CVII.—*Studies of Dynamic Isomerism. Part V.*
Isomeric Sulphonic Derivatives of Camphor.

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IN the previous paper it has been shown that the reversible isomeric change which α -bromocamphor, α -chlorocamphor, and their β - and π -halogen derivatives undergo when a trace of alkali is added to their alcoholic solutions (Kipping, Proc., 1905, 21, 125) is accompanied by a marked increase in the concentration of the saturated solutions. Similar experiments are now described in the case of some twenty com-

pounds containing a sulphonic group; the majority of these belong to the Reychler or β -series (Armstrong and Lowry, *Trans.*, 1902, 81, 1441), only a few measurements of the π -sulphonic compounds being included for the sake of comparison. The methods adopted were identical with those previously used; the results, which are shown in a table, represent in almost every case the mean of a number of determinations, special care being taken to ensure that the solid α -compounds were initially free from the α' -isomerides. The solubility of the metallic sulphonates was determined in aqueous solutions to which ammonia was added; in the other cases, the solvent was alcohol of 99.5 per cent. strength and the alkali $N/500$ or $N/1000$ sodium ethoxide.

I. *Derivatives of Camphor- π -sulphonic Acid.*

The behaviour of the π -sulphonic compounds is relatively simple. Kipping has shown that the salts both of α -bromo- and of α -chloro-camphor- π -sulphonic acid undergo isomeric change in presence of a trace of free alkali. No evidence has been obtained of the formation of lactonic rings between the κ and π -positions, and the isomerism appears to be of the same simple character as in the case of bromo-camphor itself. By fractionally crystallising the hydrindamine salts, Kipping has isolated the acids in which the halogen occupies the α' -position (*Proc.*, 1905, 21, 293), and has thus solved the problem presented by this series of isomeric changes. The measurements now described were therefore made, not so much in order to secure additional information with reference to this group of compounds as to test the method of experiment and to determine to what extent the changes noted amongst the β -compounds were due to simple stereo-isomerism on the one hand, or to lactone formation on the other.

The most suitable salts for solubility measurements are the ammonium salts, the relatively small solubility of which is made use of in isolating the sulphonic acids of the π -series. The solubility of ammonium α -bromocamphor- π -sulphonate in water was found to be 18.57 per cent. at 20°, but repeated determinations of the density of the saturated solution showed that no increase of solubility followed the addition of ammonia or of traces of caustic soda. This unexpected result is not difficult to explain; it is clear that whatever alkali is added the free base in the solution can only be ammonia, and it is probable that its basic properties are so reduced by the presence of the ammonium salt (compare the use of ammonium chloride in analysis) that it is no longer able to promote isomeric change. In presence of a trace of sodium ethoxide, the solubility of the sulphonamide in alcohol showed a marked increase from 11.6 to 13.6 per cent.

in the ratio 0.853 : 1. Although this value is subject to a correction for the influence of the α' - on the solubility of the α -compound, it is probable that the introduction of negative groups in the series :

is accompanied by a progressive increase in the proportion of the α' -form.

Acetyl- α -bromocamphor- π -sulphonamide.—This compound was prepared by boiling α -bromocamphor- π -sulphonamide with acetic anhydride to which a trace of sulphuric acid had been added. When the mixture was diluted cautiously with alcohol and water and allowed to cool, small, brilliant crystals were slowly deposited. These melted at 199° and were found on analysis to consist of an acetyl derivative of the amide (0.1126 gave 0.0602 AgBr; Br = 22.76; $\text{C}_{12}\text{H}_{18}\text{O}_4\text{NBrS}$ requires Br = 22.70 per cent.) and not the anhydramide that was expected. It was noteworthy that the addition of a large bulk of water to solutions of this compound produced no immediate precipitation as in the case of the majority of camphor-compounds, crystallisation usually taking place only after the solution was cold. Solubility determinations showed no increase in the concentration of the saturated solution on the addition of alkali,* and it is therefore probable that the compound is the enolic acetyl derivative, $\text{C}_8\text{H}_{13}(\text{SO}_2\cdot\text{NH}_2) < \begin{array}{c} \text{CBr} \\ | \\ \text{C} \cdot \text{OAc} \end{array}$, and not the acetamide, $\text{C}_{10}\text{H}_{14}\text{BrO}\cdot\text{SO}_2\cdot\text{NHAc}$.

