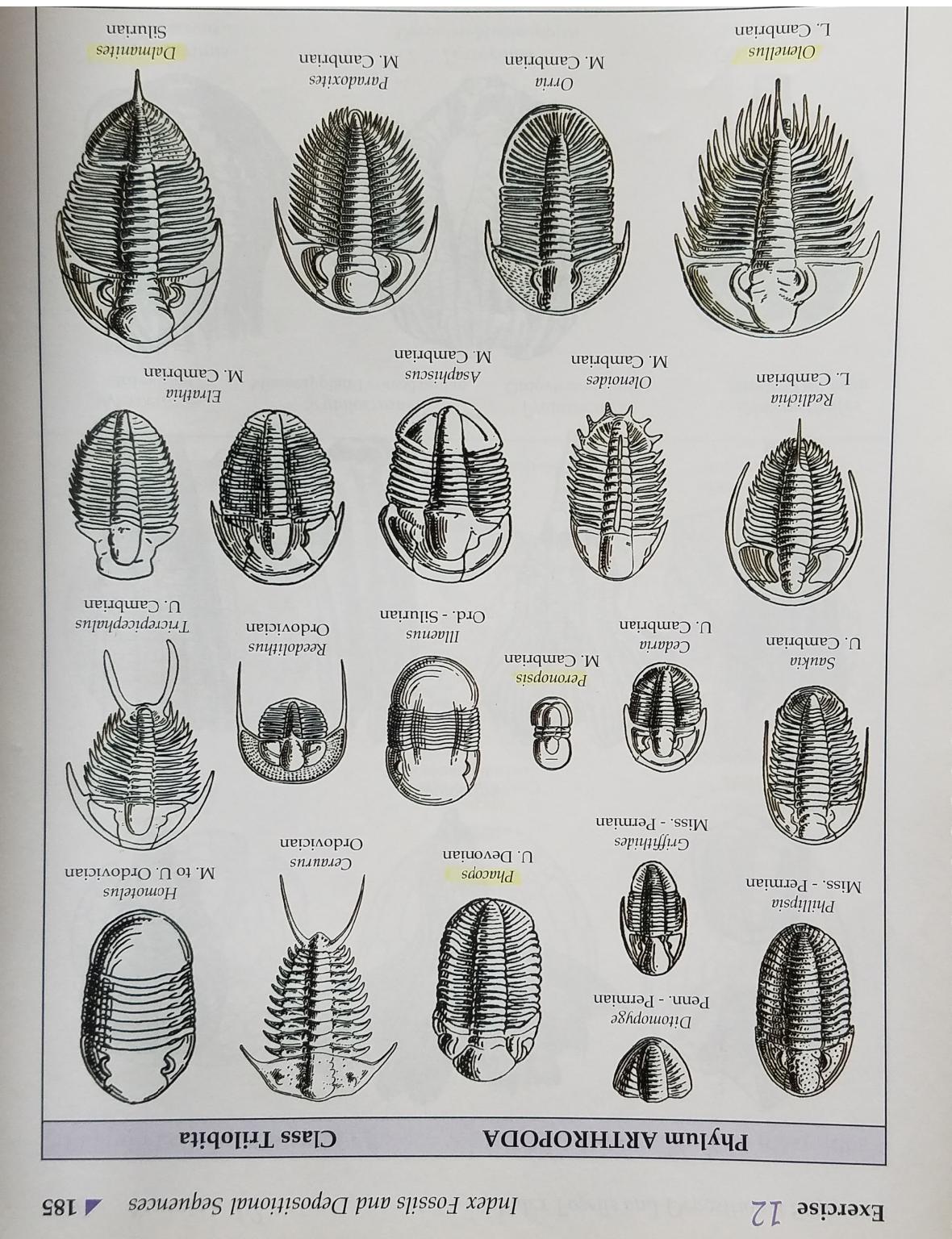


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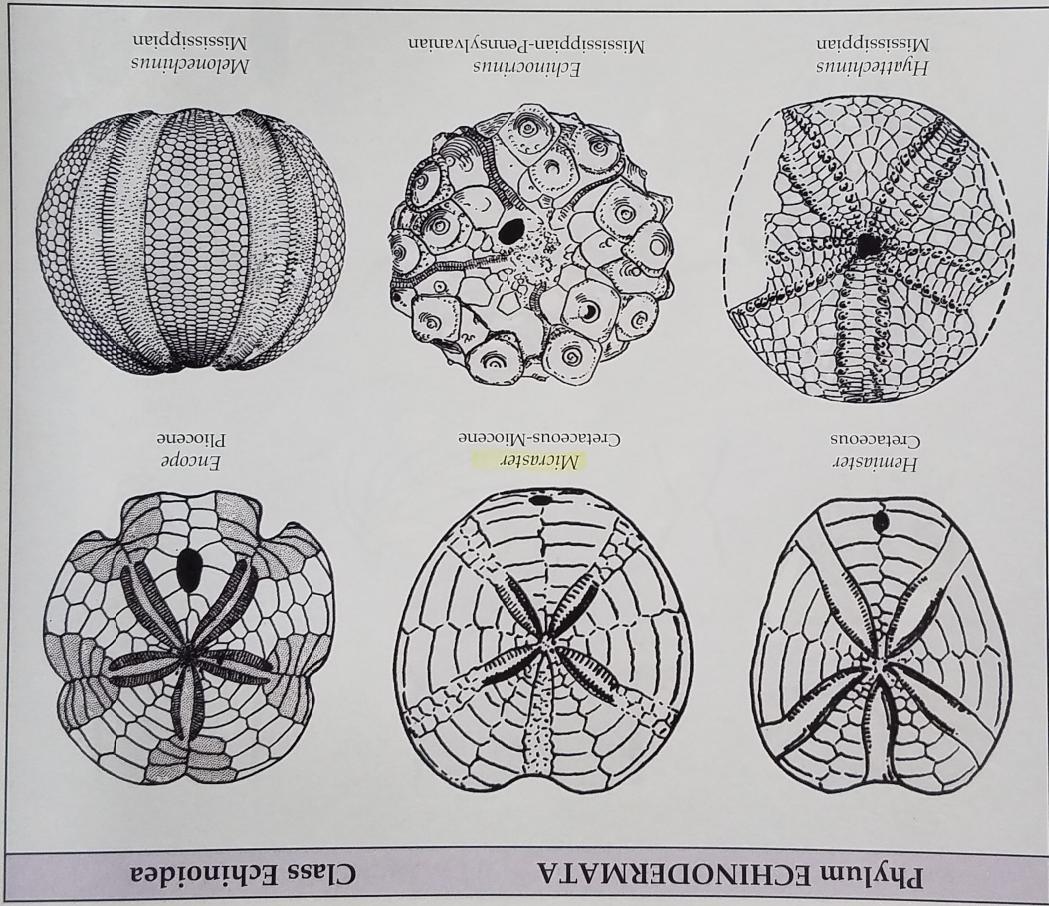
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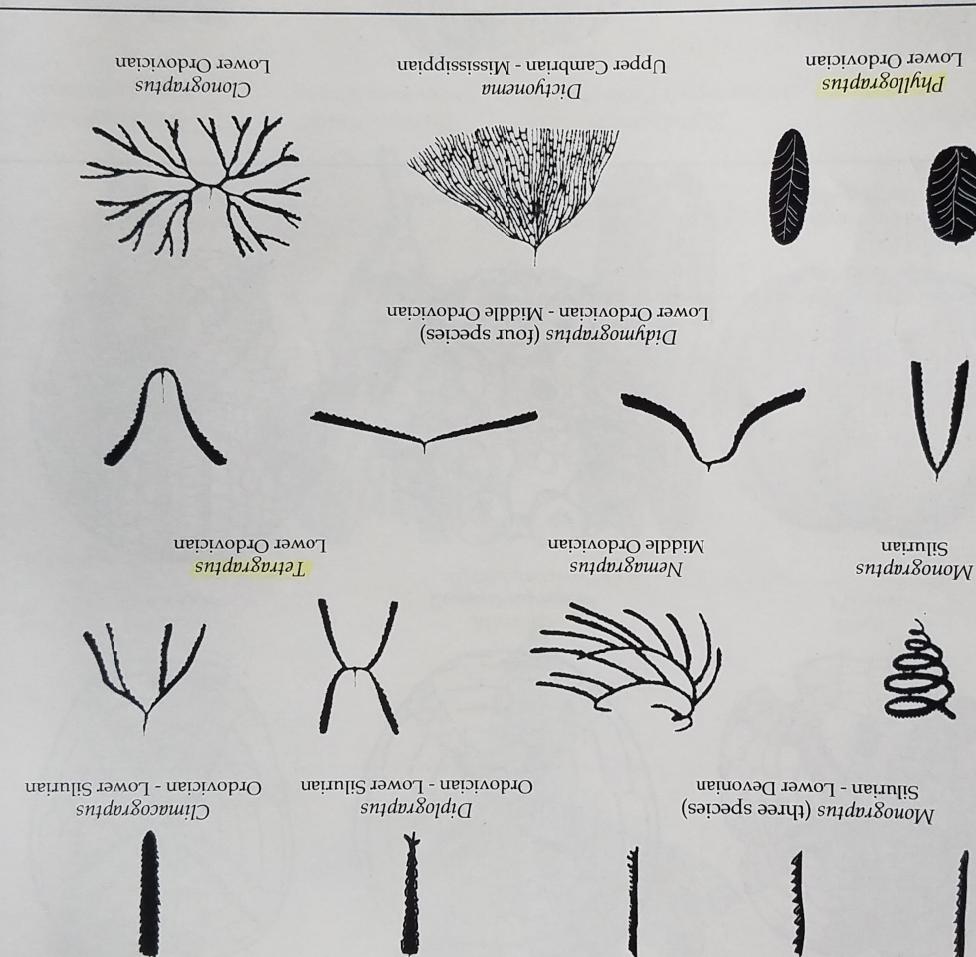


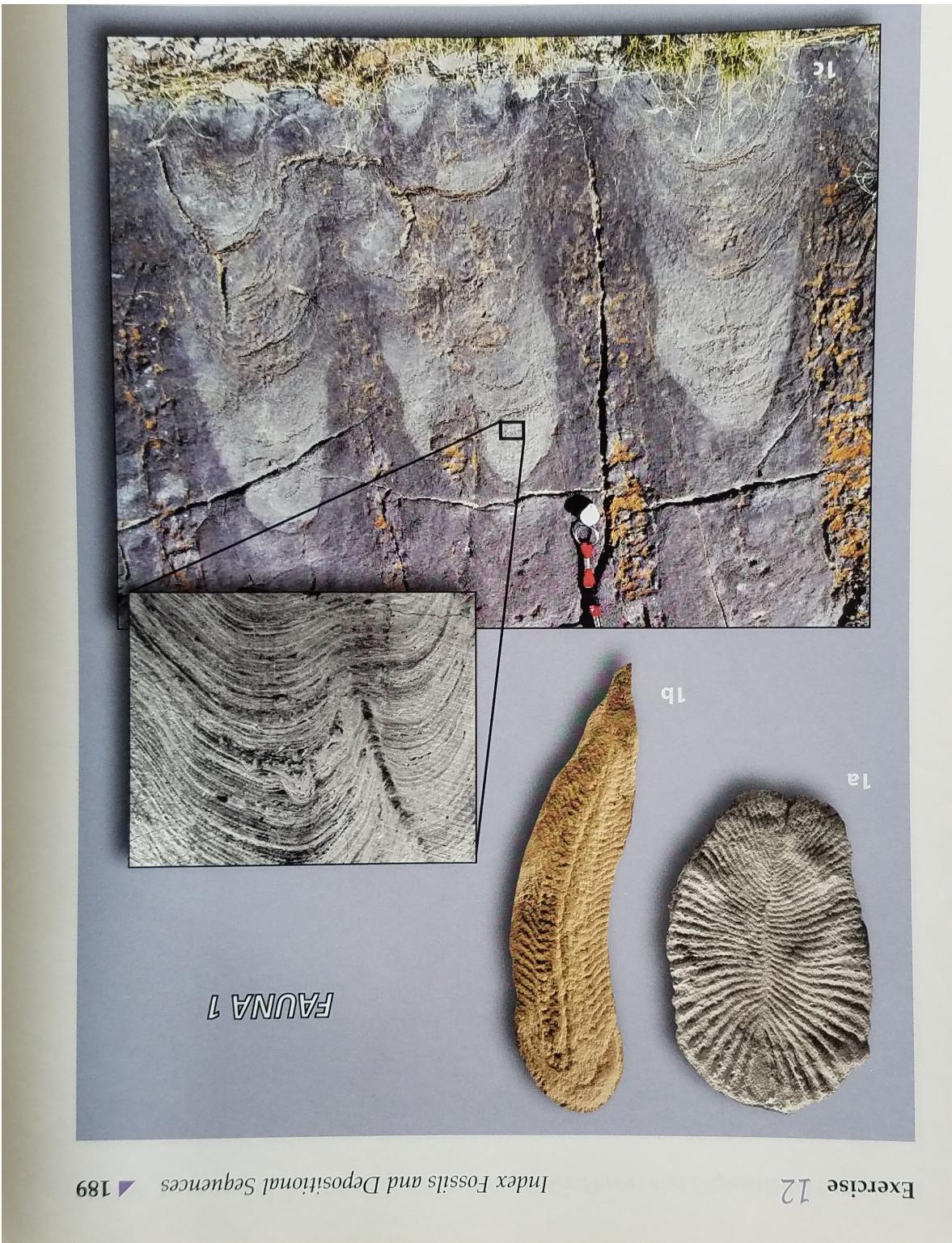
