Synthesis of 2.3,3-Trimethyl Cyclo-Pentanone, A Cyclic Derivative of Camphor.

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When a solution of the sodium derivative of methyl malonic ester and of the ethyl ester of γ-bromisocaproic acid in absolute alcohol is boiled on the water bath, about six per cent. of the brom-ester is converted into the ethyl ester of 2.3,3, tetramethyl-hexanoic 1, 2^1, 6-acid,

$$\begin{array}{l} CH_3 - C < \begin{matrix} CO_2C_2H_5 \\ CO_2C_2H_5 \end{matrix} \\ \qquad\quad | \\ \begin{matrix} CH_3 \\ CH_3 \end{matrix} > C - CH_2CH_2CO_2C_2H_5. \end{array}$$

The free acid, obtained by saponification of the ester with caustic potash, loses carbon dioxide when heated to 200° and is converted into α-$\beta\beta$-trimethyl-adipic acid, $CH_3 - CH - CO_2H$

$$\begin{matrix} CH_3 \\ CH_3 \end{matrix} > C - CH_2 - CH_2CO_2H.$$

When this acid is mixed with lime and distilled, 2.3,3-trimethyl cyclopentanone, $CH_3 - CH - CO$

$$\begin{matrix} CH_3 \\ CH_3 \end{matrix} > C \quad - CH_2,$$

is formed. The oxime of this ketone was proved to be identical with the oxime of the ketone obtained by J. W. Shepherd and myself from α-hydroxydihydrocis-campholytic acid. This synthesis establishes, beyond reasonable doubt, the correctness of Bouveault's formula for camphor.

$$\begin{array}{l} \qquad\quad CO - CH_2 \\ \qquad\quad\ \ | \quad\ \ | \\ CH_3 - C \quad - CH \\ \qquad\quad | \quad\ \ | \\ \qquad\quad | \quad CH_2 \\ \qquad\quad | \quad\ \ | \\ \begin{matrix} CH_3 \\ CH_3 \end{matrix} > C \quad - CH_2. \end{array}$$

The details of the investigation appear in the American Chemical Journal, Vol. 23, p. 128.