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TYPE SECTION OF THE CANEY SHALE

By

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ABSTRACT

The Caney shale formation is established in the region in which it was originally described by designating a type section in the Arbuckle Mountain area. Five measured sections in the adjacent ravines west of Viola townsite are so designated and type sections of three members are likewise established there. The original type locality is abandoned except as the source of the name and the shales which there contain exotic boulders are left under the name Johns Valley shale.

The Caney shale formation of Oklahoma is a widely recognized and useful stratigraphic unit. It has been apparent for some years that geologists' interpretation of the Caney is derived from exposures in the Arbuckle Mountain region whereas the name was derived from an area in which there are but obscure exposures. It seems desirable to preserve the name Caney for those strata to which it has been consistently applied. Accordingly there is herein designated a type section in an area of good exposures and where the unit has the characteristics considered those of the Caney by geologists. It is possible that this solution does not strictly accord to present rules of stratigraphic nomenclature, but it is hoped that the advantages are so evident that geologists will ratify the procedure by usage. Apparently no type section has heretofore been designated.

Taff described and named the Caney shale in 1901 (p. 3). His description, pertinent parts quoted below, was brief and generalized. "In each locality of the Caney shale in this [Coalgate] quadrangle about 800 feet of rock is exposed, approximately the upper half of the formation. This part of the formation is composed of blue clay shale, with thin beds of clay ironstone, lenticular concretions, and a few blue limestone septaria. In the lower part of the formation, in the adjoining Atoka quadrangle, the blue shale grades into black, friable, bituminous shale with dark-blue limestone segregations. The Caney shale throughout is laminated, fissile, and friable, and in consequence is rarely exposed."

From the context, columnar section, and maps it is clear that the selected top of the formation was the base of the Wapanucka limestone. The age was given as "Carboniferous and probably Devonian."

Taff gave additional information on his concept of the Caney shale in his report on the Atoka folio (1902, p. 4). He stated "shales of lower Carboniferous age, known as the Caney shale, succeed the Woodford chert in the northwestern part of the Atoka quadrangle and elsewhere throughout the Arbuckle Mountain region.

PREVIOUS WORK

The Caney shale in its lower part consists of black, bituminous, fissile shale with spherical calcareous segregations and irregular, dense, blue limestone bodies. This bituminous shale is succeeded by clay shales which include small ironstone concretions and occasional calcareous septaria. The black shale in the lower part of the Caney formation contains fossil remains of lower Carboniferous (Mississippian) age. The blue shales higher up in the formation have not yielded fossils, and the dividing line between the lower and upper Carboniferous is not known, since the limestone immediately succeeding [Wapanucka] is of Coal Measures (upper Carboniferous) age." The statement made by Taff that the Caney rests upon Silurian [Ordovician] limestones in the Ouachita Range was a misconception based upon understandable failure to recognize the Ordovician boulders in Johns Valley as exotic. On the maps the underlying Woodford is shown as Carboniferous, but Columnar Section Sheet 1 shows it as Devonian, and a footnote states that the fossils are Devonian.

In his report on the Tishomingo quadrangle, Taff recognized and named the Sycamore limestone (1903, p. 5) below the Caney at places. He augmented his earlier recognition of an upper non-fossiliferous member of blue clay shales with ironstone concretions and few calcareous septaria, and a lower black bituminous shale with fossiliferous limestone masses. In this report (p. 5) he gave a list of fossils from the lower part of the Caney as identified by G. H. Girty: *Leiorhynchus* sp. resembling *L. quadricostatum,* small *Posidonomya, Productus hirsutiformis, Seminula sp., Goniatites,* related to *G. subcircularis, G. crenistria, G. striatus,* and *G. kingi.* Girty placed the age as Late Mississippian. The type section of the Caney shale here designated is in the Tishomingo quadrangle.

In 1909, Taff p. 289) stated that the Caney shale overlies the Jackfork sandstone.

