mole is consistent with the above discussion if the resonance energy in R—CO—$CH_2\cdot$ radicals is assigned a value of about 7 kcal. This is a few kcal. higher than we would expect from bond energy considerations but not outside the limits of error of the available data. On the other hand, the very low E_{act} of 32.5 kcal. observed[10] for the first order isomerization of cyclobutene to butadiene cannot be reconciled with the present discussion unless one assumes that the strain energy in cyclobutene exceeds that in cyclobutane by about 15 to 20 kcal. This seems rather unreasonable.

[10] W. Cooper and W. D. Walters, *J. Am. Chem. Soc.*, **80**, 4220 (1958).

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RECEIVED MAY 31, 1962

CESIUM SALTS CONTAINING THE ClHCl⁻ SPECIES

Sir:

The report of West[1] on the preparation of CsClHCl has stimulated much interest and some further study of this compound (including this work). Our work indicates that the compound prepared by West is not an anhydrous salt but contains an amount of water equivalent to the amount of HCl contained. This explains the failure of Sharp[2] to find the stretching frequency characteristic of the $ClHCl^-$ species. We wish to report the preparation of anhydrous CsClHCl.

On exposure of anhydrous CsCl to anhydrous HCl at −78.5°, rapid absorption of HCl initially takes place and then slow absorption for several days to form the stoichiometric compounds. Pressure–composition diagrams indicate the presence of $CsCl\cdot 0.75HCl$ and $CsCl\cdot 1HCl$, the product being determined by the final pressure of HCl. No interaction of CsCl with HCl gas at one atmosphere could be detected at 0°. From pressure measurements at two temperatures the indicated pressures at 30°, the temperature of West's work, would be *ca.* 4.4 atmospheres and >400 atmospheres for the $CsCl\cdot 0.75HCl$ and $CsCl\cdot 1HCl$ compounds, respectively. Both of these anhydrous compounds were colorless.

Since these compounds appeared to be different from the compound reported by West, his preparative scheme was followed to obtain a sample for comparison. Four grams of Fisher purified grade CsCl were dissolved in 3 cc. of water, and the solution alternately treated with HCl gas and cooled. Approximately 2 g. of very pale yellow crystals were recovered and dried. Analysis for water using a Karl Fischer titration, HCl by titration with NaOH and total chloride by gravimetric determination as AgCl are all consistent with the compound $CsCl\cdot 0.74HCl\cdot 0.74HOH$. The compound prepared by West thus appears to be the hydrated $CsCl\cdot 0.75HCl$ or the hydrated $CsCl\cdot 1HCl$ or a mixture of the two.

[1] R. West, *J. Am. Chem. Soc.*, **79**, 4568 (1957).

[2] D. W. A. Sharp, *J. Chem. Soc.*, 2558 (1958).

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RECEIVED JULY 16, 1962

TRICYCLO[4.4.0.0^{3,8}]DECANE

Sir:

Consideration of the structure and reactivity of the highly symmetrical molecule adamantane has prompted us to synthesize its twist[1] boat isomer tricyclo[4.4.0.0^{3,8}]decane (Fig. 1), a convenient trivial name for which is "twistane." Inspection of models reveals that twistane, in contrast to adamantane, is dissymmetric and composed exclusively of twist boat cyclohexane rings, but is

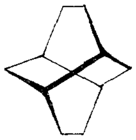

Fig. 1.

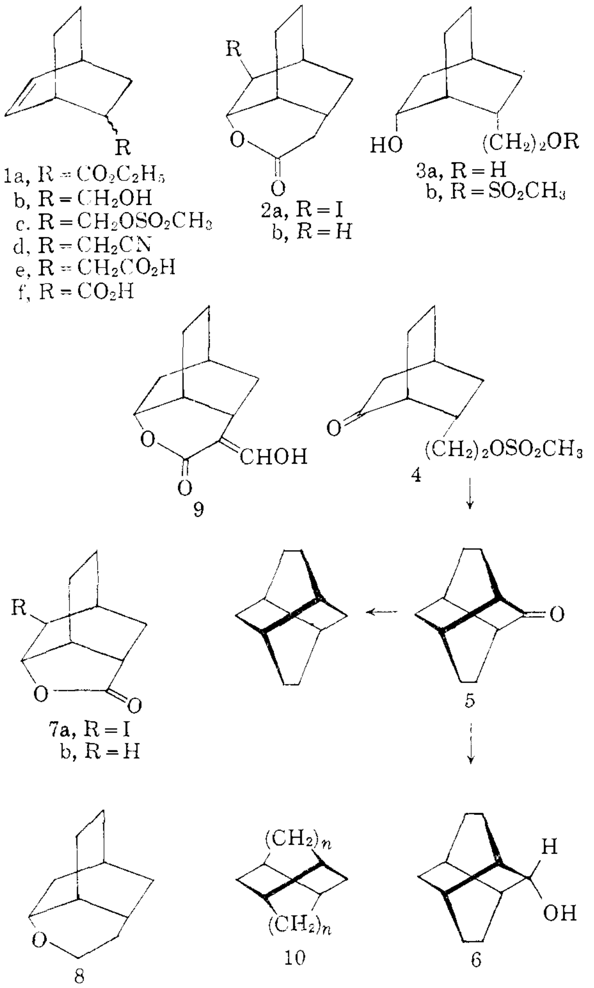

Fig. 2.

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[1] W. S. Johnson, V. J. Bauer, J. L. Margrave, M. A. Frisch, L. H. Dreger and W. N. Hubbard, *J. Am. Chem. Soc.*, **83**, 606 (1961).