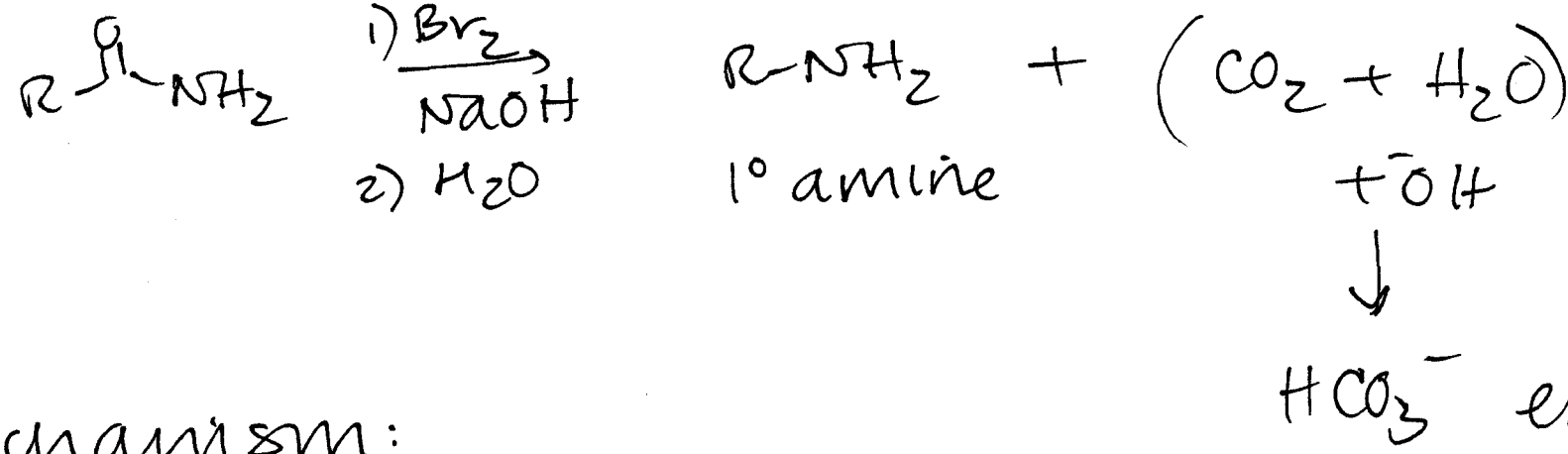
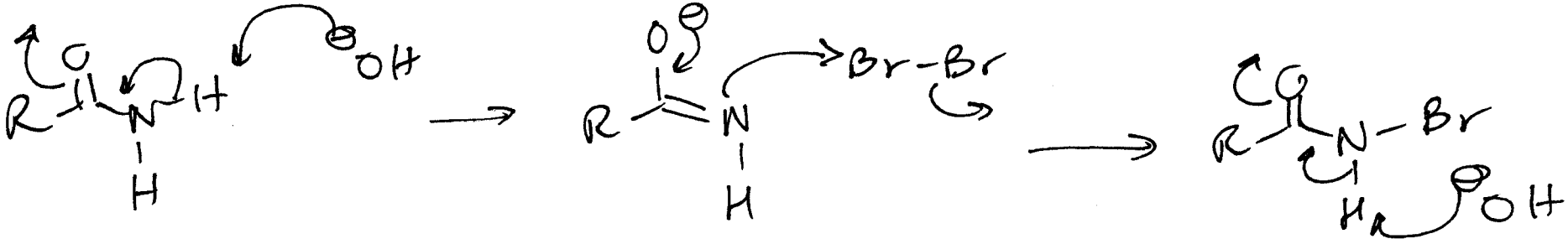
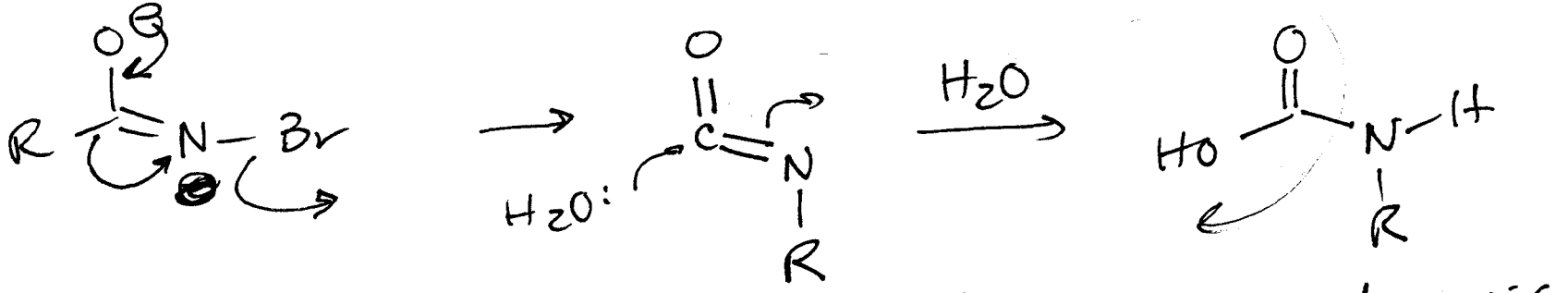
Hofmann Rearrangement – 1° amides only