Nowhere in any of these publications is there description of the Caney shale at the type locality, nor even an identification of that locality. C. N. Gould (1925, p. 23-24) published a letter from Taff in which Taff stated that the type locality is the valley of Cane Creek. The stream was shown as Caney Creek on the manuscript maps at hand. The stream name Cane Creek has been superseded by the name Johns Creek and the valley is now called Johns Valley. Incidentally, the geographic source of the name is further confused by Taff's statement (Gould 1925, p. 23-24) than the name was derived from Caney Creek, Miser's implied derivation from Caney Basin (1927, p. 11), Morgan's mistaken idea that the name came from the village of Caney in Atoka County (1925, p. 51) and Ulrich's curious statement that the name is from the settlement of Caney, now Johns Valley (1927, p. 21). Girty (1909, p. 10) listed *Lingula albapinensis, Lingulidiscina newberryi caneyana, Caneyella nasuta, Gastrioceras caneyanum, Goniatites choctawensis, G. newsomi, Adelphoceras meslerianum,* and *Productella*

hirsutiformis from the type locality. Girty concluded (p. 11) that the Arbuckle Caney and the Ouachita Caney are the same bed and are of Pottsville age. It is clear, reading between the lines, that Girty regarded the Caney as Meramecian, but was forced to hedge in order not to contradict White's identification of the underlying Stanley as Pottsville.

By the time of Gould's book (1925) geologists suspected that the upper part of the Caney as it was understood is Pennsylvanian, and the lower part Mississippian, and Morgan had reached this conclusion in 1924 (p. 56). That Morgan was including more strata than the true Caney is shown by his list of fossils from the upper part of the Caney shale. He included *Conocardium snideri,* clearly a Union Valley species, as are the seven other species listed from that locality. His other two upper Caney localities are suspect because the listed fauna is almost certainly Desmoinesian.

In the late twenties oil geologists began to speak of the Pennsylvanian Caney, an appelation later shortened to Penn Caney. This is the unit later named Goddard shale by Westheimer (1956, p. 394) and Sand Branch member by Elias (1956).

Miser (1927, p. 22-23) pointed out that the Caney type locality is also the type locality of Ulrich's Johns Valley shale. He showed that the Caney fauna is in place and that the Caney, there resting upon the Jackfork, in no wise differs from the shale unit which elsewhere rests upon the Woodford. He assigned a Late Mississippian age to the unit. In the same year Ulrich (1927, p. 22) restricted the name Caney to Meramecian shales of the Arbuckle Mountain region and gave the name Johns Valley shale to "the black shale of Pennsylvanian age in Ouachita geosyncline, carrying fossiliferous erratic boulders in lower part."

In 1934 Miser (p. 974) yielded to the age determinations of Federal paleobiologists and followed Ulrich in restricting the name Caney to the shales above the Woodford and below the Springer shale (Penn Caney) of the Arbuckle area (p. 985).

Elias (1956) clarified the stratigraphy and the paleontology of the Caney shale of the Arbuckle Mountain region. He divided the Caney into (ascending), the Ahlosa (later emended to Ahloso) member, the Delaware Creek member, and the Sand Branch member on the north side of the mountains. On the south side of the mountains, he did not recognize the Ahloso member, and he equated the Caney shale of the area with the Delaware Creek member, and the Goddard shale with the Sand Branch member. The Goddard and the Sand Branch are shown to be Chesterian and perhaps should be excluded from the Caney (restricted) when it appears feasible to map the contact.

In his subsequent description and analysis of the Redoak Hollow bryozoans, Elias (1927, p. 425-427) assigned the lower part of the Goddard to latest Chesterian (Clore-Kinkaid age), which tends to place the upper part of the Goddard in post-Kinkaid Mississippian.

