

Points on Wintered Hive Behavior in 20 in. square hives, 6 5/8 deep, 3 high, 3 x 3/8 entrance, 1 in hole 2<sup>nd</sup> super, facing south (Bill Turner)

Unprotected Hives/Checked	Insulated Hives	General Points
<ul style="list-style-type: none"> <li>- tightest insulating shell</li> <li>- stayed farthest from upper opening</li> <li>- brood more centered</li> <li>- below -10°C wooded supers lose more heat than gain by sun</li> <li>- temperature changes affect these the most</li> <li>- greatest contraction occurred early morning or at night with temp. drop</li> <li>- solar radiation markedly affected cluster movement</li> <li>- internal hive temperature lagged behind outside by 1 – 2 hours</li> <li>- warmer weather increased brood to equal packed populations by main honey flow</li> <li>- changing mean daily temp. more affect than night/day changes</li> </ul>	<ul style="list-style-type: none"> <li>- compactness of insulating shell was less</li> <li>- bottom entrance might be used</li> <li>-</li> <li>- outside temp. above 0°C able to warm entire hive above 5°C</li> <li>- greatest cluster changes due to temperature changes outside hive</li> <li>- cluster volume changed little between night and day</li> <li>- mean average temperature outside cluster 5<sup>0</sup>C higher then in unpacked</li> <li>- hive temp. lagged 6 – 8 hours with changes outside hive and was only 1/3 as great as outside</li> <li>- produce brood earlier and in greater amounts as long as pollen was available (honey too)</li> <li>- maintance of cluster temp. easier if insulated</li> </ul>	<ul style="list-style-type: none"> <li>- disturbed clustered bees require 3 days to return to normal</li> <li>- lowest temp. over 5 years was -20<sup>0</sup>C</li> <li>- January cluster smallest insulating shell</li> <li>- upper entrance enabled fly outs on warmer sunny days(better than if just a bottom opening)</li> <li>- above improves hive health(older bees gone)</li> <li>- cluster movement, location, and shape just as large between groups as within the group</li> <li>- closed hive top entrance allowed bees to move closer to it</li> <li>- stronger colonies produce greater movement to food / weaker ones can not produce enough heat for movement</li> <li>- changes in entrances(top-bottom) does not change temp. distribution within a hive</li> <li>- cluster heat is not lost to surrounding air and little air circulates in a hive</li> <li>- max. hive temp. has no relationship to ambient temperature except when heat suddenly added</li> <li>- Nosema seen to waken colonies</li> <li>- lack of honey and pollen more detrimental than low temperatures</li> </ul>