254. *The Alkaloids of Alstonia Barks. Part III. Alstonine.*

By Thomas M. Sharp.

The genus *Alstonia* is widely distributed throughout the tropics except in America, and the barks of many species have long had reputations as febrifuges. The present paper describes preliminary attempts to determine the structure of alstonine, $C_{21}H_{20}O_3N_2$, the chief alkaloid of an Australian species, *A. constricta*, F. Muell.

Alstonine on reduction yields a tetrahydro-derivative which is shown by hydrolysis and re-esterification to be a methyl ester. Oxidation with permanganate gives rise to *N*-oxalylanthranilic acid. Exhaustive methylation, by means of either Emde's method or catalytic reduction, fails before either of the nitrogen atoms is eliminated. The action of bromine on the alkaloid is described. Selenium dehydrogenation causes the loss of the methyl ester group which appears among the volatile products of the reaction as dimethyl diselenide; and an oxygen-free base, alstyrine, $C_{19}H_{22}N_2$ or $C_{18}H_{20}N_2$, is produced. The behaviour of the latter on exhaustive methylation has been studied. As in the case of alstonine, nitrogen is not eliminated, but bases are produced which give indole colour reactions.

ALSTONINE, the main alkaloid of *Alstonia constricta*, F. Muell., has been shown (J., 1934, 287) to have the formula $C_{21}H_{20}O_3N_2$, to contain one methoxy-group but no methyl attached to nitrogen, and to be a mono-acidic, tertiary base.

In Part I (*loc. cit.*) it was stated to be unaffected by catalytic reduction using either palladium–barium sulphate or platinum oxide catalyst. This is true of the salts, but it is now found that the base is readily reduced in the presence of platinum oxide with the formation of *tetrahydroalstonine*, $C_{21}H_{24}O_3N_2$, which in contradistinction to alstonine is colourless. Tetrahydroalstonine is fairly stable towards alkalis, but can be hydrolysed by long boiling with 20% alcoholic potassium hydroxide yielding an amphoteric substance, *tetrahydroalstoninic acid*, $C_{20}H_{22}O_3N_2$, which contains no methoxy-group and can be esterified with methyl alcohol with re-formation of tetrahydroalstonine. The methoxy-group in alstonine and tetrahydroalstonine is therefore present as a methyl ester; the function of two of the oxygen atoms is determined, and alstonine falls into line with echitamine, the alkaloid of many species of *Alstonia* (Goodson and Henry, J., 1925, **127**, 1642; Goodson, J., 1932, 2626), and perhaps with yohimbine. The stability of the ester towards alkali is rather unusual but not without precedent (cf. the stability of dihydro*cyclo*geranic acid methyl ester; Ruzicka and Thomann, *Helv. Chim. Acta*, 1933, **16**, 219). Tetrahydroalstonine is unaffected by acetic anhydride or by semicarbazide.

With bromine water, alstonine sulphate gave a yellow precipitate of an unstable compound, which was decomposed by boiling alcohol, forming a stable *compound* $C_{21}H_{18}O_4N_2Br_2,HBr$. The function of the new oxygen atom could not be determined. It did not yield a semicarbazone and gave tarry products with acetic anhydride. When reduced catalytically in the presence of calcium carbonate, it formed two *compounds*, $C_{21}H_{22}O_3N_2$ and $C_{21}H_{21}O_4N_2Br$. The former is generated by replacement of both bromine atoms by hydrogen and removal of an oxygen atom, presumably from a hydroxyl group; and the latter by replacement of one bromine atom by hydrogen. As these reactions did not appear to give any immediate clue to the constitution of the alkaloid, no further study of the compounds was made.

