

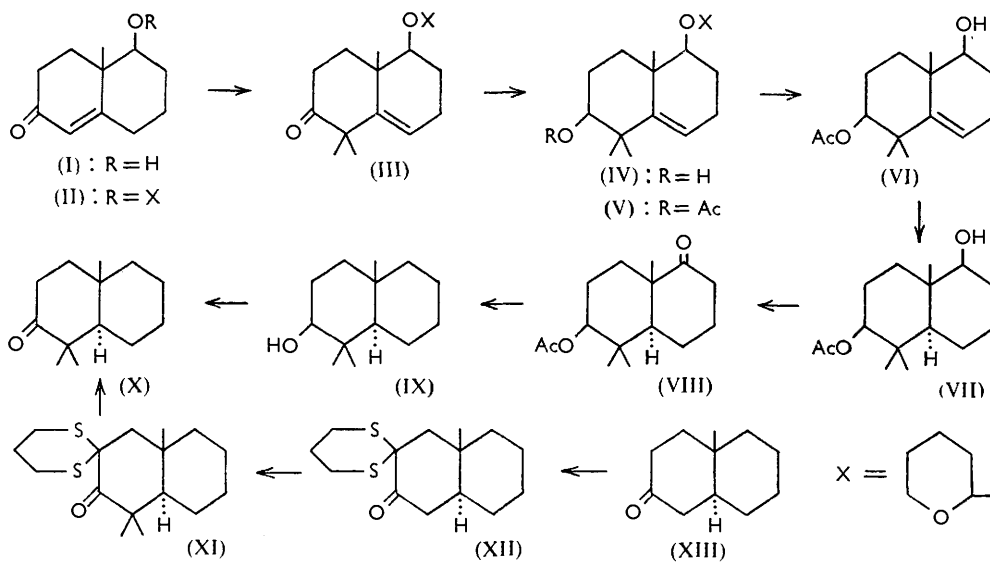
122. *Studies in the Synthesis of Terpenes. Part III.* The Synthesis of 6-Acetoxy-5:5:9-trimethyl-trans-decal-1-one.*

By B. GASPERT, T. G. HALSALL, and D. WILLIS.

The conversion of 5-hydroxy-10-methyl- $\Delta^1(9)$ -octal-2-one (I) into 6-acetoxy-5:5:9-trimethyl-*trans*-decal-1-one (VIII) is described. The *trans*-nature of the ring fusion has been proved by conversion of the decalone (VIII) into 1:1:10-trimethyl-*trans*-decal-2-one (X) which has been synthesised from 10-methyl-*trans*-decal-2-one (XIII).

In our studies of terpene synthesis 6-acetoxy-5:5:9-trimethyl-*trans*-decal-1-one (VIII) has been prepared. This compound, which has the characteristic 3-oxygen atom of triterpenes, could be used in the synthesis of derivatives of onocerin¹ and, possibly, pentacyclic triterpenes. What is probably the benzoate corresponding to the acetate (VIII), although the *trans*-fusion of its rings has not been proved, has been prepared by King, Ritchie, and Timmons² by a route different from that described below.

5-Hydroxy-10-methyl- $\Delta^1(9)$ -octal-2-one^{3,4,5} (I) was converted into its tetrahydropyranyl ether (II) by a slightly different procedure from that previously described.³ Again the ether, as normally obtained, melted over a range suggesting the presence of two stereoisomers involving the 2-position of the tetrahydropyran ring. Repeated recrystallisation afforded crystals melting over only 1° and so presumably of one stereoisomer, but the mixture of the two isomers was satisfactory for further use.



The tetrahydropyranyl ether (II) was methylated by the method of Woodward *et al.*^{6,7} to give the trimethyloctalone (III) with the protective grouping still intact. This with lithium aluminium hydride gave the octalin-2-ol (IV) which was converted into the acetyl

* Part II, *J.*, 1957, 3441.

¹ Cf. Elad and Sondheimer, *Proc. Chem. Soc.*, 1957, 206.

