Name_____Date_____Period_____

Stratigraphy and Geological Correlations I

Background

This lab investigation combines several principles and geologic concepts introduced in the AGS 381 Physical Geology E-unit. The lab is composed of four related parts and helps to reinforce much of what has been introduced in geology so far. Read the instructions carefully and complete each section of the lab in order. At the end of the investigation, various groups will combine data together in order to create one large observation.

Part A: Sedimentary Environments

Recall that mineral composition and grain size (texture) are key identifiers of sedimentary rocks. For this part of the lab, examine the six sedimentary rocks provided and fill in the chart with the appropriate information.

Sample	Characteristics (color, grain size, fossils, hardness, etc.)	Rock Name	Probable Depositional Environment
1			
2			
3			
4			
5			
6			
7			

1. What evidence is there that Samples 2 and 3 formed in very *different* environments?

2. What evidence is there that Samples 1 and 6 formed in *similar* environments?

3. How do fossils provide important clues to past environmental conditions?

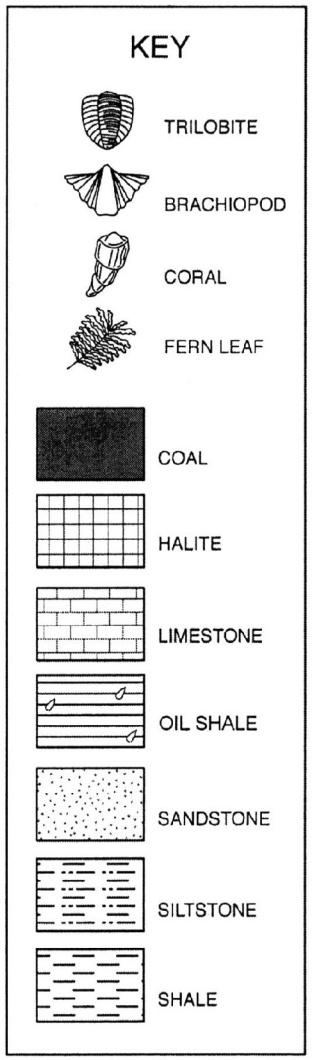
4. One of your samples should have been identified as a conglomerate. Since the rock is composed of larger, pebble sized particles and chunks, does this indicate the sediment was deposited close to or far away from the parent rock the fragments came from? Explain.