Phylum HEMICHOORDATA

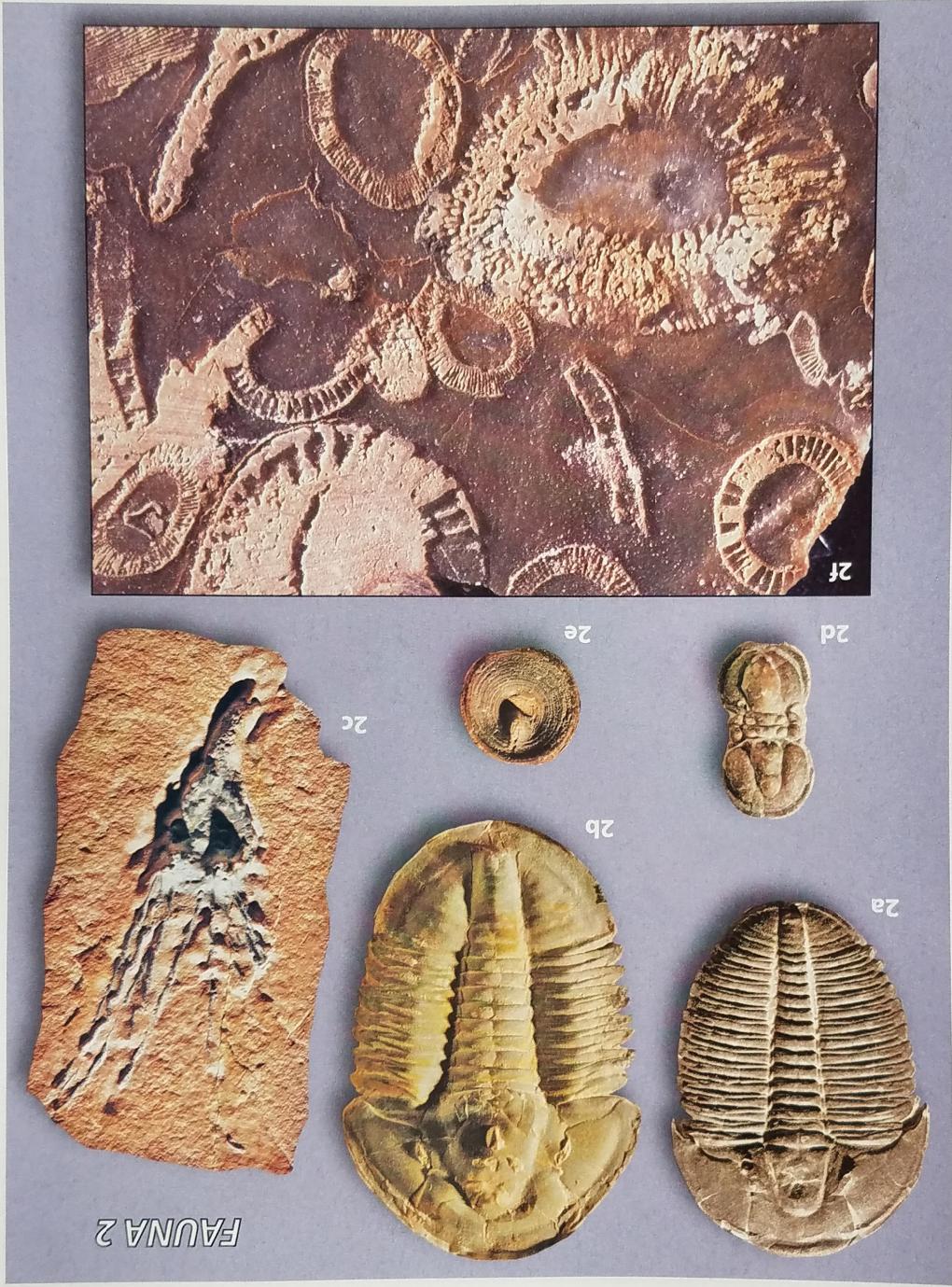
Class Graptolithina

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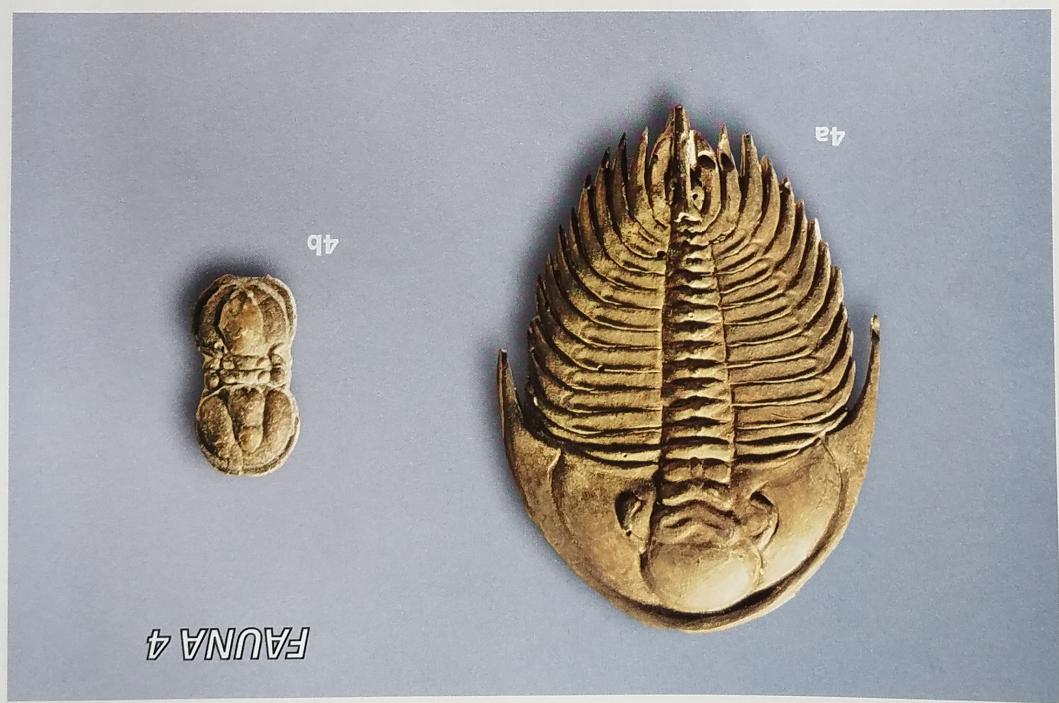
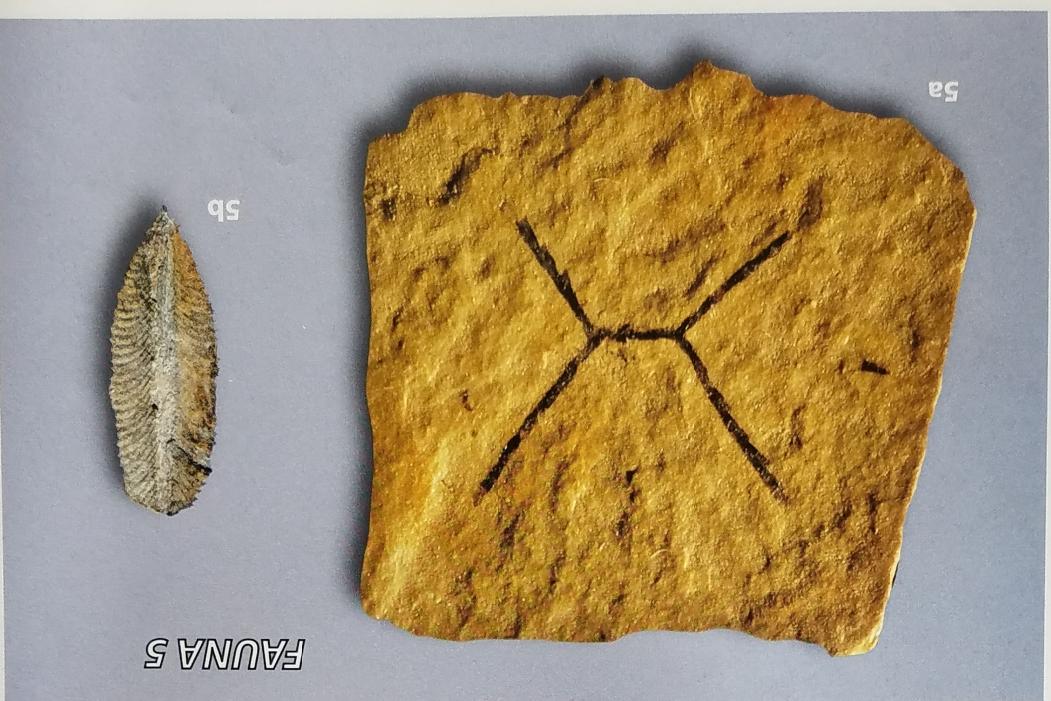