² King, Ritchie, and Timmons, *Chem. and Ind.*, 1956, 1230.

³ Cocker and Halsall, *J.*, 1957, 3441; *Chem. and Ind.*, 1956, 1275.

⁴ Elad and Sondheimer, *Bull. Res. Council Israel*, 1956, **5**, A, 269; *J. Amer. Chem. Soc.*, 1957, **79**, 5542.

⁵ Birch, Quartey, and Smith, *J.*, 1950, 1768.

⁶ Woodward, Patchett, Barton, Ives, and Kelly, *J. Amer. Chem. Soc.*, 1954, **76**, 2852.

⁷ *Idem*, *J.*, 1957, 1131.

derivative (V) under conditions which did not lead to loss of the ether group. The octalone (III) and the hydroxyoctalin (IV) were obtained as oils, probably again because of the presence of two stereoisomers as above. The octalone was, however, converted into a solid semicarbazone. The acetyl derivative (V) was crystalline: as first obtained it melted over a range, but recrystallisation gave sharply melting prisms, presumably of one isomer. After removal of the protective grouping, the cause of this isomerism disappears and the subsequent compounds were readily obtained as sharply melting crystals.

The ether grouping of compound (V) was removed and the resulting monoacetate (VI) hydrogenated with a platinum catalyst in acetic acid to give the *trans*-monoacetate (VII). That the hydrogenation had given the *trans*- rather than the *cis*-decalin derivative follows from the experiments described below. The monoacetate (VII) was oxidised with chromic acid to 6-acetoxy-5 : 5 : 9-trimethyl-*trans*-decal-1-one (VIII). This was reduced (Wolff-Kishner) to the alcohol (IX) which was oxidised to 1 : 1 : 10-trimethyl-*trans*-decal-2-one (X) identical with an authentic sample prepared as follows.

10-Methyl-*trans*-decal-2-one (XIII) was prepared from 10-methyl- $\Delta^{1(9)}$ -octal-2-one,⁸ obtained by an improved procedure, by lithium-ammonia reduction which is known to lead to the *trans*-ring fusion.⁹ Its 2 : 4-dinitrophenylhydrazone had the melting point reported by Woodward *et al.*¹⁰ The C₍₃₎ position of the decalone (XIII) was blocked by the introduction of a thioketal grouping by the method devised by Woodward *et al.*⁷ Two methyl groups were then introduced at position 1 by means of methyl iodide and sodium *tert.*-amyloxide in benzene. The carbonyl stretching band in the infrared spectrum (in CCl₄) of the resulting trimethyldecalone (XI) was at a frequency (1692 cm.⁻¹) somewhat lower than is usual for a carbonyl group in a saturated six-membered ring, in agreement with that found for 4 : 4-dimethyl-3-oxocholestane-2-*spiro*-2'-(1' : 3'-dithian) (C=O frequency at 1686 cm.⁻¹)¹¹ where there is also a carbonyl group in a saturated six-membered ring flanked by two methyl groups and the thioketal group. The thioketal group was finally removed by use of deactivated Raney nickel, to give 1 : 1 : 10-trimethyl-*trans*-decal-2-one (X) identical with that obtained from the acetyl derivative (VIII).

Wolff-Kishner reduction of the decalone (X) gave 1 : 1 : 10-trimethyl-*trans*-decalin which was identical with the Wolff-Kishner reduction product of the 5 : 5 : 9-trimethyl-decal-1-one^{3,4} previously described. This proves that this decalone has a *trans*-ring junction. Previously this had been only assumed.

EXPERIMENTAL

M. p.s were determined on a Kofler block and are corrected. The alumina used was neutral; it was prepared by neutralising Peter Spence "Grade H" alumina with 0.5*N*-hydrochloric acid, washing it with boiling water, and activating it at 140° for 12 hr. under reduced pressure. Light petroleum refers to the fraction with b. p. 60—80°, unless otherwise stated.