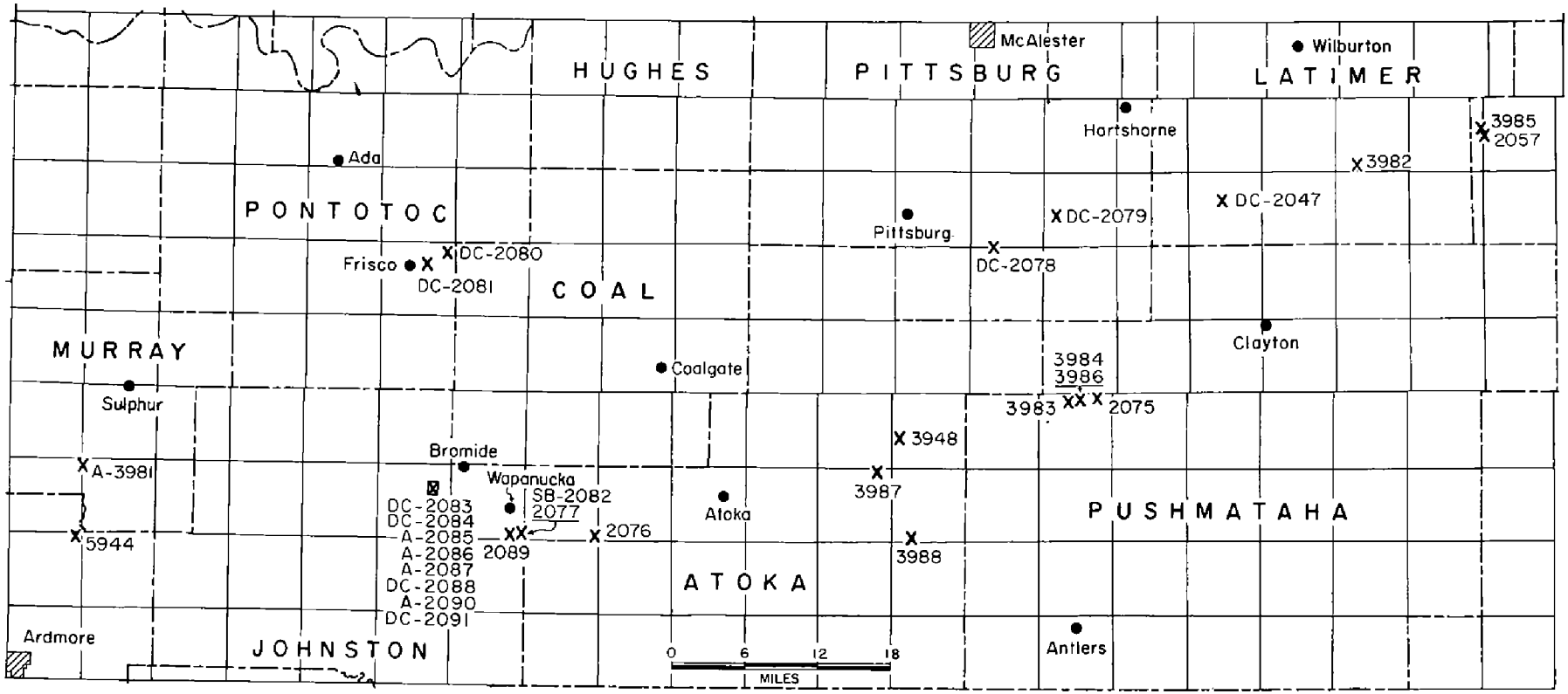


Figure 1. Map of Caney fossil localities of Girty 1909. Localities indicated by cross, Girty's number, and where known A is Ahloso, DC Delaware Creek, S B Sand Branch. Cross in box is type section of Caney shale.

PRESENT INVESTIGATION

In 1959 the co-authors discussed the feasibility of establishing a new type section. Elias had determined in his previous exploratory work that the area west of Viola, the southern foothills of the Arbuckle Mountains north and northwest of Springer, and the valley at Girty's locality 2078 southeast of Pittsburg provide the most complete measurable sections of the Caney shale. Of these three the one west of Viola was considered best because the Ahloso member is well exposed, the lower part of the Sand Branch member is present, and the exposed rocks are unusually fossiliferous. Eight of Girty's localities are concentrated in the area, and many of his illustrated types were derived from them. The south flank of the Arbuckle Mountains is unsuitable in that the Ahloso member is unrecognized and the area is remote from the one in which early studies of the Caney were made. The Pittsburg County locality is in the Ouachita province. A section measured there by Elias earlier in 1959 has been published (Elias, Branson and Amsden, 1959, p. 159-161).

From June 16 to July 2, 1959, Elias was retained as consulting geologist for the Oklahoma Geological Survey. He made a reconnaissance map of the Viola area, measured the better-exposed sections, collected fossils from Girty's localities and from new localities accurately placed stratigraphically, and marked his localities with numbered circles painted in yellow enamel. He prepared and identified the fossils, made the accompanying geologic map, and described the measured sections.

