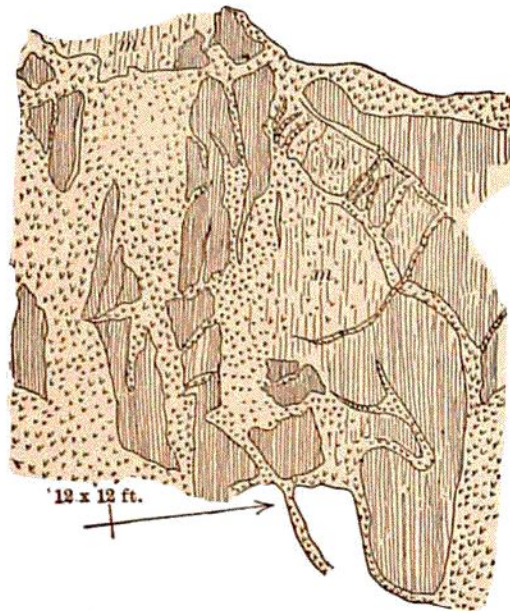


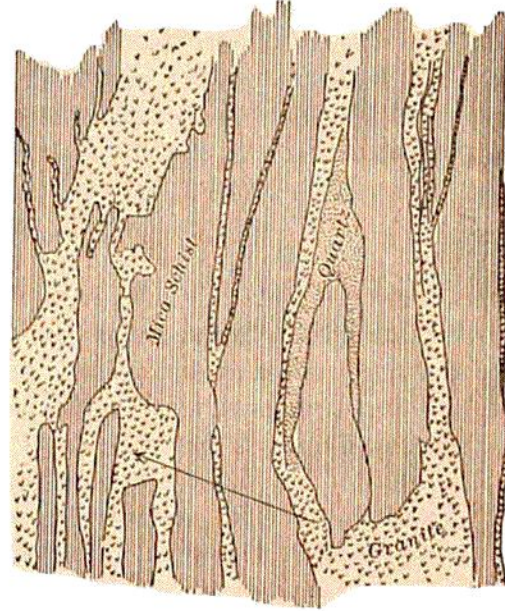
The massive rocks (whether Laurentian or Huronian) are generally igneous; but, most probably, for reasons already stated, metamorphic igneous to a greater extent than deep-seated igneous. The granite and syenite often contain great masses and long broken strips of schists, or constitute dike-like intrusions. Figures 495, 496 of portions of the rocks at Burntside Lake, in northeast Minnesota, are from A. Winchell's *Field Studies in the Archæan Rocks of Minnesota*. In these examples, granite and mica schist are the two rocks combined. In other figures, syenite has the place of granite, and the schist is a hornblende schist.

495.



Mica schist (the lined areas) and granite; at *m* the two intimately mixed. Surface, 12 feet square. A. Winchell, '87.

496.



Mica schist and granite. Surface, 12 feet square. A. Winchell, '87.

Often the massive rock contains only isolated blocks; and from this condition there are all gradations to those represented in the figures. The rock fragments are not widely scattered, like those torn from the walls of a fissure by ascending lava, but often are still nearly in their original lines. In cases like those above described, the conclusion seems unavoidable that the extrusion of the melted rock followed closely on a general fracturing of the beds that are now schist, and that this could have happened only at an epoch of metamorphism, during the progress of a great upturning, when some one or more of the strata in a thick series of formations became fused by the excessive heat, and was forced up into fissures or spaces opened in the flexed and fractured unfused strata. The liquid did not make the fractures, but these being made, it flowed in and filled all crevices. In other places, described by Winchell, and especially in the vicinity of Saganaga Lake, the granites and the associated gneiss contain rounded pebbles every rod or two, two to six inches in diameter; and at one locality the pebbles, though not in contact, were "in such abundance as to constitute a