

On the Crystalline Form of Creatine.

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SOME small crystals of a substance, supposed at the time to be an allotropic modification of Creatinine ($C_4H_7N_3O$), were submitted to me for crystallographic determination. The crystals of which the angles were to be measured were thin elongated plates nearly $\frac{1}{10}$ th of an inch long, $\frac{1}{100}$ th of an inch broad, and $\frac{1}{500}$ th of an inch thick.

Although so minute, the crystals were found to give very sharp images, and measurement of four of them led to the following results:—

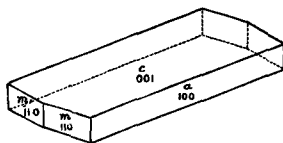
SYSTEM.—Monosymmetric.

ELEMENTS.— $a : b : c = 2.404 : 1 : 2.479$; $\beta = 71^\circ 8'$.

FORMS OBSERVED.— $a\{100\}$, $c\{001\}$, $m\{110\}$: and, on one crystal, also $e\{201\}$.

The faces of the form e are narrow, and replace the edges ac , $\bar{a}\bar{c}$.

The crystals are elongated parallel to the axis of symmetry, as illustrated in the accompanying figure.



Angles.	Mean.	Limits.
ac	$71^\circ 8'$	$70^\circ 54' - 71^\circ 13'$
$\bar{c}\bar{a}$	$108^\circ 52'$	$108^\circ 48' - 109^\circ 3'$
ae	$21^\circ 38'$	$21^\circ 38'$
$\bar{a}\bar{m}$	$66^\circ 16'$	$66^\circ 11' - 66^\circ 28'$
mm'	$47^\circ 28'$	$47^\circ 25', 47^\circ 29'$
mc	$82^\circ 31'$	$82^\circ 30\frac{1}{2}', 82^\circ 31'$
$\bar{m}\bar{c}$	$97^\circ 29'$	$97^\circ 28', 97^\circ 37'$

Almost accidentally, it was observed that these angles were strikingly similar to the following angles assigned by Heintz¹ and Keferstein² to creatine ($C_4H_9N_3O_2$):—

¹ *Pogg. Ann.* 1848, Vol. LXXIII. p. 595.

² *Ibid.* 1856, Vol. XCIX. p. 294.

	Heintz.		Keferstein.	
	Mean.		Mean.	Limits.
<i>ac</i>	71°5'		70°41'	69°43'—71°54'
<i>am</i>			65°49'	
<i>mm'</i>	46°50'		47°50'	46°48'—49°32'

The crystals of supposed creatinine were accordingly submitted to a chemical examination, and were found to be actually creatine.

As so few crystals of this substance have been measured, and the last recorded measurements were made thirty years ago, the above confirmatory numbers are worthy of record: they serve at the same time to illustrate the fact that the goniometer is still of service as a discriminating instrument.

The angles given by Heintz were obtained from a single crystal, the only one he was able to find from which satisfactory measurements could be got: those given by Keferstein were the results of measurement of five crystals.

We may add that the parametral ratios generally assigned to creatine and creatinine in works on chemistry are wrongly calculated; in each case the number assigned to the ratio $a : b$ should be divided by the corresponding value of $\sin \beta$.