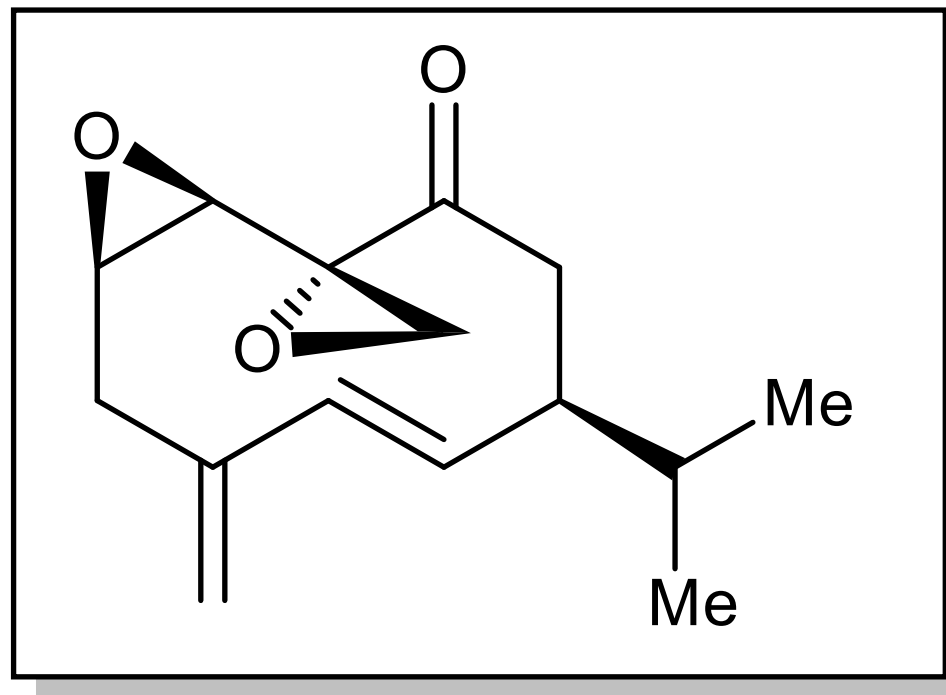


Periplanone B



Anuki Nethma Wethalawe

CEM 852 – Methods of Organic Synthesis

01/24/2022

Introduction

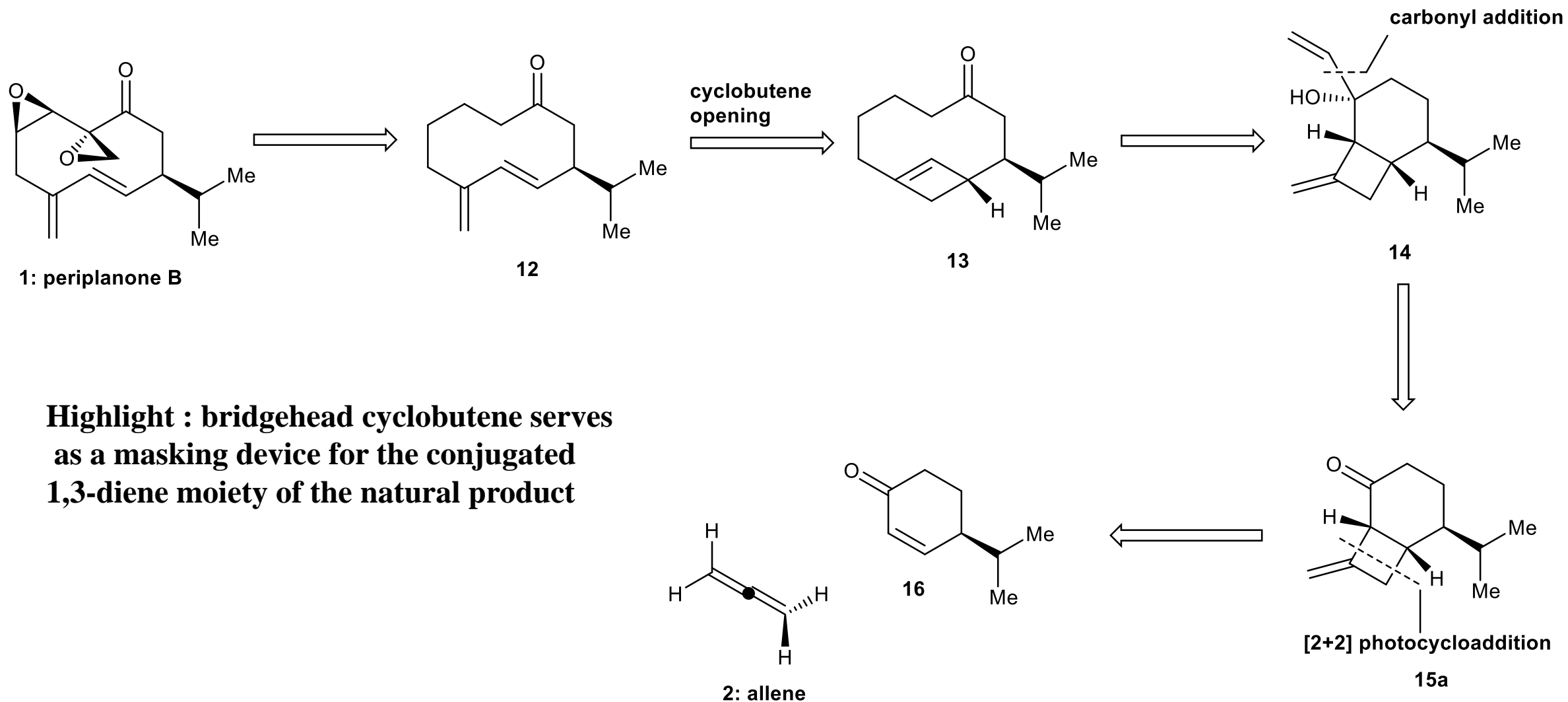
- Potent sex pheromone of the American cockroach, *Periplaneta Americana*
- Second total synthesis reported by Schreiber and Santini, in 1984, approximately five years after the landmark synthesis by W. C. Still
- Construction of functionalized 5-cyclodecen-1-one systems via **anionic oxy-Cope rearrangements** of readily available divinylcyclohexanols
