Lunar Craters

Figure 1 shows a typical region of the moon, which contains both maria and highland regions.

Draw a box, 1″ by 1″, in each of these regions and count the number of craters you can find in each square. (Make sure you are consistent in what you consider a "crater". If you consider a small dot in the maria a crater, then you should be sure that you can find craters of this size in the highlands as well.)

1) How many craters did you find in each region?

   Maria –

   Highlands –

2) Based on the number of craters, which is older, the Lunar Maria or the Lunar Highlands? Explain your reasoning.

Figure 2 shows another region of the moon, this one containing many more craters than the other.

3) Compare the two craters marked L and R. Which do you think is older, the left crater or the right one? Explain your reasoning.

4) Compare the two craters marked T and B. Which do you think is older, the top crater or the bottom one? Explain your reasoning

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5) Consider the following debate between two students.

Student 1: I believe that the top crater is older, because it appears to be overlapped by a crater on its left, while the bottom one appears to overlap one on its right.
Student 2: I disagree. Where they don't overlap each other, you can't use that as a comparison. The bottom crater looks worn down, while the top crater looks fresh and new. I think that the bottom crater is older.
Student 1: I disagree. There is no weather on the Moon, so how could the bottom crater been worn down over time?

Do you agree or disagree with either or both students? Why?

6) List two ways that astronomers can determine the relative ages of craters.

7) Go back to Figure 1. If the Maria are estimated to be around 3 billion years old, and we assume a constant rate of cratering, how can we determine how old the Highlands are?

8) Based on your answer to question #1, how old would you estimate the Highlands to be. Explain how you determined this answer.

We believe the Solar System to be around 4.6 billion years old.

9) Is your answer to question #7 consistent with the age of our Solar System. If not, how can you explain this discrepancy?