Elias had named and described the Ahloso, Delaware Creek and Sand Branch members from the immediate area or adjacent areas (1956). Here the accompanying measured Section D, beds 10 to 18 is designated the type section of the Ahloso member (49.2 feet thick); measured Section C, beds 38 to 97 (164.8 feet thick), is designated the type section of the Delaware Creek member; and Measured Section B, beds 4 to 37, is designated the type section of the Sand Branch member (172.5 feet thick). Such a division was originally suggested to him by the ease with which the Caney faunules described and recorded by Girty (1909) could be separated into three distinctly different groups (Elias 1956, p. 66-67). The oldest faunule, that of the Ahloso, was clearly indicated by Girty in his brief remarks, especially for the stations west of Viola, to come from the lower part of the Caney. The Ahloso fauna is characterized by an abundance of corneous brachiopods, especially *Lingula*, and contains a few calcareous brachiopods, some pelecypods and no cephalopods other than those newly found by Elias at his Station 8.

Table I

Fauna of the Ahloso member

Brachiopoda

Chonetes planumbonus choctawensis Girty 1909 [type]
Composita ? sp. [Girty 1909, figured]
Crurithyris sp. [Girty 1909, figured]
Leiorhynchus carboniferum Girty
Leiorphynchus carboniferum polypleurum Girty [as *L. aff. L. laura* in 1909]
Lingula albapinensis? Walcott [Girty 1909, figured]
Lingula paracletus Hall and Clark [Girty 1909, figured]
Moorefieldela n. sp.
Orbiculoidea batesvillensis Weller [Girty 1909, list]
Orbiculoidea newberryi caneyana (Girty) 1909 [type]
Orbiculoidea newberryi ovata (Girty) 1909 [figured]
Productella hirsutiformis Walcott [Girty 1909, figured]
Spirifer sp. [Girty 1909, figured]
Stenocisma cf. S. wortheni Hall
Streptorhynchus n. sp.
Tetracamera cf. T. subcuneata Hall

Lamellibranchiata

Aviculopecten caneyanus (Girty) 1909 [type]
Caneyella vaughani Girty
Conocardium sp. [Girty 1909, list]

Ostracoda

Cytherella aff. C. benniei Jones, Kirkby and Brady [Girty 1909, figured]
Sansabella unicornis (Girty) 1909 [type]

The lower part of the Delaware Creek member yields a fauna composed primarily of cephalopods, especially goniatites, and locally contains abundant shells of *Caneyella*. *Orbiculoidea* is abundant in some shale beds and conodonts are common in smoe layers. The member nearly everywhere contains *Goniatites choctawensis*, at many places in abundance, and locally with it are *Girtyoceras meslerianum*, *Lyrogoniatites caneyanus*, and *Goniatites newsomi*.

The Sand Branch member is also goniatite bearing, but contains none of the genera of the Delaware Creek. Instead it everywhere contains one or another species of *Cravenoceras*, locally in association with *Eumorphoceras*. Conodont-bearing beds occur in the upper zones.

Table II

Fauna of the Delaware Creek member

Brachiopoda

Linoproductus pileiformis McChesney [Girty 1909, figured]

Lamellibranchiata

Caneyella percostata Girty 1909 [type]
Caneyella richardsoni Girty 1909 [type]
Caneyella vaughani Girty 1909 [type]
Caneyella wapanuckensis Girty 1909 [type]

Gastropoda

Macrocheilus? sp. [Girty 1909, list]

Scaphopoda (?)

Laevidentalium? venustum? Meek and Worthen [Girty 1909, figured]

Cephalopoda

Bactrites? quadrilineatus Girty 1909 [type]
Bactrites? smithianus Girty -909 [type]
Cycloceras ballianum Girty 1909 [type]
Gastrioceras caneyanum Girty 1909 [type]
Girtyoceras meslerianum (Girty) 1909 [type]
Glyphioceras cf. G. striatum falcatum Roemer [Elias 1956]
Goniatites choctawensis Shumard 1863 [type]
Neoglyphioceras cf. N. entogonum (Gabb) [Elias 1956]
"Orthoceras" caneyanum Girty 1909 [type]
"Orthoceras" choctawense Girty 1909 [type]
"Orthoceras" crebriliratum Girty 1909 [type]
"Orthoceras" indianum Girty 1909 [type]
Rayonnoceras vaughanianum (Girty) 1909 [type]
Trizonoceras lepidum Girty 1909 [type]

Crustacea

Idiotheca sp. [Elias coll., 1959]