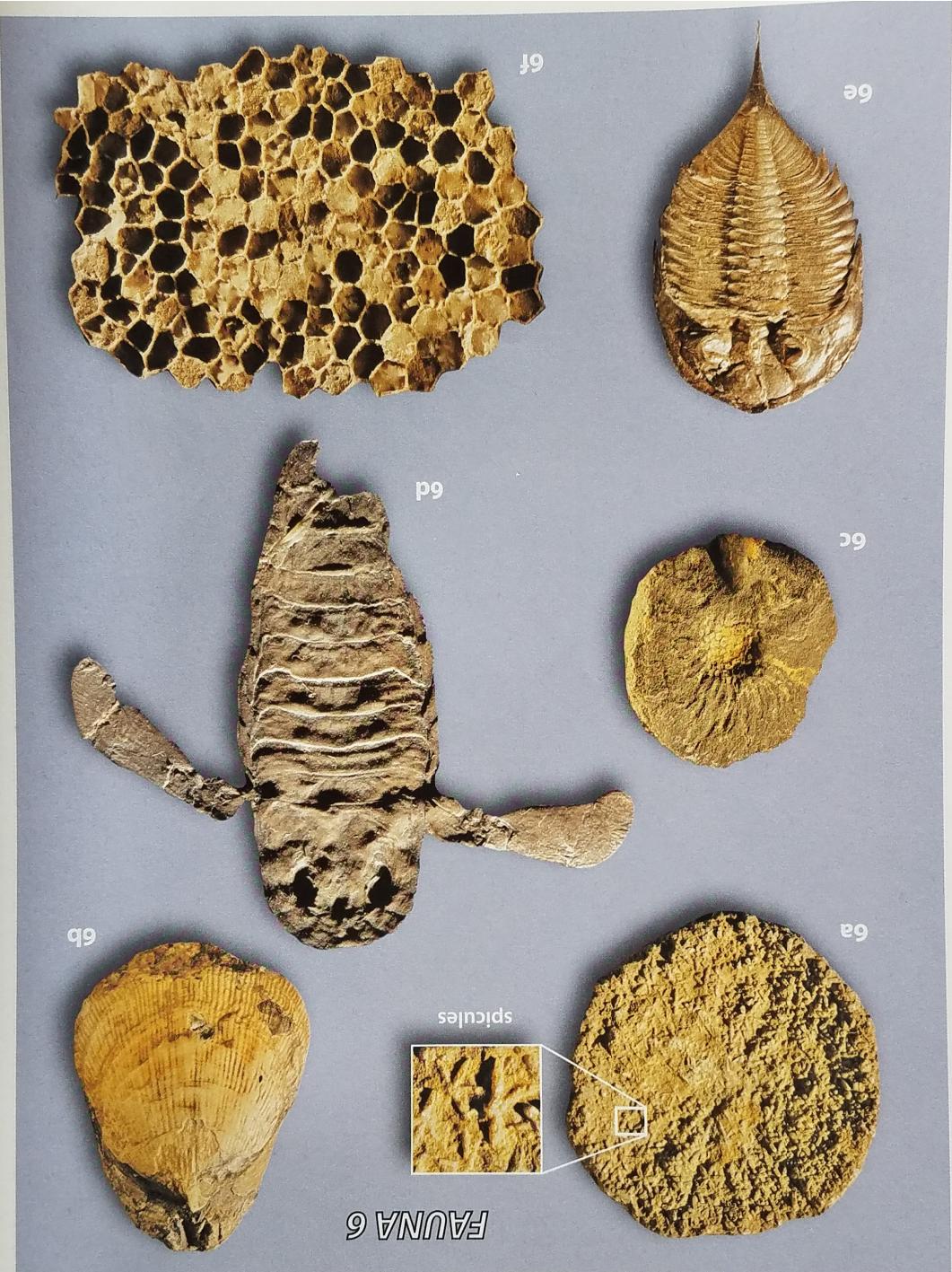


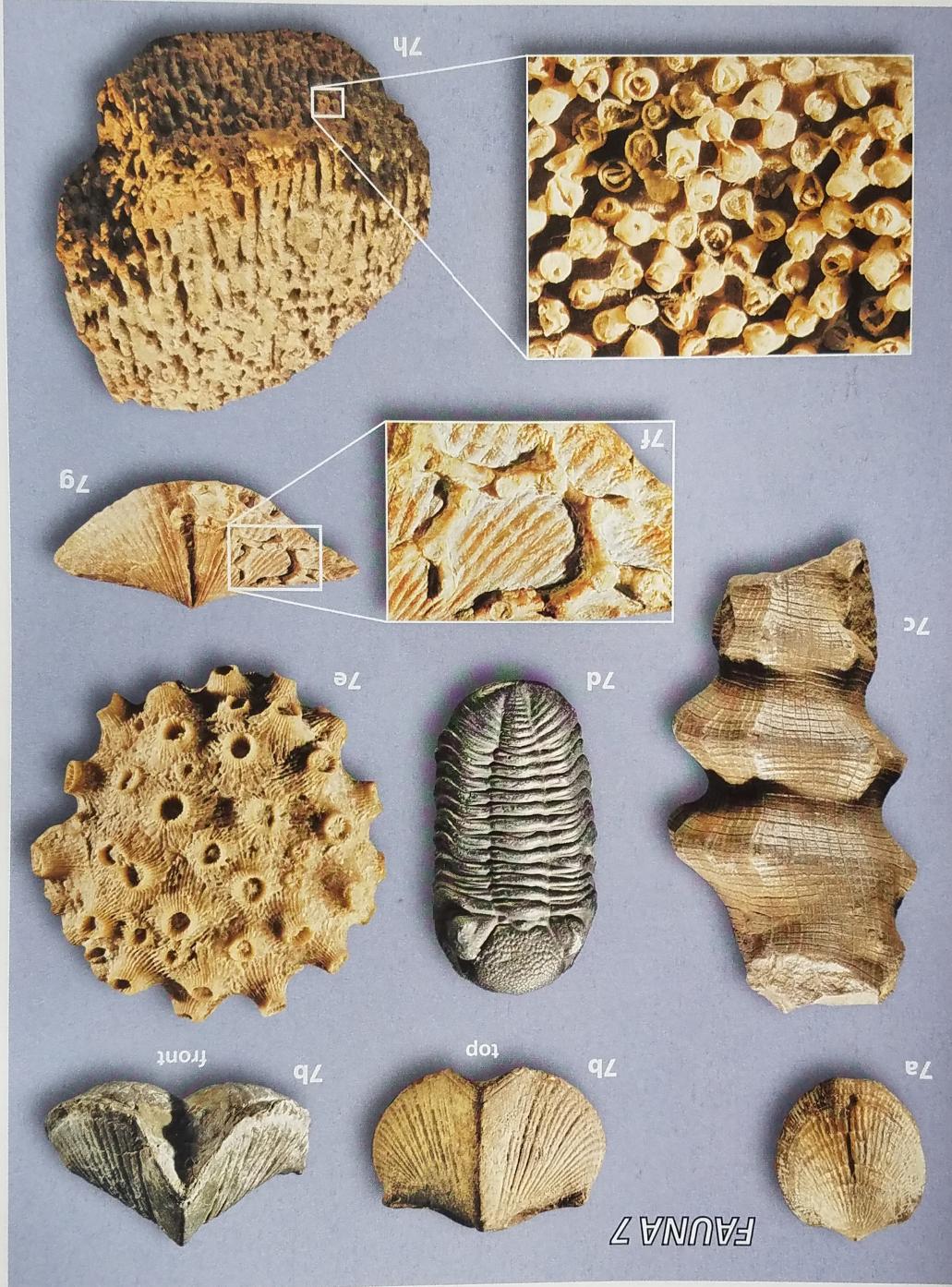
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FAUNA 9	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.	K.	TAXON NAME
Neogene												
Paleogene												
Cretaceous												