Alstonine was readily oxidised by permanganate, yielding a mixture from which *N*-oxalylanthranilic acid was separated and identified (mixed m. p., and mixed m. p. and analysis of the methyl ester). This acid has been obtained by permanganate oxidation of 4 : 3-pyrroloquinoline (Diesbach, Bie, and Rubli, *Helv. Chim. Acta*, 1934, **17**, 113), strychnine, and yohimbic acid (Späth and Bretschneider, *Ber.*, 1930, **63**, 2997), and various quinoline derivatives, and indicates the presence in the molecule of either a quinoline or an indole nucleus.

When alstonine was heated with selenium there was formed dimethyl diselenide and an oxygen-free compound, $C_{19}H_{22}N_2$ or $C_{18}H_{20}N_2$, for which the name *alstyrine* is proposed. A choice cannot at present be made between these two formulæ as the evidence is conflicting.

The dimethyl diselenide produced in the reaction was obviously derived from the methyl ester grouping, since it was also produced when tetrahydroalstonine was dehydrogenated, but not when tetrahydroalstoninic acid (which does not contain this group) was similarly treated; alstyrine was also formed in each case. This evidence in favour of the C_{19} formula is supported by analysis of alstyrine and of its *methiodide*. The evidence for the C_{18} formula comes from a study of the reductive degradation. When *alstyrine methochloride* was reduced catalytically, 3 mols. of hydrogen were absorbed and a tertiary hydromethine base produced, which was amorphous but gave with methyl iodide a crystalline compound, *alstyrine hydromethine methiodide*. The analyses of this methiodide and of the corresponding *methochloride* agree with the formula $C_{18}H_{25}N_2(CH_3)_2I$; *i.e.*, CH_2 less than would have been expected on the basis of the C_{19} formula for alstyrine. The compound contains two methyl groups on nitrogen, so that, so far as the groups involved in the degradation are concerned, the reaction has taken a normal course. Acceptance of the C_{19} formula for alstyrine involves the assumption that a CH_2 group has been lost either in the reduction of alstyrine methochloride or in the subsequent methylation. No analogous loss of a methyl group appears to have been recorded.

Alstyrine hydromethine methochloride was not degraded further by catalytic reduction. There was a slow absorption of hydrogen with platinum oxide as catalyst, but no tertiary base was formed. When reduced by Emde's method (*Annalen*, 1912, **391**, 88), however, an amorphous ether-soluble second methine base giving indole colour reactions was formed. It yielded an amorphous second methine methiodide with methyl iodide. The corresponding methochloride when heated with sodium amalgam did not evolve trimethylamine, nor was an ether-soluble base formed. Similarly, the corresponding quaternary base failed to give trimethylamine on heating.

An attempt to gain an insight into the constitution by the reductive degradation of alstonine itself has not given more favourable results. Alstonine methiodide formed a crystalline hydromethine base, $C_{21}H_{23}O_3N_2{\cdot}CH_3$, on catalytic reduction. The latter was methylated further to form *alstonine hydromethine methiodide*, $C_{21}H_{23}O_3N_2(CH_3)_2I$, whose methochloride was changed by catalytic reduction to a *compound*, $C_{22}H_{27}O_3N_2I$, which was still quaternary but appeared to have lost CH_2. Consistent figures could not be obtained in the *N*-methyl determinations, but the results indicated that the two methyl groups on nitrogen were intact. Reduction by Emde's method was not possible with this compound as, like alstonine, it is sensitive to alkalis and forms intractable tars. The attempt to degrade tetrahydroalstonine was still less favourable. It formed a *methiodide* and methochloride, but no tertiary base or any other crystalline compound could be isolated on reduction.

