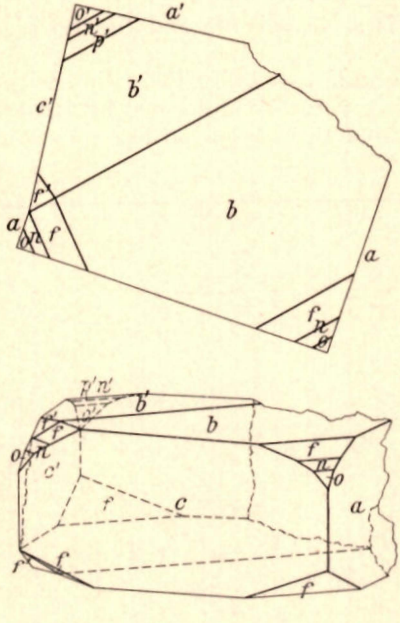
Art. XLVII.—*Anhydrite Twin from Aussee;* by F. Bascom and V. Goldschmidt.

The subject of this paper is a twin crystal, obtained from F. Krantz in Bonn by Mr. R. Schroeder.

Description of Crystal.—The crystal is colorless and transparent. Its dimensions are $15^{mm} : 13^{mm} : 5^{mm}$. A twinning plane divides the crystal into two nearly equal parts. Figure 1 shows both a top-view of the crystal, projected upon the plane $b = 0\infty$ (010) of Goldschmidt's Winkeltabelle (WT),* and also the crystal in perspective; figure 2 is a gnomonic projection of the same with a similar orientation.

1



Combination.—The forms present on the crystal are the following:

a	*b*	*c*	(*r*)	*o*	*n*	*f*	*p*	
0	0∞	$\infty 0$	10	1	12	13	15	(WT)
$\infty 0$	0	0∞	∞	1	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{5}$	(projection on *b*)

Of these forms *r* appears only as the twinning plane and

* WT means here and in the following,—V. Goldschmidt, Krystallographische Winkeltabelle, 1897.

constitutes the plane of contact for the two individuals. $p = 15(151)$ is a new form for anhydrite. It appears on the smaller individual with a well defined face and occupies the place of the plane f, which, though present on the larger individual, is missing on the smaller.

The face gives a fair signal and the form was determined by the following measurements:

Measured: $\phi\rho = 41° 57' : 16° 23'$
Calculated: " $= 41° 45' : 16° 42'$

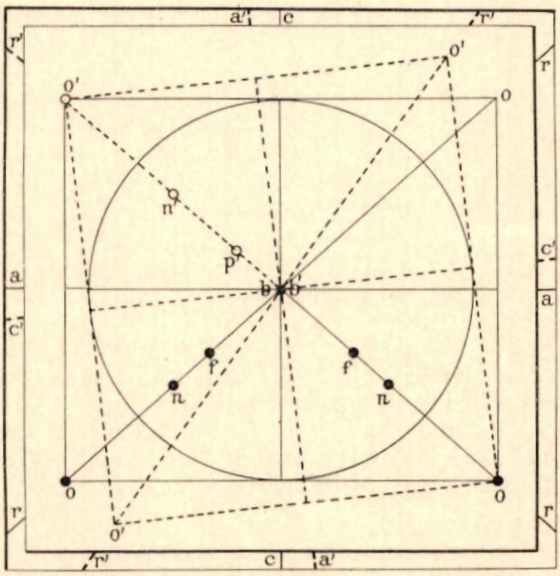
Not only is the agreement between the measured and calculated angles assuring, but the form fits perfectly into the series, as is shown by the following discussion:

	r	o	n	f	p^*	b
$pq =$	10	1	12	13	15	$0\,\infty$
$q =$	0	1	2	3	5	∞
$\frac{1}{2}(q\text{-}1) =$	—	0	$\frac{1}{2}$	1	2	∞

The series ob is a normal one and the form p is accordingly established.

General Discussion.—Anhydrite twins, with twinning plane parallel to $r(10)$, were first described by Hessenberg.† These crystals came from Berchtesgaden and are an inch in diameter.

2



• — Cryst. 1. o --- Cryst. 2.

*Senkenb. Abh. 1872, vol. viii, p. 12, pl. 1, fig. 14.

They are bounded only by the three pinacoids and show twinning striations parallel to the twinning plane. Later Preiswork* described some more highly developed crystals twinned according to the same law.

The crystal in question is still richer in forms: The parallel orientation of the faces $b(0\,\infty)$ and $r(10)$, which is characteristic and genetic, is the decisive factor for the twinning law of anhydrite. They are the chief planes of coincidence, and moreover all planes of the zone *br* coincide. We therefore call this a zone of absolute coincidence. This zone is next in importance to the dome-zones *ac* and *ab*, which are the most richly developed zones in anhydrite. It includes the forms *b.p.f.n.o.r.* The gnomonic projection (figure 2) makes quite apparent these relations.

It should be observed that the *b* faces of both individuals fall into a single plane, as is also the case with several of the twins figured by Preiswork,† and further that the *r* face is a plane of contact (grenzfläche) for both individuals. The transformation of the elements and symbols of the Winkeltabelle (WT) to those of the projection on $b = 0\,\infty$. (B) is made according to the formulæ.

$$pq(\mathrm{WT}) = \frac{1}{q}\,\frac{p}{q}\ (\mathrm{B})$$

$$p_0q_0(\mathrm{WT}) = \frac{1}{q_0}\,.\,\frac{p_0}{q_0}\,.\ (\mathrm{B})$$

The elements and table of angles on p. 490 belong to the projection on *b* and may sometimes prove convenient for use.