Measurable crystals were obtained from solutions in ethyl acetate, and gave the following figures :

FIG. 1.

System : Orthorhombic.

Axial ratios : $a : b : c = 1.778 : 1 : 1.254$.

Forms present : $a\{100\}$, $p\{011\}$, $q\{101\}$, $r\{110\}$.

* The alkali added amounted to 0.01—0.02 per cent., and appeared to increase the density by about 0.001.

Angles measured :

<i>rp</i> 110 : 011	(20)	47° 9'	(47° 4')	<i>pq</i> 011 : 101	(20)	59°20½'	—
<i>rr</i> 110 : 110	(2)	58°40'	(58°42')	<i>pp</i> 011 : 011	(6)	77°12'	(77° 9')
<i>aq</i> 100 : 101	(12)	54°46'	(54°49')	<i>qq</i> 101 : 101	(6)	70°27'	(70°21')
<i>rq</i> 110 : 101	(21)	73°36'	—	<i>pp</i> 011 : 011	(6)	102°48'	(102°51')
<i>ar</i> 100 : 110	(4)	60°40'	(60°39')	<i>pa</i> 011 : 100	(4)	89°59'	(90° 0')

II. *Derivatives of Camphor-β-sulphonic Acid.*

The isomerism of the β-sulphonic derivatives of camphor presents a far more complex problem than that of the π-derivatives, on account of the readiness with which ring-formation takes place between the β- and κ-positions (compare Armstrong and Lowry, *Trans.*, 1902, 81, 1441; Forster, *Trans.*, 1902, 81, 264).

Thus, in the case of the amides there may be formed in addition to the normal amide I and its anhydramide II, a lactam III and a lactone IV.

The simple sulphonamides yield either amide or anhydramide forms I and II, but there is evidence to show that the anilides may exist as hydroxylic lactams III and the piperidides as lactonic compounds IV. In the case of the α-bromo- and α-chloro-sulphonic compounds, each of these types may exist in stereoisomeric α- and α'-forms; in the case of the potassium salts which do not appear to form lactones this is probably the only isomerism which exists. The observations made with each type of compound may now be described.

1. *The Potassium Salts.*

The potassium salts of α-bromo- and α-chloro-camphor-β-sulphonic acids, unlike the ammonium salt referred to above, both showed a marked increase in solubility on the addition of a trace of ammonia to the saturated aqueous solution. In the case of the α-bromo-salt, which showed an increase of solubility from 26.6 to 32.3 per cent., experiments were made in order to ascertain the probable influence of the α'-salt on the solubility of the α-isomeride. The solubility of the αβ-salt was therefore also determined in solutions which already contained 6.40 and 6.50 per cent. of the απ-isomeride; in each case, the increase in concentration was greater than that due to the added π-salt, the total concentration of solute being 33.45 and 33.80 per cent. and the increase 6.9 and 7.2 per cent. respectively.

Thus, of the observed increase in concentration, only about eleven-twelfths is to be attributed to the added isomeride, the remaining one-twelfth being due to the increased solubility of the α -salt. If the same correction be applied in order to allow for the influence of the α/β - on the solubility of the $\alpha\beta$ -salt, it is probable that the solubility ratio 0.817 represents a proportion 0.832, or 83 per cent. of the α -salt in the solution. In the case of the chloro-salt, the solubility increases from 17.9 to 20 per cent., ratio 0.890, and there is perhaps 90 per cent. of the α -salt in the solution.

It will be noticed that in each case the increased concentration resulting from the addition of alkali is accompanied by a decrease in the rotatory power of the solution; the products of isomeric change are thus evidently *lævorotatory*.

It may further be pointed out that the increased solubility now observed in these salts affords the clearest proof which has yet been obtained that the sulpho-group in the Reychler series of acids does not occupy either of the α -positions, and that the formation of β -bromocamphor from camphorsulphobromide does not depend on a transference of bromine from an α - to the β -position (Trans., 1902, 81, 1445).

