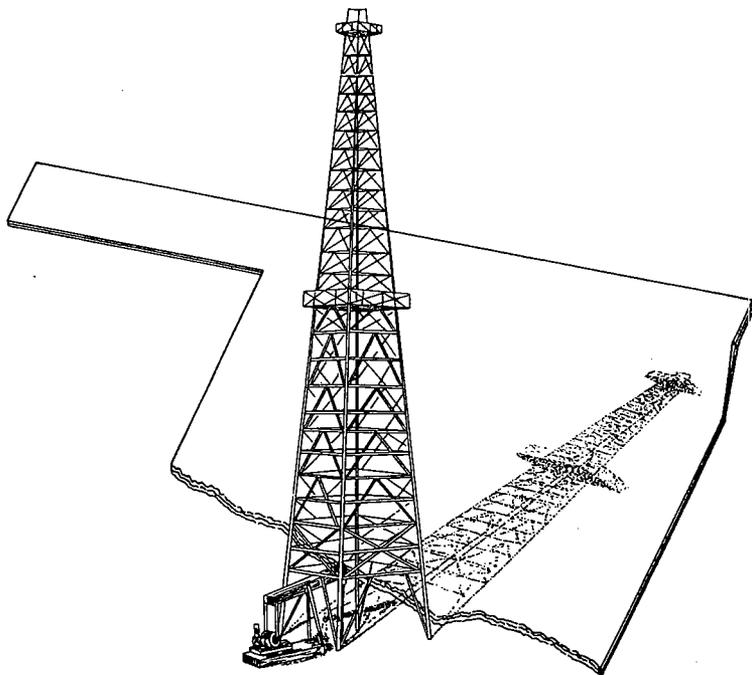


Oklahoma Geology Notes



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CYCLIC FORMATIONS OR MAPPABLE UNITS

Carl C. Branson

Since 1932 geologists of the Nebraska and Kansas Geological Surveys have given names to hundreds of units in the Pennsylvanian and early Permian rocks of these states. Many of the named units are thin and are discriminated as elements in a cyclical sequence. In "The Kansas Rock Column" (1951) the Wabaunsee rocks are divided into 28 units given formational rank, and the Wolfcampian into 29 such units. M. R. Mudge, in mapping Wabaunsee County, Kansas, and adjacent areas, found that many of these units cannot be mapped. In order to establish a workable nomenclature and to agree upon subdivisions a conference was held in Lawrence, Kansas, on October 17, 1955. Representatives of the Missouri, Oklahoma, Nebraska, and Kansas Geological Surveys and of the Federal Survey attended and reached agreement. The results are presented in a paper by R. C. Moore and M. R. Mudge (*Amer. Assoc. Petroleum Geologists, Bull.*, vol. 40, pp. 2271-2278, September, 1956).

The simplification of nomenclature arrived at is highly desirable to Oklahoma geologists for they must deal with platform, transition, and basin sediments. Within the northernmost Oklahoma county (Osage County), so many marker beds change facies that only 8 formational units can be discriminated in Virgilian rocks of the southern part of the county. In southern Lincoln County, all 28 of the Kansas formations fall within the Vanoss formation.

The proposal of the Lawrence conference is to reduce the number of formational units of the Wabaunsee to 12, and of the Admire group to 3 from an original 9. The revised Kansas section is shown in the column at the right of Figure 1, the old Kansas column in the second column from the right. The rest of the figure shows the continuity of Oklahoma mapping horizons in each township southward from the state line. From the figure it can be seen that the Severy shale can be used for the unit to the base of the Bird Creek limestone if the Bachelor Creek limestone unit is ignored. A new name, Hallett formation, is here given to the predominantly shale sequence from the top of the Bird Creek limestone to the base of the Wakarusa limestone. The name is derived from the village of Hallett in Pawnee County and the type section is that exposed in and south of the village.

The unit long called the Stonebreaker limestone in Oklahoma is now called Emporia limestone formation. The Emporia was named much earlier (1896) and was more precisely defined. The Stonebreaker was named in 1918 from the Stonebreaker Ranch in Osage County, Oklahoma.

