isomorphous crystals of triselenium di-*p*-toluenesulphinate. Work on the latter structure is in progress.

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The Structure of Triclinic Barium Pentathionate Dihydrate

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The isolation of two crystalline modifications of barium pentathionate dihydrate, *viz.*, one orthorhombic, space group $D_{2h}^{16}-Pnma$ with $Z = 4$, and one triclinic, was reported two years ago[1]. The structure of the orthorhombic crystals has later been published in detail[2], and a preliminary account of the structure of the triclinic dimorph is given below.

The unit cell dimensions of triclinic barium pentathionate dihydrate, $BaS(S_2O_3)_2 \cdot 2H_2O$, are: $a = 5.00$ Å, $b = 10.36$ Å, $c = 11.53$ Å, $\alpha = 109°$, $\beta = 98°$, $\gamma = 90°$. There are two molecules per unit cell, and the space group is $C_i^1-P\bar{1}$. The intensities of the $0kl$ and $h0l$ reflections were estimated visually from zero layer Weissenberg photographs taken with CuK radiation, and the structure was solved through Patterson and Fourier projections along the a and b axes, using in the initial stages the heavy atom technique. The $0kl$ Fourier map is shown in Fig. 1. The atomic coordinates, in fractions of corresponding cell edges and referring to the triclinic axes, are:

	x	y	z
Ba	0.749	0.211	—0.104
S_1	0.755	0.077	0.186
S_2	0.808	0.225	0.366
S_3	0.564	0.381	0.359
S_4	0.808	0.542	0.366
S_5	0.755	0.554	0.186
O_1	0.462	0.070	0.158
O_2	0.920	—0.031	0.210
O_3	0.874	0.140	0.108
O_4	0.462	0.551	0.158
O_5	0.920	0.676	0.210
O_6	0.874	0.432	0.108
$(H_2O)_1$	0.253	0.250	0.007
$(H_2O)_2$	0.603	0.131	—0.363

With a temperature factor of $B = 2.2$ Å^2, the reliability factor, $R = 0.18$ and 0.19, respectively, for the $0kl$ and $h0l$ reflections. The coordinates give the following dimensions of the sulphur chain, $S_1-S_2 = 2.12$ Å, $S_2-S_3 = 2.04$ Å, $S_3-S_4 = 2.04$ Å, $S_4-S_5 = 2.10$ Å (all ± 0.04 Å), $\angle S_1S_2S_3 = 107°$, $\angle S_2S_3S_4 = 107°$, $\angle S_3S_4S_5 = 106°$ (all ± 3°), and the dihedral angles, $S_1S_2S_3/$

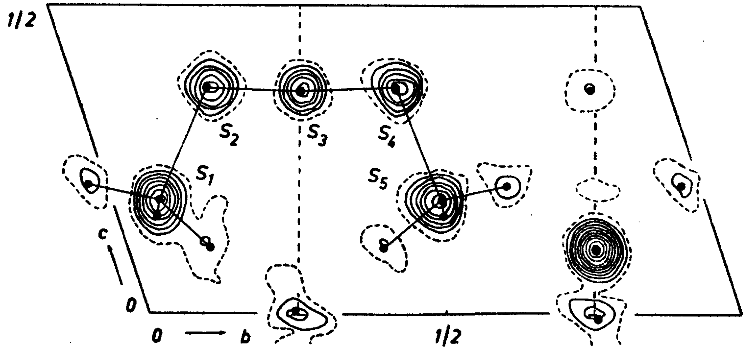

Fig. 1. Electron density projection of triclinic $BaS(S_2O_3)_2 \cdot 2H_2O$ *along the* a *axis. The atomic positions are marked with dots, and lines are drawn to show the outline of the pentathionate ion. The 5-electron line is dashed. Contour intervals: 10 e · Å^{-2} for the barium ion, and 4 e · Å^{-2} for sulphur and oxygen atoms and water molecules.*

$S_2S_3S_4$ = 107° and $S_2S_3S_4/S_3S_4S_5$ = 106°. The slight differences between these values and those reported earlier [2] for the orthorhombic structure, are within the experimental errors.

The triclinic and orthorhombic crystals both have a layer structure, and show a corresponding perfect cleavage along the c plane. The thickness of the layers are, d_{001} = 10.78 Å and half the orthorhombic c axis, *viz.*, 10.89 Å, respectively. Within the probable errors of the structure determinations, the atomic arrangement *within* the layers is the same in the two crystals. The orthorhombic space group requires a mirror plane of symmetry to pass through the barium ion and the middle sulphur atom of the pentathionate chain. Although not crystallographically required, a mirror plane of symmetry is actually present in the layers of the triclinic crystals, and is depicted through broken lines in Fig. 1. The plane is normal to, and passes through, the b axis at $z = 0$, $y = \frac{1}{4}$ and $\frac{3}{4}$, as in the orthorhombic crystals, and through the same atoms. The orthorhombic and triclinic modifications differ only in the arrangement of the layers relative to each other.

A detailed account of the structure will be published later.

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Plant Growth Regulators I.

1- and 2-Naphthylmethylarsonic Acids

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In order that a substance may exhibit auxin activity it must, among other things, have an unsaturated ring system and an acidic side chain. Hitherto mostly synthetic plant hormones with a carboxyl group have been investigated. Following a suggestion by Professor A. Fredga the author has started an investigation on aromatic arsonic acids which, if physiologically active, will be of interest stereochemically and in interpreting the growth regulating mechanism.

The 1-naphthylmethylarsonic acid (I) and the 2-naphthylmethylarsonic acid (II) were prepared according to the general procedure outlined by Quick and Adams [1]. The yields were very low but can certainly be increased. All analyses for arsenic were performed by the method described by Ramberg and Sjöström [2] and the titrimetric determinations in accordance with a method by King and Rutterford [3].

The biological activity is being investigated by Dr. Börje Åberg, who has kindly reported some preliminary results. Both acids show in different tests a conspicuous anti-auxin effect [4].

Experimental. 1-Naphthylmethylarsonic acid was prepared from 1-naphthylmethylchloride following the method given for benzylarsonic acid by Quick and Adams [1]. Colourless needles. M. p. 142—144° (decomposition). Calc. for $C_{11}H_{11}O_3As$ (266.1): C 49.6; H 4.17; As 28.2; equiv. wt. 133.1. Found: C 49.9; H 4.13; As 28.1; equiv. wt. 132.9.

2-Naphthylmethylarsonic acid was prepared in the same way from 2-naphthylmethyl bromide. Colourless plates. M. p. 159—161° (decomposition). Found: C 50.0; H 3.99; As 28.0; equiv. wt. 133.8. Calc. for $C_{11}H_{11}O_3As$ (266.1): C 49.6; H 4.17; As 28.2; equiv. wt. 133.1.

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Halogenated Guaiacoxyalkylcarboxylic Acids of Plant Physiological Interest

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If the ether linkage in aryloxyalkylcarboxylic acids (I) is replaced by S, NH or CH_2 the plant growth-regulating activity is decreased [1,2]. This type of