THE CHEMISTRY OF *EREMOPHILA* SPECIES*

III. THE ESSENTIAL OIL OF EREMOPHILA LONGIFOLIA F.MUELL.

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Eremophila longifolia F.Muell. occurs as a shrub or small tree in the Murchison district of Western Australia. Our attention was first directed to the essential oil by the aromatic odour of plants growing at Sandstone. Steam distillation of the leaves gave an aromatic oil in 5·8% yield. Gas chromatography showed the presence of only two major components, which were separated by fractional distillation and identified as safrole and eugenol methyl ether. Gas chromatography of the original oil showed a mixture of eugenol methyl ether and safrole (4 : 1), and similar analysis of the forerun and residues indicated less than 3% of all other components. Subsequent field observations at the same time have indicated the absence of oil glands in plants near Mt. Magnet, although their presence is consistent at Sandstone. The presence of aromatic compounds in this oil is in marked contrast to other *Eremophila* oils that have been examined. The wood oil of *E. Mitchelli* Benth. affords a group of sesquiterpene ketones related to eremophilone (Bradfield, Penfold, and Simonsen 1932; Djerassi, Markley, and Zalkow 1960), whereas the leaf oil of *E. oppositifolia* R.Br. appears to consist mainly of sesquiterpene alcohols (Jefferies, Knox, and White 1961).

Experimental

Melting points are uncorrected. Fractional distillation and gas chromatography were carried out with apparatus described previously (Bowyer and Jefferies 1959).

Distillation of the Oil.—The air-dried leaves and terminal branchlets (3·5 kg), collected at Sandstone airstrip in September 1957, were steam distilled using a modified Dean and Starke all-glass apparatus. The recovered oil (205 g) had n_D^{20}, 1·5306; d_4^{20}, 1·035; $[\alpha]_D$, +0·6°. A sample (62 g) was fractionally distilled at 22 mm and the following groups of fractions collected: (i) b.p. up to 122 °C (1·6 g); (ii) 122–126 °C (7·7 g); (iii) 126–141 °C (5·3 g); (iv) 141·5 °C (34·2 g); (v) residue (9·5 g). Fraction (i) showed a composition by gas chromatography of low boilings

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(22%), safrole (72%), and eugenol methyl ether (6%). Group (ii) similarly showed a mean composition of safrole (90%) and eugenol methyl ether (10%). The best fraction of safrole (93%) n_D^{20}, 1·5335 was identified by conversion to isosafrole by boiling with saturated alcoholic KOH for 48 hr, and oxidation of the product with permanganate in the usual way to give piperonylic acid, m.p. and mixed m.p. 229 °C. The amide had m.p. and mixed m.p. 165 °C.

Group (iii) consisted of eugenol methyl ether (63%) and safrole (37%). Group (iv) was chromatographically homogeneous and was identified as eugenol methyl ether by conversion to the tribromide (Hell 1895), m.p. and mixed m.p. 77 °C, and by isomerization and oxidation as above to yield veratric acid, m.p. and mixed m.p. 181–182 °C.

The residue consisted of eugenol methyl ether together with higher boiling components (10±2%).

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