NAME: _____ PERIOD: _____ DATE: _____

LAB PARTNERS: _____ LAB #22

CORRELATION OF ROCK UNITS

INTRODUCTION

Frequently a geologist is confronted with problems in which there is little or no surface information available. In such cases, the geologist must reconstruct the subsurface geology and make correlations between widely separated localities without a single surface outcrop to aid him. In such instances the geologist must use drill cuttings and cores from wells drilled deep beneath the surface in order to correlate subsurface units.

In this exercise you are supplied with certain geologic data from two regions in the state of Montana. All of the information has been taken directly from the field records of a petroleum geologist. It is based upon detailed microscopic examinations of the drill cuttings from each of the wells.

OBJECTIVES

At the conclusion of this investigation you should be able to:

1. Use information on rock types to correlate rock strata.
2. Determine which fossils in a stratigraphic column are the best index fossils.
3. Determine the geologic history of an area by examining a geologic cross section.

MATERIALS

1. Pencil with eraser
2. Colored pencils

APPROXIMATE TIME

2 Periods

PROCEDURE

1. Look at the data from the Bonanza Field. For each well you are given data on the rock type, fossil content, and depth encountered.

2. On the graph paper, mark off the top and bottom of each layer for each well with a small horizontal tick mark.

3. Write the name of the rock type for each layer. Include any fossils which are found.

4. When all the data has been plotted for each well, try to correlate the rock units from well to well, in pencil. Use fossil data sheet to assist you in correlation. Remember, only index fossils can be used to correlate, so you must decide which of the fossils is suitable as an index fossil.

5. After correlating, color each rock layer with a different color.

6. Repeat steps 1-5 for the Sunrise Field.

BONANZA FIELD DATA

WELL # 1	**TOP**	**BOTTOM**
Soil	+500	+450
Shale (dinosaur teeth)	+450	+125
Limestone (clam shell, insects)	+125	-200
Limestone (eurypterid)	-200	-550
Shale	-550	-850
Conglomerate	-850	Not reached

WELL #2	**TOP**	**BOTTOM**
Shale (insects)	+500	+425
Limestone (fish)	+425	+110
Limestone (eurypterid)	+110	-200
Shale (fish)	-200	-500
Conglomerate	-500	Not reached

WELL # 3	**TOP**	**BOTTOM**
Limestone	+500	+250
Limestone (fish-eurypterid)	+250	-90
Shale	-90	-450
Conglomerate	-450	Not reached

WELL # 4	**TOP**	**BOTTOM**
Shale (bird)	+500	+400
Limestone (shark tooth)	+400	+100
Limestone (eurypterid)	+100	-250
Shale (clam)	-250	-650
Conglomerate	-650	Not reached

WELL # 5	**TOP**	**BOTTOM**
Soil	+500	+350
Shale (dinosaur bone)	+350	+50
Limestone (clam shell)	+50	-250
Limestone (eurypterid, clam shell)	-250	-600
Shale	-600	-1050
Conglomerate	-1050	Not reached

SUNRISE FIELD DATA

Well # 1	**TOP**	**BOTTOM**
Soil	+2000	+1800
Shale (dinosaur bone)	+1800	+1600
Shale (fish scale, insect parts)	+1600	+1325
Siltstone (shark teeth)	+1325	+950
Conglomerate	+950	+675
Limestone (horn coral, clams)	+675	+340
Limestone (clams)	+340	Not reached

WELL # 2	**TOP**	**BOTTOM**
Soil	+2000	+1810
Shale (dinosaur, fish)	+1810	+1610
Siltstone (clams)	+1610	+1350
Conglomerate	+1350	+1050
Limestone (horn coral)	+1050	+700
Limestone (clam shell)	+700	Not reached

WELL # 3	**TOP**	**BOTTOM**
Soil	+2000	+1800
Shale (dinosaurs)	+1800	+1600
Siltstone	+1600	+1580
Conglomerate (insect parts)	+1580	+1290
Limestone (horn coral, clams)	+1290	+925
Limestone	+925	Not reached

WELL # 4	**TOP**	**BOTTOM**
Soil	+2000	+1800
Shale (dinosaur, fish scales)	+1800	+1600
Conglomerate	+1600	+1500
Limestone (horn coral)	+1500	+1220
Limestone (clams)	+1220	Not reached

WELL # 5	**TOP**	**BOTTOM**
Soil	+2000	+1800
Shale (dinosaurs, shark teeth)	+1800	+1600
Limestone (horn coral)	+1600	+1490
Limestone (clams)	+1490	Not reached

FOSSIL TIME CHART

FOSSIL	TIME RANGE (millions of years)
Birds	163 - present
Dinosaurs	230 – 66
Sharks	374 – present
Insects	410 – present
Eurypterids	430 – 415
Horn coral	458 – 450
Fish	530 – present
Clam	540 – present

LABORATORY QUESTIONS

1. List the order of geologic events (from oldest to youngest) in the Bonanza Field cross-section.

2. Describe the geologic event that changed the original horizontality of the rock layers in the Bonanza Field cross section.

