tron microscope examinations. More likely, the larger X-ray period reflects density differences not yet resolved with the electron microscope but which may become apparent when special methods are applied. The structural problem, which is of great interest in connection with the mechanism of contractility, is one which requires for its solution both electron microscope and X-ray diffraction data. Details of the analysis will be reported in due course.

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SPIROPENTANE

Sir:

The authors have made a Raman spectroscopic study of the low-boiling products obtained in the debromination of pentaerythrityl bromide by zinc. The first reduction was carried out in aqueous methanol.[1] In addition to lines assignable to methylenecyclobutane (I) and to 2-methyl-1-butene (II) the Raman spectrum of the product showed lines at 581 and 1033 cm.$^{-1}$ which arose from about 1–5% of a third component (III). Examination of the spectra of various fractions obtained in the distillation of the reduction mixture indicated that the boiling point of III should be near 37°. By means of this information and the known Raman spectra and generalizations therefrom it was possible, at least tentatively, to conclude that III did not correspond to any compound known to the authors. It seemed quite probable that the lines belong to spiropentane.

It was reasoned that if this were spiropentane and if it could be formed at all by zinc in aqueous methanol, in spite of the preponderance toward rearrangement, there should be other conditions, under which III would form in larger proportion. This proved to be the case. When the reduction was carried out by zinc in molten acetamide in the presence of sodium iodide and sodium carbonate[2] the product showed the same low-boiling substances but the compound responsible for the 581 and 1033 cm.$^{-1}$ lines was now a major component—approximately 40%.

Isolation of the pure compound involved removal of the accompanying olefins, first by repeated extraction with saturated aqueous silver nitrate, then with saturated aqueous silver perchlorate and finally by reaction with bromine. None of these reagents noticeably affected the new compound. The final, purified product has an odor similar to chloroform; b. p. 38.3–38.5°; n^{20}D 1.4117. *Anal.*[3] Calcd. for C_5H_8: C, 88.17; H, 11.83. Found: C, 87.91; H, 11.53. Its spectrum is given in Table I.

TABLE I

RAMAN SPECTRUM OF SPIROPENTANE

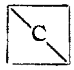
$\Delta\nu$, cm.$^{-1}$	I^a	$\Delta\nu$, cm.$^{-1}$	I^a
305	4	1397	5
581	16	1426	10
613	4	2836	0.4
779	4	2881^b	
872	30	2991	100
1033	50	3065	30
1150	1		

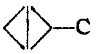
^{a} Intensities measured on Gaertner microdensitometer.
^{b} Intensity too low to measure.

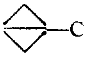
Raman spectra considerations, boiling point, and non-reactivity with bromine conclusively eliminated acetylenes, diolefins and monocyclic olefins and left only the possibility that the compound was one of the following dicyclic hydrocarbons


IV


V


VI


VII


VIII

The authors favor formula IV because, 1, the product is formed in greater amount when conditions are less favorable to rearrangement and 2, the Raman pattern in the 2800–3100 cm.$^{-1}$ region indicates that all the hydrogens present are attached to cyclopropane rings and none either to cyclobutane rings (V, VI) nor to carbon in a methyl group (VII, VIII).

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[1] A report on this part of the work was presented before the Organic Division of the American Chemical Society, September, 1943.

[2] Hass, McBee, Hinds and Gluesenkamp, *Ind. Eng. Chem.*, **28**, 1178 (1936).

[3] Micro-analysis by Dr. T. S. Ma, University of Chicago.