NOTES AND NEWS

ARRANGEMENT OF THE SYMMETRY-CLASSES

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A year ago I published in this Journal[1] a set of relatively simple names for the symmetry-classes, arranging these classes in a table which brought out to some extent analogies between the several crystal systems. At the time Professor Austin F. Rogers kindly called my attention to the fact that I was listing as trigonal certain classes which were considered by space-group theorists as hexagonal, but as this had no bearing on the working out of the new names which was the primary object of that paper, no attempt was made to introduce the corresponding changes in the tabular arrangement. The subject having recently been brought to attention again by the appearance of two German articles,[2] I now wish to place on record an improved and mathematically more acceptable tabulation of the crystal classes, which brings out to the maximum extent the relations between the classes in the several systems.

In order that the question as to the preferable names to be applied shall not enter and distract attention from the main purpose, the classes are referred to merely by minerals or inorganic compounds currently believed to typify them. As before, it must be clearly understood that the symmetry-classes in question may be in many cases merely representative of the habit or superficial symmetry of the substance, and not of the internal structure; but at any rate when the classes of wulfenite, nephelite, cuprite, etc., are enumerated, reference to any recent book on crystallography will furnish data as to exactly what symmetry is possessed by those classes. This time the table starts with minimum symmetry and proceeds to maximum, although it can be inverted if anyone desires to go the other way.

TRIMETRIC DIVISION

Triclinic	Ca-thiosulf.	....	....	....	....	chalcanthite
Monoclinic	....	....	Li-sulfate	clinohedrite	....	gypsum
Rhombic	....	....	epsomite	hemimorphite	....	barite

DIMETRIC DIVISION

Tetra-	2f.	....	meliphanite	....	....	chalcopyrite	....
gonal	4f.	wulfenite	scheelite	Ni-sulfate	Ag-fluoride	....	octahedrite
Hex-	3f.	Na-period.	....	quartz	tourmaline	....	....
ag-	3′f.	....	(unknown)	....	....	benitoite	....
on-	3″f.	....	dolomite	....	....	calcite	....
al	6f.	nephelite	apatite	high-quartz	iodyrite	....	beryl

MONOMETRIC DIVISION

Cubic	ullmannite	pyrite	cuprite	sphalerite	....	fluorite

Novel features in this tabulation are: Grouping of the crystal systems into three *divisions*. Many students seem able to appreciate the axial features of curved surface solids better than polyhedrons, at the start, and it is easy to take up, then, an ellipsoid, cylinder and sphere respectively, and show how the respective systems

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[1] *Amer. Mineral.*, **12** (5), 218, 1927.

[2] F. Becke, *Fortschr. Min. Krist. Petr.*, **12**, 97, 1927; F. Rinne, *idem*, p. 107.

can be derived by symmetrical flattening of these solids. The optical features of biaxiality, uniaxiality and isotropism also successively characterize these divisions.

The Tetragonal system is divided into two sub-systems, the Hexagonal into *four*, distinguished by the rotation symmetry of their singular directions or axes. Anyone who prefers to set up a Trigonal system as distinct from the Hexagonal can combine these sub-systems as desired. If they are to be consistent, however, they should then recognize also a Digonal system made up of the classes of the Tetragonal with 2 fold symmetry of the singular axis.

The classes of minimum symmetry within each system or sub-system appear in an early class-column, those of maximum symmetry (holosymmetry) in a late one. The second class-column contains those classes characterized by third-order forms in each of the dimetric subsystems; the third, those classes similarly characterized by trapezohedrons; and the fourth, those characterized by hemimorphism with otherwise complete symmetry. In general, it is believed that this arrangement has advantages over previous ones in bringing out similarities between analogous classes in different systems which may be of pedagogical value; and it is hoped that it is correct from the mathematical standpoint. Suggestions for its improvement will, however, be welcome.

THE PRONUNCIATION OF PYROXENE.

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During several years of teaching experience the writer has been located in a portion of Texas where he comes in contact with many oil geologists whose combined geologic training represents most of our universities and colleges which have well-established departments of the geologic sciences. Among these men *pyroxene* seems to be the most variously pronounced word in their scientific vocabularies, and this fact must reflect upon the pronunciation used by our corps of mineralogy, petrology, and geology instructors.

Five ways of pronouncing the word seem common: (1) pī′-rŏk-sēn, (2) pī′-rŏks-ēn, (3) pĭr′-ŏk-sēn, (4) pī-rŏks′-ēn, and (5) pĭr-ŏks′-ēn. A note on the origin and pronunciation of this word, therefore, seems in order.

The term *pyroxene* was established by Haüy (in 1796), being coined by him from two Greek words: pyr (fire), and xenos (a stranger), since he erroneously thought the mineral alien to igneous rocks.

The new Webster Unabridged Dictionary[1] gives "(1)" above preference and "(3)" as an alternative pronunciation. Funk and Wagnalls New Standard gives "(2)" as preference and "(3)" as an alternative. Here is practical agreement between the two works with the preference on a long *i*-sound in the first syllable, and an alternative of the short *i*-sound. The question of whether the *s*-sound should terminate the second or originate the third syllable seems of slight importance. No authority can be found for placing the accent on the second syllable.

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[1] The mineralogical terms in Webster were edited by E. S. Dana, in the new Standard by Frank W. Clarke.