



**COMPOSITE SECTION OF PENNSYLVANIAN ROCKS OF SEMINOLE CO. OKLAHOMA**  
(AVERAGE DIP, 1°)

**Konawa formation.** Shales, sandstones and conglomerates. The shales are thick and varied in color, with reds predominating. The sandstones are commonly soft and buff in color. The coarser clastics include buff chert conglomerates, the "Dripping Springs" dark chert conglomerates (west of Maude) and the "Jarvis Church" varicolored chert conglomerates. The Prague limestone occurs in the northern part of the county, about 150 feet above the base of the Konawa. The basal Konawa is a sandstone with occasional penecontemporaneous contortions, cross-bedding, and chert pebble or mica flake lenses; it is often limy, and is usually buff to light dirty brown or reddish purple. The basal contact is commonly undulatory. The Konawa is 800 to 900 feet thick in southern Seminole and Pottawatomie counties.

**Vanoss formation.** Shales and sandstones. In the southern part of the county, limy arkosic sandstones and conglomerates are prominent. The base of the arkose, instead of marking the base of the Vanoss, climbs in the section northward, and also occurs in two isolated exposures in lower formations (the Ada and the Wewoka). Several limestones and limestone conglomerates occur in the Vanoss: (1) a yellow, crinoidal limestone, one foot thick, 20 feet below the top, in the north; (2) a crumbly, fossiliferous limestone lens in a sandstone, about 60 feet down from the top, west of Seminole; (3) a limestone, chert and quartz conglomerate, six inches thick, about 70 feet down from the top, in the central part of the county; and (4) a crinoidal limestone conglomerate, about 70 feet below the top, in several railroad and road cuts northeast of Konawa. In the southern part of the county, the Vanoss channels locally into the Ada formation; in the northern part of the county, where distinctive Vanoss lithologies are not common, the two formations can be separated only with great difficulty. The basal Vanoss sandstone, where sandy and buff but not arkosic, shows penecontemporaneous contortions. The Vanoss is 140 to 550 feet thick, thickening southward.

**Ada formation.** Variegated shales, siltstones and sandstones. The pastel colored shales are distinctive, except in the northern part of the county where they are easily confused with similar shales in the Vanoss formation. The basal member of the Ada is a buff, cross-bedded and contorted sandstone, generally 10 to 20 feet thick. In a distance of less than 50 miles, it truncates the Pawhuska formation (in southwestern Okfuskee county), most of the Vamoosa formation (in Seminole county), and the rest of the Vamoosa formation, plus certain underlying Pennsylvanian strata (in Pontotoc county); the average angle of truncation is approximately 14 feet per mile. Locally the basal sandstone is a chert conglomerate, and therefore difficult to distinguish from the underlying Vamoosa formation. The middle Ada limestone conglomerates are well developed in the central and southern parts of the county. They are cross-bedded, and contain limestone cobbles as large as 4½ inches. Northward they grade into chert conglomerates in a buff sandstone matrix, and then into shale. Southward, the limestone cobbles are accompanied by pebbles of red, tan and gray chert. Biotite flakes are also fairly common. The Snomac limestone member, in the central part of the county, consists of an irregular series of thin, dull white, finely crystalline limestone beds in the lowest third of the formation. They are useful, where present, for structural control. The Ada is 150 to 250 feet thick, thickening and thinning in an irregular manner. This is due in part to less deposition northward, in part to channeling by the overlying Vanoss, and probably in part to structure.