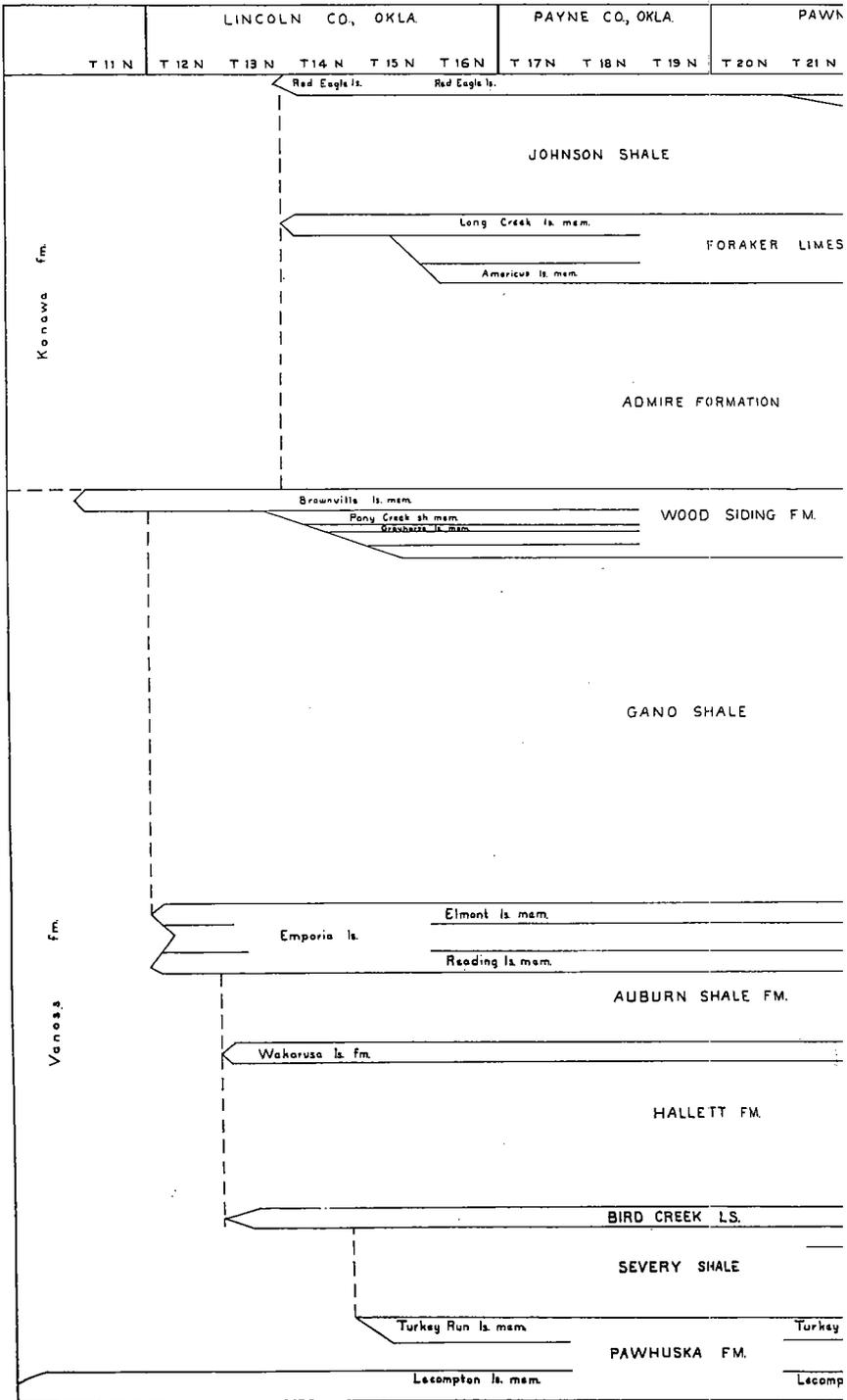
The sequence from the top of the Emporia to the base of the Wood Siding formation, which is at the base of the Nebraska City limestone member in Osage County, at the base of the Grayhorse

limestone member southward to Township 15 N., and at the base of the Brownville limestone member in southern Lincoln County, includes the rocks of 11 Kansas formational units, or 5 in the revised classification. This sequence cannot be subdivided and is here given the name Gano formation. The name is from the refinery village northeast of Cushing, in Payne County. The type section is that exposed in the hills northeast of the village.

The stratigraphic unit from the top of the Brownville limestone to the base of the Foraker limestone is indivisible in Lincoln, Payne, and Pawnee Counties. It corresponds to the entire Admire group of Kansas and can be referred to as the Admire formation. The shale sequence above the Foraker limestone and below the Red Eagle limestone is called the Johnson shale, even where the older beds of the Red Eagle have graded into shale. The entire section from the top of the Turkey Run member of the Pawhuska formation to the top of the Red Eagle limestone is, in Payne and northern Lincoln Counties, divided into but 12 formations. This contrasts with the 38 formations of the older Kansas classification and the 18 of the newly proposed classification. In southern Lincoln County and in Seminole and Pottawatomie Counties, the Wolfcampian units fall within the Konawa formation.