The formation of dimethyl diselenide in selenium dehydrogenations does not seem to have been observed before. Ruzicka, Meyer, and Mingazzini (*Helv. Chim. Acta*, 1922, **5**, 345, 581) have suggested that in the sulphur dehydrogenations of, *e.g.*, selinene and abietic acid, the tertiary methyl groups are eliminated as methylthiol, but they do not appear actually to have isolated it. It is possible that the first stage in the production of dimethyl diselenide from alstonine is the formation of methyl hydrogen selenide. The latter is readily oxidised, especially in the presence of water, to dimethyl diselenide (Goddard, Friend's "Textbook of Inorganic Chemistry," Vol. XI, Part IV, p. 3). If dimethyl diselenide is produced by the selenium dehydrogenation of compounds such as sterols, sesquiterpenes, etc., containing tertiary methyl groups, its isolation might make it a useful diagnostic agent, where the removal of such a group is in doubt. The author has not had an opportunity of testing such compounds, but has found in one case where the compound happened to be available, *viz.*, demethylechitamine (which does not contain a methoxy-group), that a methyl group on nitrogen is also eliminated as dimethyl diselenide.

EXPERIMENTAL.

Tetrahydroalstonine.—Crystalline alstonine base (Part I, *loc. cit.*) (2·0 g.) was suspended in methyl alcohol (55 c.c.) mixed with 0·1 g. of platinum oxide, and shaken with hydrogen until the solution was practically colourless. Absorption was rapid at first, but became slower as the reaction product crystallised out on the catalyst; 235 c.c. of hydrogen were absorbed in 4—5 hours (calc. for $C_{21}H_{20}O_3N_2,\frac{1}{4}H_2O$: $2H_2$, 242 c.c.). More methyl alcohol was added, and the liquid boiled to dissolve the reaction product, filtered from catalyst, and concentrated to yield *tetrahydroalstonine* as colourless glistening rods, m. p. 230—231° (corr.), $[\alpha]_D$ −107·0° (c = 1·045, chloroform) (Found : C, 71·8, 71·75; H, 7·0, 7·1; N, 7·8, 7·85; OMe, 7·4. $C_{21}H_{24}O_3N_2$ requires C, 71·6; H, 6·9; N, 7·9; OMe, 7·0%). The *hydrochloride* formed colourless diamond-shaped platelets from alcohol, m. p. 298° (corr., decomp.), $[\alpha]_D$ − 15·75° (c = 0·508, methyl alcohol) (Found : C, 64·9, 65·1; H, 6·75, 6·6; N, 7·2, 7·1; Cl, 9·0, 9·1. $C_{21}H_{24}O_3N_2$,HCl requires C, 64·8; H, 6·5; N, 7·2; Cl, 9·1%).

Hydrolysis.—Tetrahydroalstonine (2 g.) was treated with potassium hydroxide (4 g.) and alcohol (20 c.c.), boiled under reflux for 6 hours, diluted with water, acidified with hydrochloric acid, and evaporated to dryness. The dry salts were extracted with absolute alcohol, and the solution on concentration deposited *tetrahydroalstoninic acid hydrochloride* in hygroscopic needles, m. p. 296° (corr., decomp.) when dry, m. p. 279° after exposure to air, $[\alpha]_D$ − 22·1° (c = 0·97, methyl alcohol) (Found : C, 64·0, 64·1; H, 6·4, 6·5; N, 7·3, 7·5; Cl, 9·0; OMe, nil. $C_{20}H_{22}O_3N_2$,HCl requires C, 64·0; H, 6·2; N, 7·5; Cl, 9·5%). The hydrochloride (0·1 g.), in methyl alcohol (2 c.c.), was saturated with hydrogen chloride and boiled under reflux for 2 hours. The base recovered from the solution crystallised from alcohol in rods, m. p. 230°, undepressed on admixture with tetrahydroalstonine. Tetrahydroalstonine was little affected by heating for 6 hours at 140° in a sealed tube with concentrated hydrobromic acid, and failed to yield an acetyl or benzoyl derivative. When heated under reflux with a large excess of methyl iodide for 2 hours, it formed a *methiodide*, which crystallised with difficulty from alcohol in rosettes or hard aggregates of crystals, depending upon the rate of crystallisation, m. p. 236° (corr., decomp.) (Found : C, 53·6, 53·5; H, 5·7, 5·7; N, 5·7, 5·8; OMe + NMe, determined together as NMe, 11·8, 11·9. $C_{21}H_{24}O_3N_2,CH_3I$ requires C, 53·4; H, 5·5; N, 5·7; OMe + NMe, calc. as 2NMe, 11·7%). The corresponding methochloride was shaken with hydrogen in the presence of platinum oxide. It absorbed about 0·4 mol. of hydrogen, but no more was absorbed when the solvent or the catalyst was changed or when the solution was neutral, acid, or alkaline. No crystalline product could be isolated. When heated for 10 minutes at 300° with an equal weight of selenium, tetrahydroalstonine (4 g.) evolved dimethyl diselenide, and alstyrine (0·8 g.) was isolated from the melt (see below). Tetrahydroalstoninic acid when similarly treated also yielded alstyrine, but no dimethyl diselenide.