2. Amides and Anhydramides.

In the paper in which his camphor sulphonic acid was first described (*Bull. Soc. chim.*, 1898, iii, 19, 120), Reychler stated that two amides were formed by the action of ammonia on the sulphochloride. These were subsequently shown to be convertible under the action of hydrobromic acid, and were at first thought to be stereoisomerides (Armstrong and Lowry, Proc., 1901, 17, 182), but it was subsequently shown by analysis that, although both compounds crystallise unchanged from acetic anhydride, the substance of higher melting point is actually an anhydramide formed by the removal of a molecule of water from the amide (Armstrong and Lowry, Trans., 1902, 81, 1444). The solubility determinations recorded in the table disclosed the remarkable fact that camphor sulphonamide, although thus not affected by boiling with acetic anhydride, is rapidly and completely dehydrated by $N/500$ NaOEt in a cold alcoholic solution, a quantitative conversion into the anhydramide being effected in the course of a few hours at 20°. This was shown not only by the changed melting point of the solid, but also by the complete identity of the alkaline solutions; the slight increase produced by the alkali in the concentration of the saturated solution of the anhydramide is not due to any reverse action, but may be attributed wholly to the sodium ethoxide which was added.

This method of producing the anhydramide is very suggestive.

Lapworth has shown (Trans., 1904, 85, 30) that the velocity of bromination of ketones is directly dependent on the rate at which the ketone is converted during the experiment into the enolic isomeride. The present experiments show clearly that the conversion of camphorsulphonamide into the anhydramide is not a mere case of dehydration, but probably proceeds by means of an intermediate enolic form, the formation of which is favoured by the addition of alkalis, and to a less extent by the addition of acids.

In the case of the π -amide, acetic anhydride in the presence of acid actually causes the action to proceed as far as the formation of an enolic acetate, but the $-\text{SO}_2 \cdot \text{NH}_2$ group is too far removed to take part in the condensation.

No such abnormal behaviour was observed in the case of the β -sulphonamides derived from α -chloro- and α -bromo-camphor. These showed, on the addition of alkali, a regular increase of solubility, comparable with, though somewhat larger than, that observed in the case of bromocamphor- π -sulphonamide. No separation of anhydramide took place from the solutions, and there is no evidence to show that the solutions contain anything but the stereoisomeric α - and α' -halogen-sulphonamides.

In the case of the α -bromo- β -sulphonamide, experiments were made to determine the probable influence on its solubility of the α' -isomeride in the solution. Two series of measurements were made of the solubility of the β -sulphonamide in alcohol, which already contained 1 per cent. of the isomeric π -sulphonamide; in each case, the solubility was raised to 3.10 per cent., an increase of 1.10 per cent., of which 1 per cent., or ten-elevenths of the whole, was due to the added π -sulphonamide and 0.10 per cent., or one-eleventh, to the increased solubility of the β -sulphonamide. In this case, therefore, in spite of the small solubility of the substance, there is a slight increase of solubility in presence of an isomeride. If the same correction be applied to the solubility of α -bromocamphor- β -sulphonamide in presence of the α' -isomeride, the solubility ratio 0.641 would represent a proportion 0.673, or approximately two-thirds of the α -form in the solution. In the case of the α -chlorosulphonamide, the solubility ratio 0.721 probably corresponds to a proportion 0.74 to 0.75, or roughly three-quarters of the α -form in the solution.

A long series of experiments showed that a small but definite increase of solubility is brought about by the action of alkali on the anhydramides derived from α -chlorocamphor and from α -bromocamphor; in the former case, the solubility increases from 1.28 to 1.56 per cent. in the ratio 0.820 : 1, and in the latter case from 2.51 to 2.71 per cent. in the ratio 0.926 : 1. The displacement of the ketonic oxygen by nitrogen therefore does not prevent isomeric change, although it greatly reduces the proportion of the isomeride which is formed in the solution. No increase of solubility was observed in the simple

anhydramide, $\begin{array}{c} \text{C}_8\text{H}_{13} \diagup \text{CH}_2 \\ | \quad | \\ \text{SO}_2 - \text{C} \\ | \\ \text{N} \end{array}$, nor in the dibromoanhydramide,

$\begin{array}{c} \text{C}_8\text{H}_{13} \diagup \text{CBr}_2 \\ | \quad | \\ \text{SO}_2 - \text{C} \\ | \\ \text{N} \end{array}$, and the increase now recorded must therefore be ascribed, as in previous cases, to a reversible stereoisomeric change.