Conodonta

Bryantodus sp.
Cavusgnathus alta Harris and Hollingsworth 1933 [type]
Cavusgnathus cristata Branson and Mehl 1940 [type]
Gnathodus pretexanus Elias 1956 [type]
Gnathodus (Harltonodus) bilineatus (Roundy) [Elias 1959, figured]
Gnathodus (Harltonodus) bransoni Elias 1959 [figured]
Gondolella prima Elias 1956 [type]
Hamulosodina bransoni Elias 1956 [type]
Hindeodella undata Branson and Mehl 1940 [type]
Ligonodina tenuis Branson and Mehl 1940 [type]
Lonchodus cf. L. lineatus Pander
Lonchodus cf. L. simplex Pander
Neoprioniodus erectus Rexroad [Elias 1959, figured]
Neoprioniodus miseri Elias 1959 [type]

Neoprioniodus rynikeri Elias 1959 [type]
Neoprioniodus scitulus (Branson and Mehl) 1940 [type]
Neoprioniodus varians (Branson and Mehl) 1940 [type]
Prioniodus cf. P. inclinatus Hass
Solenodella mutabilis (Branson and Mehl) 1940 [type]
Spathognathodus commutatus Branson and Mehl 1940 [type]

Plantae

Sphenopteris intermedius [Elias 1956]

Table III

Fauna of the Sand Branch member

Lamellibranchiata

Aviculopecten caneyanus (Girty) [Elias 1956, list]
Caneyella wapanuckensis Girty [Elias 1956, list]

Gastropoda

Macrocheilus? micula Girty 1909 [type]
Naticopsis sp. [Girty 1909, figured]
Worthenia? sp. [Girty 1909, figured]

Cephalopoda

Cravenoceras (Richardsonites) richardsonianum (Girty) [type]
Cyrtorhizoceras? hyattianum Girty 1909 [type]
Discitoceras gratiosum (Girty) 1909 [type]
Eumorphoceras bisulcatum Girty 1909 [type]
Eumorphoceras girtyi Elias 1956 [type]
"Orthoceras" wapanuckense Girty 1909 [type]
Rayonnoceras vaughanianum (Girty) 1909 [list]
Trizonoceras lepidum Girty 1909 [list]
Trizonoceras typicale Girty 1909 [type]

Conodonta

Geniculatus longiden Elias 1956 [type]
Gnathodus glaber Elias 1956 [type]
Gnathodus streptognathoides Elias 1956 [type]
Gnathodus (Harltonodus) multilineatus Elias 1956 [type]
Gnathodus (Spathognathodus) cf. S. (S.) inornatus Hass [Elias 1956]
Gnathodus (Spathognathodus) miniden Elias 1956 [type]
Hamulosodina brevis Elias 1956 [type]
Hamulosodina cooperi Elias 1956 [type]
Hindeodella bigeniculata Elias 1956 [type]
Hindeodella longissima Elias 1956 [type]
Hindeodella mehli Elias 1956 [type]
Ligonodina? truncata Elias 1956 (type)
Lonchodina regularis Elias 1956 [type]
Prioniodella galea Elias 1956 [type]
Prioniodella galea uniden Elias 1956 [type]
Neoprioniodus? brevifundus Elias 1956 [type]
Neoprioniodus cf. N. federatus Elias [Elias 1956, figured]
Neoprioniodus roundyi dividen Elias 1956 [type]

Neoprioniodus roundyi cf. parviden Elias 1956 [Elias 1956, fig.]
Scaliognathus sp. [Elias 1956]
Solenodella multiden Elias 1956 [type]
Solenodella uniden Elias 1956 [type]
Streptognathodus primus Elias 1956 [type]

Plantae

Medullosa sp. [Elias 1956]

The Johns Valley shale of Ulrich, in fact the shale originally intended to be called Caney, is of the Delaware Creek facies in the type locality. Its faunule contains the Delaware Creek goniatites, rare *Caneyella*, and many conodont species. The many species of Foraminifera, of Bryozoa, of Ostracoda, and of Conodonta described by Harlton in 1933 are nearly all new species, but are omitted because many of them are not from the Johns Valley.

