Table 3. *Relevant hydrogen bonds*

No.	*D*–H···*A*	*D*···*A* (Å)	H···*A* (Å)	*D*H···*A* (°)
1	N(2)–H···O(1^{i})	2·961 (2)	2·23 (3)	139 (2)
2	N(1)–H···N(3^{i})	2·754 (2)	2·27 (3)	118 (2)
3	N(3)–H···O(2^{i})	2·593 (2)	2·09 (2)	113 (2)
4	C(17)–H···N(1^{i})	3·370 (3)	2·85 (2)	117 (2)
5	C(22)–H···O(1^{ii})	3·491 (2)	2·77 (2)	137 (2)

Symmetry code: (i) x, y, z; (ii) $\bar{x}, 1-y, 2-z$.

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rel-(3*R*,3a*R*,8*S*,8a*R*)-3a-Hydroxy-1-oxo-6-daucen-8-yl *p*-Anisate (1) and *rel*-(1*S*,3*R*,3a*S*,4*S*,8*S*,8a*R*)-1,8-Diacetoxy-3-hydroxy-6-daucen-4-yl *p*-Anisate (2)*

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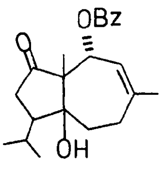
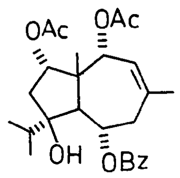
Abstract. (1), $C_{23}H_{30}O_5$, $M_r = 386\cdot49$, orthorhombic, $P2_12_12_1$, $a = 11\cdot723$ (6), $b = 17\cdot261$ (8), $c = 10\cdot515$ (3) Å, $V = 2128$ (2) Å^3, $Z = 4$, $D_x = 1\cdot206$ g cm^{-3}, Mo $K\alpha$, $\lambda = 0\cdot71069$ Å, $\mu = 0\cdot90$ cm^{-1}, $F(000) = 832$, $T = 295$ K, $R = 0\cdot044$ for 1448 independent reflections (θ:2θ scan). (2), $C_{27}H_{36}O_8$, $M_r = 488\cdot59$, orthorhombic, $P2_12_12_1$, $a = 11\cdot733$ (3), $b = 26\cdot654$ (9), $c = 8\cdot644$ (4) Å, $V = 2703$ (2) Å^3, $Z = 4$, $D_x = 1\cdot200$ g cm^{-3}, Mo $K\alpha$, $\lambda = 0\cdot71069$ Å, $\mu = 0\cdot94$ cm^{-1}, $F(000) = 1048$, $T = 295$ K, $R = 0\cdot052$ for 1927 independent reflections (θ:2θ scan). The carotane-class sesquiterpenes were isolated from *Ferula communis* (Compositae). The five- and seven-membered rings are *cis* fused in compound (1) but *trans* fused in (2), which leads to conformational differences in the two compounds. The five-membered rings in both compounds exhibit envelope conformations with C(4) the flap in (1) and C(1) the flap in (2). The seven-membered ring in (2) is in an almost perfect chair conformation while that in (1) exhibits a distorted twist-chair conformation.

Introduction. *Ferula communis* L. subsp. *Communis* has been known as a medicinal since ancient times (Gunther, 1959) and has been used as an antihysteric and for the treatment of dysentery (French, 1971). *Ferula communis* was collected near Istanbul, Turkey, and the dried powdered roots were extracted with benzene. Chromatography led to the isolation of fourteen daucene-type sesquiterpene esters (Miski & Mabry, 1985). Because of the difficulty in determining relative stereochemistry and ester substitution patterns, the structures of two sesquiterpenes were determined by X-ray diffraction techniques. The absolute configuration can be assigned by comparison with known structures (Miski & Mabry, 1985).



