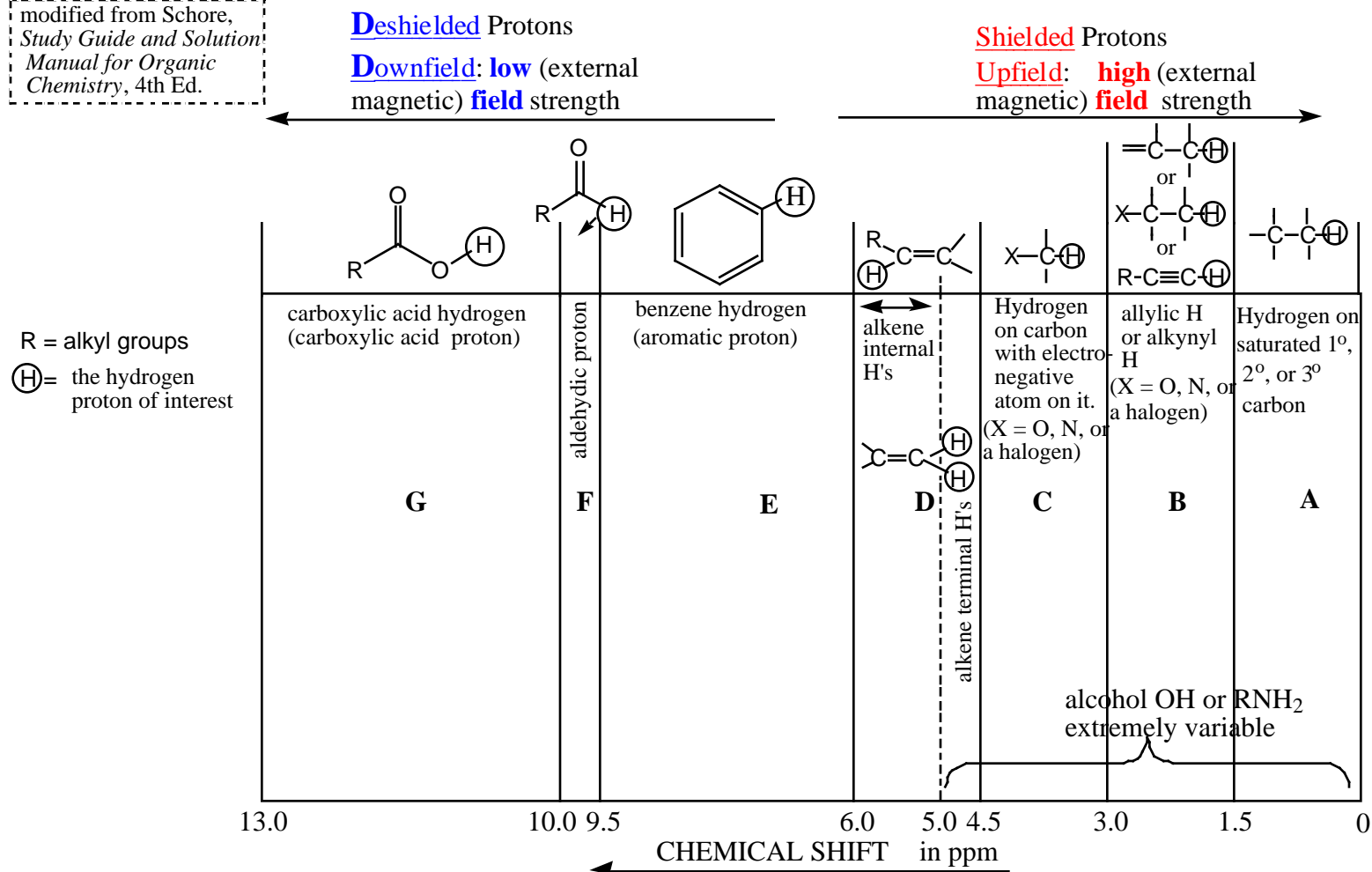


modified from Schore,
*Study Guide and Solution
 Manual for Organic
 Chemistry*, 4th Ed.

Jim Hollister
 LSC/UCDavis



Region A: 0 -1.5 ppm: alkane type hydrogens; proton on a saturated 1°, 2°, or 3° carbon. $-\text{C}-\text{C}^{\oplus}$

Region B: 1.5 - 3.0 ppm: hydrogens on carbons next to carbon-containing functional groups, ie, allylic H's. An allylic H is a H on a C next to a C which is functionalized by a double bond or an electronegative atom, X. (X in this case could be O, N or a halogen.) Examples: $=\text{C}-\text{C}^{\oplus}$ or $\text{X}-\text{C}-\text{C}^{\oplus}$. This range could also have alkyne H's, as $\text{R}-\text{C}\equiv\text{C}^{\oplus}$.

Region C: 3.0 -4.5 ppm: hydrogens on carbons attached to electronegative atoms, as $\text{X}-\text{C}^{\oplus}$. (X in this case could be O, N or halogen.)

Region D: 4.5 - 6.0 ppm: alkene type hydrogens, as $\text{C}^{\oplus}=\text{C}$ (old name, vinylic proton).

Region E: 6.0 - 9.5 ppm: benzene type hydrogens, as $\text{C}_6\text{H}_6^{\oplus}$

Region F: 9.5 - 10.0 ppm: hydrogen of an aldehyde, as $\text{R}-\text{C}^{\oplus}=\text{O}$

Region G: 10.0 - 13.0 ppm: hydrogen of carboxylic acid, as $\text{R}-\text{C}(=\text{O})-\text{O}^{\oplus}$