Action of Bromine Water on Alstonine.—Alstonine sulphate (5 g.) in water (50 c.c.) was treated with freshly prepared bromine water. A yellow precipitate formed, and was filtered off after 10 minutes (8·44 g.). It sintered at 90° and formed an orange-coloured froth at 130°. The compound could not be dried for analysis, as it lost weight continuously in a desiccator during 15 months. When boiled with alcohol, the solid dissolved to a deep red solution, and a pale yellow solid quickly separated. This was recrystallised from alcohol, forming rosettes of thin yellow plates, m. p. 276° (corr., decomp., heated quickly) (Found: C, 42·0, 42·2; H, 3·3, 3·35; N, 4·65; Br, 39·5; OMe, 5·0, 5·2. $C_{21}H_{18}O_4N_2Br_2$,HBr requires C, 41·8; H, 3·2; N, 4·65; Br, 39·8; OMe, 5·15%). This *compound* was suspended in methyl alcohol, mixed with calcium carbonate and platinum oxide catalyst, and shaken with hydrogen. When hydrogen ceased to be absorbed (2 days) the catalyst and calcium carbonate were filtered off, the filtrate evaporated, the residue taken up in water, and ammonia added. The precipitated bases were collected, converted into sulphates, and crystallised from methyl alcohol. After recrystallisation by solution in water and addition of alcohol, the *sulphate* formed rosettes of yellow needles, m. p. 212° (decomp.), $[\alpha]_D$ − 13·6° (c = 0·05, water) (Found : C, 51·2, 51·2; H, 4·6, 4·6; N, 5·7, 5·7; Br, 15·9, 15·75; S, 3·1, 3·1. $C_{21}H_{21}O_4N_2Br,\frac{1}{2}H_2SO_4$ requires C, 51·0; H, 4·5; N, 5·7; Br, 16·2; S, 3·2%). The mother-liquors from the sulphate were collected, the base recovered, and converted into *hydrobromide*, which crystallised from alcohol to which a few drops of water were added in rosettes of boat-shaped crystals, m. p. 291° (decomp.), $[\alpha]_D$ + 162·8° (c = 0·47, methyl alcohol) (Found : C, 58·3, 58·5; H, 5·1, 5·1; N, 6·4, 6·3; Br, 18·9. $C_{21}H_{22}O_3N_2$,HBr requires C, 58·5; H, 5·4; N, 6·5; Br, 18·5%).

