The definiton of "mineral", Part I: The 1800s (and their influence today)

The modern definitions of "mineral" and "mineralogy" have evolved from definitions dating back to at least the early 1800s. Like evolved organisms, the modern definitions carry with them vestiges from the past that seem unnecessary and even dysfunctional today. To see what vestiges of the past might make our modern definitions less useful than they should be, this page examines some early definitons of "mineral" and "mineralogy".

Early thinking was greatly influenced by the notion that all things could be categorized as animal, vegetable, or mineral. Thus Ebeneezer Emmons, in his **1832** second edition of his *Manual of Mineralogy and Geology*, wrote in language odd to our ears that

"The mineral kingdom embraces those natural productions which are not organized."

He went to explain that many natural productions are "composed of different parts and organs, and each organ performs a different function" and has a "vital affinity." He went on to explain that these "organized bodies . . . cease to grow and naturally or necessarily die". In short, "organ-ization" was a characteristic of life, and mineralogy was in contrast the study of non-living things.

It was in that vein, but in language a bit more familiar to us, that the famous James Dwight Dana of Yale University wrote in 1**837** in his *System of Mineralogy* that "The productions of our globe naturally distribute themselves into three grand kingdoms, the Animal, the Vegetable, and the Mineral".[1] After considering the first two, he went on that

"The mineral kingdom . . . contains those natural objects that are not possessed of life."

This emphasis on minerals as non-living things led Dana to go on that "The word Mineral is applied to all *inorganic* natural objects, whether *solid, liquid, or gaseous.*" His third edition in **1850** similarly maintained that

"the word mineral . . . [refers to] . . . all *inorganic natural objects* which are proper chemical compounds, whether *solid, liquid, or gaseous*".

Thus the principal difference between his 1837 and 1850 definitions was the addition of the words "proper chemical compounds", leading toward our modern notion that a mineral name should be linkable to a chemical formula.

Writing in **1868** in his *Manual of Mineralogy,* Dana continued to see the world divisible among animal, plant, and mineral, and he still maintained that water should be considered a mineral. He went on therefore to this definition:

"A mineral . .. is any substance in nature not organized by vitality, which has a homogenous structure."

Thus homogeneity had become a characterisitc of minerals, which were thereby distinguished from mixtures. Dana maintained the sense that minerals were separate from living things with his exclusion that minerals were "not organized by vitality", a usage that harkened back to that of Emmons decades before. As we'll see in Part II, that exclusion would continue into and through the twentieth century, even as its logic became less and less apparent.

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[1] With the view that all things were "animal, vegetable, or mineral', Dana could in 1837 say that knowledge of them "is comprised in the Natural Sciences, [which are] Zoology, Botany, and Mineralogy." It was in this context that he went on to say, oddly to our ears, that "Mineralogy comprises the two distinct, though closely allied sciences, Mineralogy proper and Geology," where the former considered minerals "as independent bodies" and the latter considered them in the context of soils and rocks, and in "the structure of the earth". Today, of course, we more commonly take the opposite view, whereby Mineralogy is a subject within Geology. The division of mineralogy and geology seen by Dana persisted long enough that American universities like the University of Michigan and Ohio State University each had a "Department of Geology and Mineralogy" into the late 1900s, and academic departments with that name persisted in other countries into at least the early 2000s.