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CYCLIZATION AND CYCLOADDITION REACTIONS OF 1,3-OXAZEPINE AND 1,2-DIAZEPINE DERIVATIVES

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In connection with the interesting behavior of valence isomerization of heteropines such as oxepines and azepines, we studied the electrocyclic and cycloaddition reactions of 2-phenyl-1,3-oxazepine (I), which has recently been synthesized in this laboratory. On the basis of evidence obtained, it may be concluded that in the cycloheptatriene $\rightleftarrows$ norcaradiene type equilibrium, 1,3-oxazepine (I) is directed towards the triene side at ordinary temperatures. The reactivities of 1,2-diazepine derivatives (II) were compared with those of the 1,3-oxazepine (I) from the view point of valence isomerization.

The most intriguing finding is the fact that both compounds, I and II, add to 2,5-dimethyl-3,4-diphenylcyclopentadienone to give 1 : 1 adducts III and IV. In addition, irradiation of adducts III and IV results in the formation of novel cage compounds containing two hetero atoms such as 1,3-dimethyl-6,9,10-triphenyl-5-oxa-7-azapentacyclo[8.2.0.$0^{3,9}$.$0^{4,12}$.$0^{8,11}$]dodeca-6-en-2-one and 7-substituted 1,3-dimethyl-9,10-diphenyl-6,7-diazapentacyclo[8.2.0.$0^{3,9}$.$0^{4,12}$ $0^{8,11}$]dodeca-5-en-2-one.