

the activated complex together with this volume effect, since the mutual approach to a distance of  $1.5\text{\AA}$  of the two planes shown in Fig. 1 leads to the fact that the distances between some atoms that are not linked by valence bonds become smaller than the sum of their intermolecular radii (the new bond formed in the reactor, in our case N-C, will be considered as a valence bond).

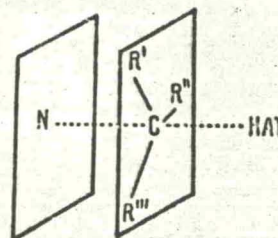


Fig. 1. Scheme of the structure of the activated complex in Menshutkin reactions.

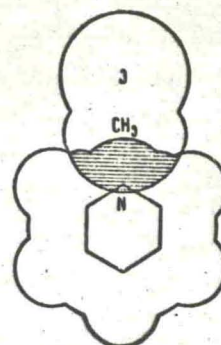


Fig. 2. Activated complex in the reaction of pyridine with methyl iodide. The compression is cross-hatched.

These additional compressions characterize (although, of course, incompletely) the steric hindrance of the reaction. It appears, from this consideration, that Menshutkin reactions are sterically hindered, to a greater or smaller extent.