Composite section of Hallett formation, based upon measured section of Paul B. Greig, Jr. taken in NE $\frac{1}{4}$ sec. 31, T. 20 N., R. 7 E., Pawnee County, Oklahoma (Greig, unpublished M. S. thesis, Univ. Okla., 1954, pp. 89-90).

	Feet
Wakarusa limestone	
limestone, light-gray, fossiliferous, with Triticites	2.0
Hallett formation	
shale, gray, weathers buff, calcareous near top, thin siltstone beds near base, Triticites in upper calcareous zone	7.0
sandstone, buff, fine- to medium-grained, cross-bedded	11.0
shale, gray to red, with siltstone beds, contains thin limestone with Cryptozoon	26.0
sandstone, buff, cross-bedded	4.0
shale, gray, with local siltstone and sandstone beds	20.0
sandstone, white with spots of brown	3.0
shale, gray	2.5
sandstone, buff, massive	3.0
shale, gray, with thin siltstone layers which are fucoidal on the basal bedding plane, local sandstone beds, red shale near top	29.0
Thickness of Hallett fm.	105.5
Bird Creek limestone	
limestone, dark-gray, shaly, fossiliferous, contains Triticites	0.5



OSAGE CO., OKLA.						KANSAS 1951		KANSAS 1956		
T 24 N	T 25 N	T 26 N	T 27 N	T 28 N	T 29 N					
					Howe ls. mem.		Howe ls.		Howe ls.	COUNCIL GROVE GP
					Red Eagle ls. fm Bennett sh. mem.	Red Eagle ls.	Bennett sh.	Red Eagle ls.	Bennett sh.	
					Glenrock ls. mem.		Glenrock ls.		Glenrock ls.	
					Johnson sh. fm	Johnson sh.		Johnson sh.		ADMIRE GP
					Foreaker ls. fm Long Creek ls. Hughes Creek ls. Americus ls.	Foreaker ls.	Long Creek ls. Hughes Creek sh. Americus ls.	Foreaker ls.	Long Creek ls. Hughes Creek sh. Americus ls.	
					Janesville sh. fm Oaks sh. Hauchen Creek ls. Stine sh. Five Point ls.	Hamlin sh. Five Point ls. West Branch sh.	Oaks sh. Hauchen Creek ls. Stine sh.	Janesville sh. Five Point ls. West Branch sh.		
						Falls City ls.		Falls City ls.		WABAUENSE GP
						Mauby sh.		Mauby sh.		
					Aspinwall ls.	Aspinwall ls.		Onaga sh.	Aspinwall ls.	
					Wood Siding fm Towle sh. Brownville ls. Pony Creek sh. Grayhorse ls. Plumb sh. Nebraska City ls.	Brownville ls. Pony Creek sh. Coryville ls.	Indian Coat sh. Grayhorse ls. Nebraska City ls.	Wood Siding fm	Towle sh. Brownville ls. Pony Creek sh. Grayhorse ls. Plumb sh. Nebraska City ls.	
					Root sh. fm French Creek sh. Jim Creek ls. Friedrich sh. Grandhaven ls.	French Creek sh. Jim Creek ls. Friedrich sh. Grandhaven ls.		Root sh.	French Creek sh. Jim Creek ls. Friedrich sh. Grandhaven ls.	WABAUENSE GP
					Stotler ls. Dry sh. Dover ls.	Dry sh. Dover ls.		Stotler ls.	Dry sh. Dover ls.	
						Langdon sh. Maple Hill ls. Piercen Point sh. Tarkio ls. Willard sh.		Pillsbury sh. Zandala ls. Tarkio ls. Willard sh.	Maple Hill ls. Wanago sh. Tarkio ls.	
					Emporia ls. fm Elmont ls. Harveyville sh. Reading ls.	Elmont ls. Harveyville sh. Reading ls.		Emporia ls.	Elmont ls. Harveyville sh. Reading ls.	
					Auburn sh. fm	Auburn sh.		Auburn sh.		WABAUENSE GP
					Wakarusa ls. fm Wakarusa ls. Soldier Creek sh. Burlingame ls. Silver Lake sh. Rulo ls. Cedar Vale sh. Happy Hollow ls.	Soldier Creek sh. Burlingame ls. Silver Lake sh. Rulo ls. Cedar Vale sh. Happy Hollow ls.		Barn ls. Seranton sh.	Wakarusa ls. Soldier Creek sh. Burlingame ls. Silver Lake sh. Rulo ls. Cedar Vale sh. Happy Hollow ls. White Cloud sh.	
						White Cloud sh. Howard ls. Severy sh.	Utopia ls. Winstler sh. Church ls. Aarde sh. Bachelor Creek ls.	Howard ls.	Severy sh.	
						Tapaha ls. Cathman sh. Over Creek ls. Yerumash sh. Lecompton ls.				