(1)



(2)

Experimental. Syntex $P2_1$ diffractometer, θ:2θ scan, variable scan rate, $2\theta_{\max} = 50°$, graphite-monochromated Mo $K\alpha$ radiation; lattice parameters from

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* IUPAC names: (1) *rel*-(3*R*,3a*R*,8*S*,8a*R*)-3a-hydroxy-3-isopropyl-6,8a-dimethyl-1-oxo-1,2,3,3a,4,5,8,8a-octahydro-8-azulenyl *p*-anisate; (2) *rel*-(1*S*,3*R*,3a*S*,4*S*,8*S*,8a*R*)-1,8-diacetoxy-3-hydroxy-3-isopropyl-6,8a-dimethyl-1,2,3,3a,4,5,8,8a-octahydro-4-azulenyl *p*-anisate.

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least-squares refinement of 15 reflections [$4 \cdot 18 \leq 2\theta \leq 13 \cdot 56°$ for (1) and $6 \cdot 0 \leq 2\theta \leq 23 \cdot 0°$ for (2)] with angles measured by a centering routine associated with the diffractometer system; after data collection all accessible equivalent reflections collected for selected reflections differing in 2θ; Lorentz and polarization corrections, empirical absorption correction [transmission factors 0·9704 to 0·9725 for (1) and 0·9612 to 0·9750 for (2)]; direct methods (*MULTAN*78: Main, Hull, Lessinger, Germain, Declercq & Woolfson, 1978); full-matrix least-squares refinement, $\sum w(|F_o| - |F_c|)^2$ minimized, $w = 1/\sigma^2(F_o)$ [derived from counting statistics evaluated by Syntex (1976) routine].

(1) Transparent prismatic crystal of dimensions 0·35 × 0·38 × 0·68 mm with crystal oriented along c axis (long dimension), systematic absences ($h00$ $h = 2n + 1$, $0k0$ $k = 2n + 1$, $00l$ $l = 2n + 1$) consistent with space group $P2_12_12_1$ (222), monitored reflection (102) showed no change in intensity greater than $2\sigma(I)$; 2059 independent reflections ($0 \leq h \leq 12$, $0 \leq k \leq 18$, $0 \leq l \leq 11$), equivalent reflections averaged ($R_{\text{int}} = 0 \cdot 031$), 1448 had intensities greater than $3\sigma(I)$; all except three H atoms located in difference Fourier map and refined with fixed thermal parameters, positions for missing H atoms calculated, after final refinement H-atom positions scaled to C—H distance of 1·08 Å; $R = 0 \cdot 044$, $wR = 0 \cdot 049$, 334 parameters refined, $(\Delta/\sigma)_{\max} = 0 \cdot 4$, $S = 2 \cdot 16$, $|0 \cdot 14|$ e Å^{-3} largest peak in final difference Fourier map.

(2) Transparent prismatic crystal of dimensions 0·39 × 0·61 × 0·75 mm with crystal oriented along c axis (long dimension), systematic absences consistent with space group $P2_12_12_1$ (222), monitored reflection (032) showed no change in intensity greater than $2\sigma(I)$; 2595 independent reflections ($0 \leq h \leq 12$, $0 \leq k \leq 27$, $0 \leq l \leq 9$), 1927 had intensities greater than $3\sigma(I)$; all H atoms located in difference Fourier maps, H-atom positions constrained during final cycles of refinement, after final refinement C—H distances scaled to 1·08 Å; $R = 0 \cdot 052$, $wR = 0 \cdot 063$, 316 parameters refined; $(\Delta/\sigma)_{\text{av}} = 0 \cdot 031$, $(\Delta/\sigma)_{\max} = 0 \cdot 44$, $S = 2 \cdot 88$, $|0 \cdot 22|$ e Å^{-3} largest peak in final difference Fourier map.