Table IV

Fauna of the Johns Valley shale

Brachiopoda

Chonetes sp. [Harlton 1933]
Composita sp. [Harlton 1933]
Derbyia sp. [Girty in Miser 1934]
Dielasma sp. [Harlton 1933]
Hustedia sp. [Harlton 1933]
Lingula albapinensis Walcott [Girty 1909, figured]
Linoproductus sp. [Girty in Miser 1934]
Orbiculoidea newberryi caneyanum (Girty) 1909 [list]
Orbiculoidea newberryi ovato (Girty) 1909 [type]
Phricodothryis sp. [Harlton 1933 as Squamularia]
Rhipidomella sp. [Girty in Miser 1934]
Rhynchopora sp. [Girty in Miser 1934]
Spirifer aff. S. rockymontanus [Girty in Miser 1934]
Spiriferina sp. [Harlton 1933]

Lamellibranchiata

Caneyella nasuta Girty [Girty 1909, figured]

Cephalopoda

Cravenoceras (Richardsonites) richardsonianum (Girty) [Girty, 1909, listed]
Girtyoceras meslerianum (Girty) [Girty 1909, list]
Goniatites choctawensis Shumard [Girty 1909, list]
Goniatites newsomi Smith [Girty 1909, list]

The Goddard shale is correlated with the Sand Branch member, and established as Chesterian in age. A large fauna from the Redoak Hollow member has been described by Elias. The more important species of the 192 known are:

Archimedes ardmorensis Elias 1958
Archimedes distans Ulrich [Elias 1956]
Archimedes meekanoides McFarlan [Elias 1958]

LITHOLOGY OF MEMBERS

Archimedes meekanus Hall [Elias 1958]
Cheilotrypa distans Elias 1958
Fenestella morrowensis Mather [Elias 1956]
Fenestella serratula Ulrich [Elias 1956]
Fenestella tenax Ulrich [Elias 1956]
Buxtonia semicircularis (Sutton and Wagner) [Elias 1956]
Cancrinella boonensis (Swallow [Elias 1956]
Diaphragmus elegans (Norwood and Pratten) [Elias 1958]
Eumetria verneuiliana (Hall) [Elias 1956]
Linoproductus ovatus (Hall) [Elias 1956]
Meekella striatocostata (Cox) [Elias 1956]
Orthotetes kaskaskiensis Weller [Elias 1956]
Phestia inflata (Girty) [Elias 1958]
Posidoniella (Caneyella) laevis Brown [Elias 1956, p. 77]
Cravenoceras oklahomensis Elias [Elias 1958]
Eumorphoceras girtyi Elias [Elias 1958]
Eumorphoceras (Edmooroceras) goddardensis Elias 1956 [type]
Gnathodus (Harltonodus) bransoni Elias 1956 [figured]
Ptilognathus fayi Elias 1956 [type]
Solenodella equiden Elias 1956 [type]
Neoprioniodus solidiformis (Elias) 1956 [type]

