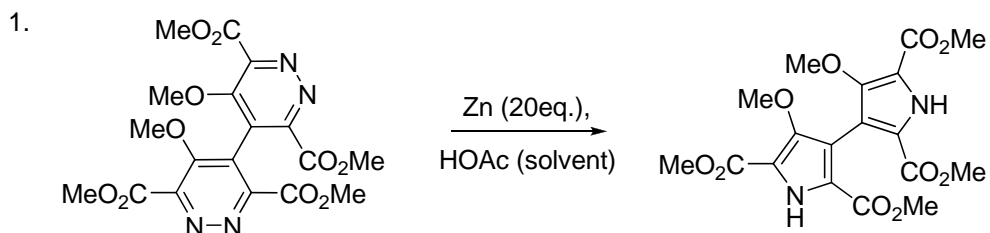
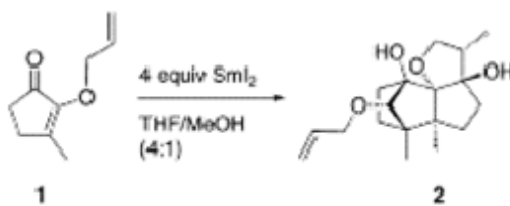


MSV problem set 3/30/10

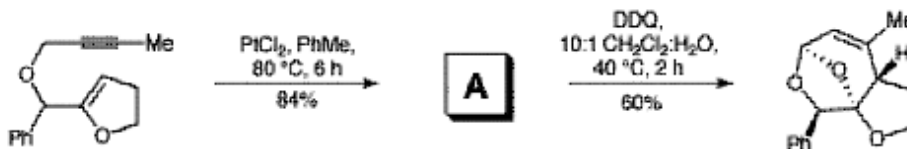
You know what to do.



2. Kilburn and co-workers have reported a study on the SmI_2 reductive cyclization of cyclic enones (*Org. Lett* **2004**, *6*, 1943-1945). One of their most interesting cases is provided in the context of this problem. When cyclopentenone **1** was added to a solution of 4 equiv of SmI_2 in a mixed THF/MeOH (4:1) solvent system at -78°C , a new compound **2** was obtained in 67% yield as a single diastereoisomer. Structure determination of the product was provided by X-ray crystallography.

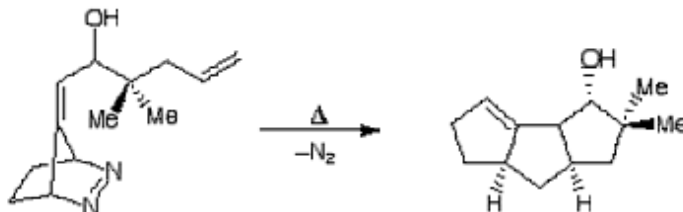


3. Based on the pioneering work of Murai (*Organometallics* **1996**, *15*, 901) and Fürstner (*J. Am. Chem. Soc.* **2000**, *122*, 6785-6786), Echavarren and co-workers (*Org. Lett.* **2004**, *6*, 3191) demonstrated the interesting sequence of transformations shown below.



Please show the correct structure of compound **A** and delineate a mechanism for each transformation.

4. Little and co-workers employed this stunning transformation in a series of studies directed toward the synthesis of diketocoridin B. (For a relevant review see *Chem. Rev.* **1986**, *86*, 875).



Please provide a mechanism for this transformation, accounting for stereochemistry when necessary.