Permanganate Oxidation of Alstonine.—Alstonine sulphate (20 g.) in water (150 c.c.) was treated with 5% aqueous potassium permanganate (1·4 l.), the temperature rising to 30°. The manganese dioxide was filtered off, washed well with hot water, and the combined filtrates made slightly acid with sulphuric acid and concentrated to about 700 c.c. Continuous ether extraction of this liquor furnished 4·58 g. of a dark syrup which, on standing, deposited crystals of oxalic acid (m. p. 98°, resolidified on further heating and remelted at 183°). The filtrate was dissolved in methyl alcohol but did not crystallise. When evaporated and left on a water-bath for some time it afforded a sublimate, which had the m. p. of methyl oxalate. Redissolution in methyl alcohol then caused the separation of a small crop of crystals which after recrystallisation from water melted at 227° and did not depress the m. p. of a synthetic specimen of *N*-oxalylanthranilic acid. The filtrate was neutralised with potassium carbonate, evaporated to dryness, and the dry salts extracted with dry alcohol. The salts not dissolved by alcohol were dissolved in water, acidified, and the free acids extracted with ether (1·95 g.). This mixture was dissolved in methyl alcohol and treated with ethereal diazomethane. The mixed esters obtained on evaporation were dissolved in methyl alcohol, and deposited crystals on standing. After several recrystallisations, the substance was obtained in colourless needles, m. p. 151°, which did not depress the m. p. of synthetic methyl *N*-oxalylanthranilate (Found : C, 56·0; H, 4·9; N, 6·2; OMe, 26·2. Calc. for $C_{11}H_{11}O_5N$: C, 55·7; H, 4·7; N, 5·9; OMe, 26·2%). From the alcohol-soluble potassium salts, 0·68 g. of free acids was obtained as a red-brown varnish, but no crystalline substance could be isolated. The mother-liquors from the continuous ether extraction were evaporated to dryness, and the dry salts extracted with methyl alcohol. On evaporation, there remained 4·38 g. of dark-coloured oil, which was dissolved in potassium carbonate solution. Nothing was obtained from this solution by extraction with ether or chloroform. The potassium was removed by conversion into perchlorate, and the filtrate treated with picric acid. A crystalline picrate (m. p. 208—214°) was obtained, but it has not been possible to purify this, nor has any crystalline material been obtained from the regenerated base.

Selenium Dehydrogenation of Alstonine.—Alstonine base (5 g.) freshly precipitated from the sulphate and dried in a desiccator, was powdered with an equal weight of selenium and heated in a metal-bath at 300° for 10 minutes in a flask fitted with a condenser and receiver. The mixture effervesced, and water mixed with red oily drops passed over. These were separated, and the oil (1·5 g. from 3 batches) dried over a pinch of magnesium sulphate and distilled. The first fraction (about 2 drops) boiled below 100° and was rejected. The second fraction (1·06 g.) boiled between 140° and 160°, and a residue was obtained which decomposed on further heating. The second fraction was redistilled; b. p. 150—154° (dimethyl diselenide has b. p. 155—157°; van Dam, Inaug. Diss., Groningen, 1930), 0·8 g.; the quantity was too small for an accurate b. p. determination (Found : Se, 82·3. Calc. for $C_2H_6Se_2$: Se, 84·0%). The melt after cooling was powdered, and extracted in a Soxhlet extractor with petroleum (b. p. 60—80°). The petroleum on evaporation left a light yellow to brown varnish, which crystallised on addition of alcohol but contained selenium. (The yield varied from 0·25 to 0·8 g.) It was purified by distillation under 1 mm. pressure from a tube of inverted **V**-shape heated by a copper block bored to fit the tube. The compound distilled at about 210°, forming a yellow resin which contained a little red selenium. The resin was dissolved in alcohol, the solution filtered from selenium through kieselguhr, and cooled; *alstyrine* was deposited in pale yellow plates, m. p. 113° (corr.) (Found : C, 81·5, 81·7, 81·35, 81·4; H, 7·7, 7·6, 7·7, 7·9; N, 10·2, 10·2, 10·4, 10·6. $C_{19}H_{22}N_2$ requires C, 81·95; H, 8·0; N, 10·1%. $C_{18}H_{20}N_2$ requires C, 81·8; H, 7·6; N, 10·6%). The *picrate* forms yellow platelets from alcohol, m. p. 215—216° (corr.) (Found : C, 59·15, 59·35; H, 4·8, 4·8; N, 14·2, 14·3. $C_{19}H_{22}N_2,C_6H_3O_7N_3$ requires C, 59·1; H, 5·0; N, 13·8%. $C_{18}H_{20}N_2,C_6H_3O_7N_3$ requires C, 58·4; H, 4·7; N, 14·2%). Alstryrine was recovered unchanged after boiling for 2 hours with 50% amyl-alcoholic potassium hydroxide, and after heating in a sealed tube with concentrated hydrochloric acid at 130° for 15 hours.