It may be noted that, in the case of the monohalogen compounds, an intermediate isomeride of the enolic type is still possible, thus :

3. Anilides.

The anilides of this series were examined in the hope that, since direct anhydramide formation is no longer possible, they would exhibit the simple stereoisomeric change characteristic, for instance, of α -bromocamphor- π -sulphonamide. Preliminary experiments showed that the anilides were too soluble readily to be purified or used for solubility measurements. *p*-Bromoanilides were therefore prepared from α -bromo- and α -chloro-camphorsulphonic acids. It was accidentally discovered that these were soluble in alkalis, a property which was shared by the simple anilides derived from α -bromo- and from α -chloro-camphor, but not to any marked extent by the anilide or *p*-bromoanilide derived from camphor itself. The alkaline solutions are quite stable, but the anilides are precipitated as a curdy mass on the addition of acids. This solubility in alkalis appears to be an altogether exceptional property, and is best explained by supposing that the α -substituted anilides are capable of yielding sodium salts derived from the hydroxylic lactam :

It is not easy to decide whether the anilides are themselves lactams or not.

(1) No evidence has been obtained of mutarotation in freshly-prepared solutions of the anilides, nor after the addition of acetic acid to an alcoholic solution of the sodium salt; it is therefore probable that the solution contains only a single form of the substance and not a mixture of isomerides in equilibrium.

(2) The marked difference in rotatory power between the anilide and its sodium salt suggests that they are perhaps differently constituted, the sodium salt only having the lactam structure. A solution of chlorocamphor-*p*-bromoanilide gave $[\alpha]_D +73.6^\circ$ in neutral solution, $+39.5^\circ$ in presence of 0.8 equivalents of sodium ethoxide, and $+29.2^\circ$ only in presence of an excess, 1.3 equivalents of alkali.

(3) The fact that the camphorsulphonanilides do not yield sodium salts supports the view that the anilides are not themselves lactams; it is clear that ring-formation does not take place readily, and it is therefore unlikely that the α -substituted anilides should, in the absence of alkalis, pass spontaneously into the lactam form.

(4) Although soluble to a considerable extent in alkalis, the anilides dissolve only slowly, and behave as if the dissolution involved some change beyond the mere neutralisation of an acid by a base; their behaviour suggests, in fact, that they are pseudo-acids (Hantzsch), that is, neutral compounds which only become acid after undergoing isomeric change.

(5) The *p*-bromoanilides derived from α -bromo- and from α -chloro-camphor do not show any increase of solubility on the addition of a trace of alkali. This might be attributed to the neutralisation of the alkali by the anilide, in which case the anilides might be compared with the sulphonic acids, which undergo change only in presence of a quantity of alkali in excess of that required for neutralisation. The observations recorded above show, however, that no marked alteration of rotatory power follows the addition of an excess of alkali to the sodium salt. The case appears, therefore, to be similar to that of nitrocamphor, in which the formation of a salt affords an alternative to, and thus effectually prevents, enolisation.

In view of the fact that the anilides derived from α -bromo- and α -chloro-camphor show no increase of solubility in presence of alkalis, it is somewhat remarkable that those derived from camphor show a distinct change. Although the increase in concentration amounts only to 0.1 per cent., it was clearly established by some thirty-five measurements of the solubility of the anilide and of the *p*-bromoanilide. Various possibilities of isomeric change might be suggested, but there is not sufficient evidence to permit of any definite conclusion as to the nature of the change which takes place.

α -Chlorocamphor- β -sulphonanilide melts at 97° , has specific rotation $[\alpha]_D +79^\circ$ (in alcohol), and is reduced by zinc dust and acetic acid to camphorsulphonanilide, melting at 119° . The partially purified material was decolorised by dissolving in alkali, filtering, and precipitating with acids. Like the α -bromo-compound, it crystallises from alcohol in a dense mass of felted needles.

α -Chlorocamphor- β -sulpho-*p*-bromoanilide (0.2145 gave 0.1686 AgCl + AgBr, Cl + Br = 27.39; $C_{16}H_{19}O_3NClBrS$ requires Cl + Br = 27.44 per cent.) melts at 115° . It was purified by dissolving in alkali and precipitating with acid; the curdy mass was obtained in a crystalline form by covering it with cold methyl alcohol, in which it quickly dissolved and separated again in crystals in the course of a few minutes. It was further purified by crystallising from alcohol, from which it separates in rectangular tablets with truncated edges. It was reduced by zinc dust and acetic acid to the camphor- β -sulpho-*p*-bromoanilide melting at 167° .