Locally written programs used for data reduction, *MULTAN*78 for direct-methods calculations, *XRAY*76 (Stewart, Machin, Dickinson, Ammon, Heck & Flack, 1976) for all others; atomic scattering factors for C and O from Cromer & Mann (1968), for H from Stewart, Davidson & Simpson (1965), anomalous dispersion from *International Tables for X-ray Crystallography* (1974). Tables 1 and 2 give atomic positional parameters and U_{eq} values for (1) and (2) while Table 3

Table 1. *Fractional atomic coordinates* ($\times 10^4$) *and equivalent isotropic thermal parameters* U_{eq} (Å^2 $\times 10^3$) *for* (1)

	x	y	z	U_{eq}†
C(1)	8008 (3)	3370 (2)	9191 (4)	41 (2)
C(2)	7158 (4)	3108 (3)	10212 (4)	49 (3)
O(2)	6516 (3)	3548 (2)	10773 (3)	61 (2)
C(3)	7219 (4)	2251 (2)	10392 (4)	51 (3)
C(4)	7618 (3)	1960 (2)	9082 (4)	44 (2)
C(5)	8511 (3)	2578 (2)	8692 (4)	42 (2)
O(5)	9532 (2)	2461 (2)	9422 (3)	55 (2)
C(6)	8776 (4)	2564 (2)	7280 (4)	50 (3)
C(7)	9543 (4)	3218 (3)	6779 (5)	60 (3)
C(8)	8997 (4)	3998 (2)	6613 (4)	53 (3)
C(9)	8043 (4)	4241 (2)	7164 (5)	54 (3)
C(10)	7356 (4)	3857 (2)	8215 (4)	46 (2)
O(10)	6426 (2)	3369 (1)	7697 (3)	48 (2)
C(11)	8010 (4)	1107 (2)	9025 (4)	54 (3)
C(12)	7688 (10)	745 (3)	7808 (6)	163 (7)
C(13)	7494 (6)	604 (3)	10063 (6)	100 (4)
C(14)	9609 (4)	4522 (3)	5690 (5)	73 (3)
C(15)	8883 (4)	3909 (2)	9832 (4)	55 (3)
C(16)	5516 (4)	3758 (3)	7229 (4)	57 (3)
O(16)	5488 (3)	4458 (2)	7154 (4)	83 (2)
C(17)	4582 (4)	3237 (3)	6813 (4)	50 (3)
C(18)	4543 (4)	2452 (2)	7055 (4)	52 (3)
C(19)	3623 (4)	2001 (3)	6698 (4)	56 (3)
C(20)	2703 (4)	2343 (3)	6091 (4)	59 (3)
O(20)	1743 (3)	1965 (2)	5716 (3)	72 (2)
C(21)	2735 (4)	3129 (3)	5857 (5)	66 (3)
C(22)	3653 (4)	3570 (3)	6197 (5)	62 (3)
C(23)	1628 (4)	1166 (3)	6000 (5)	79 (4)

† $U_{\text{eq}} = \frac{1}{3}|U_{11}(aa^*)^2 + U_{22}(bb^*)^2 + U_{33}(cc^*)^2 + 2U_{12}aba^*b^*\cos\gamma + 2U_{13}aca^*c^*\cos\beta + 2U_{23}bcb^*c^*\cos\alpha|$.

Table 2. *Fractional atomic coordinates* ($\times 10^4$) *and equivalent isotropic thermal parameters* U_{eq} (Å^2 $\times 10^3$) *for* (2)