**Vamoosa formation.** Shales, sandstones and chert conglomerates. The three highest members in the formation have been mapped, previously, across northern and central parts of the county as the Pawhuska or Leocompton limestones. This report does not so consider them. They are buff to yellow sandstones having a very high proportion of secondary calcite (about 40%), and local chert conglomerate lenses. Very hard, they reach thicknesses in excess of 10 feet, but are generally only a foot or two thick. The three are truncated by the Ada formation, at more-or-less regular intervals. Each of the three changes, southward, as it approaches the point of truncation: first, from a sandstone to hard limy sandstone, then to a soft rotten sandstone probably deeply weathered in pre-Ada time. The coarsest conglomerates occur in the middle and lower portions of the Vamoosa formation. The chert cobbles in the lowest 100 feet coarsen from a maximum of about 3 inches, in T. 6 N., to a maximum of 7 inches, in T. 11 N. Where not conglomeratic, the resistant ledges in the Vamoosa are buff to brown sandstones and silts, commonly cross-bedded and contorted. The shales are largely red to brown. The entire formation grades from a shale-elastic ratio of 60:40, in the south, to a ratio of about 80:20, in the north. Fossils are rare, yet three fossil-assemblage types have been found: poorly preserved and unidentified gastropods; plant remains; and a suite consisting of *Nueulana* sp., *Tropidophorus* sp., *Acanthopecten* ? and *Hustedtia* ? . The plant remains, the most common of the three assemblages, occur in the thickest conglomerates. The Vamoosa formation, in Seminole county, varies from 125 feet thick at the Canadian river, to over 550 feet thick at the North Canadian river.

**Belle City formation.** Upper and lower limestones, separated by a dark shale. The upper limestone, generally the thicker of the two, is commonly a blue-gray dense, fossiliferous limestone, exhibiting a rubby, wavy type of bedding, and weathering to a dull, chalky white. South of Wewoka creek, it varies from a maximum thickness of about 11 feet, to a minimum of about 2 feet. The middle shale, although in most places black or dark gray, and highly fossiliferous, is at other places light green or gray-green, and non-fossiliferous. It is commonly 10 to 20 feet thick. The lower limestone, only 3 or 4 feet thick, is buff to pale yellow, and locally fossiliferous. North of Wewoka creek, the entire formation is a blue crystalline limestone, a few inches thick, which weathers yellow. The fossil suite changes northward, becoming first crinoidal, then fusulinid. Within a few miles thereafter, the formation thickens locally to 2 or 3 feet, and becomes a deep red limestone. It vanishes southwest of Cromwell. The Belle City has a maximum thickness of 30 feet, thinning northward.

**Hilltop formation.** Dark blue-gray shales, buff siltstones and buff, very fine, sandstones, with many thin limestones near the base of the formation. The Hilltop includes representatives of the Barnsdall, Chanute, upper Dewey, and perhaps other formations of northern Oklahoma. In the southern part of the county, isolated red shales between the Vamoosa and Belle City formations probably belong to the Hilltop. In the northern part of the county, where the formation reaches a thickness of 200 feet, the various components are not separable. In the extreme northeastern part of the county, beds which are probably Dewey equivalents contain mudcracks, contortions, and the following fossils, commonly replaced by pink calcite: *Nueulana bellistriata*, *Dielasma bovidens*, *Deryia* sp., crinoid plates, and pelecypod fragments. In the extreme southern part of the county, the Hilltop contains, 22 feet above the base, a bluish-gray conglomerate of chert, jasper, limestone and clay-plates, the limestone cobbles measuring up to 7 inches in diameter. In the subsurface, the Hilltop is separable into a lower shale, which seems to be upper Dewey, and a clastic section which is probably entirely Barnsdall. The Hilltop is truncated by the Vamoosa formation; excluding the pre-Vamoosa outliers in the southern part of the county, the Hilltop thins from 200 feet, at the North Canadian river, to zero feet, in the central part of the county. The average angle of truncation is seven feet per mile.

**Nellie Bly formation.** Shales, sandstone, siltstones and chert conglomerates. The sandstones are massive but soft, buff to brown in color, cross-bedded, and ripple marked (ripple index about 10). Siltstones and very fine sandstones are common both in exposed ledges and in covered intervals. The chert conglomerates occur as soft lenses in soft sandstones, rather than as ridge or cuesta makers. Cross-bedding, lensing, channeling, and rapid facies changes are common. The 100-foot interval above the basal sandstone member is generally a black or very dark gray shale. This can be traced great distances in the subsurface on electric logs. In the southern part of the county, limestone lenses—some of them pure—and coarse limestone conglomerates are found. The coarsest, which crops out in the roadside ditch 2½ miles west of Sasakwa, contains limestone boulders, pockets of yellow clay, and fragments of thick-shelled brachiopods such as *Neospirifer dunbari*. The black shale immediately underlying this conglomerate is one of the best fossil-bearing beds in the county. The limestone lenses are most numerous near the top of the section, where some of them rival, for short distances, the overlying Belle City formation. In the subsurface, upper Nellie Bly limestone lenses are often misidentified as Belle City. On the surface, the best limestone lenses are developed in T. 6 N. The Nellie Bly has a thickness of 300-400 feet; where it varies, the difference is commonly accounted for in the underlying Coffeyville formation.

