References.

[1] Schriften Ges. naturf. Freunde, Berlin, 1792, vol. 10, p. 368.
[2] Mineralogische Tabellen, Berlin, 1800, pp. 50, 77.
[3] System of Mineralogy, 5th edn, 1868, p. 591.
[4] B. Mason and C. J. Vitaliano, Min. Mag., 1955, vol. 30, p. 102.
[5] Some bismuth bromide also passed into the distillate.
[6] See, for example, E. V. Shannon, Econ. Geol. (Chicago), 1920, vol. 15, pp. 92, 93.
[7] B. Mason and C. J. Vitaliano, loc. cit.

Cahnite from Capo di Bove, Rome.

CAHNITE, $Ca_2B(OH)_4AsO_4$, is the textbook example of a mineral crystallizing with point symmetry $\bar{4}$ and is thus better known than its rarity would suggest. The type locality is Franklin, New Jersey (Palache and Bauer, 1927), and the Klodeborg mine, Arendal, Norway (Bügge, 1952), is the only other recorded locality; cahnite is the last-formed mineral at both places.

A specimen labelled 'Gismondite, Capo di Bove, near Rome, Italy' was obtained by F. N. Ashcroft in 1906 from J. R. Gregory and Co. and later presented to the British Museum (Natural History) with the identity of the gismondine queried. My optical examination showed the refractive indices (ω 1·662) to be much too high for a zeolite, and that the mineral was probably cahnite; because the paragenesis is so unexpected, the identification has been confirmed by X-ray powder photograph and qualitative chemical analysis. The specimen, B.M. 1914, 339, a dark grey leucitic lava, has on one side part of a cavity lined with rounded aggregates of glassy phillipsite and a few white hemispheres of chabazite. Parts of the cavity, between the zeolites, are coated with a thin drusy layer of calcite on which are several dozen flattened sphenoids of cahnite. The crystals are clear and glassy, and of fairly uniform size (about $\frac{1}{3}$ mm.); the habit is dominated by slightly curved faces of $\{111\}$, the corners of the sphenoids being truncated by much smaller faces of $\{\bar{1}11\}$ (indices of Palache), and I have not seen any other form. None of the crystals examined was truly single, even when there were no external traces of another individual, but at the same time no true twin was observed goniometrically; between crossed nicols the extinction positions of the components differ by 1–2°. Despite careful searching, I have found no cahnite on other similar specimens in the Museum from Capo

TABLE I. X-ray powder data for cahnite from Franklin, New Jersey (B.M. 1918, 283). Camera diam. 114·6 mm., Cu-Kα radiation. Cu-Kα_2 lines have been omitted.