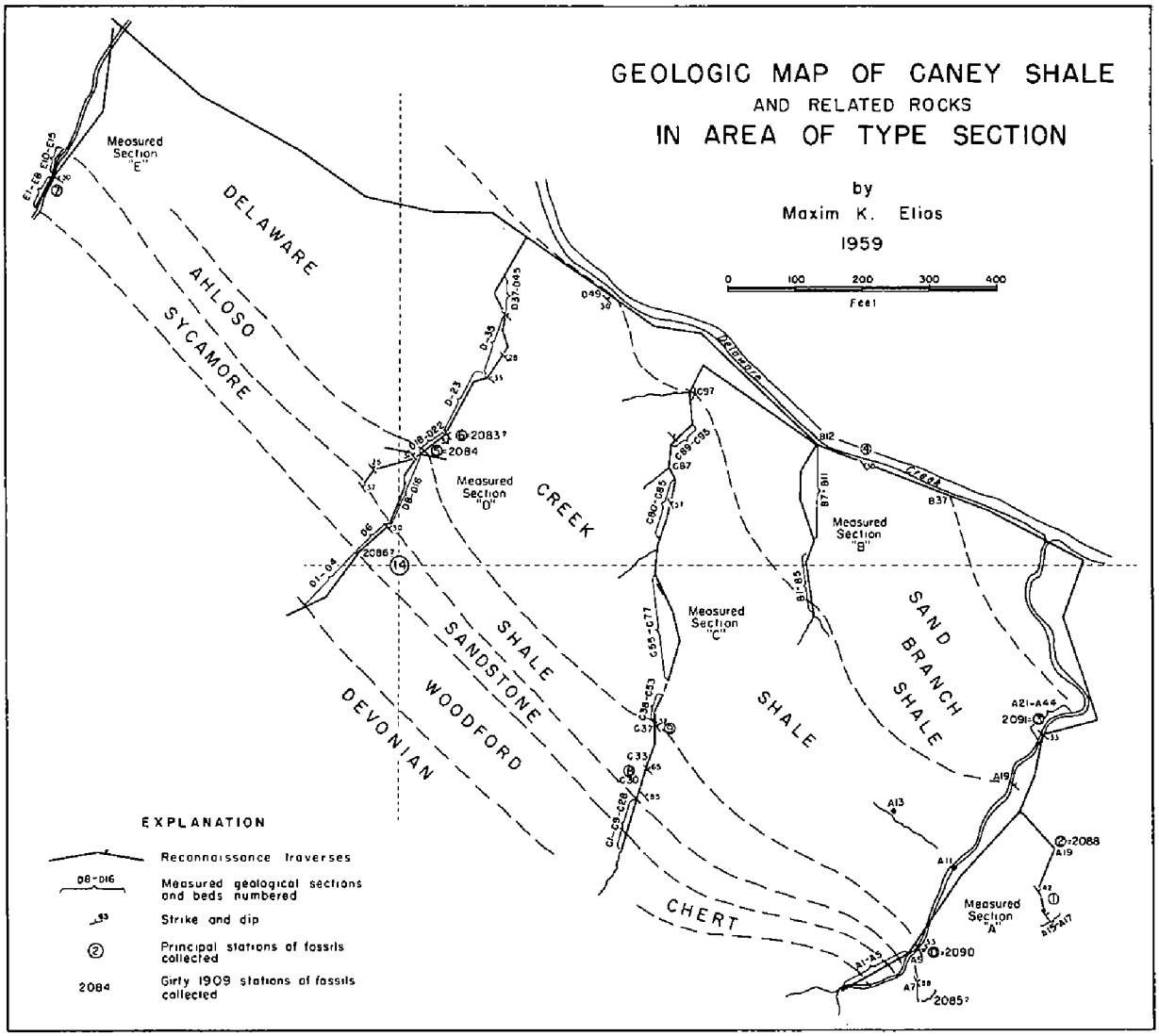
The three members of the Caney have differing lithologic characteristics (Elias 1956), but the scarcity of broad, continuous exposures has made correlation difficult. Lithologic differentiation has been greatly aided by the present investigation. The Ahloso shales are more arenaceous and contain silty shales in contrast with the unctuous shales of the Delaware Creek. There is not an abrupt change, but an intertonguing and the boundary between the two members is arbitrarily selected. By means of correlation through the newly measured sections it has been possible to trace an indurated silty shale unit one to two feet thick, with abundant *Lingula* and *Orbiculoidea*, and this bed is selected as the highest bed of the Ahloso.

The Delaware Creek and the Sand Branch members each contain clayey shale and compact shale. Silty shales are uncommon. The Sand Branch shales alone commonly contain small phosphatic concretions. The upward change is not abrupt nor clearly developed, and here also the boundary must be arbitrarily selected.

It is here suggested that the unique 5- to 6-foot thick zone of large closely spaced septarian and non-septarian limestone concretions which occurs high in the Delaware Creek member be considered the topmost bed of the member in the Viola area. Although these concretions are in easily weathered shales which leave the concretions lying on soils with no remaining bedding, they remain on slopes and divides and support a sort of bench which can be mapped with reasonable accuracy.

MEASURED SECTION A

The top of the Caney shale formation is not preserved in the type section. Near Wapanucka Elias (1956, p. 65) observed the Rhoda Creek formation resting unconformably upon the lower part of the Sand Branch member. He noted exposures of the upper part of the Sand Branch only at a locality three miles south of Wapanucka (p. 68).



