

primary rocks, regarded the crystalline schists of the Green mountains as altered paleozoic strata, the metamorphosis of which he declared to have been effected by intrusive serpentines and intrusive quartzites.

As regards the geological horizon of the paleozoic sediments in question, we may note that Amos Eaton maintained the existence in the region in debate of two distinct series each consisting principally of argillites and sandstones, which he called the First and Second Graywackes, much resembling each other; the first of these being below the horizon of the Trenton limestone, and the second above it, or between this same and the Niagara limestone. The absence of such a Graywacke series in parts of New York below the Trenton led Mather to deny its existence, and to confound in one group the First and Second Graywackes along the Hudson valley, under the common name of the Hudson slates (called collectively by Vanuxem, the Hudson-River group); which were assumed to be the equivalent of the Loraine shales, with the addition of the Utica shale below and the Gray or Oneida sandstone above. Mather's view of the post-Trenton age of the whole of the Hudson River Graywacke and of its extension north and east through Vermont to the city of Quebec, was accepted by James Hall, by C. B. Adams, by W. B. Rogers, and for a time by Emmons himself; who, in his final report in 1842 on the geology of the Northern District of New York, describes the rocks at Quebec as Loraine shales with their overlying sandstones, which he speaks of as extending from the valley of the Hudson through eastern Vermont to the city of Quebec. In another chapter of the same volume, however, Emmons reverts to the teaching of Eaton, and in his subsequent writings includes these rocks in the First Graywacke—his Upper Taconic series. This view, however, was not accepted by other geologists. James Hall continued to maintain Mather's doctrine of the post-Trenton age of the Graywacke series in question. C. B. Adams, charged with a geological survey of Vermont, held in 1846 that the Red Sandrock of that state, "now included by Emmons in the First Graywacke or Upper Taconic, is of "the period of the Medina sandstone and the Clinton groups," while W. B. Rogers, in 1851, considered that limestones, which near Burlington, Vermont, are associated with this Red Sandrock are probably "of the Medina group."