	x	y	z	U_{eq}
C(1)	1718 (4)	1182 (1)	3155 (5)	51 (2)
C(2)	2833 (4)	976 (2)	2476 (5)	60 (3)
O(2)	2669 (3)	885 (1)	834 (4)	64 (2)
C(3)	3693 (4)	1404 (2)	2674 (5)	59 (3)
C(4)	3003 (4)	1900 (2)	2745 (5)	35 (2)
O(4)	3091 (3)	2129 (1)	4262 (3)	58 (2)
C(5)	1738 (3)	1732 (1)	2571 (4)	43 (2)
C(6)	838 (3)	2071 (1)	3268 (5)	45 (2)
O(6)	987 (2)	2551 (1)	2446 (3)	49 (2)
C(7)	−400 (4)	1914 (2)	2958 (5)	56 (3)
C(8)	−836 (4)	1454 (2)	3815 (6)	65 (3)
C(9)	−377 (4)	1007 (2)	3670 (6)	64 (3)
C(10)	642 (4)	889 (1)	2687 (5)	57 (3)
O(10)	370 (3)	1007 (1)	1071 (4)	63 (2)
C(11)	3402 (4)	2291 (2)	1528 (6)	59 (3)
C(12)	3234 (5)	2110 (2)	−112 (6)	85 (4)
C(13)	4652 (4)	2445 (2)	1808 (7)	81 (4)
C(14)	−1849 (5)	1527 (2)	4799 (7)	97 (4)
C(15)	1848 (4)	1137 (2)	4937 (5)	68 (3)
C(16)	717 (3)	2983 (1)	3176 (5)	51 (2)
O(16)	328 (3)	2993 (1)	4470 (4)	69 (2)
C(17)	969 (3)	3425 (1)	2237 (6)	50 (3)
C(18)	733 (4)	3904 (2)	2848 (6)	71 (3)
C(19)	951 (5)	4329 (2)	2023 (10)	89 (4)
C(20)	1399 (5)	4290 (2)	567 (9)	87 (4)
O(20)	1613 (3)	4737 (1)	−199 (6)	124 (3)
C(21)	1648 (4)	3827 (2)	−118 (6)	72 (3)
C(22)	1430 (4)	3396 (1)	755 (6)	58 (3)
C(23)	1925 (6)	4730 (3)	−1738 (11)	158 (7)
C(24)	3175 (5)	511 (2)	156 (6)	69 (4)
O(24)	3792 (5)	227 (2)	873 (6)	127 (3)
C(25)	2958 (5)	501 (2)	−1528 (7)	85 (4)
C(26)	109 (5)	633 (3)	133 (7)	79 (4)
O(26)	121 (6)	207 (2)	494 (5)	155 (4)
C(27)	−220 (6)	823 (3)	−1425 (7)	85 (5)

lists interatomic distances, valence angles and torsion angles.*

Discussion. Figs. 1 and 2 are *ORTEP* (Johnson, 1971) drawings of (1) and (2). Both compounds belong to the carotane class of sesquiterpenes and are related biogenetically to daucene, which has a C(4)–C(5) double bond. Since addition to this bond may occur from either side, *cis* and *trans* ring fusions are possible. Compound (1) exhibits a *cis* C(1)–C(5) ring juncture with a methyl group at C(1) and a hydroxyl group at C(5). Compound (2) is *trans* fused with a methyl group at C(1) and a hydrogen at C(5). In general, it is assumed that the stereochemistry at C(1) is the same for all members of this class, and the absolute configuration has been assigned for a number of derivatives, *e.g.* the absolute configuration of the *p*-bromobenzoate of laserol has been assigned by X-ray diffraction (Holub, Samek, Herout & Sorm, 1967) and by spectroscopic techniques (Holub, Tax, Sedmera & Sorm, 1970). The stereochemistry at C(1) has been used to select the most probable enantiomer for (1) and (2).

Table 3. *Interatomic distances* (Å), *valence angles* (°) *and torsion angles* (°) *for* (1) *and* (2)

