

DISCUSSION

QUERY: ORTHOQUARTZITE ??? ?¹

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The term "orthoquartzite" has been misused, changed in meaning, and created confusion to the point that its original meaning and true value have been lost. It makes little difference as to when it was first misused and changed from its original meaning in textbooks and in dozens of papers. A large number of the younger teachers of sedimentology and many older ones are now compounding the misuse to current students.

I have objected to the wrong application of the word in all of my classes, and have finally decided to try to correct the well established word. Extensive usage of the word for the last 30 years is no argument for retaining a word that perpetuates a wrong meaning.

F. J. Pettijohn became concerned with the misuse and altered meaning of the word "graywacke" and published a note of clarification based on a survey of several dozen modifications and variations. This was a great contribution and his definition gave us a standard communicable precise meaning.

It is completely in error to apply the word "orthoquartzite" to an ordinary sandstone just because it is dominantly quartz. The correct designation is quartzose sandstone or quartzitic sandstone. The word "quartzite" is already established and has been in use for many decades with a specific meaning to all geologists abroad, and to most geologists in the United States, to mean a metamorphosed rock composed of quartz so tightly cemented with quartz that it will break across the constituent grains. According to the acceptance and use by many workers in the United States, the term "orthoquartzite" is applied and extended to include loosely consolidated sandstone such as the St. Peter. Obviously, the St. Peter is not a metamorphosed rock and is not an orthoquartzite but a quartzose sandstone composed of 95% or more of quartz sand and highly friable. Other beds

improperly called orthoquartzite in the literature are Potsdam, Oriskany, Tensleep, Coconino, and Dakota. These sandstones range from those that are friable to well consolidated, but unless they are so tightly cemented that they will break across the included grains, the term "orthoquartzite" cannot be applied without making a new definition for the term "quartzite."

The work "ortho" meaning "straight" could be applied to the meaning of being composed chiefly of quartz, but it is most confusing and fails to communicate the proper meaning to foreign geologists outside the United States who follow the established meaning for the term "quartzite."

The word "orthoquartzite" was created by Paul Krynine in 1941 and he used it again in 1948. The meaning as used by Krynine was for a quartzose sandstone that had been so thoroughly cemented by silica or recrystallized that it met the standard definition for a quartzite, but it had not been subjected to the dynamic processes normally associated with metamorphism. He very specifically states that the word is used in contrast to a metaquartzite. As I see it, Krynine's intended use has been greatly altered.

I have travelled extensively abroad to universities and to five International Geological Congresses, and have met many foreign geologists during field work in Europe, Asia, Africa, Australia, and South America. Geologists from those areas think of quartzite as a metamorphosed sandstone and define a quartzite as a silicified sandstone so tightly cemented that it will break across the grains and not around them. Such marks the difference between a very hard indurated sandstone and a quartzite. Attaching a prefix of "ortho" to "quartzite" implies that the rock is of metamorphic origin, although it has not had high pressure, heat, or other tectonic metamorphic processes affect it. It may be difficult to separate an "orthoquartzite" from a "metaquartzite" by general appearances only, except where field relations show evidence for tectonic metamorphism.

¹ Manuscript received September 26, 1973.

² We regret to report Professor Ireland's death on November 4, 1973.

I urge that "orthoquartzite" be standardized according to its original meaning for a rock composed chiefly of quartz so tightly cemented with silica by ground water or non-tectonic processes that it breaks across the constituent grains. Any other sandstone with a high quartz content would be a quartzose sandstone. Any

orthoquartzite could be modified by such adjectives as calcareous, micaceous, glauconitic, etc. if there was a significant percentage of non-quartz impurities. Orthoquartzite as it has been changed to mean is confusing to foreign geologists and the misuse is degrading to the scientific ability of American geologists.