10-Methyl-5-tetrahydropyranyloxy- $\Delta^{1(9)}$ -octal-2-one (II).—5-Hydroxy-10-methyl- $\Delta^{1(9)}$ -octal-2-one monohydrate³ (20 g.) was dried over phosphoric oxide at 50—55°/20 mm. for 15 min. and then for 10 min. in a high vacuum. The oily residue (18 g.) in dihydropyran (60 c.c.; redistilled from potassium hydroxide) was treated with a 1.6% solution of hydrogen chloride in dry ether (2 c.c.) and kept overnight. Ether (40 c.c.) was added and the solution washed with sodium hydrogen carbonate solution and water, dried, and evaporated under reduced pressure to an oil which was dissolved in light petroleum and kept overnight at -5°. The ether (13.9 g.) separated as prisms, m. p. 55—65°. Further recrystallisation from light petroleum gave prisms, m. p. 82—83° (Found: C, 73.0; H, 8.9. Calc. for C₁₆H₂₄O₃: C, 72.7; H, 9.15%), λ_{max} . 2375 Å (ϵ 15,300), ν_{max} . (in CCl₄) 1675, 1075, and 1055 (C-O-C-O-C), and 1030 cm.⁻¹ (ether linkage).

1 : 1 : 10-Trimethyl-5-tetrahydropyranyloxy- Δ^8 -octal-2-one (III).—10-Methyl-5-tetrahydropyranyloxy- $\Delta^{1(9)}$ -octal-2-one (2 g.) in *tert.*-butyl alcohol (32 c.c.) at 40° was treated with

⁸ Du Feu, McQuillin, and Robinson, *J.*, 1937, 53.

⁹ Barton and Robinson, *J.*, 1954, 3045.

¹⁰ Woodward, Sondheimer, Taub, Heusler, and McLamore, *J. Amer. Chem. Soc.*, 1952, **74**, 4223.

¹¹ Beton, Halsall, Jones, and Phillips, *J.*, 1953, 753.

potassium *tert.*-butoxide (0.88 g. of potassium) in the same solvent (20 c.c.). Methyl iodide (6.4 g.) in dry *tert.*-butyl alcohol (6 c.c.) was immediately added and the mixture was heated under reflux for 1 hr. under nitrogen. Evaporation under reduced pressure, dilution with water, and extraction with ether afforded an oil (2.04 g.) which was taken up in light petroleum and filtered through alumina along with light petroleum (100 c.c.). The resultant oil (1.75 g.) was further chromatographed on alumina (30 g.), to give 1 : 1 : 10-*trimethyl-5-tetrahydropyranyloxy- Δ^8 -octal-2-one* as an oil (1.3 g., 62%). An analytical sample had n_D^{25} 1.5112 (Found: C, 74.3; H, 9.9. $C_{18}H_{28}O_3$ requires C, 73.9; H, 9.65%), $\nu_{\max.}$ (CCl₄) 1720 (saturated ketone), 1385 and 1360 (*gem.*-dimethyl), and 1076, 1065, and 1032 cm.⁻¹ (C·O·C·O·C). The *semicarbazone* crystallised from ethanol as stout needles, m. p. 204—207° (Found: C, 65.15; H, 8.75; N, 12.3. $C_{19}H_{31}O_3N_3$ requires C, 65.3; H, 8.95; N, 12.0%).

2-*Acetoxy-1 : 1 : 10-trimethyl-5-tetrahydropyranyloxy- Δ^8 -octalin* (V).—1 : 1 : 10-Trimethyl-5-tetrahydropyranyloxy- Δ^8 -octal-2-one (5.3 g.) in ether (400 c.c.) was added during 45 min. to a stirred solution of lithium aluminium hydride (1.3 g.) in ether (150 c.c.), heated under reflux. Half of the solvent was then removed under reduced pressure, an equal volume of water was added, and the mixture centrifuged. The resulting ether layer, free from colloidal aluminium salts, was washed with water, dried, and evaporated, to give 1 : 1 : 10-*trimethyl-5-tetrahydropyranyloxy- Δ^8 -octalin-2-ol* (IV) as a viscous oil (5.03 g., 95%), n_D^{25} 1.5173, $\nu_{\max.}$ (in CCl₄) 3610 cm.⁻¹ (OH), no band in the carbonyl region.