Section of Gano formation in SE $\frac{1}{4}$ sec. 10, T. 18 N., R. 5 E., modified from Nakayama (unpublished M. S. thesis, Univ. of Okla., 1955, p. 64).

	Feet
Grayhorse limestone	
limestone, gray, dense, arenaceous, with crinoid stem ossicles	0.8
Gano formation	
shale, gray	2.5
sandstone, yellow-buff, thin-bedded	2.3
shale, gray	12.0
limestone, light-gray, shaly, nodular, abundant specimens of <i>Myalina</i>	2.3
shale, gray, fossiliferous	11.0
shale, red, local, thin limestones	24.0
sandstone, brown, thin-bedded	5.0
shale, red	3.0
	<hr/>
Thickness of Gano fm.	62.1
Emporia formation, Elmont limestone member limestone, gray to brown, arenaceous	1.2

A Little-known Oklahoma Fossil

Carl C. Branson

In the early twenties, George D. Morgan was a geologist for the Survey and mapped the Stonewall Quadrangle, Pontotoc County. The map and report constituted his doctoral dissertation at Columbia University. Before his report could be printed, the then governor, Jack Walton, vetoed the Survey's appropriation. The report was printed as Bulletin 2 of the Bureau of Geology. In this bulletin Morgan described and illustrated several new species, among which was *Conocardium snideri*. The photographs were not good, and in the preparation of the printing plate nearly all the detail of the fossils was lost.

The cotypes were borrowed from the Department of Geology, Columbia University, through the good offices of Norman D. Newell. The four specimens are "Stratigraphical Collection No. 18,501" and include the originals of Morgan's figures 13, and 13 b. The original of figure 13 a. has not been located.

The synonymy of the species is:

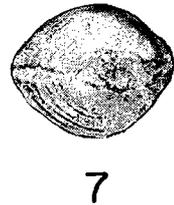
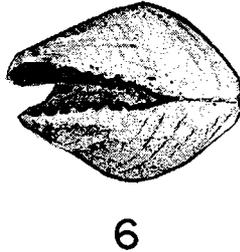
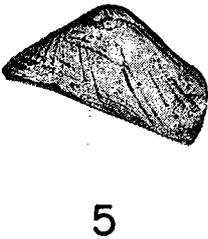
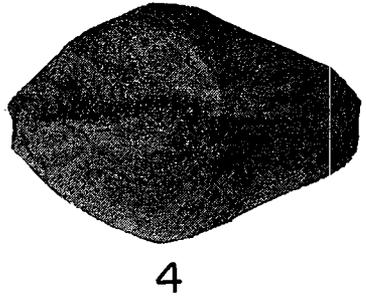
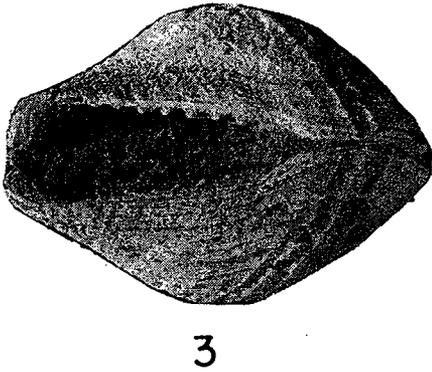
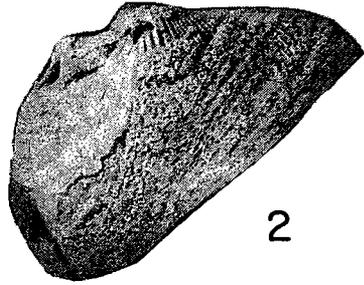
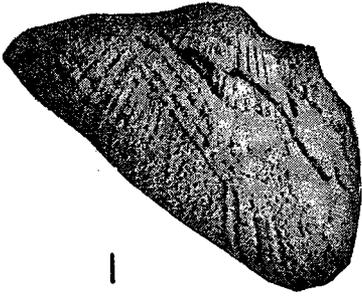
Conocardium snideri Morgan, 1924. Bureau of Geology (Okla.), Bull. 2, p. 55, p. 222, pl. 28.

