Aspertetronin A and B, Two Novel Tetronic Acid Derivatives Produced by a Blocked Mutant of *Aspergillus rugulosus*

By **J. A. Ballantine, V. Ferrito, C. H. Hassall,*** and (in part) **V. I. P. Jones,** Department of Chemistry, University College of Swansea, Singleton Park, Swansea

The structures of aspertetronin A ($C_{16}H_{20}O_4$) and aspertetronin B ($C_{16}H_{22}O_5$), metabolites of a mutant strain of *Aspergillus rugulosus*, have been elucidated. The use of both high-resolution ^1H n.m.r. spectroscopy (220 Mc./sec. and spin decoupling) and ' element-map ' mass spectrometry have proved determining in establishing that the metabolites are the novel acyltetronic acid derivatives (XXII) and (XXIII) respectively.

In an investigation of geodoxin and related compounds produced by *Aspergillus terreus* [1] it was established that it was possible to define stages in the biosynthesis of secondary metabolites by the use of blocked mutants. A similar study has been undertaken using *Aspergillus rugulosus*.[2] Several phenolic products of metabolism have been identified. They include asperugin (I),[3] asperugin B (II),[4] 2,4-dihydroxy-6-methylbenzaldehyde (III),[5] 2,4-dihydroxy-6-hydroxymethylbenzaldehyde (IV),[5] orcinol (V),[6] *o*-orsellinic acid (VI),[6] and 3,3′-dihydroxy-5,5′-dimethyldiphenyl ether (VII).[5]

One of the mutants which was isolated in the course of this study produced, as major metabolites, two novel compounds that both gave a characteristic lilac colour on thin-layer chromatograms sprayed with diazotised

[1] R. F. Curtis, P. C. Harries, C. H. Hassall, and J. D. Levi, *Biochem. J.*, 1964, **90**, 43.
[2] C. H. Hassall and K. Lawrence, *J. Gen. Microbiol.*, 1964, **35**, 483.
[3] J. A. Ballantine, C. H. Hassall, and G. Jones, *J. Chem. Soc.*, 1965, 4672.
[4] J. A. Ballantine, C. H. Hassall, B. D. Jones, and G. Jones, *Phytochemistry*, 1967, **6**, 1157.
[5] J. A. Ballantine, C. H. Hassall, and B. D. Jones, *Phytochemistry*, 1968, **7**, 1529.
[6] G. Jones, unpublished results.

o-dianisidine, followed by ammonia. In what follows, investigations which led to the determination of the molecular structures of these two metabolites are described. Aspertetronin A, $C_{16}H_{20}O_4$, $[\alpha]_D$ +133°, m.p. 72°, was isolated from an ether extract of the culture fluid of a mutant of *A. rugulosus* (ARM 1532). The 60 Mc./sec.

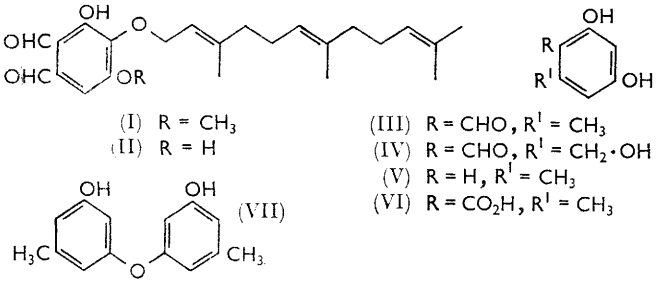


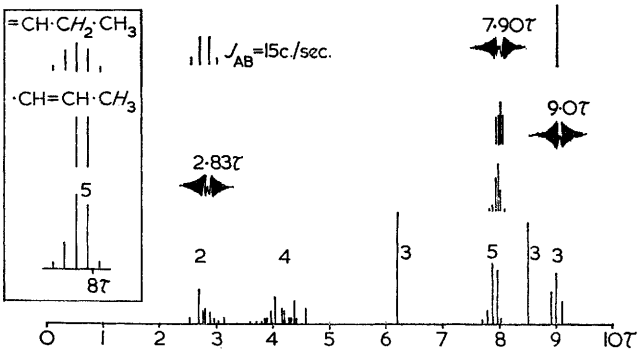
TABLE 1

^{1}H N.m.r. spectra of aspertetronin A, B, at 60 Mc./sec.

