## **TX Exercise - Notes**

The purpose of this exercise is for students to begin to think about TX phase diagrams and how they are interpreted.

Along the way, students learn that text book authors sometimes make mistakes.

The figure in the handout is from Winter's <u>Petrology</u>. But, Winter made a goof and left some reactions off of the phase diagram.

Here are the reactions that should intersect at point A. The phase in parenthesis is the phase NOT in the reaction. The last reaction is degenerate – missing two phases.

$$\begin{array}{lll} \text{Tr} + 3 \text{ Cal} + 7 \text{ CO}_2 = 5 \text{ Dol} + 8 \text{ Qtz} + \text{H}_2\text{O} & (\text{Tlc}) \\ 5 \text{ Tlc} + 15 \text{ Cal} + 15 \text{ CO}_2 = 15 \text{ Dol} + 20 \text{ Qtz} + 5 \text{ H}_2\text{O} & (\text{Tr}) \\ 3 \text{ Tr} + 2 \text{ H}_2\text{O} + 6 \text{ CO}_2 = 5 \text{ Tlc} + 6 \text{ Cal} + 4 \text{ Qtz} & (\text{Dol}) \\ 2 \text{ Tlc} + 3 \text{ Cal} = \text{Tr} + \text{Dol} + \text{H}_2\text{O} + \text{CO}_2 & (\text{Qtz}) \\ 7 \text{ Tlc} + 12 \text{ Cal} = 3 \text{ Tr} + 6 \text{ Dol} + 4 \text{ Qtz} + 4 \text{ H}_2\text{O} & (\text{CO}_2) \\ \text{Tr} + 4 \text{ CO}_2 = \text{Tlc} + 4 \text{ Qtz} + 2 \text{ Dol} & (\text{Cal}, \text{H}_2\text{O}) \end{array}$$

The last question in this exercise, involving Schreinemaker's analysis, may be too much for most petrology students. The invariant point should look like this:

