MISSISSIPPIAN STRATIGRAPHY OF OHIO

FRED T. HOLDEN
University of Chicago, Chicago, Illinois

The Mississippian rocks of Ohio consist of six formations: Maxville limestone, Logan formation, Cuyahoga formation, Sunbury shale, Berea sandstone, Bedford shale.

The Bedford shale is a chocolate-brown, red and blue-black, argillaceous shale. It crops out along the western and northern margins of the Mississippian outcrop zone in Ohio. Its thickness varies from 40 to 110 feet. Only in the basal few feet are there fossil remains. A slight disconformity exists at the base of the Bedford. Nearly everywhere there is a sharp contact between it and the underlying Ohio shale, but rarely is there evidence of the existence of erosional conditions between the deposition of the Ohio shale and of the Bedford shale.

The Berea sandstone consists essentially of a light tan or light gray, well sorted, fine-grained sandstone or siltstone. In southern Ohio it is composed of several thin layers of siltstone, each layer from 8 to 15 inches thick. In central Ohio thin, argillaceous and arenaceous shale layers to a total thickness of about 7 feet occur near the base of the Berea. Above are fine-grained, rather massive sandstone layers, each 2 to 8 feet thick. In northern Ohio the maximum thickness of the Berea exceeds 200 feet.

The contact between the Berea and the underlying Bedford shale is marked by a well-defined erosional surface.

Overlying the Berea along the western margin of the Mississippian outcrop in Ohio is the Sunbury shale. This is a black, fissile, carbonaceous shale lithologically very similar to the Ohio shale. In northern Ohio the Sunbury shale is indistinguishable from the black shales of the Orangeville member of the Cuyahoga formation. Hence the Sunbury is not recognized as a distinct formation in this area, all of the black shales immediately overlying the Berea sandstone being included in the Orangeville member.

Seven lithologic facies, each subdivided into a varying number of members and submembers are recognized in the Cuyahoga formation:

Tinkers Creek shale facies
  Meadville shale member
  Sharpsville sandstone member
  Orangeville shale member
    Aurora sandstone submember

River Styx conglomerate facies
  Black Hand conglomerate member
  Armstrong sandstone member
    Rittman conglomerate submember

Killbuck shale facies
  Black Hand shale member
  Armstrong sandstone member
  Burbank member

Toboso conglomerate facies
  Black Hand conglomerate member
  Pleasant Valley member

Granville shale facies
  Black Hand siltstone member
  Raccoon shale member

Hocking Valley conglomerate facies
  Black Hand conglomerate member
  Fairfield sandstone member
  Lithopolis siltstone member

Henley shale facies
  Henley shale member

These facies have been named in progressive order from northeastern Ohio to south-central Ohio.

The axes of the conglomerate facies trend northwest-southeast. It is probable that the conglomerate facies represent deltas formed by deposition of coarse materials derived from lands to the southeast. Intervening shale facies are areas where fine sands, silts and clays accumulated.

The Logan formation directly overlies the Cuyahoga formation. From south central Ohio the Logan outcrops extend northward with varying thickness to Holmes and Wayne counties, where it thins rapidly due to erosional beveling.

Three lithologic facies are distinguished in the Logan formation:

Pretty Run sandstone facies
  Rushville shale member
  Vinton sandstone member

Allensville conglomerate member
Byer sandstone member
Berne conglomerate member

Scioto Valley shale facies
Vinton sandstone member
Portsmouth shale member
Buena Vista sandstone member

Vanceburg siltstone facies
Vinton sandstone member
Churn Creek member
Vanceburg siltstone member
Rarden shale member
Buena Vista sandstone member

The material composing these deposits was probably derived from the southeast.

The Maxville limestone overlies the Logan formation in southeastern Ohio. It is rarely exposed, being nearly everywhere covered by Pennsylvanian deposits which overlap on to the Logan formation.