Aspertetronin A (XXII)			Aspertetronin B (XXIII)	
τ(CCl$_4$)	Protons	Assignment	Protons	τ(CCl$_4$)
2·4—3·1(m)	2	CH_3·C*H*=C*H*·CO	—	—
3·6—4·7(m)	4	Olefinic H	4	3·5—4·7(m)
—	—	CH_3·C*H*·OH	1	5·7 (q, *J* 7)
—	—	OH	1	5·95 (br s)
6·26(s)	3	OCH_3	3	6·25 (s)
—	—	·C*H*·CH_2·CO	2	6·85 (d, *J* 7)
7·94 (d, *J* 7)	3	CH_3·CH=CH	—	—
7·90 (*, *J* 7)	2	CH_3·CH_2·CH=	2	7·86 (*, *J* 7)
8·52(s)	3	CH_3·C<	3	8·50 (s)
—	—	CH_3·CH·OH	3	8·70 (d, *J* 7)
9·0 (t, *J* 7)	3	CH_3·CH_2	3	9·0 (t, *J* 7)

* = quintet

^{1}H n.m.r. spectrum (Table 1) indicated the nature of several of the functional groups in this compound. In addition to three methyl groups, one of which was chain-terminating, another attached to a quaternary carbon atom, and one in a deshielded methoxy-function, there was evidence of four olefinic protons in a similar environment, of two additional olefinic protons, strongly deshielded, and of five protons which account for a complex multiplet. Spin-decoupling experiments made it possible to assign these five protons (Figure). Irradiation at τ 7·90 caused the methyl triplet at τ 9·0 to collapse to a singlet, and the deshielded pair of olefinic protons at 2·2—2·8 to collapse to an AB quartet (*J* 15 c./sec.). Thus, the multiplet centred at τ 7·9 was made up of two exactly superimposed absorptions: there was the quintet arising from the methylene portion of an ethyl group and a doublet arising from the methyl portion of a CH_3·CH=CH (*trans*) system. The value of the chemical shift and the presence of a quintet suggested that the ethyl group was attached to an olefinic system. The ^{1}H n.m.r. spectrum of hexahydro-aspertetronin A, which was prepared by catalytic hydrogenation, did not include resonances for any olefinic protons. One of the new methylene groups was significantly deshielded (τ 7·01, triplet) presumably by an adjacent carbonyl group. This suggested that a *trans*-crotonyl group was a structural feature of aspertetronin A.



Spin-decoupling of aspertetronin A, $C_{16}H_{20}O_4$; 60 Mc./sec.

The mass spectrum of aspertetronin A served to confirm the presence of the crotonyl system (C_4H_5O). The fragmentation of the molecular ion (element map, Table 3) involved losses of C_6H_8, C_4H_5O, and CH_4O which were common throughout the spectrum; † this is illustrated by the sequence shown in Scheme 1. It seemed likely that the fragment C_6H_8 was derived from

TABLE 2

Ultraviolet spectra of aspertetronin derivatives in ethanol

Compound	λ$_{max.}$ (log ε)			
Aspertetronin A (XXII)		230 (4·38)	240sh (4·35)	300 (4·04)
Aspertetronin B (XXIII)		235 (4·04)	265sh (3·83)	
Hexahydro-aspertetronin A (XIV)	215 (3·88)		264 (4·00)	
De-*O*-methylhexahydro-aspertetronin A (XV)	211 (3·70)	233 (3·73)	268 (4·01)	
3-Acetyl-4-hydroxybut-3-enolide [13]	211 (3·68)	232 (3·93)	265 (4·08)	
Debutyryl-de-*O*-methylhexahydro-aspertetronin A (XVII) *		249 (4·28)		
(±)-4-Hydroxy-5-hexyl-5-methylbut-3-enolide *		249 (4·30)		
4-Hydroxybut-3-enolide [10] *		249 (4·36)		

* 1 Drop of N NaOH added.

† A description of the mass spectra of various tetronic acid derivatives will be published in *Org. Mass Spectrometry*.

a C_6H_9 side-chain, with hydrogen rearrangement; losses of C_6H_9 fragments were also common. This C_6H_9 side-chain must contain both the ethyl and olefin groups which were observed in the n.m.r. spectrum of aspertetronin A, and hence the side-chain must be formulated as an ethyl-substituted butadiene system. An examination of the n.m.r. spectrum of hexahydroaspertetronin A indicated that this chain contained only one methyl terminus, and hence the C_6H_9 side-chain of aspertetronin A must be formulated as a straight-chain hexa-1,3-diene system.