The octalin-2-ol (1 g.) in pyridine (5 c.c.) was heated with acetic anhydride (0.4 c.c.) at 100° for 1 hr., then poured into 2*N*-hydrochloric acid (20 c.c.), and the product was isolated by ether. The resulting oil was poured in light petroleum through alumina (3 g.), followed by further light petroleum (50 c.c.). Evaporation gave an oil (0.9 g.) which was dissolved in light petroleum (*ca.* 10 c.c.) and kept overnight at -5°. 2-*Acetoxy-1 : 1 : 10-trimethyl-5-tetrahydropyranyloxy- Δ^8 -octalin* (0.2 g.) crystallised as prisms, m. p. 80—88° raised by further recrystallisation to 102.5—104.5° (Found: C, 71.3; H, 9.55. $C_{20}H_{32}O_4$ requires C, 71.4; H, 9.6%), $\nu_{\max.}$ (in CCl₄) 1739 and 1238 (acetate) and 1075, 1062, and 1022 cm.⁻¹ (C·O·C·O·C). The residue (0.7 g.) from the mother-liquor of the crystals, m. p. 80—88°, showed the same infrared bands.

6-*Acetoxy-5 : 5 : 9-trimethyl- $\Delta^4(10)$ -octalin-1-ol* (VI).—The acetate (V) (4.5 g. of oil) prepared from 1 : 1 : 10-*trimethyl-5-tetrahydropyranyloxy- Δ^8 -octalin-2-ol* (5 g.) was treated in methanol (45 c.c.) with hydrochloric acid (3 drops) at 40—45° for 20 min. Dilution with water and extraction with ether gave an oil (3.4 g.). Addition of light petroleum (b. p. 40—60°) to this oil led to 6-*acetoxy-5 : 5 : 9-trimethyl- $\Delta^4(10)$ -octalin-1-ol* as prisms (1.85 g.), m. p. 97—98° (Found: C, 71.7; H, 9.85. $C_{18}H_{24}O_3$ requires C, 71.4; H, 9.6%), $\nu_{\max.}$ (in CS₂) 3600 (OH), 1739 and 1238 (acetate), and 793 cm.⁻¹ (C·C).

6-*Acetoxy-5 : 5 : 9-trimethyl-trans-decalin-1-ol* (VII).—The octalinol (VI) (210 mg.) in acetic acid (15 c.c.) was hydrogenated in the presence of Adams platinum catalyst (100 mg.). Uptake of hydrogen ceased after 6 hr. Removal of the catalyst, evaporation under reduced pressure, and crystallisation at 0° from light petroleum gave the *trans-decalinol* as prisms, m. p. 93—95° (Found: C, 71.15; H, 10.25. $C_{15}H_{26}O_3$ requires C, 70.85; H, 10.3%). There was no infrared absorption band in CS₂ solution at 793 cm.⁻¹.

6-*Acetoxy-5 : 5 : 9-trimethyl-trans-decal-1-one* (VIII).—The decalinol (VII) (400 mg.) in acetone (25 c.c.) was treated with 8*N*-chromic acid (0.62 c.c.) by the method of Bowers *et al.*¹² After dilution with water, ethereal extraction afforded a solid (340 mg.) which crystallised from light petroleum (b. p. 40—60°) to give the *decalone* as needles, m. p. 92—96°, raised by sublimation at 75—80°/0.05 mm. to 96—97° (Found: C, 71.75; H, 9.5. $C_{15}H_{24}O_3$ requires C, 71.4; H, 9.6%), $\nu_{\max.}$ (in CS₂) at 1710 (C=O), and 1739 and 1238 cm.⁻¹ (acetate).