CANEY SHALE (type section)

MEASURED SECTION A

Alluvium

Sand Branch member (145.45 feet):

		Thickness in feet
44.	Shale, black thinly laminated to flaky	11.+
43.	Limestone concretions, thin, pancake-like	0.05
42.	Shale, black, laminated	2.0
41.	Covered	23.5

MEASURED SECTION A

40.	Limestone concretions, gray, flattened elliptical, top with poorly preserved fossils	0.7
39.	Shale, black, flaky	2.0
38.	Limestone concretions, gray, flattened-elliptical, fossils in upper 0.2: *Cravenoceras*	1.2
37.	Shale, black, laminated	1.5
36.	Limestone concretions, gray, elliptical	0.5
35.	Shale, black, laminated	4.0
34.	Limestone concretions, gray, elliptical	0.6
33.	Shale, black, laminated to flaky, with scattered phosphatic concretions	7.5
32.	Limestone concretions, pancake-like	0.1
31.	Shale, black, flaky	6.0
30.	Shale, black, thick laminate, with scattered phosphatic concretions (supports waterfall)	7.0
29.	Shale, gray, calcareous, with abundant *Caneyella wapanuckensis*	0.05
28.	Shale, black and gray interbedded, laminated	1.8
27.	Limestone concretions, gray, elliptical	0.3
26.	Shale, black, laminated, with abundant *Caneyella wapanuckensis*	1.0
25.	Shale, black, laminated to flaky	7.5
24.	Shale, black, laminated to massive	1.0
23.	Limestone concretions, gray, septarian, pancake-like	0.15
22.	Shale, black, laminated to massive, with conodonts. *Station* 3	2.0
21.	Shale, black, laminated	21.0
20.	Covered	43.0
	Total	145.45

Delaware Creek member (197.4 feet)

19.	Zone of large limestone concretions, gray, mostly septarian but also non-septarian. Large *Goniatites choctawensis*: *Station* 2	5.0
18.	Covered	46.0
17.	Limestone concretions, gray, elliptical, large and small	up to 1.3
16.	Shale, dark-gray, coarsely laminated	4.0
15.	Shale, dark-gray, coarsely laminated: with *Orbiculoidea newberryi caneyana* (Girty) (common), *Caneyella richardsoni* (?), and few conodonts: *Hindeodella* n. sp. (same as undescribed species from lower Delaware Creek shale in Ardmore basin: 1½ mi. N. of Springer, and at 6,513.5 and at 6,521 feet in cores of Gulf Oil Corp. Riner 1); and	

MEASURED SECTION B

	Hamulosodina n. sp., aff. *H. cooperi* Elias, 1956 (same as undescribed species from lower Delaware Creek shale in Ardmore basin, Henry House Creek). *Station* 1, Dip N42E, 42°.	0.5
14.	Covered	50.0
13.	Limestone concretion, gray-buff, elliptical; with *Goniatites choctawensis, Girtyoceras meslerianum,* and *"Orthoceras"* sp.	0.6
12.	Cover	8.0
11.	Shale, black, laminated	2.0
10.	Covered	80.0
	Total	197.4
	Ahloso member (38 feet):	
9.	Shale, black, silty, massive to laminated; with *Lingula paracletus* (fairly common) and *Orbiculoidea newberryi caneyana* Girty (common). *Station* 0. Dip N39E, < 39°	2.0
8.	Covered	21.0
7.	Shale, black, silty, massive to laminated, Dip N39E, < 58°. Girty's Station 2085 (?)	5.0
6.	Covered	10.0
	Sycamore sandstone (29 feet):	
5.	Sandstone, light buff, silty, laminated	5.0
4.	Covered	14.0
	Woodford chart	
3.	Chert, greenish, interbedded with siliceous shale	27.0
2.	Covered	11.0
1.	Limestone, light-gray, thin bedded, base of Woodford not exposed	4.+

MEASURED SECTION B
CANEY SHALE

Alluvium

Sand Branch member (172.75 feet):

		Thickness in feet
37.	Shale, black, flaky	3.+
36.	Limestone concretions, gray, flattened-elliptical to pancake-like	0.3
35.	Shale, black, flaky	4.0
34.	Limestone concretions, gray, flattened-elliptical	0.2
33.	Shale, black, flaky	3.5
32.	Limestone concretions, gray, round pancake-like	0.4
31.	Shale, black, laminated	3.2
30.	Limestone concretions, gray, round pancake-like	0.4
29.	Shale, dark gray, platy to massive	29.0

MEASURED SECTION B

28.	Limestone concretions, gray, 8 x 6 feet across, fossilifrous in upper 0.1 foot: *Cravenoceras* aff. *C. malhamense* Bisat (common) *Cravenoceras cf. C. oklahomense* Elias *Eumorphoceras* cf. *E. girtyi* