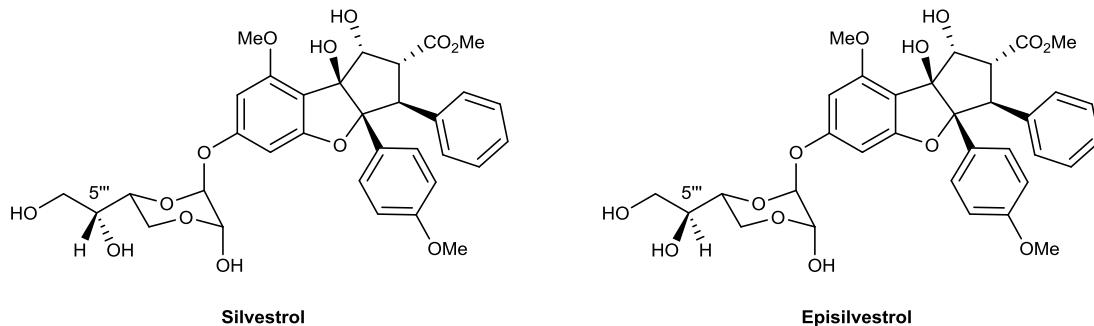


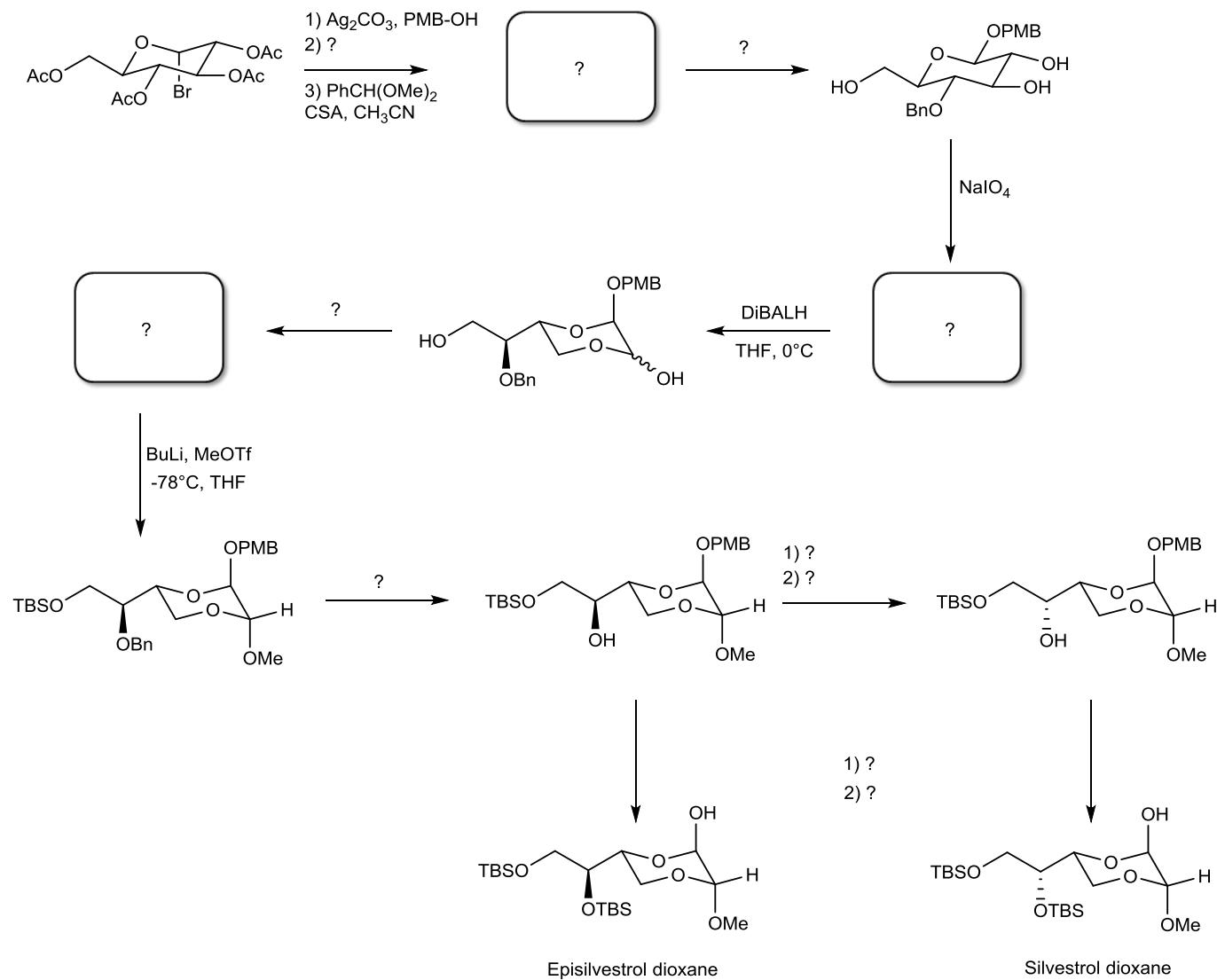
Spivey Group Problem Session – Total Synthesis of (-)-Silvestrol and (-)-Episilvestrol

The roccaglate derivatives Silvestrol and Episilvestrol, isolated from the fruits and twigs of the woody plant species *Aglaia*, has been found to show very potent in vitro cytotoxic activity against several human cancer cell lines comparable to that of the well-known anticancer drug paclitaxel (Taxol®).