1 : 1 : 10-*Trimethyl-trans-decalin-2-ol* (IX).—6-*Acetoxy-5 : 5 : 9-trimethyl-trans-decal-1-one* (740 mg.) in redistilled diethylene glycol (15 c.c.) was heated under reflux for 1 hr. with 100% hydrazine hydrate (1.45 c.c.) and potassium hydroxide (1.3 g.). The excess of water was then removed by distillation until the internal temperature reached 200°, then heating under reflux was continued for a further 4 hr. under nitrogen. After dilution with water, ethereal extraction afforded a solid (410 mg.) which on sublimation at 100—120°/14 mm. gave 1 : 1 : 10-*trimethyl-trans-decalin-2-ol* as plates, m. p. 60—65° (Found: C, 79.25; H, 12.45. $C_{13}H_{24}O$ requires C, 79.5; H, 12.3%), $\nu_{\max.}$ (in CCl₄) 3636 (OH) and 1381 and 1364 cm.⁻¹ (*gem.*-dimethyl).

1 : 1 : 10-*Trimethyl-trans-decal-2-one* (X).—1 : 1 : 10-*Trimethyl-trans-decalin-2-ol* (200 mg.) in acetone (10 ml.) was treated with 8*N*-chromic acid (0.35 c.c.) as above.¹² After dilution with

¹² Bowers, Halsall, Jones, and Lemin, *J.*, 1953, 2548.

water, ethereal extraction afforded a liquid (194 mg.) which, distilled at 70—75°/0.3 mm., gave 1 : 1 : 10-*trimethyl-trans-decal-2-one*, n_D^{17} 1.4950, m. p. 25—28° (Found: C, 80.4; H, 11.4. $C_{13}H_{22}O$ requires C, 80.35; H, 11.4%), ν_{max} . (liquid film) 1710 (>CO) and 1381 and 1365 cm^{-1} (*gem.*-dimethyl). The 2 : 4-*dinitrophenylhydrazone* formed orange needles, m. p. 191—192°, from ethanol (Found: C, 60.85; H, 7.15; N, 14.9. $C_{19}H_{26}O_4N_4$ requires C, 60.95; H, 7.0; N, 14.95%). The *semicarbazone* formed needles, m. p. 218—219° (decomp. >210°), from ethanol (Found: C, 67.0; H, 9.95; N, 16.8. $C_{14}H_{25}ON_3$ requires C, 66.9; H, 10.05; N, 16.7%).

10-*Methyl- $\Delta^{1(9)}$ -octal-2-one*.—2-Methylcyclohexanone (146 g.) was heated under reflux for 45 min. under nitrogen with potassium *tert.*-butoxide (from 39 g. of potassium) in *tert.*-butyl alcohol (1.2 l.). The solution was cooled to 20° during 1½ hr., then freshly distilled 1-diethylaminobutan-3-one (14.3 g.) was added with stirring during 45 min., the temperature rising to 60°. Stirring was continued for 16 hr. under nitrogen, then the solvent was removed. The residue was acidified to pH 2 with dilute sulphuric acid and extracted with ether, to give a mixture of 2-methylcyclohexanone and 10-methyl- $\Delta^{1(9)}$ -octal-2-one. These were separated by distillation and 10-methyl- $\Delta^{1(9)}$ -octal-2-one (56 g., 35%), b. p. 68°/0.1 mm., n_D^{19} 1.5190, was obtained.

10-*Methyl-trans-decal-2-one* (XIII).—10-Methyl- $\Delta^{1(9)}$ -octal-2-one (31 g.) in ether (150 c.c.) was added during 45 min. to a stirred solution of lithium (15 g.) in liquid ammonia (2 l.). After a further 45 min. ethanol was slowly added to discharge the blue colour and the ammonia allowed to evaporate. The residue was acidified to pH 1 and extracted with ether, to give 10-methyl-*trans-decalin-2-ol* (23 g.), b. p. 73—80°/0.1 mm., m. p. 72—74° [after crystallisation from light petroleum (b. p. 30—40°) and sublimation at 70°/0.05 mm.] (Found: C, 78.5; H, 12.0. Calc. for $C_{11}H_{20}O$: C, 78.5; H, 12.0%).