- Belongs to a class of natural products called **germacranes**, which consists of a ten-membered carbocyclic ring, with a butadiene unit

Nicolaou, K. C.; Sorensen, E.J. *Classics in Total Synthesis, Targets, Strategies, Methods* VCH, 1996.

Marvell, E. N.; Whalley, W. *Tetrahedron Lett.* **1970**, 509

Still, W. C. *J. Am. Chem. Soc.* **1979**, 101, 2493

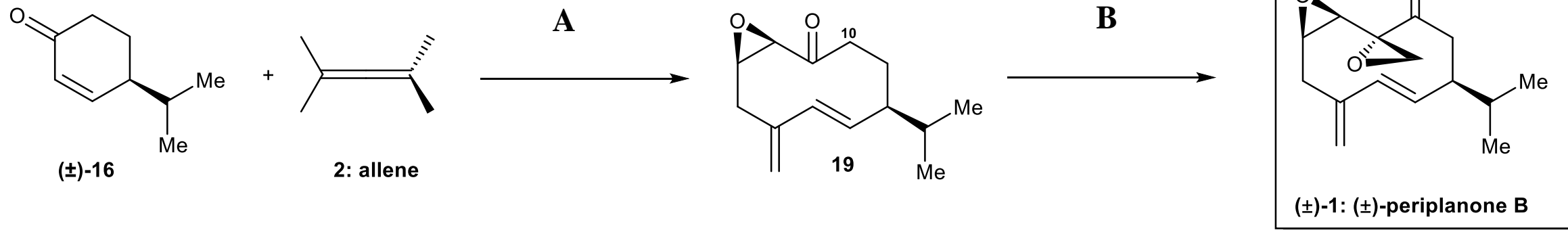
Schreiber's Retrosynthetic Analysis of Periplanone B