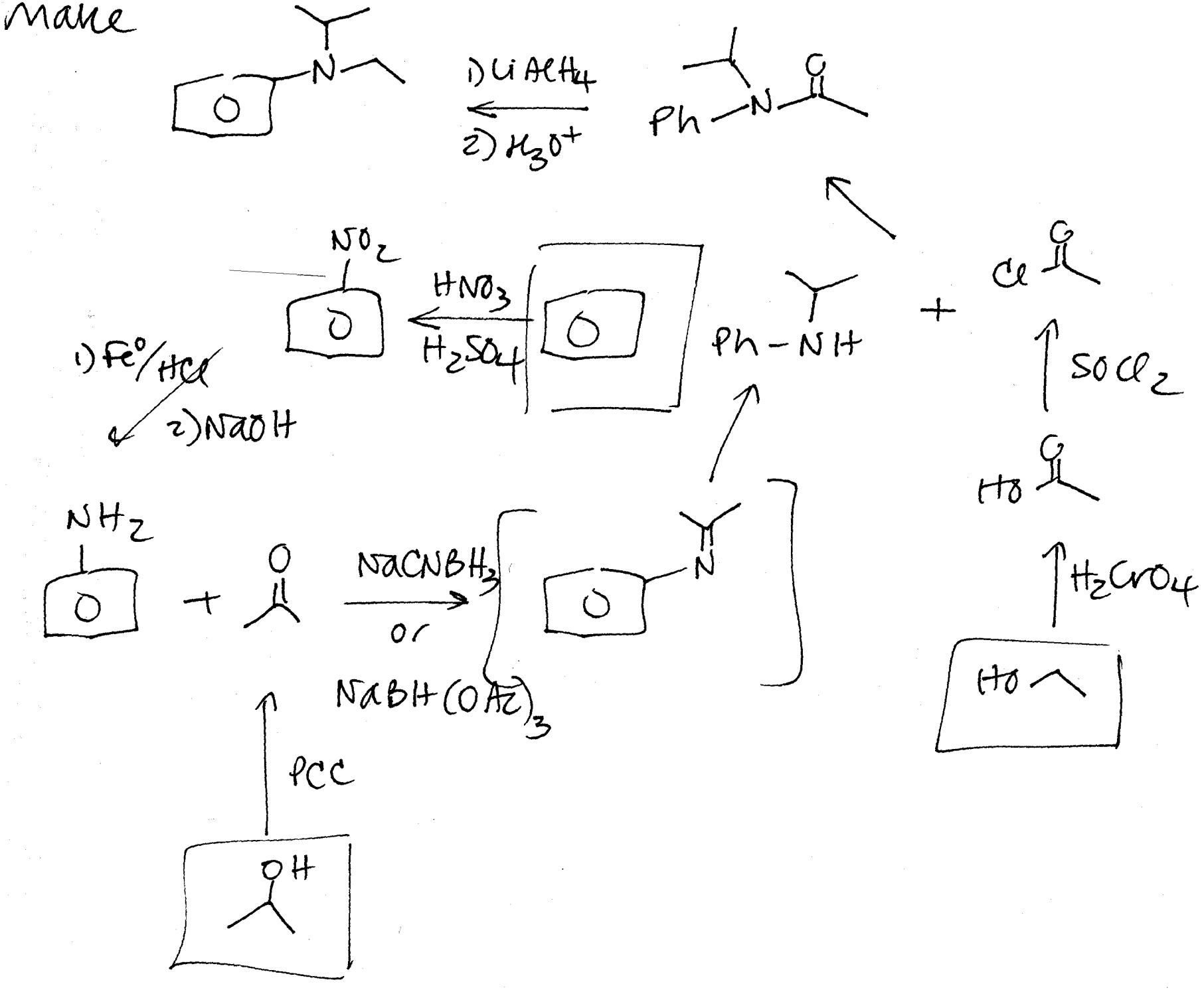
mechanism:





