of them. Such knowledge has been obtained wholly from books and mineral publications, and is of course a useful knowledge, but the ability to recognize the minerals should come first in mineral instruction. Our present types of books and publications are not designed for the general reader. The books on mineralogy are all of the stereotyped textbook style, dry and uninteresting to a layman and few students find them of much use let alone the general reader. There are interesting phases of crystallography and of mineralogy which could be written about in a readable manner, but the proper author has not appeared. It has been said that mineralogy cannot be popularized since it is such an exact science of facts, which are definite characteristics of the mineral and books descriptive of the minerals of necessity must be largely an enumeration of these facts and therefore dry and uninteresting. This statement seems to be borne out by the fact that in the list of one hundred books on scientific subjects written in a popular way so as to be available for the general reader, recommended by a committee appointed to prepare such a list, not one title on the subject of mineralogy is included. Ruskin may have gone to extremes to make the subject of crystallography understandable when he wrote his "Ethics of the Dust," and while his style of presenting the subject does not commend itself to the crystallographer, his book is, nevertheless readable, and has been read by many more persons than has any textbook on the subject. We need to cultivate a new style of writing for our textbooks both in mineralogy and crystallography, a style that presents the facts and theories in an interesting as well as in an instructive manner. Until this is done we cannot hope to see any of our books on the shelf of the home library, nor can we expect to see our sciences obtain or retain an equal place with other sciences, in the minds of the general public.

SUGGESTIONS CONCERNING THE USE OF SPECIES NAMES IN THE GARNET, AMPHIBOLE, PYROXENE, AND TOURMALINE GROUPS (ABSTRACT)

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For some years the writer has met with considerable difficulty in mineralogy classes because writers of many textbooks consider garnets, amphiboles, pyroxenes, and tourmalines as single mineral

species, each with several varieties or possibly sub-species, when they should really be regarded as isomorphous groups consisting of several species. Our idea of a variety is that there should be little if any difference in physical properties or chemical composition. For example, the varieties of quartz, among others, are rock crystal, amethyst, citrine, smoky, and rose quartz. In our opinion chalcedony is not a variety of quartz, but a separate species on account of its distinct optical properties. Varieties of corundum are ruby, sapphire, and emery, while varieties of gypsum are, selenite, alabaster, and satin spar. It is our general contention that there would be less confusion if the words, garnet, amphibole, pyroxene, and tourmaline were discarded as names of species, but retained for those of a group as in the case of micas and feldspars.

Garnet Group

The three members of this isomorphous group which are encountered most frequently are grossularite, almandite, and andradite, and it is our opinion that these are species just as distinctly as are albite, oligoclase and labradorite among the feldspars.

Amphibole Group

I think the general tendency among writers is to regard tremolite, actinolite, and hornblende as separate minerals. Although they will grade into each other as do all isomorphous minerals, it seems that they are as distinct as glaucophane, riebeckite, crocidolite, and arfvedsonite which are considered as separate species.

Pyroxene Group

Most writers distinguish diopside and augite as separate species of monoclinic pyroxenes. In our opinion too much is included under the term diopside, which contains both colorless and green varieties. Although all textbooks agree that diopside is $CaMg(SiO_3)_2$, nevertheless an inspection of analyses shows that most diopsides correspond to the actinolite molecule under the amphiboles rather than to the formula commonly given. The diopside which corresponds most nearly to the required formula seems to be the colorless one from De Kalb, St. Lawrence County, New York, which is given under analysis 8 in Dana's System of Mineralogy, page 359. For this species of pyroxene which corresponds most nearly to the tremolite from Campo Longo in the St. Gothard

region of Switzerland, I would suggest the name De Kalbite in order to preserve the name of the old St. Lawrence County locality. On this basis the diopside formula would be $Ca(Mg, Fe)(SiO_3)_2$ and would correspond, as it should, to actinolite in the amphibole group.

Tourmaline Group

Since most writers consider tourmaline as a single mineral and not an isomorphous group of several species, the writer has experienced more difficulty in teaching the tourmalines than any other group of minerals. It is true that all writers have distinguished between alkali, magnesia, and iron tourmalines as varieties, yet the differences in chemical composition, color, and probably other physical properties are presumably greater than between muscovite, lepidolite and biotite among the micas, or between the members of other isomorphous groups which are regarded as distinct species. The writer would like to see at least three species names used in the tourmaline group, and does not care particularly who names them or what they are called.

Although achroite and indicolite are also alkali tourmalines, nevertheless the pink mineral has such a wide distribution in lithium pegmatites that we suggest that rubellite be considered as a separate species. For the brown magnesia tourmaline, we suggest the name gouverneurite to perpetuate the name of the famous old St. Lawrence County, New York, locality. For the black iron tourmalines which are the most common of all, the writer suggested pierrepontite for the locality in St. Lawrence County, New York. Dr. Schaller has objected on the ground that this is a magnesia tourmaline. However, it depends on the definition of "iron" tourmaline which thus far has never been defined. As a matter of fact the magnesia is but slightly in excess of the iron, and one might argue that an iron tourmaline, by whatever name we wish to call it, is one which will contain enough iron to color it black. The one which has most iron, namely 17.40% FeO, is one quoted from Rammelsberg by Dana, (analysis 21, page 554) from St. Andreasberg in the Harz mountains. Dr. Wherry has pointed out that schorl or schorlite would have priority, and although we do not like the name, we are perfectly willing to accept it, as long as some definite name is assigned. Certainly rubellite, gouverneurite and schorl mean more and are subject to less confusion than the word "tourmaline."