Ar.tartemisene, a diterpenic hydrocarbon, has been isolated from the Wormwood oil (117). On the basis of its partial hydrogenation, with Raney nickel in ethanol, to 2,6-dimethyl-10-p-tolylundecane and its complete hydrogenation with platinum oxide in acetic acid, to 2,6-dimethyl-10-(4-methylcyclohexyl) undecane (B), the constitution (XLI) has been assigned to the hydrocarbon (117).
The structures of the hydrogenated products (A, B) have been established through synthesis and spectral data (113).

The presence of methylene and isopropylidene group in the constitution (XLI) is also supported through ozonolytic studies whereby formaldehyde and acetone are produced (117). Finally, the structure for ar-artemisinene has been further corroborated through spectral data (117).

The present investigations record a clean and unambiguous synthesis of (XLI) through an application of the Wittig reaction. The following chart illustrates the sequence of the reactions employed:

\[
\begin{align*}
\text{(XLII)} & \quad \text{CH}_3 & \quad \text{CH}_2 \\
\text{H}_3C & \quad \text{CH} & \quad \text{CH}_2 \text{COEt} \\
\end{align*}
\]

\[
\begin{align*}
\text{(XLIII)} & \quad \text{CH}_3 & \quad \text{CH}_2 \\
\text{H}_3C & \quad \text{CH} & \quad \text{CH}_2 \text{OH} \\
\end{align*}
\]

\[
\begin{align*}
\text{(XLIV)} & \quad \text{CH}_3 & \quad \text{CH}_2 \\
\text{H}_3C & \quad \text{CH} & \quad \text{CH}_2 \\
\end{align*}
\]

\[
\begin{align*}
\text{(XLV)} & \quad \text{CH}_3 & \quad \text{CH}_2 \\
\text{H}_3C & \quad \text{CH} & \quad \text{CH}_2 \text{COEt} \\
\end{align*}
\]

\[
\begin{align*}
\text{(XLVI)} & \quad \text{CH}_3 & \quad \text{CH}_2 \\
\text{H}_3C & \quad \text{CH} & \quad \text{CH}_2 \text{COEt} \\
\end{align*}
\]

\[
\begin{align*}
\text{(XLVII)} & \quad \text{CH}_3 & \quad \text{CH}_2 \\
\text{H}_3C & \quad \text{CH} & \quad \text{CH}_2 \\
\end{align*}
\]
Ethyl 3-methyl-3-(p-tolyl)-propionate (XLII), the starting material in this scheme was obtained by esterification of 3-methyl-3-(p-tolyl)propionic acid (IIX). Lithium aluminium hydride reduction of the ester (XLII) gave 3-methyl-3-(p-tolyl)propanol-1, in 80 per cent yield. The carbinol (XLIII) was converted into the corresponding bromide (XLIV) with phosphorus tribromide, in 62.5 per cent yield. Alkylation of ethyl 7-methyl-3-oxo-6-octen-1-carboxylate (XIX) (obtained in the synthesis of isobisabolene, Chapter II, Section A, p. 44) with the bromide (XLIV) in the presence of potassium tert. butoxide gave 2-methyl-6-oxo-7-ethoxy carbonyl-10-p-tolylundec-2-ene (XLV) in 80 per cent yield. It gave coloration with alcoholic ferric chloride. Hydrolysis of β-keto ester (XLV) with alcoholic potassium hydroxide and subsequent decarboxylation with copper powder furnished 2-methyl-6-oxo-10-p-tolylundec-2-ene (XLVI) in 64 per cent yield. The ketone was characterised through its I.R. absorption spectrum which showed peaks at 1720 cm\(^{-1}\)(=C=O) and 815 cm\(^{-1}\) (strong), 722 cm\(^{-1}\) (1:4-benzene substitution).

The compound (XLV) was submitted to the Wittig reaction (30) with methylene phosphorane as usual (33) under the atmosphere of nitrogen when 2-methyl-6-methylene-10-p-tolylundec-2-ene (XLI) was obtained which was filtered through alumina column and eluted with petroleum ether for purification.

The synthetic hydrocarbon (XLII) was characterised through its I.R. absorption spectrum which showed peaks at 1640,
Soras and coworkers report the peaks for natural hydrocarbon at 1510, 1460, 1380, 1310, 1100, 1042, 1010, 980, 885, 815 and 722 cm$^{-1}$. The ultraviolet absorption spectrum of the synthetic sample exhibits maxima at 271, 263, and 205.5 nm. $\lambda_{\text{max.}}$ at 271, 262.5 and 256 nm.