etc. + RNH_2

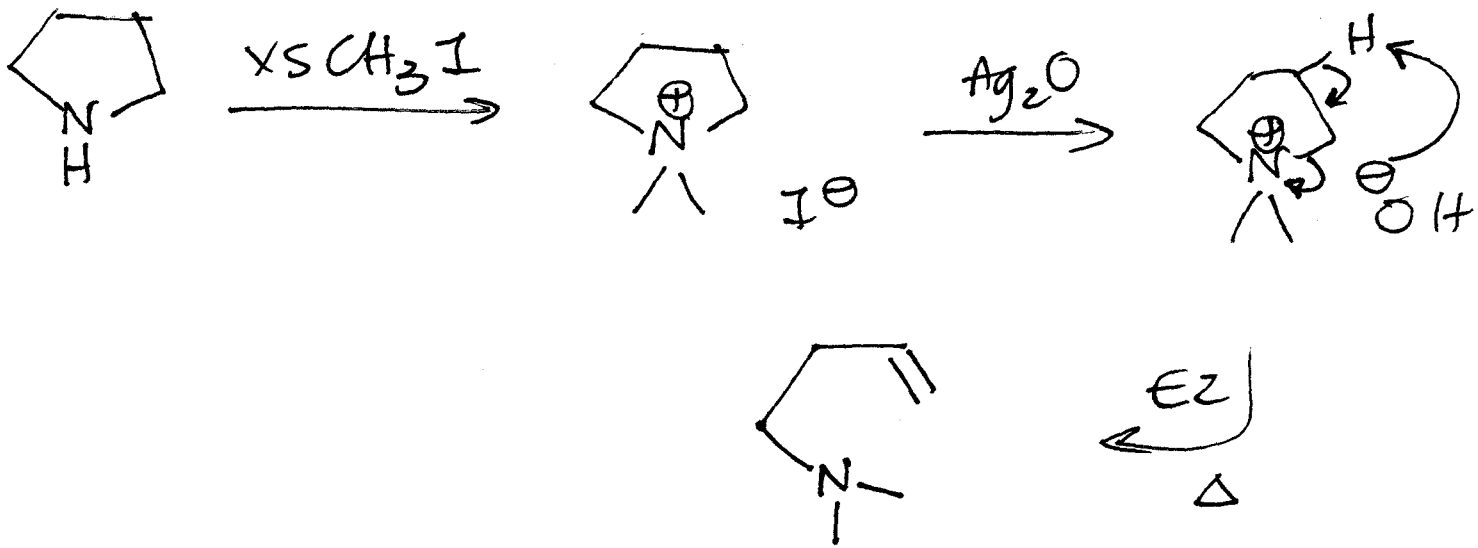
Make

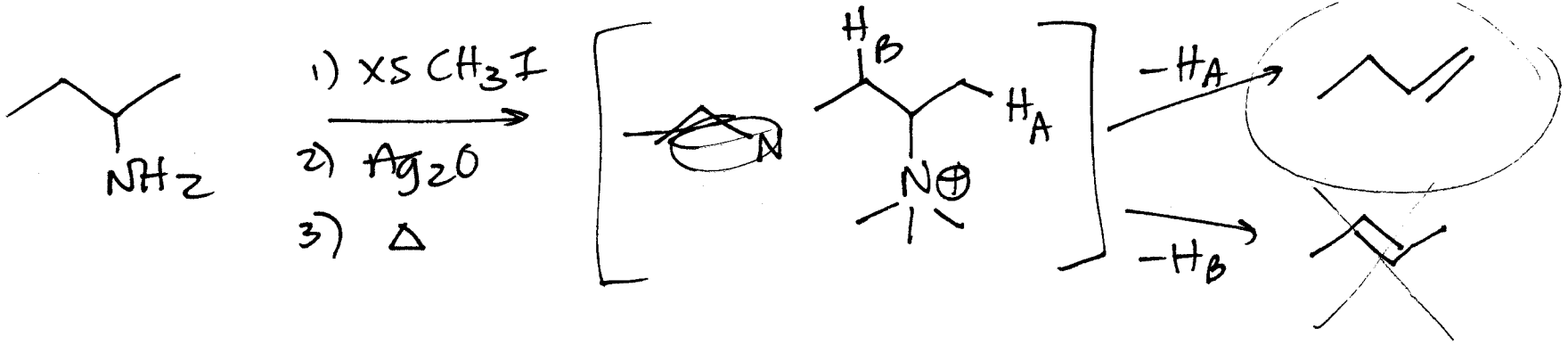


Reactions of Amines – bases + nucleophiles

1. Rxn w/ aldehydes + ketones → imines + enamines
2. Rxn w/ acyl chlorides, esters, etc. → amides
3. Rxn w/ alkyl halides (S_N2) – most useful is exhaustive methylation (react w/ xs CH_3I)

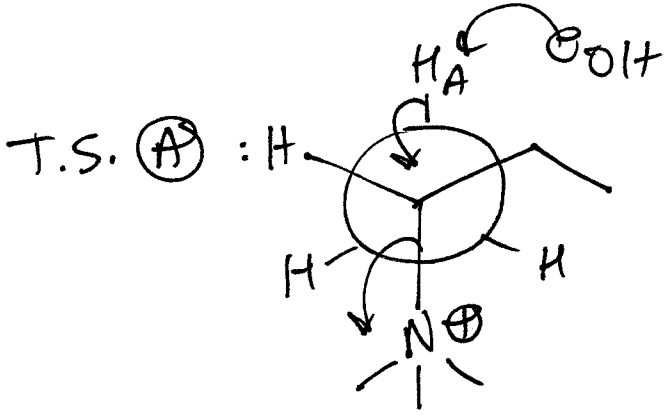
4. Hofmann Elimination – specific to 4° ammonium salts.