The partial structure (VIII) summarises the evidence of functional groups derived from the study of the n.m.r. and the mass spectra. The portion C_4O_2 must account for the ultraviolet absorption spectrum of hexahydroaspertetronin A (Table 2) and for carbonyl absorption in the infrared spectrum. Of the possible ring systems permitted by the formula C_4O_2, the lactone formulation (IX) was favoured; it was already well known as the nucleus of the tetronic acid series of fungal metabolites The structures which have been established for 4-hydroxy-5-methylbut-3-enolide (XI),[7] carolic acid (XII),[8] and carolosic acid (XIII),[9] metabolites of *Penicillium charlesii* G. Smith, are typical.

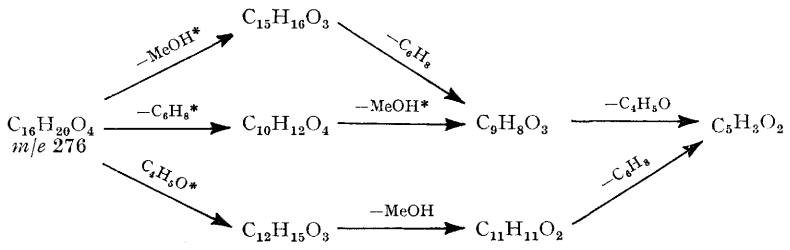
TABLE 3

'Elemental map' of aspertetronin A*

m/e	CH		CHO		CHO_2		CHO_3		CHO_4	
276									C16H20	++++
258							C16H18	+		
245							C15H17	++		
244							C15H16	+++		
233							C14H17	+++		
229							C14H13			
219							C13H15	+	C12H11	
215					C14H15	+	C13H11	++		
207							C12H15	+	C11H11	
202					C13H14	+++	C12H10	+		
201					C13H13	+++	C12H9	+		
196									C10H12	+++
176			C12H16	+++	C11H12	+++	C10H8			
175			C12H15		C11H11	+++	C10H7			
164			C11H16		C10H12		C9H8	+++		
149	C11H17	+++	C10H13		C9H9		C8H5			
124					C7H8	+++++				
107	C8H11	+++	C7H7	++						
95	C7H11	+	C6H7	+++	C5H3	+				
94	C7H10	++	C6H6	+++						
93			C6H5	+++++						
91	C7H7	+++	C6H3	++						
83	C6H11		C5H7	++	C4H3	+				
81	C6H9	++	C5H5	++						
79	C6H7	+++	C3H3							
77	C6H5	+++								
69			C4H5	+++++						
66	C5H6	+++	C4H2							
65	C5H5	++	C4H							

* The number of + signs is a measure of the relative abundance of the various ions.

SCHEME 1



(* Indicates the presence of a metastable ion.)

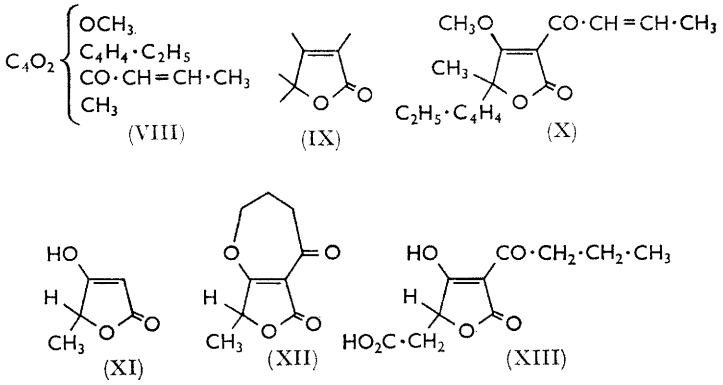
The base peak of the mass spectrum of aspertetronin A is due to an ion $C_7H_8O_2$ which we have tentatively formulated as $[CH_3O{\cdot}C{\equiv}C{\cdot}CO{\cdot}CH{=}CH{\cdot}CH_3]^+$. This, together with the evidence which has been discussed, led to the formulation of the metabolite as the tetronic acid derivative (X).

[7] P. W. Clutterbuck, H. Rastrick, and F. Reuter, *Biochem. J.*, 1935, **29**, 1300.