d, *Å.*	I/I_0	*hkl*	$\sin^2\theta$ (*obs.*)	$\sin^2\theta$ (*calc.*)	*d*, *Å.*	I/I_0	*hkl*	$\sin^2\theta$ (*obs.*)	$\sin^2\theta$ (*calc.*)
5·02	20	110	0·0235	0·0236	1·108	7	424	0·4834	0·4834
4·67	20	101	0·0272	0·0273	1·090	1	541	0·4987	0·4987
3·56	**100**	**200**	0·0469	0·0472	1·055	1	622	0·5329	0·5333
3·10	2	002	0·0618	0·0620	1·043	1	631	0·5453	0·5458
2·833	19	211	0·0741	0·0745	1·035	1	514	0·5540	0·5541
2·640	**48**	**112**	0·0854	0·0856	1·015	1	613	0·5752	0·5754
2·514	15	220	0·0941	0·0944	1·011	2	116	0·5808	0·5809
2·336	17	202	0·1090	0·1092	0·9845	3	640	0·6120	0·6128
2·249	13	310	0·1175	0·1180	0·9748	2	444	0·6243	0·6248
2·215	15	301	0·1212	0·1218	0·9635	1	721	0·6391	0·6401
1·986	4	103	0·1508	0·1514	0·9548	9	712	0·6508	0·6512
1·951	5	222	0·1561	0·1565	0·9400	1	604	0·6714	0·6720
1·879	10	321	0·1684	0·1690	0·9369	3	316	0·6759	0·6752
1·818	**52**	**312**	0·1798	0·1801	0·9080	3	624	0·7196	0·7191
1·777	10	400	0·1882	0·1889	0·8993	1	651	0·7336	0·7344
1·733	3	213	0·1978	0·1986	0·8919	4	406	0·7458	0·7459
1·676	1	330	0·2116	0·2125	0·8870	1	800	0·7541	0·7542
1·660	5	411	0·2155	0·2162	0·8811	1	723	0·7642	0·7639
1·590	10	420	0·2354	0·2361	0·8777	1	107	0·7701	0·7704
1·558	2	303	0·2453	0·2458	0·8712	1	811, 741	0·7818	0·7815
1·540	2	402	0·2504	0·2509	0·8645	1	426	0·7939	0·7931
—	1	114	—	0·2717	0·8603	3	820	0·8016	0·8014
1·473	11	332	0·2738	0·2745	0·8488	1	615	0·8234	0·8231
1·427	3	323	0·2920	0·2930	0·8418	1	714	0·8372	0·8370
1·420	6	204	0·2950	0·2954	0·8363	1	660	0·8483	0·8485
1·412	3	422	0·2981	0·2981	0·8302	3	644	0·8609	0·8605
1·394	3	510	0·3061	0·3069	0·8284	6	307	0·8645	0·8647
1·386	3	501, 431	0·3099	0·3106	0·8253	1	545	0·8710	0·8702
1·318	8	224	0·3422	0·3426	0·8231	1	831	0·8756	0·8758
1·281	2	521	0·3570	0·3578	0·8094	2	813	0·9055	0·9054
1·272	11	512	0·3679	0·3690	0·8040	1	635	0·9179	0·9174
1·256	2	440	0·3763	0·3778	0·7980	1	734	0·9317	0·9312
1·219	2	530	0·3999	0·4014	0·7970	5	752	0·9341	0·9340
1·183	3	600	0·4239	0·4243	0·7932	4	840	0·9429	0·9428
1·166	4	404	0·4360	0·4363	0·7866	6	417	0·9589	0·9590
1·153	1	215	0·4460	0·4460	0·7836	1	910	0·9663	0·9664
1·148	1	611	0·4512	0·4515	0·7821	1	901	0·9698	0·9701
1·132	7	532	0·4625	0·4626	0·7771	1	606	0·9825	0·9816
1·122	6	620	0·4708	0·4714	0·7732	1	008	0·9922	0·9908

di Bove, from Vallerano, from Acquacetosa, or from Casale di Mostacciano; Mr. A. W. G. Kingsbury has examined Capo di Bove specimens in the Oxford University Museum, but without success. There seems little doubt of the locality, although details of the actual collecting are unknown, and the occurrence is the more interesting in the absence of other boron and arsenic minerals.

X-ray examination shows that the powder pattern is identical with that of cahnite from Franklin, New Jersey, for which data are given in table I, and shows a very striking resemblance to that of xenotime, YPO_4. This resemblance suggests that the structure of cahnite is that of zircon (with which xenotime is isostructural), with Ca occupying Zr positions and alternating $B(OH)_4$ and AsO_4 tetrahedra in the SiO_4 positions. This arrangement results in a point symmetry of $\bar{4}2m$ unless the tetrahedral groups are slightly rotated about the *c*-axis from their positions in the zircon structure. A qualitative comparison of approximate structure factors calculated on this assumption with intensities obtained from the powder photograph shows that the suggested structure is reasonable. The space group is $I\bar{4}$, as determined from the observed point symmetry (Palache, 1941) and systematically absent reflections with $h+k+l$ odd. Cell dimensions derived by a modified Nelson–Riley extrapolation are $a = 7{\cdot}0952 \pm 0{\cdot}0015$, $c = 6{\cdot}1904 \pm 0{\cdot}003$ Å. Cell contents are thus $2[Ca_2B(OH)_4AsO_4]$, and the structure cell has twice the volume of the morphological cell (transformation: Palache and Bauer to new, $[1\bar{1}0/110/001]$). Adopting the new setting, cahnite and xenotime have comparable morphology when the difference in symmetry is taken into account, and both have a {100} cleavage.

I wish to thank Mr. D. L. Williams for taking the photographs, Miss E. E. Fejer for measuring the films and calculating the results, and Dr. R. J. Davis for a method of obtaining cell dimensions using all the high-angle data.

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Note. Results of an accurate structure determination of cahnite have now been reported at the Fifth International Congress of the International Union of Crystallography by C. T. Prewitt and M. J. Buerger, and my proposed structure is in substantial agreement with theirs. I have also been informed by Dr. C. M. Gramaccioli that building operations at Capo di Bove have made the quarries inaccessible for collecting.