	(1)	(2)
C(1)–C(2)	1·534 (6)	1·535 (6)
C(1)–C(5)	1·578 (5)	1·552 (6)
C(1)–C(10)	1·530 (6)	1·538 (6)
C(1)–C(15)	1·540 (6)	1·552 (6)
C(2)–C(3)	1·493 (6)	1·533 (7)
C(2)–O(2)	1·221 (5)	1·453 (5)
C(3)–C(4)	1·539 (6)	1·551 (6)
C(4)–C(5)	1·550 (6)	1·557 (6)
C(4)–C(11)	1·544 (6)	1·552 (6)
C(4)–O(4)	—	1·449 (5)
C(5)–C(6)	1·517 (6)	1·515 (6)
C(5)–O(5)	1·437 (5)	—
C(6)–C(7)	1·537 (6)	1·537 (6)
C(6)–O(6)	—	1·473 (5)
C(7)–C(8)	1·500 (7)	1·521 (7)
C(8)–C(9)	1·327 (7)	1·313 (7)
C(8)–C(14)	1·505 (7)	1·475 (8)
C(9)–C(10)	1·520 (6)	1·500 (7)
C(10)–O(10)	1·482 (6)	1·467 (6)
C(11)–C(12)	1·473 (8)	1·510 (6)
C(11)–C(13)	1·520 (8)	1·545 (7)
O(6)/O(10)–C(16)	1·354 (5)	1·350 (5)
C(16)–O(16)	1·211 (6)	1·209 (5)
C(16)–C(17)	1·483 (6)	1·460 (6)
C(17)–C(18)	1·380 (6)	1·410 (7)
C(17)–C(22)	1·392 (6)	1·392 (7)
C(18)–C(19)	1·382 (6)	1·363 (8)
C(19)–C(20)	1·385 (7)	1·368 (11)
C(20)–C(21)	1·380 (7)	1·399 (8)
C(20)–O(20)	1·358 (6)	1·386 (8)
C(21)–C(22)	1·366 (7)	1·399 (7)
O(20)–C(23)	1·419 (7)	1·380 (11)
O(2)–C(24)	—	1·300 (6)
C(24)–O(24)	—	1·216 (7)
C(24)–C(25)	—	1·478 (8)
O(10)–C(26)	—	1·320 (7)
C(26)–O(26)	—	1·178 (9)
C(26)–C(27)	—	1·489 (9)

	(1)	(2)
C(1)C(2)C(3)C(4)	−27·9 (4)	−24·9 (4)
C(2)C(3)C(4)C(5)	39·7 (4)	−0·3 (4)
C(3)C(4)C(5)C(1)	−37·4 (4)	25·1 (4)
C(4)C(5)C(1)C(2)	20·4 (4)	−40·2 (4)
C(5)C(1)C(2)C(3)	4·6 (4)	39·8 (4)
C(5)C(6)C(7)C(8)	76·4 (5)	72·1 (5)
C(6)C(7)C(8)C(9)	19·9 (7)	−60·1 (6)
C(7)C(8)C(9)C(10)	9·4 (8)	1·4 (8)
C(8)C(9)C(10)C(1)	31·2 (7)	60·1 (6)
C(9)C(10)C(1)C(5)	−70·5 (9)	−78·7 (5)
C(10)C(1)C(5)C(6)	27·0 (5)	66·0 (4)
C(1)C(5)C(6)C(7)	53·2 (5)	−61·0 (5)