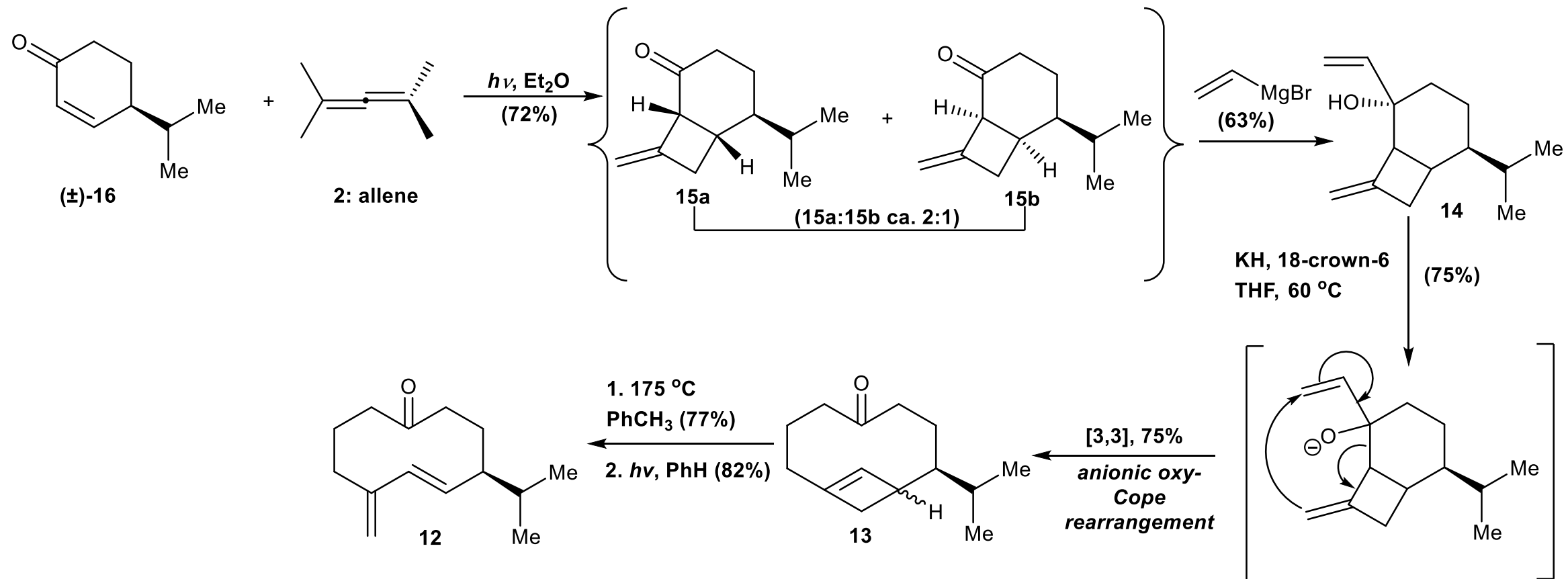
Total Synthesis of Periplanone B

A. Synthesis of Intermediate 19

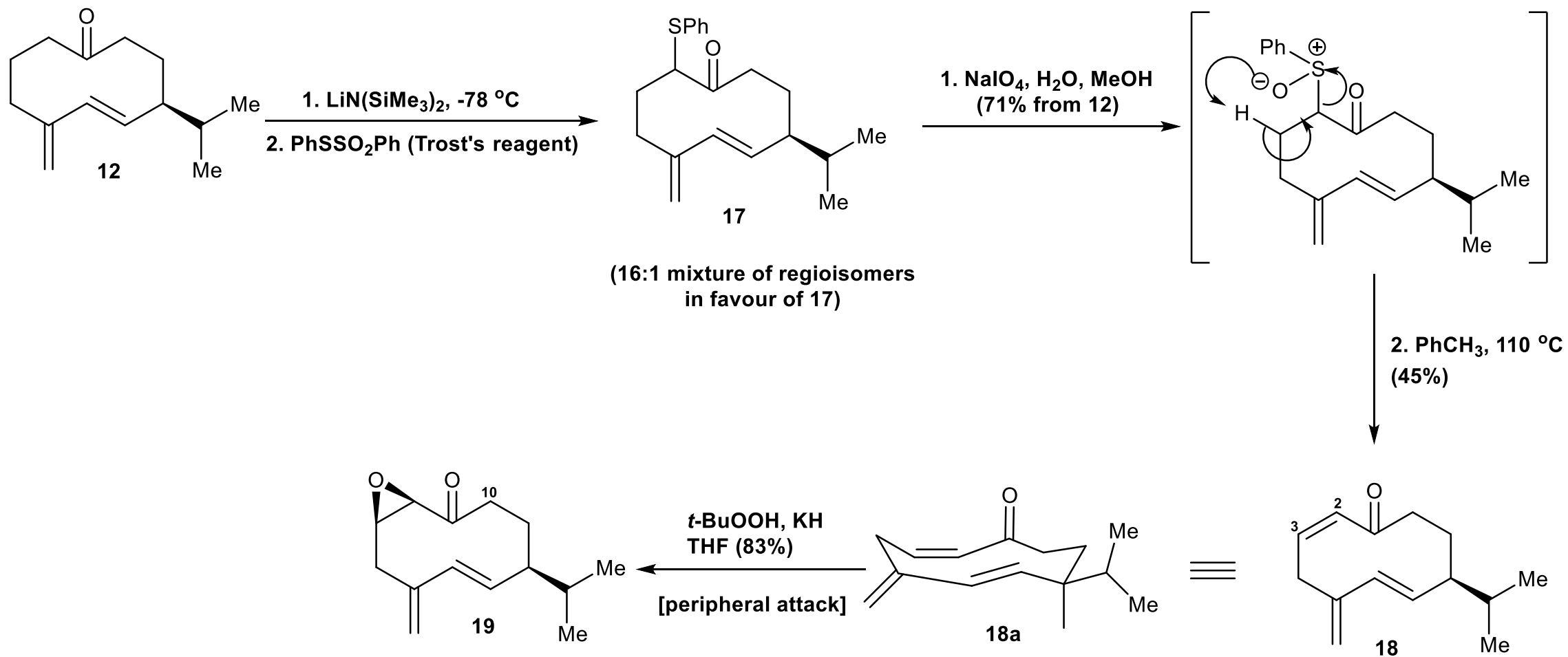
B. Synthesis of Periplanone B



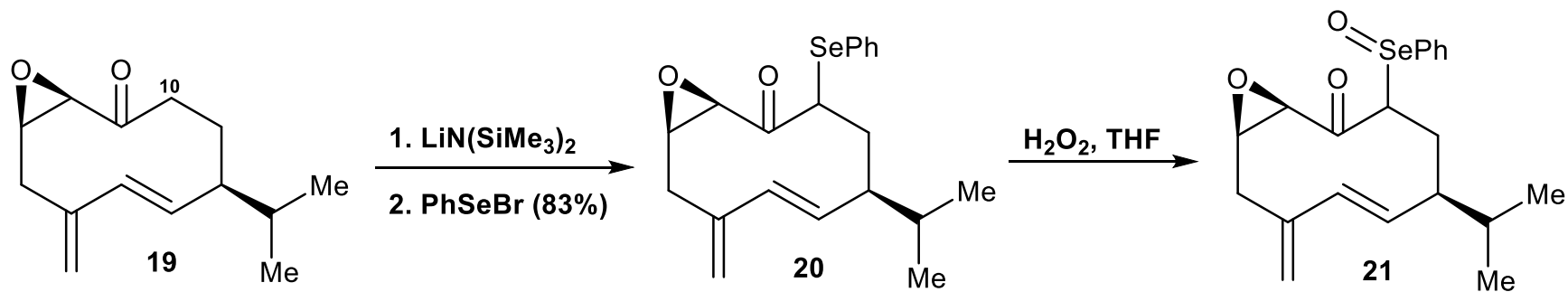
A : Synthesis of Intermediate 19



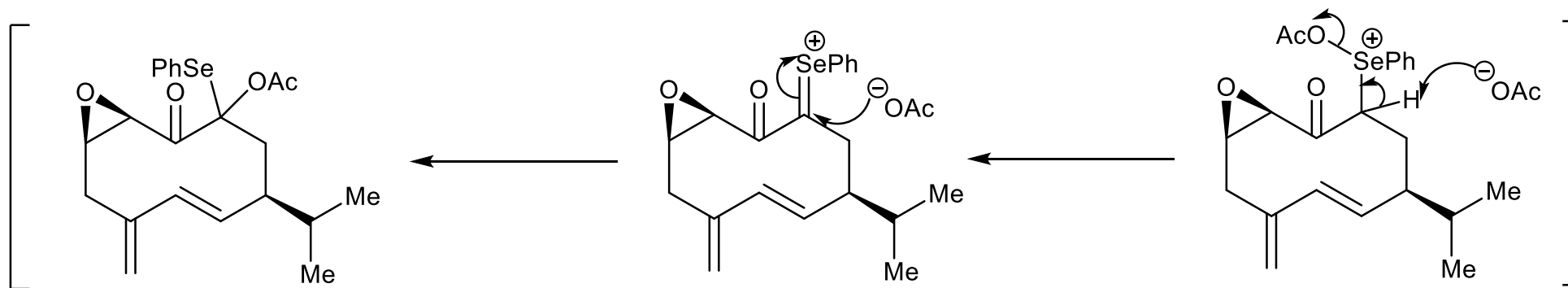
A : Synthesis of Intermediate 19 continued...