α -Bromocamphor- β -sulpho-*p*-bromoanilide (0.1625 gave 0.1321 AgBr, Br = 34.6; $C_{16}H_{19}O_3NBr_2S$ requires Br = 34.4 per cent.), prepared from bromocamphorsulphochloride and *p*-bromoaniline and from bromocamphorsulphonanilide and bromine, melts at 95° and resembles the preceding compound.

4. Piperidides.

The existence of isomeric piperidides derived from camphorsulphonic acid has already been clearly established (Armstrong and Lowry, *Trans.*, 1902, 81, 1449), but at that time only a single α -bromopiperidide could be prepared, namely, that derived from the camphor-piperidide of high melting point. In the course of the present investigation it was found that when the α -bromopiperidide was prepared by the Schotten-Baumann method, using aqueous piperidine instead of an ethereal solution, an isomeric compound of low melting point was produced. It is probable that in the Schotten-Baumann method of preparation the interaction proceeds normally, giving rise to the true piperidide I; in ethereal solution, the piperidine probably combines with the carbonyl group, hydrogen chloride is subsequently eliminated, and the piperido-lactone II is produced.

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The conclusion thus arrived at, that the compounds of low melting point are the true piperidides, whilst the high melting compounds are piperido-lactones, is in accord with the rise of melting point which accompanies ring formation when the amides are converted into anhydramides.

Both bromopiperidides show a marked increase of solubility in presence of alkalis, the ratio of the initial to the final solubility being 2:3 approximately in each case. This increase, which does not occur in the case of camphor piperido-lactone, must be attributed to stereo-isomeric change, and probably involves the opening of the lactone ring. It should be noted that whilst both bromopiperidides are readily converted into isodynamic stereoisomerides, they are not convertible into one another either by the action of acids or of alkalis. Owing to the small quantity of pure material available, the densities and rotatory powers of the saturated solutions were not determined.

Camphor-β-sulphopiperidide, provisionally described (*loc. cit.*) as *iso-camphorsulphopiperidide* (?), melts at 56°.

Camphor-β-sulphopiperidolactone, provisionally described as *camphor-sulphopiperidide* (?), melts at 140°.

α-Bromocamphor-β-sulphopiperidide (0.2958 gave 0.1479 AgBr, Br = 21.28; C₁₅H₂₄O₃NBrS requires Br = 21.14 per cent.) melts at 75° and crystallises from alcohol, or, when pure, from light petroleum. From the latter solvent it separates in small, orthorhombic prisms, *a* : *b* : *c* = 1.112 : 1 : 1.095.

FIG. 2.

<i>rr</i> 101 : 10 $\bar{1}$	(12)	90°52'	—	<i>qq</i> 011 : 01 $\bar{1}$	(6)	84°47'	—
<i>rr</i> 101 : $\bar{1}$ 01	(12)	89° 9'	(89° 8')	<i>qq</i> 011 : 0 $\bar{1}$ 1	(6)	95°15'	(95°13')
<i>qr</i> 011 : 101	(2)	61°30'	(61°18')	<i>rq</i> 101 : 0 $\bar{1}$ 1	(2)	118°41'	(118°42')

α-Bromocamphor-β-sulphopiperidolactone, formerly described as *α-bromocamphorsulphopiperidide*, melts at 123°.

Summary.—(1) In continuation of the work described in the previous paper, measurements have been made of the solubility of twenty sulphonic derivatives of camphor in neutral and alkaline solutions.

(2) The amide of bromocamphor- π -sulphonic acid, an acid which has been shown by Kipping to undergo stereoisomeric change in presence of a trace of free alkali, increases in solubility from 11.6 to 13.6 per