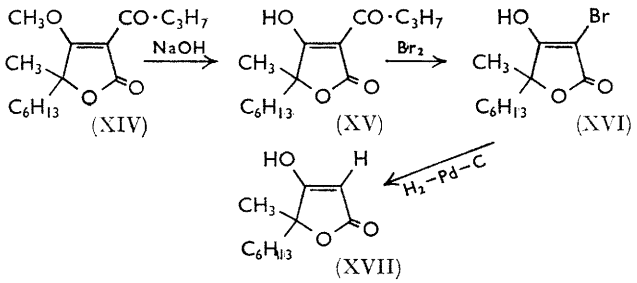
[8] P. W. Clutterbuck, H. Raistrick, and F. Reuter, *Biochem. J.*, 1935, **29**, 300.

[9] P. W. Clutterbuck, H. Raistrick, and F. Reuter, *Biochem. J.*, 1935, **29**, 871.

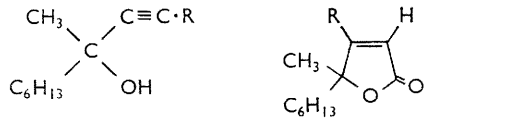
The nature of the substituted tetronic acid skeleton of aspertetronin A has been confirmed through synthesis. The alkali-catalysed hydrolysis of hexahydro-aspertetronin A (XIV), as in analogous cases,[9] gave the corresponding enol, $C_{15}H_{24}O_4$ (XV), with an u.v. spectrum characteristic of 3-acyl-4-hydroxybut-3-enolides (Table 2). Removal of the butyryl side-chain by treatment with bromine, followed by hydrogenolysis [10] of the 3-bromo-compound (XVI), gave the tetronic acid derivative (XVII). The u.v., n.m.r., and mass spectra of this



degradation product of aspertetronin A were indistinguishable from those of synthetic (±)-4-hydroxy-5-hexyl-5-methylbut-3-enolide. The i.r. spectra of the two compounds showed the minor differences to be expected when comparing optically active and racemic material. The synthetic compound was prepared by a procedure similar to that used by Jones and Whiting [11] for related tetronic acids. The carbinol



(XVIII), prepared from octan-2-one, was carboxylated through the Grignard reagent. Treatment of the methyl ester (XIX) with diethylamine gave the lactone (XX) which was hydrolysed by concentrated hydrochloric acid to the racemic product (XXI).



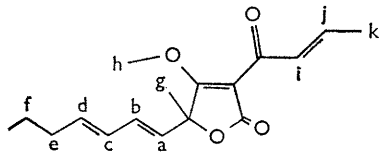
(XVIII) R = H
(XIX) R = CO_2·CH_3
(XX) R = N(CH_2·CH_3)$_2$
(XXI) R = OH

[10] F. Reuter and R. B. Welch, *J. Proc. Roy. Soc. New South Wales*, 1939, **72**, 120.

The geometrical isomerism of the olefinic systems in aspertetronin A has been investigated. The n.m.r. signals due to the complex $ABCDX_2$ system of the hexadiene portion of the molecule were so much better resolved in the spectrum at 220 Mc./sec. (Table 4) than at 60 Mc./sec. that the former was first-order; the coupling constants could be determined by direct inspection. These coupling constants indicated that the hexadiene system in aspertetronin A existed in the *trans,trans*-form. This established that aspertetronin A was 3-*trans*-crotonyl-5-(*trans,trans*-hexa-1,3-dienyl)-4-methoxy-5-methylbut-3-enolide.

TABLE 4

^{1}H N.m.r. spectrum of aspertetronin A at 220 Mc./sec.



τ (CCl_4)		Protons	Assignment
8·99	(t; *J* 7)	3	f
8·52	(s)	3	g
7·94	(d; *J* 7)	3	k
7·91	(quintet; *J* 7)	2	e
6·28	(s)	3	h
4·53	(d; *J* 15)	1	a
4·29	(d, t; *J* 15, 7)	1	d
4·08	(d, d; *J* 15, 10)	1	c
3·86	(d, d; *J* 15, 10)	1	b *
2·94	(d, q; *J* 15, 7)	1	j
2·68	(d; *J* 15)	1	i