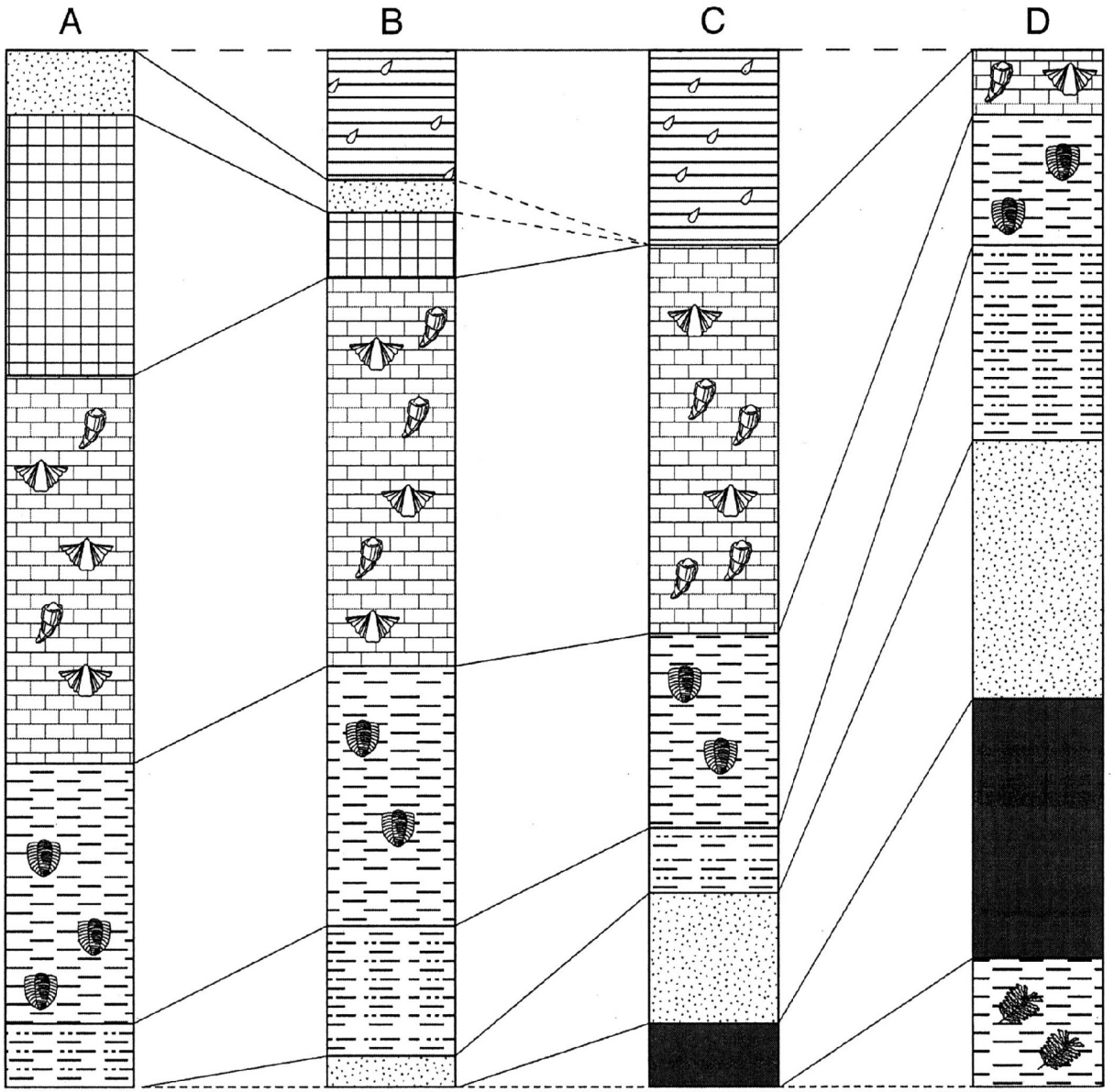
Part B: Stratigraphic Columns

In Part B of the lab, you will examine several stratigraphic columns and use them to solve a variety of problems associated with the clues provided by the rock types in the columns.

5. Site D clearly indicates changes in sea level (among other things). What combination of transgressions/regressions are contained in the rock? Explain.

Set 1





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6. Assuming the rock samples used in Part 1 were from Site D, which ones would most likely be found here and in what order?

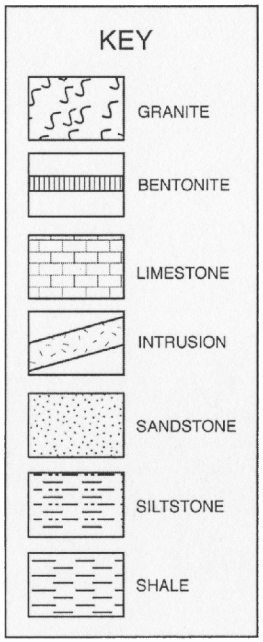
7. Many of the world's oil deposits are the result of accumulated marine organisms that die and sink to the bottom of the ocean. This oil, in turn, forms in rocks like shale after the deposits are heated and compacted. However, the oil often travels to other places due to hydraulic pressure until it begins to accumulate in more porous rock layers nearby where it accumulates into rich deposits. These rocks where the oil accumulates are known as ***reservoir rocks*** and an impermeable rock just above that which serves to keep the oil in the reservoir rock is called a ***cap rock***. At Site D, which layer of rock might be productive to search for oil? Explain.