	(1)	(2)
C(2)C(1)C(5)	102·7 (3)	101·5 (3)
C(2)C(1)C(10)	107·9 (3)	114·7 (3)
C(2)C(1)C(15)	107·7 (3)	105·6 (7)
C(5)C(1)C(10)	116·0 (3)	113·9 (3)
C(5)C(1)C(15)	114·8 (3)	113·2 (3)
C(10)C(1)C(15)	107·1 (3)	107·6 (3)
C(1)C(2)C(3)	110·5 (3)	104·6 (3)
C(1)C(2)O(2)	123·7 (4)	108·7 (3)
C(3)C(2)O(2)	125·8 (4)	108·7 (3)
C(2)C(3)C(4)	102·9 (3)	107·2 (3)
C(3)C(4)C(5)	102·6 (3)	104·4 (3)
C(3)C(4)C(11)	115·9 (3)	112·7 (3)
C(3)C(4)O(4)	—	110·9 (3)
C(5)C(4)C(11)	116·4 (3)	114·5 (3)
C(5)C(4)O(4)	—	106·1 (3)
O(4)C(4)C(11)	—	108·0 (3)
C(1)C(5)C(4)	104·8 (3)	104·7 (3)
C(4)C(5)C(6)	112·7 (3)	117·0 (3)
C(4)C(5)O(5)	108·9 (3)	—
C(1)C(5)C(6)	114·6 (3)	115·1 (3)
C(1)C(5)O(5)	104·8 (3)	—
C(6)C(5)O(5)	110·5 (3)	—
C(5)C(6)C(7)	116·3 (4)	115·2 (3)
C(5)C(6)O(6)	—	104·1 (3)
C(7)C(6)O(6)	—	105·4 (3)
C(6)C(7)C(8)	116·8 (4)	117·0 (4)
C(7)C(8)C(9)	126·3 (4)	123·1 (4)
C(7)C(8)C(14)	114·2 (4)	116·5 (4)
C(9)C(8)C(14)	119·5 (4)	120·3 (5)
C(8)C(9)C(10)	120·8 (4)	124·8 (4)
C(1)C(10)C(9)	117·6 (3)	113·5 (4)
C(1)C(10)O(10)	107·6 (3)	108·7 (3)
C(9)C(10)O(10)	111·7 (3)	108·7 (4)
C(4)C(11)C(12)	111·2 (4)	112·5 (4)
C(4)C(11)C(13)	113·4 (4)	111·2 (4)
C(12)C(11)C(13)	106·3 (5)	111·0 (4)
C–O–C(16)	115·5 (4)	119·2 (3)
O–C(16)–O(16)	122·7 (4)	122·6 (4)
O–C(16)–C(17)	112·8 (4)	112·4 (4)
O(16)C(16)C(17)	124·5 (4)	124·9 (4)
C(16)C(17)C(18)	124·5 (4)	118·9 (4)
C(16)C(17)C(22)	117·6 (4)	123·0 (4)
C(18)C(17)C(22)	117·8 (4)	118·1 (4)
C(17)C(18)C(19)	121·9 (4)	121·3 (5)
C(18)C(19)C(20)	119·6 (4)	119·3 (5)
C(19)C(20)C(21)	118·7 (4)	122·5 (6)
C(19)C(20)O(20)	125·1 (4)	116·3 (5)
C(21)C(20)O(20)	116·2 (4)	121·2 (6)
C(20)C(21)C(22)	121·5 (4)	117·3 (5)
C(17)C(22)C(21)	120·5 (4)	121·5 (4)
C(20)O(20)C(23)	118·9 (4)	119·8 (5)
C(2)O(2)C(24)	—	120·5 (4)
O(2)C(24)C(25)	—	112·2 (5)
O(2)C(24)O(24)	—	121·2 (5)
O(24)C(24)C(25)	—	126·4 (5)
C(10)O(10)C(26)	—	118·3 (4)
O(10)C(26)O(26)	—	124·1 (6)
O(10)C(26)C(27)	—	111·1 (6)
O(26)C(26)C(27)	—	124·8 (6)

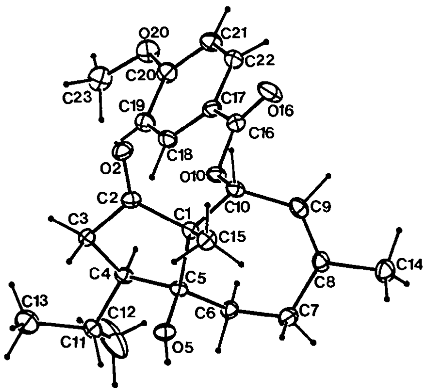

Fig. 1. *ORTEP* drawing of (1). Thermal ellipsoids are drawn at the 35% probability level. H atoms are drawn as spheres of arbitrary size.