8N-Chromic acid was slowly added to a cooled solution of the decalinol (15.3 g.) in acetone (150 c.c.) until an orange colour persisted for 1—2 min. Most of the acetone was removed at 20°, the residue was treated with water, and the product isolated with ether. Distillation of the resultant oil gave 10-methyl-*trans-decal-2-one* (12.1 g.), b. p. 60°/0.1 mm., $n_D^{18.5}$ 1.4918 (Found: C, 79.6; H, 10.9. Calc. for $C_{11}H_{18}O$: C, 79.5; H, 10.9%). The decalone was characterised as its 2 : 4-dinitrophenylhydrazone which crystallised as yellow plates, m. p. 178—180°, from ethyl acetate. Woodward *et al.*¹⁰ give m. p. 177—178°.

3-*Hydroxymethylene-10-methyl-trans-decal-2-one*.—Sodium methoxide (from 1.86 g. of sodium) was dried at 160°/0.1 mm. for 1 hr., powdered, and suspended in dry benzene (25 c.c.) under nitrogen. Ethyl formate (11.1 g.) was slowly added to the stirred suspension, and 30 min. later the mixture was cooled in ice and treated during 1 hr. with 10-methyl-*trans-decal-2-one* (5 g.) in benzene (25 c.c.). More benzene (25 c.c.) was added and the mixture stirred at 20° under nitrogen for 18 hr. After dilution with benzene, the mixture was cooled in ice and cautiously acidified to pH 1. The organic layer was extracted with 2% potassium hydroxide solution. The aqueous alkaline solution was then washed with ether, cooled, and acidified as before, and the product isolated with ether and crystallised from light petroleum (b. p. 30—40°), to give 3-*hydroxymethylene-10-methyl-trans-decal-2-one* (5.6 g.), m. p. 73—74°, raised by sublimation at 70°/0.1 mm. to 75.5—76° (Found: C, 74.3; H, 9.4. $C_{12}H_{18}O_2$ requires C, 74.2; H, 9.35%), λ_{max} . (in 50% ethanolic 0.05N-sodium hydroxide) 3150 Å (ϵ 18,750).

10-*Methyl-2-oxo-trans-decalin-3-spiro-2'-(1' : 3'-dithian)* (XII).—3-Hydroxymethylene-10-methyl-*trans-decal-2-one* (4.03 g.), trimethylene ditoluene-*p*-thiosulphonate (9.35 g.), and potassium acetate (11.2 g.) in ethanol (150 c.c.) were heated under reflux for 7 hr. Evaporation of the solvent and dilution with water gave a solid, to which was added the material obtained on chloroform extraction of the aqueous layer. Crystallisation from ethanol gave the *spiran* (XII) (4.4 g.) as plates, m. p. 136.5—138° (partial sublimation) (Found: C, 62.5; H, 8.0. $C_{14}H_{22}OS_2$ requires C, 62.2; H, 8.2%), ν_{max} . (in CS_2) 1704 cm^{-1} .

1 : 1 : 10-*Trimethyl-2-oxo-trans-decalin-3-spiro-2'-(1' : 3'-dithian)* (XI).—Sodium (1.75 g.) was dissolved in vigorously stirred dry *tert.*-amyl alcohol (25 c.c.) under nitrogen by heating under reflux. When all solid material had dissolved the solution was concentrated to incipient crystallisation and the hot liquid rapidly transferred to a dish in a desiccator, which was slowly evacuated as the mass solidified. The resultant yellowish-white solid was powdered and dissolved in benzene (100 c.c.) under nitrogen. 10-Methyl-2-oxo-*trans-decalin-3-spiro-2'-(1' : 3'-dithian)* (3.43 g.) in benzene (60 c.c.) was added with stirring. The solution was heated at 60° for 30 min., then cooled somewhat and treated with methyl iodide (18 g.) in benzene (25 c.c.). After 10 min. the temperature was raised and the solution heated under reflux for