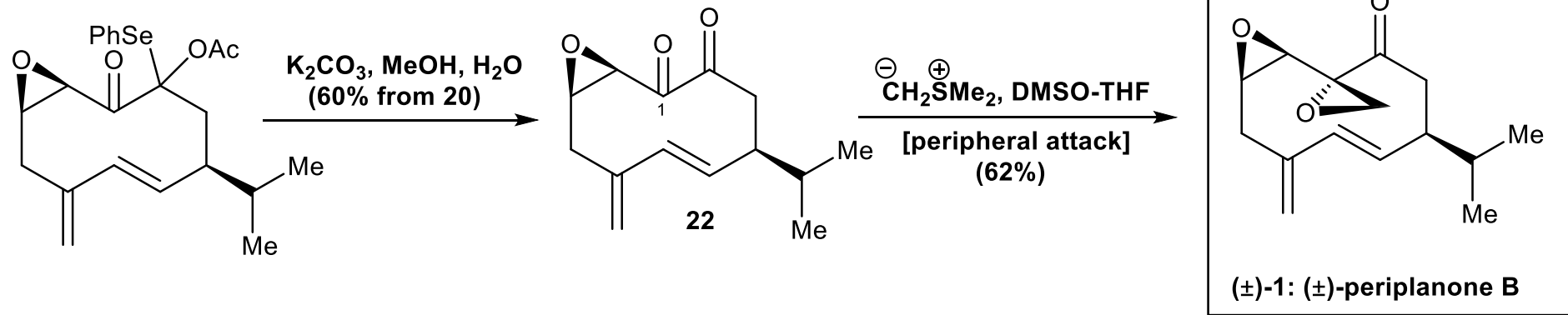
B : Synthesis of Periplanone B



Seleno-Pummerer rearrangement – conversion of an organoselenide to a ketone



B : Synthesis of Periplanone B continued..



Conclusion

- The most productive and impressive transformations are facilitated by **light and heat**
- Emphasis on the use of anionic oxy-Cope rearrangement to prepare 5-cyclodecen-1-one frameworks has been made
- Architectural feature of **bicyclic β - γ unsaturated ketone** controls the stereochemical course of reactions
- Control of the stereochemistry of a crucial oxidation step
- Population control aspect of American cockroach has been explored

Thank you!