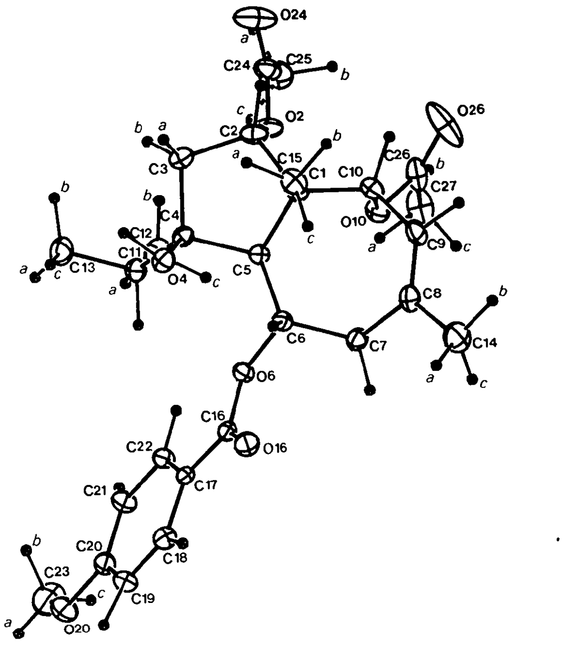

Fig. 2. *ORTEP* drawing of (2). Thermal ellipsoids are drawn at the 35% probability level. H atoms drawn as spheres of arbitrary size. Methyl-group hydrogen atoms are labeled *a*, *b* and *c*.

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* Lists of structure factors, H-atom parameters and thermal parameters for (1) and (2) have been deposited with the British Library Lending Division as Supplementary Publication No. SUP 42384 (49 pp.). Copies may be obtained through The Executive Secretary, International Union of Crystallography, 5 Abbey Square, Chester CH1 2HU, England.

The conformations of (1) and (2) differ significantly owing to the differences in ring fusion. The five-membered ring in both compounds is in an envelope conformation; however, C(4) is the flap in (1) while C(1) is the flap in (2). The distances and angles around the ring cannot be compared owing to differences in functionality. The seven-membered heptene ring in (2) has an almost perfect chair conformation while that in (1) is a highly distorted twist chair (Toromanoff, 1980; Bucourt, 1974), see torsion angles in Table 3. The C(1)–C(5) bond common to both rings differs significantly, 1·578 (5) Å for (1) and 1·552 (6) Å for (2), as do a number of valence angles. The ester groups are not held tightly by packing interactions and the thermal parameters are relatively large as are the thermal parameters for the C(12) and C(13) methyl groups in (2).

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Structural Studies of Pyrimidine Cyclonucleoside Derivatives. IX.* Structure of 6,2′-Anhydro-6-ethyl-1-β-D-arabinofuranosyluracil

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Abstract. $C_{11}H_{14}N_2O_5$, $M_r = 254{\cdot}2$, orthorhombic, $P2_12_12_1$, $a = 6{\cdot}400\ (1)$, $b = 9{\cdot}734\ (2)$, $c = 17{\cdot}797\ (5)$ Å, $V = 1108{\cdot}7\ (4)$ Å^3, $Z = 4$, $D_m = 1{\cdot}506\ (1)$, $D_x = 1{\cdot}523$ Mg m^{-3}, $\lambda(\mathrm{Cu}\ K\alpha) = 1{\cdot}5418$ Å, $\mu = 0{\cdot}69$ mm^{-1}, $F(000) = 536$, $T = 290$ K, $R = 0{\cdot}057$ for 1030 independent observed reflections. The glycosidic torsion angle is in the *anti* range, χ_{CN} [O(4′)–C(1′)–N(1)–C(2)] = 268·1 (3)°, and the sugar conformation is the unusual ${}^{O}T_4$. The O atom O(5′) takes two disordered orientations, *gauche–trans* and *trans–gauche,* but not *gauche–gauche* (*gauche* ≡ –synclinal) as frequently found in nucleosides. No base stacking is observed.

Introduction. Cyclonucleosides have generally served as good model compounds for investigations of physicochemical properties of nucleosides and nucleotides in solution because they have conformational rigidity between the base and the sugar moieties by cyclization (Rogers & Ulbricht, 1970; Ikehara, Kaneko, Nakahara, Yamada & Uesugi, 1971; Ueda & Shibuya, 1974; Manor, Saenger, Davies, Jankowski & Rabczenko, 1974; Yamagata, Fujii, Fujiwara, Tomita & Ueda, 1981). In particular, cyclonucleosides cyclized through a C atom are much better model nucleosides for spectroscopic studies because the bridging C atom has less effect on the physicochemical properties of the base or the sugar moiety than O or S bridges, and we recently synthesized several new types of C-bridged

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* Part VIII: Yamagata, Fujiwara, Tomita, Shuto & Ueda (1984).

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