

stone,—constituting the Mississippian group of Williams,—have an aggregate thickness in southwestern Illinois of 1200 to 1500 feet. They thin out northward in this state before reaching Rock Island County; and beyond, the coal-measures rest on the Devonian. These limestones extend in part into Iowa, Indiana, Kentucky, Missouri, and southward into Texas. The Kinderhook group extends far into Iowa; but after its deposition a long retreat of the shore line took place before the Burlington beds, the first part of the Osage group, were deposited; and this retreat was continued after the deposit of the Burlington group. But before the St. Louis epoch began there was a subsidence, allowing of an advance again northward, as the northward extension of the beds shows. There is thus unconformability by overlap of the St. Louis limestone over the underlying beds, as stated by C. A. White (1870, Rep. Iowa).

The subdivisions of the Mississippian group in Illinois and the adjoining parts of the Central Interior area are arranged as follows by C. R. Keyes (G. S. A., 1892):—

1. **The Kinderhook Group.**—This group was so named by Meek and Worthen (1861). The “Lithographic limestone,” “Vermicular sandstone and shales,” and “Chouteau limestone” of Missouri, are three rather persistent divisions. The term *Louisiana*, from a place in Pike County, Mo., is used by Keyes in place of Lithographic, and Hannibal shales for Vermicular sandstone and shales. The “Louisiana” limestone is 60' thick in Missouri. The Hannibal shales are reported from Iowa, as well as Missouri, with a thickness of 70' to 150' or more. The Chouteau is a fine buff-colored limestone, 10' to 15' thick at Hannibal and Louisiana, 100' or more at Sedalia, in Missouri, and perhaps 50' at Burlington, Iowa. The Goniatite limestone of Rockford, Ind., was referred to the horizon of the Chouteau by Meek. The larger part of the “Knobstone group” of sandstones and shales (partly calcareous), which makes the eastern border of the Carboniferous area of Indiana, is referred to the Kinderhook.

2. **The Osage Group.**—The subdivisions of the Osage group—so named by H. S. Williams—are: (1) Lower Burlington, (2) Upper Burlington, (3) Keokuk, with the “geode-bed” and the Warsaw shales and limestone. The Lower Burlington is described as having Crinoids of delicate forms; the Upper, of stouter forms; the Keokuk, of still coarser and larger kinds, massive in construction. The geode-bed is a bed of blue shale, 30' to 35' thick, containing thin layers of limestone. The geodes are sometimes 2' in diameter; they contain within: quartz crystals, agate, crystals of calcite, dolomite, and often pyrite, sphalerite, millerite (in hair-like needles, or tufts of needles), besides other minerals. An extermination of a large part of the Keokuk species occurred at the close of the epoch.

3. **The St. Louis Group.**—The St. Louis limestones were so named by Shumard from the evenly bedded limestone of St. Louis, Mo. They are oölitic 3 miles above Alton. The northern limit in north-central Iowa, near Fort Dodge, is the evidence of the northward return of the shore line for several hundred miles beyond the limit of the Keokuk, and here the beds are fossiliferous marls. In St. Genevieve County, Mo., the thickness of the beds is over 300', and it is still greater to the southeastward. The rock at Spargen Hill, Ind., is of this division.

4. **The Chester or Kaskaskia Group.**—This group includes limestone, in three or four beds, with intercalated shale and sandstone, and sandstone below; it is occasionally 600' thick. It comprises the “Pentremital” limestone, and the “Upper Archimedes” limestones, called also the “Kaskaskia” limestone. The stratum of sandstone at the