Degradation of Alstyrine.—Alstyrine (2·4 g.) was boiled under reflux for 7 hours with methyl iodide (20 c.c.), the excess of methyl iodide distilled off, and the residue crystallised from methyl alcohol. *Alstyrine methiodide* (2·9 g.) was thus obtained in yellow prismatic needles, m. p. 221° (corr., decomp.) (Found : C, 57·4, 57·4; H, 6·25, 6·2; N, 6·7, 6·6; I, 31·0, 31·2; NMe, 6·9, 7·0. $C_{19}H_{22}N_2,CH_3I$ requires C, 57·1; H, 6·0; N, 6·7; I, 30·2; NMe, 6·9%. $C_{18}H_{20}N_2,CH_3I$ requires C, 56·1; H, 5·7; N, 6·9; I, 31·25; NMe, 7·15%).

Alstyrine methochloride, m. p. 242° (decomp.) (1·35 g.), was dissolved in water (25 c.c.), 1·0 g. of anhydrous sodium acetate, 0·13 g. of platinum oxide, and 25 c.c. of methyl alcohol added, and the mixture shaken with hydrogen. Absorption was rapid at first but became slow as the catalyst " balled " together owing to separation of the reaction product. More methyl alcohol was therefore added, and the reduction continued until the solution was colourless (8 days) (absorption about 270 c.c.). The catalyst was filtered off, the methyl alcohol evaporated, and the methine base extracted with ether after addition of sodium hydroxide. After evaporation of the ether, there remained a light orange-coloured, fusty-smelling oil (1·25 g.) which did not crystallise. It was boiled under reflux for 2½ hours with methyl iodide (5 c.c.), the excess of reagent distilled off, and the residue crystallised from methyl alcohol. *Alstyrine hydromethine methiodide* was thus obtained in rosettes of soft, colourless needles, m. p. 227°

(corr.) but 234° if heated quickly [Found: C, 56·5, 56·65; H, 7·05, 7·2; N, 6·55, 6·6; NMe, 14·7, 14·8. $C_{19}H_{27}N_2(CH_3)_2I$ requires C, 57·2; H, 7·6; N, 6·4; 2NMe, 13·2%. $C_{18}H_{25}N_2(CH_3)_2I$ requires C, 56·3; H, 7·3; N, 6·6; 2NMe, 13·6%]. The *methochloride*, m. p. 196—197°, forms soft colourless needles from dry alcohol [Found: C, 71·3, 71·1; H, 9·3, 9·2; N, 8·4, 8·35; Cl, 10·5, 10·6; NMe, 18·3, 18·1. $C_{19}H_{27}N_2(CH_3)_2Cl$ requires C, 72·3; H, 9·5; N, 8·0; Cl, 10·2; 2NMe, 16·6%. $C_{18}H_{25}N_2(CH_3)_2Cl$ requires C, 71·6; H, 9·3; N, 8·4; Cl, 10·6; 2NMe, 17·3%]. When shaken with platinum oxide and hydrogen in methyl-alcoholic solution, it absorbed but very little gas. The compound was therefore treated by Emde's method. The methochloride from 0·77 g. of methiodide was dissolved in water (5 c.c.), heated on a water-bath, and treated with 4% sodium amalgam (8 g.). An oil began to separate almost at once. After 2 hours, the mixture was extracted with ether and yielded an amber-coloured amorphous base (0·5 g.) which gave a light brown colour quickly changing to red with alcoholic vanillin and hydrochloric acid, and a reddish-brown coloration with Ehrlich's reagent. The base was treated with methyl iodide for 2½ hours on a water-bath, excess of the reagent distilled off, and the residue extracted with ether to remove a trace of unaltered base. The methiodide thus obtained was converted into methochloride, dissolved in water (2·5 c.c.), and heated on a water-bath for 4½ hours with 8 g. of 4% sodium amalgam, added gradually. No trimethylamine could be detected. The residue on extraction with ether gave a trace of oil (0·02 g.), which partly crystallised on addition of a drop of alcohol. It gave an immediate cherry-red coloration with Ehrlich's reagent and an orange-colour with vanillin–hydrochloric acid. The methochloride was recovered from the mother-liquors, treated with silver oxide, and the base heated on a water-bath in a current of hydrogen for an hour. No trimethylamine was evolved, and no tertiary base could be recovered from the liquor.