The following forms, which are distinguished thus (?) in the table, are uncertain:

	a	τ	μ	ρ	σ	
Orientation	$= 0\frac{2}{3}$	$0\frac{4}{5}$	$0\frac{5}{3}$	02	03	= Hessenberg
Orientation (B)	$= \frac{3}{2}0$	$\frac{5}{4}0$	$\frac{3}{5}0$	$\frac{1}{2}0$	$\frac{1}{3}0$	

The forms *a* and ρ are given by W. H. Miller‡ but designated by him as uncertain. The forms τ, μ, and σ are figured by A. Schrauf§ without further description. They also cannot be considered assured forms. All these forms should be omitted from the list until they have received additional confirmation.

Heidelberg, July, 1907.

‡ Jahrbuch Min., 1905, vol. i, p. 39, pl. 3, fig. 5-8.
† Jahrbuch Min., 1905, vol. i, pl. 3, figs. 5, 7, 8.
‡ Phil. Mag. 1874, vol. xlvii, p. 124.
† Atlas 1871, pl. 15, fig. 4, 5.

TABLE OF ANGLES (B).

No.	Letter	Symb.	Miller	ϕ'' $(90-\xi_0)$	ρ'' $(90-\eta_0)$	ξ_0'' $(90-\eta_0)$	η_0'' (ϕ)	ξ'' $(90-\rho)$	η (ξ)	X' (Prisms) $(x:y)$	y''	d'' $(\mathrm{tg}\rho)$
1	*a*	$\infty 0$	100	90° 00	90° 00	90° 00	90° 00	90° 00	0° 00	∞	0	∞
2	*b*	0	001	—	0 00	0 00	0 00	0 00	"	0	"	"
3	*c*	0∞	010	0 00	90 00	90 00	90 00	"	90 00	"	∞	∞
4	*δ*	20	201	90 00	63 25	63 25	0 00	63 25	0 00	1·9984	0	1·9984
5	?*a*	$\frac{\infty}{2}0$	302	"	56 17·	56 17	"	56 17	"	1·4988	"	1·4988
6	?*τ*	$\frac{\infty}{5}0$	504	"	51 19	51 19	"	51 19	"	1·2490	"	1·2490
7	*s*	10	101	"	44 58·	44 58·	"	44 58·	"	0·9992	"	0·9992
8	?*μ*	$\frac{\infty}{3}0$	305	"	30 56·	30 56·	"	30 56·	"	0·5995	"	0·5995
9	?*ρ*	$\frac{\infty}{5}0$	102	"	26 33	26 33	"	26 33	"	0·4996	"	0·4996
10	?*σ*	$\frac{1}{\infty}0$	103	"	18 26	18 26	"	18 26	"	0·3331	"	0·3331
11	*ω*	$5\frac{\infty}{5}$	510	77 22	90 00	90 00	90 00	77 22	12 38	4·4625	∞	∞
12	*t*	$4\frac{\infty}{5}$	410	74 21	"	"	"	74 21	15 39	3·5700	"	"
13	*v*	$3\frac{\infty}{5}$	310	69 31	"	"	"	69 31	20 29	2·6775	"	"
14	*e*	$\frac{5}{2}\frac{\infty}{5}$	520	65 51·	"	"	"	65 51·	24 08·	2·2312	"	"
15	*u*	$2\frac{\infty}{5}$	210	60 44·	"	"	"	60 44·	29 15·	1·7850	"	"
16	*β*	$\frac{5}{3}\frac{\infty}{5}$	950	58 06	"	"	"	58 06	31 54	1·6065	"	"
17	*g*	$\frac{5}{3}\frac{\infty}{3}$	530	56 05·	"	"	"	56 05·	33 54·	1·4875	"	"
18	*q*	$\frac{5}{3}\frac{\infty}{2}$	320	53 14·	"	"	"	53 14·	36 45·	1·3387	"	"
19	*x*	$\frac{4}{3}\frac{\infty}{5}$	430	49 57·	"	"	"	49 57·	40 02·	1·1900	"	"
20	*l*	$\frac{4}{3}\frac{\infty}{3}$	540	48 07·	"	"	"	48 07·	41 52·	1·1156	"	"
21	*r*	∞	110	41 45·	"	"	"	41 45	48 15	0·8925	"	"
22	*k*	$\frac{4}{3}\frac{\infty}{4}$	340	33 48	"	"	"	33 48	56 12	0·6694	"	"
23	*γ*	$\frac{4}{3}\frac{\infty}{2}$	350	28 10	"	"	"	28 10	61 50	0·5355	"	"
24	*i*	$\frac{\infty}{3}2$	120	24 03	"	"	"	24 03	65 57	0·4462	"	"
25	*h*	$\frac{\infty}{3}\frac{5}{3}$	250	19 39	"	"	"	19 39	70 21	0·3570	"	"
26	*o*	1	111	41 45	56 19	44 58·	48 13·	33 39	38 22·	0·9992	1·1195	1·5002
27	*n*	$\frac{1}{2}$	112	"	36 53	26 33	29 14·	23 33	26 36	0·4996	0·5597·	0·7501
28	*f*	$\frac{1}{3}$	113	"	26 34	18 26	20 28	17 20	19 30	0·3331	0·3732	0·5000
29	*p*	$\frac{1}{5}$	115	"	16 42	11 18	12 37	11 02	12 23	0·1998	0·2239	0·3000

Anhydrite Elements (B) Projection on $b = 0\infty$ (WT).

a = 1·1204 lg a = 004938 lg a_0 = 000034 lg p_0 = 999966 a_0 = 1·0008 p_0 = 0·9992
c = 1·1195 lg c = 004904 lg b_0 = 995096 lg q_0 = 004904 b_0 = 0·8932 q_0 = 1·1195