Substance.	Solubility.			Density.		α_D (2-dm. tube).		$[\alpha]_D$.	
	<i>a.</i>	<i>b.</i>	Ratio.	<i>a.</i>	<i>b.</i>	<i>a.</i>	<i>b.</i>	<i>a.</i>	<i>b.</i>
Ammonium α -bromocamphor- π -sulphonate	18.57	—	—	1.0632	1.0635	23.64°	—	75.1°	—
α -Bromocamphor- π -sulphonamide	11.61	13.60	0.853	0.834	0.836	18.71	20.94°	67.2	65.1°
Acetyl- α -bromocamphor- π -sulphonamide	2.95	2.98	—	0.801	0.803	4.33	—	92.0	—
Potassium α -bromocamphor- β -sulphonate	26.56	32.28	0.817	1.1033	1.1217	42.33	41.53	72.1	57.3
„ α -chlorocamphor- β -sulphonate	17.92	20.14	0.890	1.0612	1.0681	19.94	18.80	49.6	43.7
Camphor- β -sulphonamide	4.30	0.49	—	0.803	0.794	1.56	0.29	23.0	—
Camphor- β -sulphonanhydramide	0.46	0.48	—	0.793	0.793	— 0.31	— 0.34	— 45.0	—
α -Chlorocamphor- β -sulphonamide	3.05	4.23	0.721	0.802	0.807	3.68	4.07	75.0	59.0
α -Bromocamphor- β -sulphonamide	2.00	3.12	0.641	0.799	0.804	2.81	3.99	89.0	79.0
α -Chlorocamphor- β -sulphonanhydramide	1.28	1.56	0.820	0.795	0.796	0.79	0.71	39.0	—
α -Bromocamphor- β -sulphonanhydramide	2.51	2.71	0.926	0.800	0.803	5.40	5.46	134.0	—
$\alpha\alpha'$ -Dichlorocamphor- β -sulphonanhydramide	0.92	—	—	0.793	—	— 0.01	—	—	—
$\alpha\alpha'$ -Dibromocamphor- β -sulphonanhydramide	0.49	0.44	—	0.792	0.793	+ 0.21	—	—	—
Camphor- β -sulphonanilide	7.44	7.54	0.988	0.8118	0.8124	3.31	3.32	27.4	—
Camphor- β -sulpho- <i>p</i> -bromoanilide	1.35	1.44	0.938	0.7954	0.7964	0.47	0.44	21.4	—
α -Chlorocamphor- β -sulpho- <i>p</i> -bromoanilide	6.55	6.58	—	0.8161	0.8166	7.86	—	73.6	—
α -Bromocamphor- β -sulpho- <i>p</i> -bromoanilide	15.53	15.57	—	—	—	—	—	209.0	—
Camphor- β -sulphopiperidolactone	0.58	0.60	—	0.792	0.793	—	—	—	—
α -Bromocamphor- β -sulphopiperidolactone	2.64	3.90	0.677	—	—	—	—	—	—
α -Bromocamphor- β -sulphopiperidine	18.4	27.7	0.664	—	—	—	—	—	—

(a) Neutral solution.
(b) Alkaline solution.

cent. in the ratio 0·853:1 when alkali is added to the alcoholic solution. An acetyl derivative prepared from the sulphonamide shows no increase, and is therefore formulated as the enolic acetate,

(3) The potassium salts of α -bromocamphor- and α -chlorocamphor- β -sulphonic acids show a marked increase of solubility when ammonia is added to the aqueous solutions, and therefore (like the isomeric π -acids) exist in stereoisomeric forms; the α' -salts are levorotatory.

(4) In presence of a trace of sodium ethoxide camphor- β -sulphonamide is converted quantitatively in cold alcoholic solution into the anhydramide; this is remarkable, as the amide crystallises unchanged from boiling acetic anhydride.

(5) The β -sulphonamides of bromocamphor and chlorocamphor, like the π -compound, show an increased solubility in alkaline solution owing to stereoisomeric change, but are not converted into anhydramides.

(6) The β -sulphonanilides derived from bromocamphor and chlorocamphor are soluble in alkalis, owing probably to the formation of

salts derived from the isomeric lactam, for example, $\text{C}_8\text{H}_{13} \begin{array}{c} \text{CHBr} \\ | \\ \text{C} \cdot \text{ONa} \\ | \\ \text{SO}_2 - \text{N} \cdot \text{C}_6\text{H}_5 \end{array}$

Owing to the formation of these compounds, the anilides are not converted into stereoisomerides by the action of alkalis. Three new anilides are described.

(7) Isomeric piperidides derived from bromocamphor- β -sulphonic acid are described, corresponding with those prepared from camphor-sulphonic acid. These are formulated as the piperidide and piperido-

lactone, $\text{C}_5\text{H}_{10}\text{N} \cdot \text{SO}_2 \cdot \text{C}_8\text{H}_{13} \begin{array}{c} \text{CHBr} \\ | \\ \text{CO} \end{array}$ and $\text{C}_8\text{H}_{13} \begin{array}{c} \text{CHBr} \\ | \\ \text{C} \cdot \text{NC}_5\text{H}_{10} \\ | \\ \text{SO}_2 - \text{O} \end{array}$; both

compounds undergo stereoisomeric change in presence of alkalis.

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