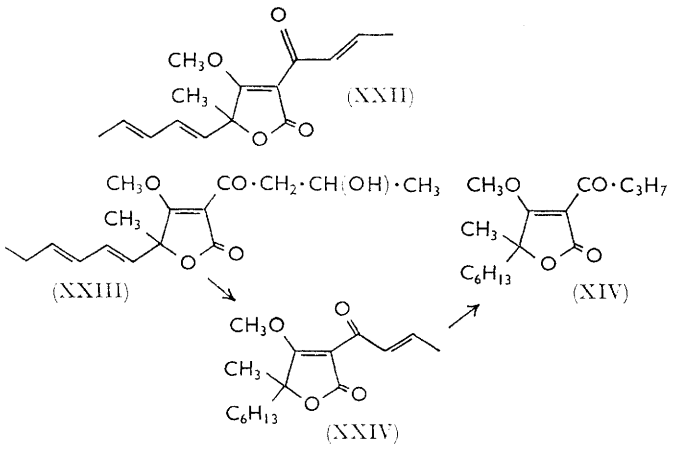
* Confirmed by spin decoupling; irradiation at τ 4·53.

Comparison of ultraviolet spectra of the saturated and the unsaturated acyl derivatives of aspertetronin A (Table 2) established that the olefinic double bond in the *trans*-crotonyl side-chain of aspertetronin A accounted for a bathochromic shift of 26 mμ. Such a contribution suggested that the double bond was coplanar and conjugated with both the carbonyl group and the unsaturated system of the ring.[12] This restriction allowed only four

[11] E. R. H. Jones and M. C. Whiting, *J. Chem. Soc.*, 1949, 1419, 1423.

[12] H. H. Jaffe and M. Orchin, 'Theory and Application of Ultraviolet Spectroscopy,' Wiley, New York, 1964, pp. 419—423.

possible conformations for the side-chain. Models suggested that the side-chain was very crowded and was prevented from free rotation. Only the *S-cis,S-cis*-conformer could exist in a coplanar form without considerable steric interaction. It seemed likely therefore that the preferred conformation of aspertetronin A was represented by (XXII).



A related metabolite, aspertetronin B, $C_{16}H_{22}O_5$, $[\alpha]_D$ −70·5, was obtained as a viscous oil in the course of fractional elution chromatography of the extract of the culture fluid. The n.m.r. spectrum (Table 1) indicated that this metabolite differed from aspertetronin A in only one structural feature. The ABX_3 absorptions associated with the crotonyl group in aspertetronin A were missing and had been replaced by absorptions at higher field; these were characteristic of a system $CH_3{\cdot}CH(OH){\cdot}CH_2{\cdot}CO$.

The structure (XXIII) for aspertetronin B has been confirmed. A product identical with hexahydro-aspertetronin A (XIV) was formed by catalytic hydrgenation of the crotonyl derivative (XXIV), prepared from tetrahydro-aspertetronin B by the action of thionyl chloride. Unlike aspertetronin A, the metabolite B gave iodoform on treatment with sodium hypoiodite; this located the hydroxy-group at position 3 of the acyl side-chain.

The relationship of aspertetronin A, B, to other metabolites of *A. rugulosus*, and the mode of biosynthesis of these compounds, will be the subject of further investigation.

EXPERIMENTAL

All melting points were determined on a Kofler hot-stage microscope. U.v. spectra were measured on a Unicam SP 800 spectrophotometer. I.r. spectra were determined using a Perkin-Elmer model 257 spectrophotometer. ^1H N.m.r. spectra were determined at 60 Mc./sec. in this department with a Perkin-Elmer model R-10 instrument, and one determination was carried out at 220 Mc./sec. using a Varian instrument with a superconducting magnet immersed in liquid helium. (We are grateful to I.C.I. Petrochemicals and Polymers Division, Runcorn, for this determination.) Mass spectra were measured on an A.E.I. model MS9 spectrometer. Optical rotations were obtained using either an ETL-NPL Automatic Polarimeter model 143A or a Perkin-Elmer model 141 automatic polarimeter. R_F values refer to thin-layer chromatograms (t.l.c.) on Kieselgel G (Merck) using benzene–methanol–acetic acid (10 : 2 : 1 v/v) as the developing solvent. The chromoplates were sprayed with diazotised *o*-dianisidine solution followed by ammonia. Light petroleum had b.p. 60—80°.