Jurassic												
Triassic												
Permian												
Mississippian												
Pennsylvanian												
Devonian												
Silurian												
Ordovician												
Cambrrian												
Age of Bed:												

TAXONOMIC CATEGORY	LIST OF GENERA REPRESENTED IN FAUNAS
Phylum Archocayatha	
Phylum Potifera	
Phylum Cnidaria	
Phylum Brachipoda	
Phylum Tabulata	
Order Scleractinia	
Phylum Ciliata	
Order Rugosa	
Phylum Articulata	
Phylum Inarticulata	
Phylum Bryozoa	
Phylum Mollusca	
Phylum Gastropoda	
Phylum Trilobita	
Phylum Arthropoda	
Order Ostacoda	
Eurypterida	
Phylum Echimeroidea	
Class Crinoidea	
Phylum Echimeroidea	
Class Blastoidae	
Class Echimeroidea	
Phylum Hemichordata	
Class Graptolithina	

TABLE 12.1 Classification of genera identified in exercise 12.

TAXONOMIC CATEGORY	LIST OF GENERA REPRESENTED IN FAUNAS
Phylum Archocayatha	
Phylum Potifera	
Phylum Cnidaria	
Phylum Brachipoda	
Order Tabulata	
Order Scleractinia	
Phylum Ciliata	
Order Rugosa	
Phylum Articulata	
Phylum Inarticulata	
Phylum Bryozoa	
Phylum Mollusca	
Phylum Gastropoda	
Phylum Trilobita	
Phylum Arthropoda	
Order Ostacoda	
Eurypterida	
Phylum Echimeroidea	
Class Crinoidea	
Phylum Echimeroidea	
Class Blastoidae	
Class Echimeroidea	
Phylum Hemichordata	
Class Graptolithina	