Degradation of Alstonine.—Alstonine methochloride (1·6 g.), from the methiodide (Part I, *loc. cit.*), was dissolved in methyl alcohol (65 c.c.) and reduced with platinum oxide and hydrogen. The catalyst was filtered off, washed well with methyl alcohol, and the filtrates evaporated. The residue was dissolved in water, basified, and *alstonine hydromethine base* extracted with ether. It crystallised from methyl alcohol in colourless prismatic needles, m. p. 182—183° (corr.) (0·35 g.) (Found: C, 71·75, 71·9; H, 6·9, 7·0; N, 7·6, 7·7; OMe, 9·2, 9·25; NMe, 7·5, 7·4. $C_{21}H_{23}O_3N_2{\cdot}CH_3$ requires C, 72·1; H, 7·2; N, 7·65; OMe, 8·5; NMe, 7·9%). *Alstonine hydromethine methiodide*, formed from the methine base by boiling with methyl iodide, separates from alcohol as rosettes of soft needles, m. p. 276° (corr., decomp.) [Found: C, 54·2, 54·3; H, 5·5, 5·6; N, 5·5, 5·5; OMe, 6·3, 6·3; NMe, 9·1, 7·15, 8·5, 7·6.* $C_{21}H_{23}O_3N_2,(CH_3)_2I$ requires C, 54·3; H, 5·75; N, 5·5; OMe, 6·1; 2NMe, 11·4%]. The corresponding methochloride (0·37 g.) was dissolved in water (10 c.c.), treated with platinum oxide, and shaken with hydrogen. The volume absorbed was only sufficient to reduce the catalyst. The solution was in turn treated with sodium acetate, sodium hydroxide, and hydrochloric acid, but no reduction took place in any case. The catalyst was replaced by palladium on charcoal, but practically no absorption of hydrogen was observed. After the catalyst had been filtered off, the solution was acidified and treated with potassium iodide. The precipitated *iodide* crystallised from methyl alcohol in pale cream-coloured, wart-like aggregates, m. p. 257° to a red froth (Found: C, 53·4, 53·2; H, 5·7, 5·6; N, 5·6, 5·4; OMe, 4·2, 4·2; NMe, 6 to 10%.* $C_{22}H_{27}O_3N_2I$ requires C, 53·4; H, 5·5; N, 5·7; OMe, 6·3; NMe, 5·9%). It was thought that this compound might be the hydriodide of alstonine hydromethine base, but a specimen of the latter, prepared from the base, crystallised in yellow rectangular prisms from alcohol, m. p. 262° (decomp.), and depressed the m. p. of the above iodide to 249°.

The author thanks Messrs. A. Bennett and H. C. Clarke for the micro-analyses.

THE WELLCOME CHEMICAL RESEARCH LABORATORIES,
LONDON, N.W. 1.

[*Received, July* 14*th*, 1938.]

* Consistent results for NMe could not be obtained with the two compounds denoted thus.