Extraction and Purification of Aspertetronin A and B.—A pale-green, fluffy mutant (ARM 1532), derived in one mutational step from *Aspergillus rugulosus* I.M.I. strain 84338, was grown from a spore suspension for 13 days at 25° on a low-nitrogen medium.[2] The stationary cultures were in 800 flat-sided bottles (*ca.* 1 l. capacity) each containing 200 ml. of medium. After removal of the mycelium, the culture fluid was concentrated to 8 l. at 30° under reduced pressure. The concentrate was extracted continuously with ether. All acidic and phenolic material was removed from the ether extract by repeated washing with sodium carbonate solution (5%). Evaporation of the ethereal solution left a yellow, viscous residue (2·6 g.) which was chromatographed by gradient elution on silica gel (80 g.; L. Light and Co., 200—300 mesh). The intermediate fractions contained almost pure aspertetronin A (R_F 0·76, lilac spot). Recrystallisation of the metabolite from light petroleum furnished analytically pure *aspertetronin A* (XXII) as colourless needles, m.p. 72° (500 mg.) [Found: C, 69·4; H, 7·2%; *M* (mass spectrometry), 276·1362 ± 0·0010. $C_{16}H_{20}O_4$ requires C, 69·5; H, 7·3%; *M*, 276·1362], $[\alpha]_D$ +133 (*c* 0·3 in $CHCl_3$), $\nu_{max.}$ included 1740sh and 1705 $cm.^{-1}$.

Later fractions from the gradient elution afforded almost pure aspertetronin B (R_F 0·50, lilac spot) which was purified by further chromatography to give pure *aspertetronin B* (XXIII) as a colourless viscous oil (490 mg.), b.p. 100°/0·40 mm. [Found: *M* (mass spectrometry), 294·1467 ± 0·0010. $C_{16}H_{22}O_5$ requires *M*, 294·1467], $[\alpha]_D$ −70·5 (*c* 5·25 in $CHCl_3$), $\nu_{max.}$ included 1740sh and 1705 $cm.^{-1}$.

Catalytic Hydrogenation of Aspertetronin A.—Aspertetronin A (423 mg.) in benzene (30 ml.) was treated with hydrogen in the presence of 10% palladium–charcoal (100 mg.) at room temperature and pressure for 15 hr. Removal of the catalyst and solvent gave *hexahydro-aspertetronin A* (XIV) as a viscous oil (420 mg.), b.p. 94°/0·35 mm. [Found: C, 67·9; H, 9·4%; *M* (mass spectrometry), 282·1831 ± 0·0010. $C_{16}H_{26}O_4$ requires C, 68·1; H, 9·3%; *M*, 282·1831], $[\alpha]_D$ −62° (*c* 0·56 in $CHCl_3$), τ (CCl_4) 6·2 (3H, s, OMe), 7·0 (2H, t, *J* 7), 8·0—8·4 (4H, m), 8·65 (3H, s), 8·8 (8H, br m), 8·94 (3H, t), and 9·1 (3H, t).

Demethylation of Hexahydro-aspertetronin A.—The hexahydro-derivative (51 mg.) was shaken with 1·0N-sodium hydroxide (3 ml.) for 15 hr. at 20°. The resultant solution was extracted with ether, and the aqueous layer acidified to pH 2 and extracted several times with chloroform. *De-O-methylhexahydro-aspertetronin A* (XV) was obtained from the chloroform layer as a viscous oil (22 mg.), b.p. 90°/0·30 mm. [Found: C, 67·2; H, 9·4%; *M* (mass spectrometry), 268. $C_{15}H_{24}O_4$ required C, 67·1; H, 9·0%; *M*, 268], $[\alpha]_D$ −47·4 (*c* 5·7 in $CHCl_3$). The n.m.r. spectrum in $CDCl_3$ indicated that the OMe group had been replaced by an enolic hydroxy-peak at τ −0·25, one-proton singlet exchangeable with deuterium oxide.

Removal of the Acyl Side-chain from De-O-methylhexahydro-aspertetronin A.—The enol (77 mg.) in aqueous acetic acid (1 ml. of 50%) was treated with 9·3 ml. of a 0·124N-solution of bromine in 50% aqueous acetic acid at 20° for 2 hr. The resultant solution was evaporated under reduced pressure over potassium hydroxide pellets, to give the intermediate bromo-derivative (XVI) as a viscous residue, which was dissolved in dilute sodium hydroxide solution and hydrogenated over 10% palladium–charcoal at 20° and atmospheric pressure for 8 hr. Removal of the catalyst and acidification of the filtrate, followed by repeated extraction with ether, gave *debutyryl-de-O-methylhexahydro-aspertetronin A* (XVII) as a viscous oil upon evaporation of the solvent (33 mg.), b.p. 90°/0·1 mm. (solidified upon standing), m.p. 42° (Found: C, 66·6; H, 8·7. $C_{11}H_{18}O_3$ requires C, 66·7; H, 9·1%), $[\alpha]_D$ −9·7 (*c* 0·30 in $CHCl_3$). The n.m.r. spectrum ($CDCl_3$) is that of a keto–enol mixture, the CH_2 and olefin protons occurring at τ 6·8 and 5·0 as singlets, both of which are exchangeable with with deuterium oxide.