**Coffeyville formation.** Dark shales and buff sandstones. The Coffeyville and Nellie Bly formations comprise Morgan's Francis formation, described from outcrops in Pontotoc county. The Coffeyville contains two sandstone members, although in the southern part of the county they are sufficiently close, locally, to be mistaken for one. Limestone, siltstone and chert conglomerate lenses are found in the upper sandstone member, and at places in the shales. The latter are dark, like those of the overlying Nellie Bly formation, although not so fossiliferous. The base of the formation is marked by the DeNay member, a dense but vuggy, mustard yellow to brown, fossiliferous limestone a few inches to a few feet thick. West of Sasakwa it is about 65 feet down from the overlying sandstone member; from there northward it rises in the section until, in western Hughes county, it vanishes in shale only a few feet below the sandstone. For about 15 miles from there north, the lower sandstone is considered to mark the base of the formation; then the Checkerboard limestone appears, much in the same manner as the DeNay vanished. The Checkerboard does not, however, extend as far southwestward as Seminole county. The DeNay fossil suite is noteworthy chiefly for its trilobites and minute brachiopods, including *Punctospirifer kentuckiensis*. The Coffeyville is 150 to 200 feet thick. The Francis interval is uniformly close to 600 feet thick.

**Seminole formation.** Shales, sandstones and lenses of chert conglomerate. In the southern part of the county, there are two resistant ledges; east of Wewoka, along the Hughes county line, there are three. With the basal member locally splitting into two distinct sandstones. The uppermost sandstone is at places yellow limy and crinoidal, and therefore easily mistaken for the DeNay member of the Coffeyville formation above. Yellow limestone lenses also occur in the upper Seminole shales. In general, the resistant members are yellow to buff, locally contorted, siltstones and very fine sandstones. The shales are green to gray green, and sparingly fossiliferous. A few thick lenses of coarse chert conglomerate convey the impression that the formation is coarser than it actually is. In the subsurface, the Seminole interval is handed most conveniently by extending it upward past the DeNay limestone to the base of the lowest sandstone member of the Coffeyville formation. The subsurface "Checkerboard" is approximately middle Seminole, and may be equivalent to the middle Seminole sandstone. The Seminole formation is about 170 feet thick.

**Holdenville formation.** Shales, with two prominent limestone members. The upper, the Sasakwa limestone, is light gray to chalky white, fine-grained, very hard, and richly fossiliferous. Its weathered surface looks much like that of the Snomac limestone, or the upper Belle City limestone. The Sasakwa fossil suite, of more than 50 species, can be collected from the quarry southeast of Sasakwa. The limestone is 30 to 70 feet below the top of the formation, and a few inches to a few feet thick. Despite its variations in thickness, it is generally thin-bedded. The lower member, the Homer, is a thin Chonetes limestone with a black or dark gray color, or a dark brown sandy pelecypod limestone 2 to 10 feet thick. It lies 70 to 120 feet above the base of the formation. Both limestone members thin northeastward into Hughes county, where they vanish, the Homer into a shale section, and the Sasakwa into a coarse chert conglomerate which may be a Seminole formation channel. In the shale interval between the two limestones may be found local sandstone and chert conglomerate lenses. The shales are gray to green, and largely barren. In the subsurface, the lower Seminole, the Holdenville, and the Wewoka, shales are often not separable. The Holdenville is about 250 feet thick.

**Wewoka formation.** Shales alternating with sandstones. The sandstones are buff or brown, commonly cross-bedded, and contain chert flakes or pebbles. The upper sandstone (DWWK-4 of Wewoka) is the only coarse clastic, in the Wewoka section, cropping out in Seminole county. It is more massive than any of the other clastic members in the entire Seminole county section. The Wewoka is 600-700 feet thick in Seminole and Hughes counties.