Table 2. Unit cell dimensions at room temperature. (Estimated accuracy ± 0.05 %).

Phase	*a*-axis (Å)	*c*-axis (Å)	*c*/*a*
Ti_3P	9.956	4.988	0.5005
V_3P	9.387	4.756	0.5067

Table 1 gives the X-ray powder data for V_3P. There are a further three weak reflections which can be identified as oxide lines. The agreement of the unit cell dimensions and X-ray intensities for V_3P and ε_1 ($FeP_{0.37}B_{0.63}$) [6] shows that V_3P belongs to the ε_1 structure type, space group $P4_2/n-C^4_{4h}$. The presence of lines $h + k + l = 2n + 1$ demonstrates that V_3P is not isostructural with Fe_3P, which has the space group $I\bar{4}$ [6].

The powder pattern and Weissenberg photographs of Ti_3P show that this phase is also of the ε_1-type. A single crystal investigation of Ti_3P is currently being undertaken and will be published in this journal.

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Constituents of the Umbelliferous Plants

II *. A Note on the Isolation of *O*-β-D-Glucosyl-β-sitosterol from the Root of *Levisticum officinale* L.

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Naturally occurring sterol glycosides (sterolins), were first reported in 1913 by Power and Salway [1], and since compounds of this type have been isolated from a variety of plant species [2-4].

In continuation of our attempts to find lignans in the plant family Umbelliferae [5] a sterol glycoside was isolated from the root of *Levisticum officinale* L. and identified as *O*-β-D-glucosyl-β-sitosterol.

The root also afforded angelic acid as well as an unidentified glucoside, m.p. 228–232° **.

In the initial steps of the investigation the method described in the U.S.Pharmacopoeia XI for the preparation of podophyllin resin *(Resina podophylli)* was followed. The resin prepared in this way was fractionated according to the method of Hartwell and Detty [6] starting with a chloroform extraction. The alcohol-benzene solution prepared in this manner was chromatographed on alumina (Alcoa). The results are presented in Table 1.

Fraction 7. On evaporation this fraction left a yellow waxy solid, which upon washing with diethyl ether yielded a colourless powder. A total of 190 mg was obtained.

The product recrystallized from pyridine-ethanol yielded a colourless compound positive to the Liebermann-Burchard as well as the Molisch and Withby [7] tests, m.p. 283–286° (decomp.), $[\alpha]_D^{26}$ −41.5° (*c* 0.397, pyridine).

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** Melting points are uncorrected and determined in capillary tubes.

Table 1. Column-chromatographic fractionation on alumina of resin from *Levisticum officinale* L.

Fraction	Eluent		ml	Substance
1	benzene abs. ethanol	1 1	200	colourless, crystalline m.p. 45° (angelic acid) 20 mg
2	benzene abs. ethanol	1 1	500	colourless, crystalline m.p. 228–232° (unidentified glucoside) 50 mg
3	benzene abs. ethanol water	47.5 47.5 5.0	250	no residue
4	benzene abs. ethanol water	47.5 47.5 5.0	500	gummy resin, unidentified
5	abs. ethanol		300	gummy resin, unidentified
6	96 % ethanol		700	no residue
7	96 % ethanol		700	colourless, crystalline *O*-β-D-glucosyl-β-sitosterol 190 mg

These values are in agreement with those reported by other workers [8,9] for a compound named β-sitosterol-D-glucoside. The identity of the compound was confirmed partly through the IR-spectrum (KBr) and partly by identification of the sterol and sugar components separately after hydrolysis of the glycoside by the method of Thornton *et al.* [10] Paper chromatography revealed glucose as the only sugar component. Recrystallization of the diethyl ether-soluble product from the hydrolysis yielded a sterol, m.p. 134–135°. By means of the IR-spectrum (KBr) it was identified as β-sitosterol.

On enzymic hydrolysis with emulsin, paper chromatography revealed glucose. Hence the compound is considered to be *O*-β-D-glucosyl-β-sitosterol.

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