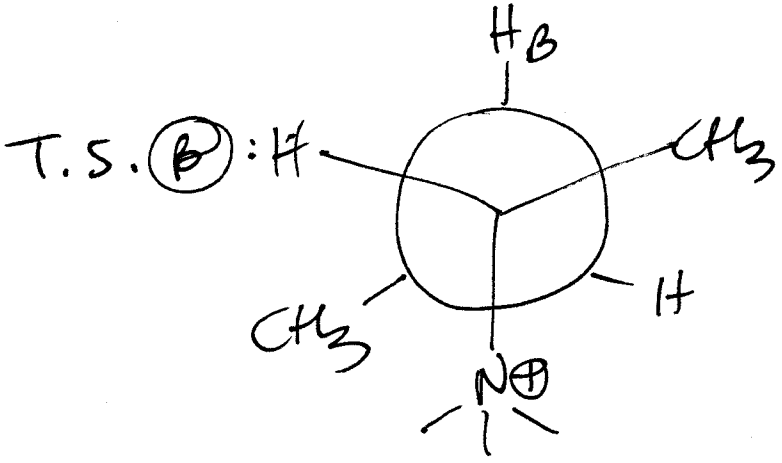


Hofmann elimination does <u>not</u> follow Zaitsev's rule - instead, we get the <u>less</u> substituted alkene.

Why? Could be electronics (see book); it could be sterics. Both give the same answer.



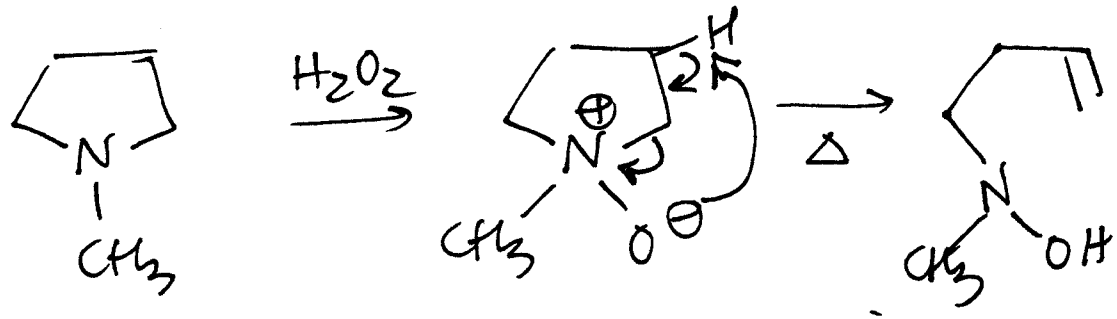
sterically less hindered



5. Oxidation of Amines – use H_2O_2 or mCPBA

1°/2° amines → nothing useful

3° amine

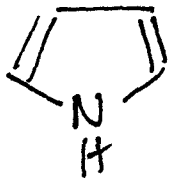


tertiary amine oxide

* Cope elimination
syn-elimination

6. Recall diazotization rxns

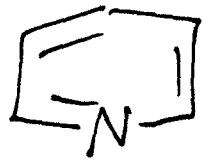
Aromatic Heterocyclic compounds



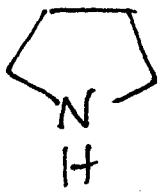
pyrrole

furan

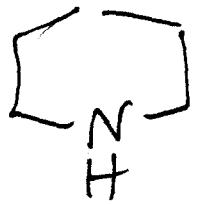
thiophene



pyridine



pyrrolidine



piperidine

* these aromatics also do EAS.

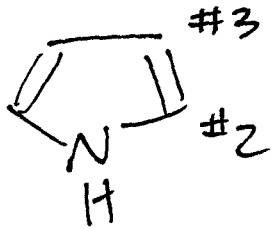
pyrrole > furan > thiophene > benzene

> nitrobenzene > pyridine

very reactive

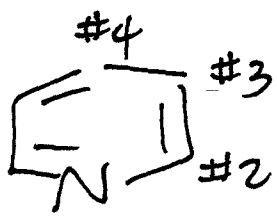
not very reactive

5-membered heterocycles



EAS is preferred @ #2
(sigma complex is more stable)

6-membered heterocycles



EAS is preferred @ #3

sigma complexes for rxn @ #2 + #4
have N w/o complete octet <u>and</u> w/ a ⊕

[SKIP nucleophilic aromatic substitution]