equatorial. There are, examining the Newman projections, two possible isomers of the trans molecule (37 and 38) which are mirror images, and the trans molecule should be optically active as the result of bridgehead bonding. Unsymmetrical derivatives of 36, such as the trans-acyloin 42 (R' = H, -OH), no longer have identically substituted bridgehead carbon atoms, and two dl pairs should be possible as the result of bridgehead asymmetry. In addition, the trans-acyloin 42 (R' = H, -OH) has another asymmetric center at the hydroxy carbon, and a total of eight isomers (23), four dl pairs, is possible. In symmetrical derivatives of 36, such as the trans-diketone 42 (R' = O), the situation with regard to stereochemistry is the same as in 36, and only one dl pair is possible. Resolution of a symmetrical derivative of 36 would constitute the first demonstration of optical activity resulting exclusively from bridgehead bonding.

Statement of the Problem

Although the chemistry and stereochemistry of bridged bicyclic systems containing normal rings have been extensively investigated, there is a lack of such information regarding the more inaccessible medium-ring, bridged bicyclic systems. The acyloin condensation has been used to prepare a variety of fused-ring and bridged-aromatic,