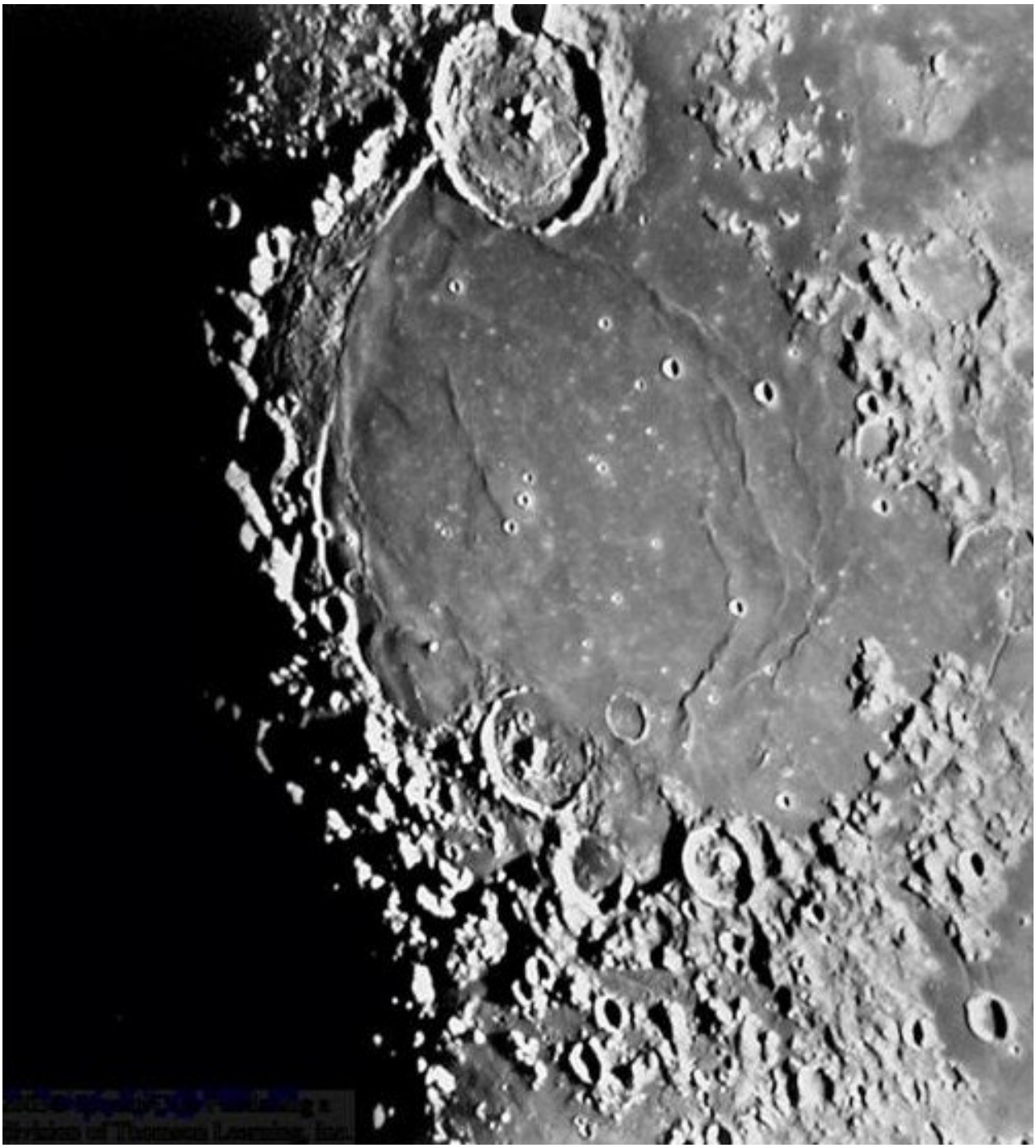

Figure 1

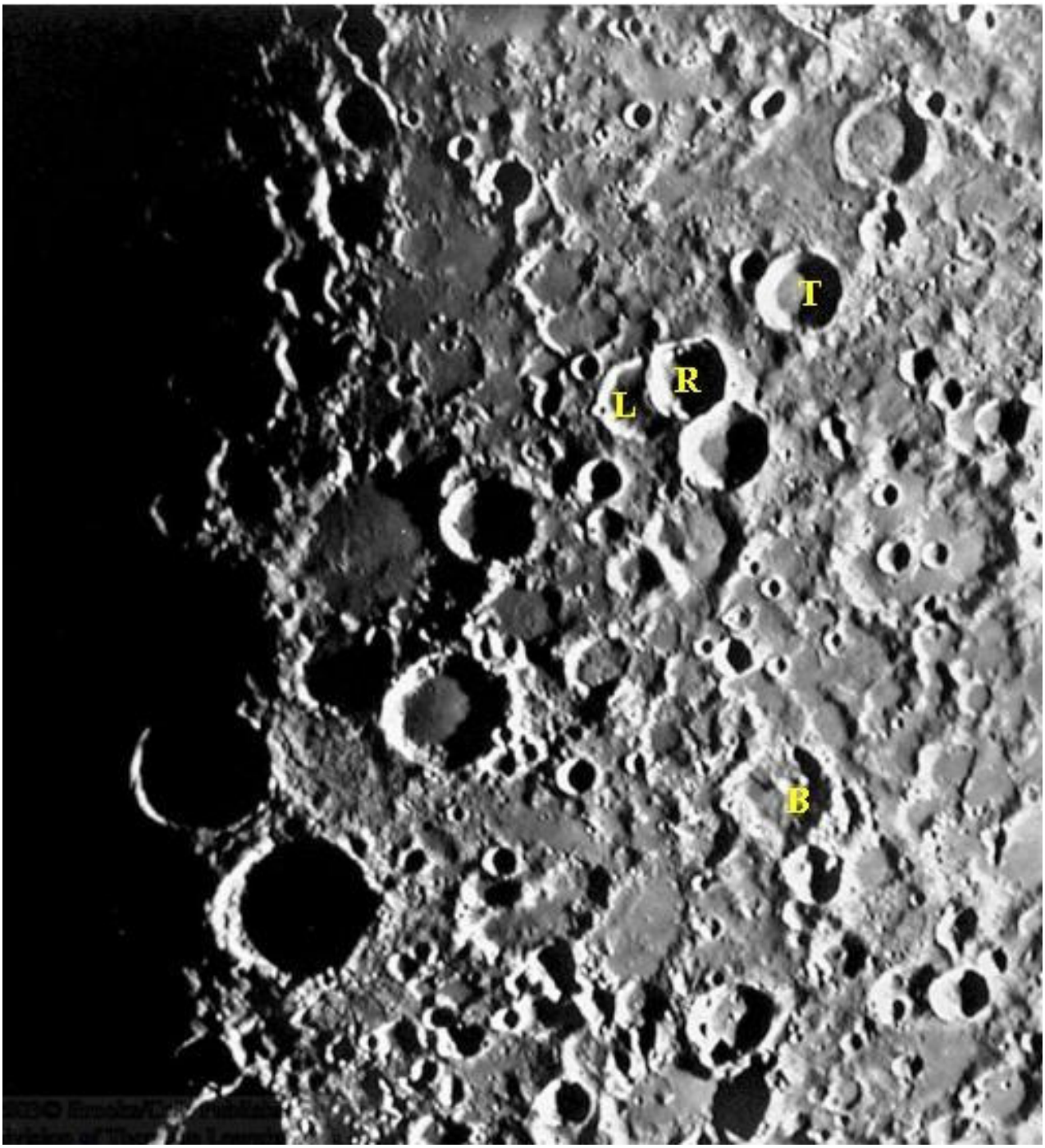

Figure 2