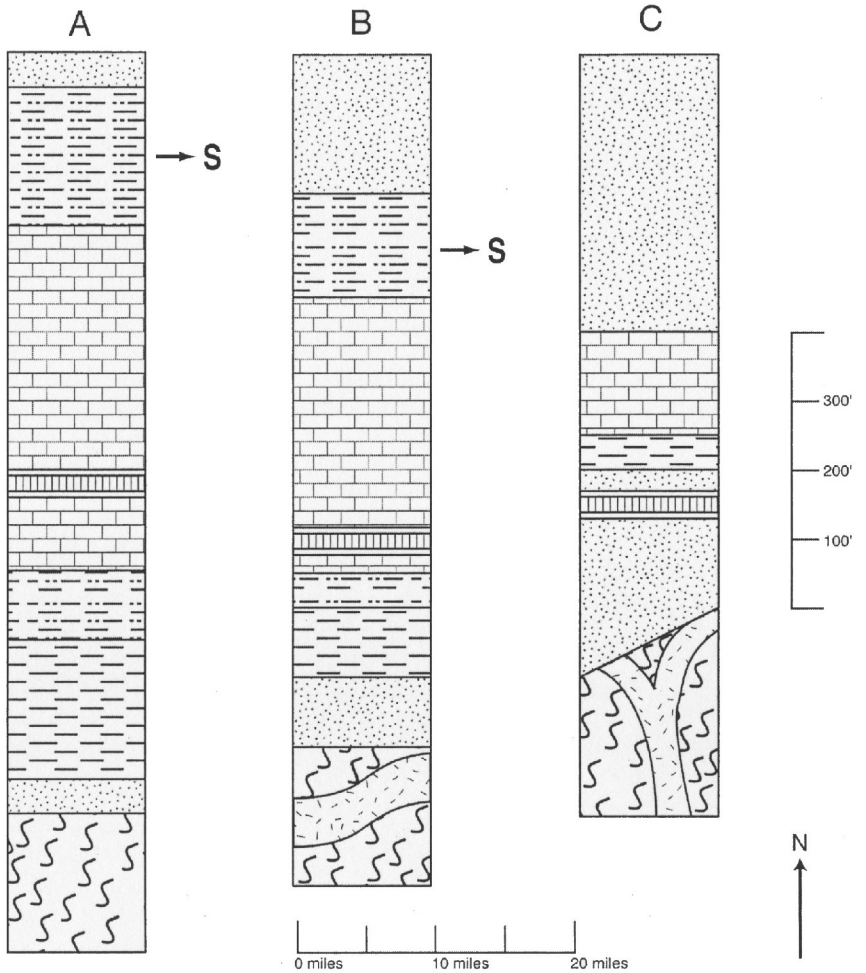
8. A geologist is searching for the marine trilobite Phacops and is walking past several rock outcrops looking for clues. As he/she walks west to east, the visible rocks at the surface turn from red sandstone to carbonaceous shale to coal. First, is the geologist likely to find Phacops in this area? Explain. Second, continuing in which direction would offer the higher chances of finding the trilobite; east or west? Explain.

9. Using the Set 1 correlations as an example, draw in the correlations between the stratigraphic columns in Set 2.

10. Look closely at the siltstone layer marked with an "S". What happens to the layer as you move east through the columns? What geologic principle explains this occurrence? What actually occurred here?

Set 2





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11. What rock layer is the oldest rock at Site A? What geologic principle was used to make this determination?

12. Is the intrusion in the granite at Site C younger or older than the sandstone directly above it? Defend your answer.

13. What evidence is there of unconformities in the stratigraphic columns? What do(es) the pattern indicate actually happened?

14. A *marker bed* is a distinct, easily traceable layer of rock that can be used to quickly identify and accurately date a widespread event. When these beds are present, it is especially useful to use them to match up different stratigraphic columns. Identify the best marker bed in Set 2 and defend your reasons for choosing it.