3. List the order of geologic events (from oldest to youngest) in the Sunrise Field cross-section.

4. Describe the geologic event that changed the original horizontality of the rock layers in the Sunrise Field cross section.

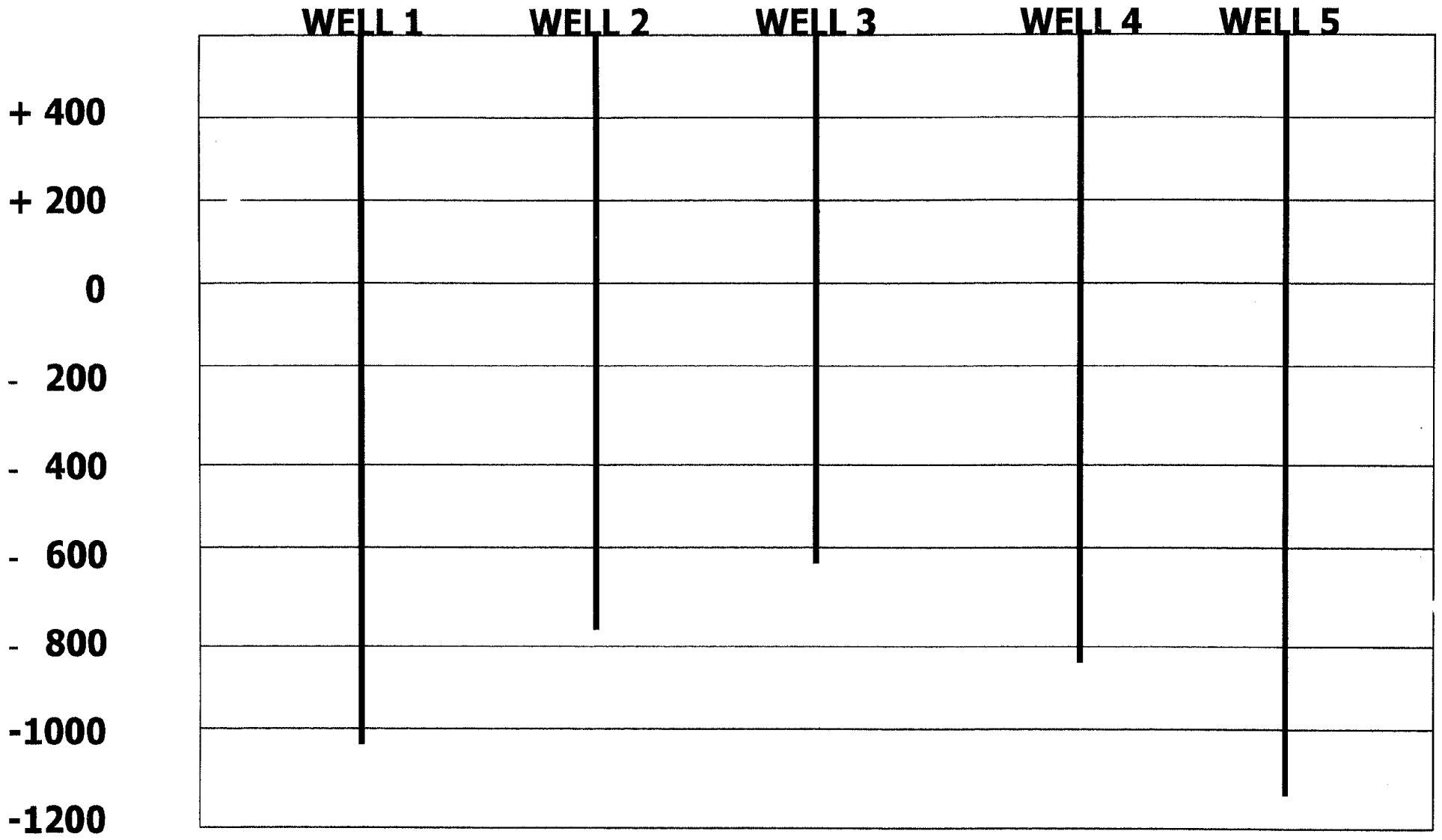
5. Which of the fossils did you use as an Index Fossil in the Bonanza Field?

   In the Sunrise Field?

6. Why did you choose these as the index fossils?

7. Using your Earth Science Reference Tables, name the period in which the index fossils in question 5 existed.

BONANZA FIELD



SUNRISE FIELD