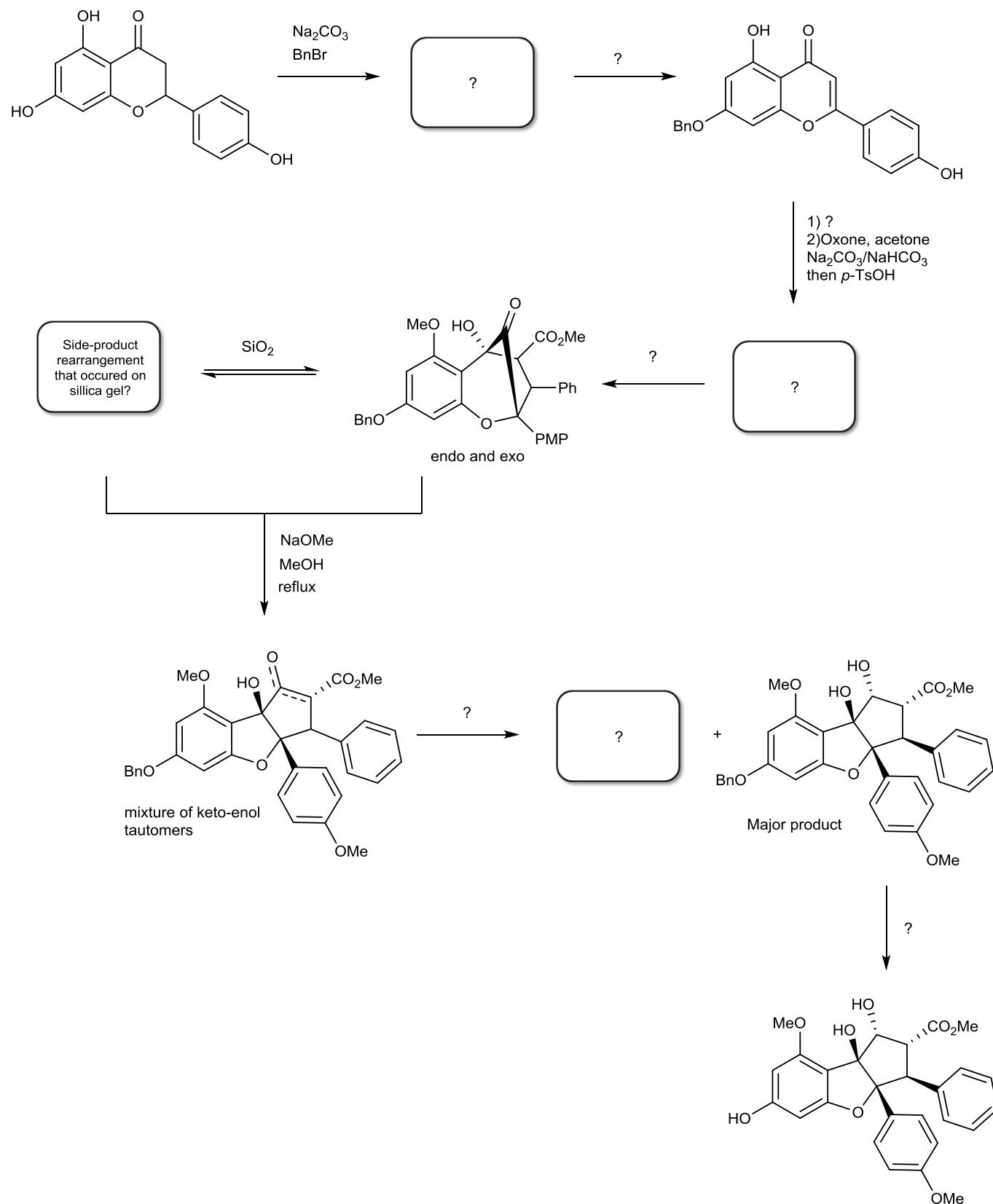


Below is a portion of the total synthesis of (-)-Silvestrol and (-)-Episilvestrol. Please provide reagents, conditions and intermediates where indicated as well as mechanisms for all steps.

## Synthesis of the 1,4-Dioxane fragment



## Synthesis of the Cyclopentabenzofuran Core



What is the name of the reaction that couples these two portions together (DIAD,  $\text{Ph}_3\text{P}$ ,  $0^\circ\text{C}$ , 2 h)?  
 Give a reason for the stereochemistry achieved.