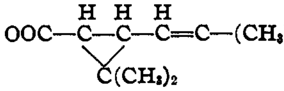
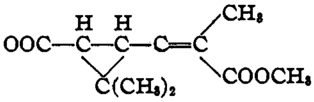
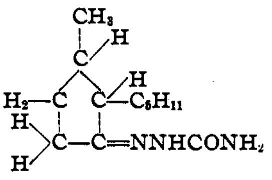
them to differ sharply with respect to their solubility in acids. The semicarbazones which we have considered may be divided into two groups, those that are soluble and those that are insoluble in dilute hydrochloric acid.

The former include the semicarbazones of pyrethrone, formula I, R = C_5H_7, R′ = H; dihydropyrethrone (jasmone), R = C_5H_9, R′ = H; tetrahydropyrethrone (dihydrojasmone), R = C_5H_{11}, R′ = H; and tetrahydropyrethrolone, R = C_5H_{11}, R′ = OH. The acid-insoluble semicarbazones include those of pyrethrolone, formula I, R = C_5H_7, R′ = OH; pyrethrin I, R = C_5H_7, R′ = ; pyrethrin II, R = C_5H_7, R′ =  and two geometric forms of hexahydropyrethrone semicarbazone of melting points 160 and 194°, respectively, represented by formula II.



II

There seems to be no chemical feature distinguishing the members of each group. The solubility of some of the semicarbazones has been utilized in their separation from other material. All of an acid-soluble semicarbazone present in an impure reaction mixture may be obtained practically pure by extraction with dilute hydrochloric acid, removal of the by-products with a water-immiscible solvent, and precipitation of the semicarbazone with alkali. For example, a reaction product consisting of tetrahydro- and hexahydropyrethrone semicarbazones was separated into the two components by dissolving the one in dilute acid and filtering from the other.

To what extent the property of solubility in hydrochloric acid is shared by the semicarbazones of other ketones is a matter of interest, but one which we have not investigated.

CONTRIBUTION FROM THE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
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Photoreaction of Chlorine Monoxide and Hydrogen

BY T. IREDALE AND T. G. EDWARDS

According to Finkelnburg, Schumacher and Stieger[1] chlorine monoxide dissociates, in the continuous absorption region of the visible spectrum, into Cl and ClO. We have found that addition of hydrogen accelerates the decomposition, at any rate, up to the stage where the secondary reaction $H_2 + Cl_2 = 2HCl$ becomes prominent. As without the H_2, Cl_2 and O_2 are the main products, but there are now also small amounts of HCl and H_2O. Finally all the Cl_2 goes to HCl.

Since the reaction $Cl + H_2 = HCl + H$ has a collision efficiency of 10^{-4} — 10^{-5}, and $Cl + Cl_2O = Cl_2 + ClO$[1] a collision efficiency of 10^{-2} – 10^{-3}, H atoms are not so important as the ClO radical in continuing the chain, that is, where the Cl_2O and H_2 pressures are comparable. The chain must, therefore, be continued by the reactivity of ClO and H_2, a state of affairs not much understood in the literature of this subject.

We may have either $ClO + H_2 = HClO + H$ or $ClO + H_2 = HCl + OH$. The latter reaction seems the more probable. Further details will be forthcoming when we have studied the reaction more closely.

Contrary to the experience of others,[2] we did not find that Cl_2O was explosively unstable in the presence of strong light. A 500 candle power lamp brought within 2.5 cm. of a spherical glass bulb (7.6 cm. in diameter) containing Cl_2O at a pressure of half an atmosphere, did not cause an explosion, nor did it do so when hydrogen was present at the same pressure.

(1) Finkelnburg, Schumacher and Stieger, *Z. physik. Chem.*, **B15**, 127 (1931).

(2) Wallace and Goodeve, *Trans. Faraday Soc.*, **27**, 653 (1931).

LABORATORY OF PHYSICAL CHEMISTRY
UNIVERSITY OF SYDNEY
SYDNEY, AUSTRALIA
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The Heat of Mixing of Diisobutylene and Isooctane

BY WM. D. KENNEDY AND GEORGE S. PARKS

In connection with the recent study by Crawford and Parks[1] of the liquid-phase hydrogenation of diisobutylene (*i. e.*, a material containing about 4 parts of 2,4,4-trimethylpentene-1 and 1 part

(1) B. L. Crawford and G. S. Parks, THIS JOURNAL, **58**, 373 (1936).