Conocardium sniderii Morgan, 1924. Idem, pp. 184, 185, pl. 46, figs. 13, 13 a, 13 b.

Conocardium snideri Morgan, Hollingsworth, 1933. Unpublished Master of Science thesis, Univ. Okla., p. 38, pl. 8, figs. 1-3, table 1.

Conocardium snideri Morgan, Hollingsworth, 1934, Geol. Soc. Amer., Proc. for 1933, pp. 364, 365.

Morgan (1924, p. 185) says "Holotype.—Columbia University, New York City." On page 222 Morgan lists each of the three specimens figured as cotypes. These are labeled as from the Upper Caney, sec. 29, T. 3 N., R. 7 E., Stonewall Quadrangle, Oklahoma. The figured specimens are said to be from Station 170, which on



Conocardium snideri

Figure 1. Left valve, x2.

Figure 2. Right valve, x2.

Figure 3. Ventral view to show gape, x2.

Figure 4. Dorsal view, x2.

Figure 5. Morgan's photograph of the holotype.

Figure 6. Morgan's photograph of ventral anterior.

Figure 7. Morgan's photograph of the posterior of a paratype.

page 244 is identified as "Sandy limestone, just north of railroad, NE cor. sec. 29, T. 3 N., R. 7 E. Caney shale, upper part." In the table on page 55, the species is given as rare at Station 36, which is (p. 240) "Shale, bed of Canyon Creek, southeast of the center of sec. 8, T. 7 N., R. 7 E. Caney shale, upper part."

In the paleontological collections at the University of Oklahoma are additional specimens. Richard Alexander collected 9 specimens at Morgan's Station 170 (O. U. No. 794). Three specimens collected by Cooksey and Hollingsworth (O. U. No. 792) are from SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 29, T. 3 N., R. 7 E., in Buck Creek, just north of the Missouri, Kansas and Texas Railroad station at Lovelady, seemingly the same as Morgan's locality. The specimens are from "impure arenaceous limestone at the top of the Union Valley sandstone member of the Wapanucka formation." Another collection (O. U. No. 791) is labeled "Cromwell, SE of Ada, Okla." This lot includes the specimen figured in Hollingsworth's thesis. Hollingsworth also listed the species as occurring on the west side Oklahoma State Highway 19 (now Highway 3) in NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 33, T. 3 N., R. 7 E. and SW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 3, T. 2 N., R. 7 E.

The original of Morgan's Figure 13 was silicified and was largely covered by matrix. By permission of Dr. Newell the writer removed the matrix with acid, and the specimen is a nearly complete example of both valves. This specimen is here selected as the holotype.

Description—The species is pronouncedly trigonal, truncate posteriorly, alate anteriorly. The umbonal slope, or body is broad, rounded, curved posteriorly downward, and is set off from the wing by a flattening of the shell and by a change in the size of the ribs, bears six narrow, high ribs, the posterior one broad-topped and serving as the carina, which is the base of the hood. A weak seventh rib is intercalated between the posterior two on the right valve. The interspaces bear irregular fine striae, and these are crossed by fine, evenly spaced concentric markings, which, with the striae, cancellate the shell surface. The anterior wing is marked by about twenty rounded ribs with narrow interspaces.

The surface bears 11 low, rounded ribs similar to those on the wing. The rostrum is poorly preserved, but appears to have been short and stout. The gape is large, denticulate with 7 pairs of prominent, widely spaced "teeth," rounded anteriorly, and extends posteriorly to the body. The holotype is 27.6 mm long, 22.7 mm high, and 22.1 mm wide.

The shell of *Conocardium* is smooth when unweathered. In the holotype where the outer layer of shell has been eroded away the anterior wing bears twelve even, round ribs, with narrow, sharp interspaces, the anterior dorsal rib broad, and the anterior dorsal margin a broad, rounded, unmarked surface. On steinkerns the body ribs are round-topped and are separated by flat-bottomed interspaces about half as wide as the ribs.

All specimens have come from the calcareous sandstone at the top of the Union Valley sandstone and all are from near Ada, Oklahoma.