Methyl 4-hydroxy-4-methyldec-2-ynoate (XIX).—4-Hydroxy-4-methyldec-2-ynoic acid [14] (4·0 g.) was treated with methanol and sulphuric acid, to give the *ester* as a colourless oil (3·4 g.), b.p. 52°/0·01 mm. (Found: C, 67·9; H, 9·4. $C_{12}H_{20}O_3$ requires C, 68·0; H, 9·0%), $\nu_{max.}$ 3400 (OH), 2205 (C≡C), and 1710 (ester) cm.$^{-1}$, τ ($CDCl_3$) included 6·20, (3H, s, OMe) and 7·4 (1H, s, alcoholic OH exchangeable with deuterium oxide).

4-Diethylamino-5-hexyl-5-methylbut-3-enolide (XX).—The acetylenic hydroxy-esters (3 g.) in ether (15 ml.) was treated with diethylamine (4 g.) at 20° for 24 hr. The solvent was removed by distillation and the residue heated for 30 min. at 100°, to furnish the *lactone* as a viscous liquid (3·1 g.), b.p. 77°/0·01 mm. [Found: C, 71·1; H, 10·8; N, 5·6%; *M* (mass spectrometry), 253. $C_{15}H_{27}NO_2$ requires C, 71·1; H, 10·7; N, 5·5%; *M*, 253], $\nu_{max.}$ 1730 cm.$^{-1}$ (unsaturated lactone C=O), τ ($CDCl_3$) included 5·45 (1H, s, ring H) and 6·67 (4H, q, *J* 7, *N*-ethyl group).

(±) *4-Hydroxy-5-hexyl-5-methylbut-3-enolide* (XXI).—The diethylamino-lactone (1 g.) was warmed at 100° with concentrated hydrochloric acid (4 ml.) for 45 min., poured into water, and the organic material extracted into ether. The *tetronic acid* was isolated, after extraction into sodium hydrogen carbonate solution, as a colourless viscous oil (350 mg.), b.p. 68/0·01 mm. (solidified on standing, m.p. 65°) (Found: C, 67·0; H, 8·8. $C_{11}H_{18}O_3$ requires C, 66·7; H, 9·1%). A comparison of the i.r., u.v., n.m.r., and mass spectra of this tetronic acid with the spectra of debutyryl-de-*O*-methylhexahydro-aspertetronin A served to confirm that these two compounds were identical.

Conversion of Aspertetronin B into Hexahydro-aspertetronin A.—Aspertetronin B (409 mg.) in dry benzene (30 ml.) was hydrogenated over 10% palladium–carbon (200 mg.) at room temperature and pressure for 8 hr. The catalyst and solvent were removed, to yield *tetrahydro-aspertetronin B* as a colourless oil (310 mg.), b.p. 58°/0·3 mm. [Found: *M* (mass spectrometry), 298·1780 ± 0·0015. $C_{16}H_{26}O_5$ requires *M*, 298·1780].

Tetrahydro-aspertetronin B (50 mg.) in dimethylformamide (1 ml.) was added to a solution of thionyl chloride (1 ml.) in dimethylformamide (3 ml.) which was cooled in ice and the mixture allowed to warm to room temperature during 2 hr. before being poured into ice and extracted with ether. The ether extract was washed with sodium hydrogen carbonate solution, dried, and upon removal of the solvent yielded the *dehydrated product* $C_{16}H_{24}O_4$ (XXIV) as a colourless viscous oil (29 mg.). The crude dehydration product was hydrogenated in the usual way, to give a *hexahydro-dehydrated product of aspertetronin B* (XIV) as a colourless viscous oil (11·4 mg.), b.p. 94°/0·35 mm. [Found: *M* (mass spectrometry), 282·1831 ± 0·0014. $C_{16}H_{26}O_4$ requires *M*, 282·1831], $[\alpha]_D$ −58° (*c* 0·36 in $CHCl_3$).

The i.r., u.v., n.m.r., and mass spectra of this compound were identical with the spectra of hexahydro-aspertetronin A.

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