5½ hr. under nitrogen, more methyl iodide (1 c.c. portions) being added at hourly intervals. Water (100 c.c.) was added and the organic phase separated and combined with a benzene extract of the neutralised aqueous phase. The benzene was removed and the residue in light petroleum-benzene solution filtered through deactivated alumina (15 g.). Evaporation gave a solid which crystallised from ethanol, to give 1 : 1 : 10-*trimethyl-2-oxo-trans-decalin-3-spiro-2'-(1' : 3'-dithian)* as prisms (2.65 g.), m. p. 137—138° (with sublimation) (Found: C, 64.4; H, 9.95. $C_{16}H_{26}OS_2$ requires C, 64.4; H, 8.8%), ν_{\max} . (in CCl_4) 1692 ($>CO$ group) and 1382 and 1362 cm^{-1} (*gem.*-dimethyl).

1 : 1 : 10-*Trimethyl-trans-decal-2-one* (X).—The foregoing thioketal (635 mg.) and deactivated Raney nickel⁷ (6.44 g. of settled suspension) were heated under reflux in ethanol (25 c.c.) for 6½ hr. and then kept overnight. Most of the supernatant liquid was decanted, the nickel was washed with hot ethanol, and the combined liquids were centrifuged. Evaporation under reduced pressure at low temperature gave an oil (400 mg.) which was distilled, to give 1 : 1 : 10-*trimethyl-trans-decal-2-one* (340 mg.), b. p. (bath) 60°/0.03 mm., n_D^{17} 1.4954, m. p. 25—28° (Found: C, 80.7; H, 11.5. $C_{13}H_{22}O$ requires C, 80.4; H, 11.4%), ν_{\max} . (liquid film) 1710 cm^{-1} . The spectrum was identical with that of the 1 : 1 : 10-*trimethyl-trans-decal-2-one* prepared from 6-acetoxy-5 : 5 : 9-*trimethyl-trans-decal-1-one*.

The 2 : 4-dinitrophenylhydrazone formed orange needles (from ethanol-benzene [3 : 1]), m. p. 189—190° (decomp.), undepressed on admixture with the 2 : 4-dinitrophenylhydrazone of the 1 : 1 : 10-*trimethyl-trans-decal-2-one* prepared from 6-acetoxy-5 : 5 : 9-*trimethyl-trans-decal-1-one*. The semicarbazone formed needles (from ethanol), m. p. 218—219° (decomp.), undepressed on admixture with the authentic semicarbazone (similarly obtained).

1 : 1 : 10-*Trimethyl-trans-decalin*.—1 : 1 : 10-*Trimethyl-trans-decal-2-one* (520 mg.), 100% hydrazine hydrate (1.5 c.c.), potassium hydroxide (1.34 g.), and redistilled diethylene glycol (12 c.c.) were heated under reflux for 2 hr. under nitrogen. Water and excess of hydrazine were distilled until the internal temperature reached 210°, the distillate (2.5 c.c.) being retained. The mixture was then heated under reflux for 5 hr. under nitrogen. The distillate was then added back, together with water, and the product was isolated with ether as an oil which was percolated through alumina (5 g.) with light petroleum (25 c.c.). Distillation of the final oil afforded 1 : 1 : 10-*trimethyl-trans-decalin* (270 mg.), b. p. (bath-temp.) 105—110°/17 mm., $n_D^{17.5}$ 1.4858 (Found: C, 85.9; H, 13.1. $C_{13}H_{24}$ requires C, 86.6; H, 13.4%), ν_{\max} . (liquid film), no carbonyl band, bands at 1378 and 1365 cm^{-1} (*gem.*-dimethyl group).

Wolff-Kishner Reduction of 5 : 5 : 9-Trimethyl-trans-decal-1-one.³—5 : 5 : 9-*Trimethyl-trans-decal-1-one* (500 mg.) was reduced as described in the preceding experiment. The 1 : 1 : 10-*trimethyldecalin* (250 mg.) so obtained had b. p. (bath-temp.) 100—105°/10 mm., n_D^{17} 1.4862. Its infrared absorption spectrum was identical with that of 1 : 1 : 10-*trimethyl-trans-decalin* obtained from 1 : 1 : 10-*trimethyl-trans-decal-2-one*.

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