Radical-Driven Deoxygenation of Secondary Alcohols: The Barton–McCombie Reaction

**Significance:** The authors reported a very broadly applicable method for the deoxygenation of secondary alcohols, providing complex hydrocarbons in high yields. The alcohol thereby has to be activated by transforming it into its corresponding thioester.

**Comment:** By using a radical mechanism and the favorable formation of an S–Sn bond, these thioesters can be deoxygenated. This concept has been revived in the Barton–McCombie decarboxylation (J. Chem. Soc., Chem. Commun. 1980, 15, 732).

**Selected examples:**
- 67% yield from ergosterol
- 85% yield from α-D-glucofuranose
- 70% yield from α-D-glucopyranoside

**Proposed mechanism:**

1. Phosgene (2.0 equiv) reacts with the thioester to form a chloroformate intermediate.
2. The chloroformate is decomposed by the alcohol to generate a radical.
3. The radical reacts with the thioester to form a new carbon–carbon bond.
4. Hydrogen sulfide is added to the thioester to provide the final product.

**R1** = Alk (sec)

**R2** = H, Me, SMe, OMe, Ph, OPh, imidazolyl

**Key words**
deoxygenation
secondary alcohols
stannanes