506. *Phyllanthol. A New Alcohol from the Root Bark of* Phyllanthus engleri *(Pax).*

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The isolation and characterisation of a new triterpene (?) alcohol from *Phyllanthus engleri* (Pax) is described; the name phyllanthol is suggested for it.

The root bark of *Phyllanthus engleri* (Pax) is reported to be used as a criminal poison amongst certain tribes in Rhodesia, and from it Breyer-Brandwijk (*Quart. J. Pharm. Pharmacol,* **1934**, **7**, 167) isolated a buff-coloured amorphous glucoside, capable of killing small animals at the extremely low dose-rate of 0·2 mg./kg.; the material was stated to comprise 2% of the dry weight of the bark.

The bark used in the present investigation was supplied by the Colonial Products Research Council and even as received was found to be much less active than reported, as it required 2 g./kg. of the ground bark (equivalent to 40 mg./kg. of the glucoside) to produce fatal results when orally administered to rabbits; also a crude extract prepared by Breyer-Brandwijk's method was fatal only at doses of the order of 100 mg./kg. The remarkable slowness of action observed previously (Breyer-Brandwijk, *loc. cit.*) was confirmed; death usually occurred about 4 days after administration. Post-mortem examination failed to reveal any obvious cause of death.

The difference between our results and those previously obtained may be due to the fact that Breyer-Brandwijk worked in Africa, probably with the fresh bark, whilst our specimen was of necessity not examined until some considerable time after collection. It is also possible that the proportion of glucoside in the bark varies seasonally.

The major constituent of the bark (0·5%) was found to be an alcohol of high melting point which shows no ultra-violet absorption above 210 mμ., thus indicating the absence of a conjugated system, and which contains no reactive double bonds. Analyses of the alcohol and its acetate, benzoate, and *p*-nitrobenzoate suggest a molecular formula $C_{30}H_{50}O$.

The molecular-rotation differences of the alcohol, acetate, and benzoate appear to indicate its triterpenoid nature (Barton, *J.*, 1945, 818) and to relate it to pentacyclic triterpene alcohols, such as ψ-taraxasterol (*idem, ibid.*, 1944, 659) to which it shows a distinct similarity.

	M. p. (uncorr.).	$[\alpha]_D$.		M. p. (uncorr.).	$[\alpha]_D$.
ψ-Taraxasterol	218—219°	48°	Alcohol	225—226°	43°
acetate	237—239	53	acetate	259—260	50
benzoate	280—282	72	benzoate	253—254	57

On the basis of the above evidence, the alcohol appears to be new; the name phyllanthol is suggested for it.

Experimental.

M. p.s are corrected. Rotations were measured in chloroform solution in a 1 dm. tube.

Phyllanthol.—The bark (2·3 kg.) was finely ground and then extracted with acetone (10 l.) in a large Soxhlet apparatus for 10 hours. The deep red acetone solution on cooling deposited a colourless amorphous material (6 g.), which was filtered off and exhaustively extracted with light petroleum (b. p. 40—60°). The extract, on evaporation of the solvent, yielded almost pure *phyllanthol* (3·8 g.), m. p. 231—233°. More impure material (9 g.) was obtained by evaporation to dryness of the original acetone solution, followed by extraction with light petroleum. The alcohol was recrystallized from chloroform–light petroleum yielding clusters of tiny needles, m. p. 233—234°, $[\alpha]_D^{15}$ +43° (*c*, 1·23) [Found: C, 83·6, 83·7, 83·1; H, 11·5, 12·0, 12·1%; *M* (Rast), 393, 396. $C_{30}H_{50}O$ requires C, 84·4; H, 11·8%; *M*, 426 (the discrepancy may be due to solvation)].

The alcohol gave a faint yellow colour with tetranitromethane in chloroform, but could not be hydrogenated with hydrogen and platinum and did not react with perbenzoic acid. It did not decolorise a solution of bromine in carbon tetrachloride, or give a precipitate with digitonin; it could not be made to yield a carbonyl derivative with hydroxylamine hydrochloride and sodium acetate. With concentrated sulphuric acid, it gave an orange colour in the cold changing to a reddish-brown on being warmed. With concentrated sulphuric acid and acetic anhydride, it gave a violet colour which faded to a pale red.

Phyllanthol Acetate.—Phyllanthol (0·7 g.) was refluxed with acetic anhydride (3 c.c.) for 1 hour. The crude *acetate* (0·7 g.), which crystallised in glistening plates on cooling, was filtered off and recrystallised from chloroform–methanol giving needles, m. p. 271°, $[\alpha]_D^{14}$ +50° (*c*, 1·54) (Found: C, 82·2, 81·8; H, 11·2, 11·3. $C_{32}H_{52}O_2$ requires C, 82·0; H, 11·1%).

Phyllanthol Benzoate.—Phyllanthol (0·3 g.) and anhydrous pyridine (2 c.c.) were mixed and warmed to about 50°. Benzoyl chloride (0·2 c.c.) was then added and the mixture kept at 50—60° during 2 hours. The crude crystalline *benzoate*, precipitated by the addition of water, was recrystallised from chloroform–methanol giving glistening needles, m. p. 263—264°, $[\alpha]_D^{16\cdot5}$ +57° (*c*, 0·27) (Found : C, 83·3; H, 10·4. $C_{37}H_{54}O_2$ requires C, 83·7; H, 10·2%).

Phyllanthol p-*Nitrobenzoate.*—Phyllanthol (0·1 g.), anhydrous pyridine (1·5 c.c.), and *p*-nitrobenzoyl chloride (0·17 g.) were refluxed for 2 minutes, the solution was then diluted with water, and the crude precipitated *ester* recrystallised from chloroform–methanol, giving glistening blades, m. p. 262° (Found : C, 77·0; H, 9·9; N, 2·5. $C_{37}H_{53}O_4N$ requires C, 77·2; H, 9·2; N, 2·4%).

Molecular-rotation Differences.—

	Alcohol (1).		Acetate (2).		Benzoate (3).
$[M]_D$	183°		234°		304°
Δ		$\Delta_{(2-1)}$ 51°		$\Delta_{(3-1)}$ 121°	

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