CLXXIV.—*The Essential Oil of the Leaves of Atherosperma moschatum* ("Australian Sassafras").

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Atherosperma moschatum, Labill. (Nat. Ord. *Monimiaceae*), known as "Australian Sassafras," although having no connexion with the *Sassafras officinale* of the British Pharmacopœia, grows luxuriantly in gullies among ranges, such as those around Healesville and Warburton in Victoria. The leaves and bark of the tree have some medicinal repute locally, and oils were distilled from them many years ago by Bosisto, but they were not chemically examined.

The leaves employed for the present investigation were obtained from Warburton, through the kindness of Mr. Dowey, of the Forestry Department, and from Sassafras, and were distilled within two or three days after picking. The yield of oil varied, in different samples, from 1.7 to 2.65 per cent. During the steam distillation it was observed that the first portion of oil (about 30 per cent. of the whole) was lighter than water, whilst that which subsequently passed over was heavier than water and sank to the bottom of the vessel.

About 3 litres of crude oil were obtained, which, after drying over calcium chloride, had a pale yellow colour and the characteristic sassafras odour. Its physical constants were as follows: $D_{20} 1.027$; $[\alpha]_D + 7.5^\circ$; $n_D 1.5211$.

The oil was first distilled under diminished pressure (100 mm.), and was thus divided into sixteen fractions, ranging in boiling point from 99° to 183° . The optical rotation of fractions 1—9 ranged from $+61.7$ to $+1.7^\circ$, the remaining seven fractions being optically inactive. The density of the fractions varied from 0.881 in No. 1 to 1.034 in No. 16, whilst the refractive index of the same fractions was 1.4687 and 1.5322 respectively.

The above-mentioned sixteen fractions were subsequently subjected to repeated fractional distillation at the ordinary pressure, with the use of the rod-and-disk dephlegmator described by Young.

Identification of Pinene, $C_{10}H_{16}$.

A fraction boiling at 157 — 158° , which was a colourless liquid, was analysed. (Found, C=87.99; H=11.65. $C_{10}H_{16}$ requires C=88.23; H=11.77 per cent.)

The identity of this fraction with pinene was determined by the formation of a crystalline hydrochloride (m. p. 130°) and the nitrosochloride, which melted sharply at 103° . The amount of material was insufficient for determining its optical rotation.

Identification of Camphor, C₁₀H₁₆O.

Five successive fractions of the oil yielded on distillation a solid substance, which, when collected and purified from adhering oil, was white and crystalline, possessed the characteristic odour of camphor, and melted at 174·5—176°. (Found, C=78·87; H=10·58. C₁₀H₁₆O requires C=78·94; H=10·52 per cent.)

A determination of the optical rotatory power of the substance proved it to be *d*-camphor, for a 10 per cent. solution in alcohol (D 0·820) gave $[\alpha]_D +40·66^\circ$.

Identification of Eugenol Methyl Ether, C₁₁H₁₄O₂.

The largest portion of the oil, after repeated fractionation, was a pale yellow liquid, which distilled at 251·7°/755 mm. (Found, C=73·63; H=7·88. C₁₁H₁₄O₂ requires C=74·15; H=7·86 per cent.)

The further identification of this fraction with eugenol methyl ether was effected by the formation of a bromo-derivative, which, after crystallisation from alcohol, melted at about 75°.

Identification of Safrole, C₁₀H₁₀O₂.

The portions of the oil possessing the highest boiling point were found to be a mixture of eugenol methyl ether with another compound, the separation of which was effected by repeated fractional distillation. A nearly colourless liquid was thus obtained, which boiled at 233°, and had the characteristic odour of safrole. (Found, C=74·47; H=6·03. C₁₀H₁₀O₂ requires C=74·07; H=6·17 per cent.)

On exposing the liquid to the temperature of boiling liquid ammonia, it congealed, forming white, silky needles, which melted at a temperature of 8—12°. The identity of this substance with safrole was thus established.

From the results of this investigation it may be concluded that the essential oil of *Atherosperma moschatum*, Labill., contains the following compounds in approximately the proportions indicated: eugenol methyl ether, 50—60 per cent.; pinene, 15—20 per cent.; camphor, 15—20 per cent.; and safrole, 5—10 per cent.

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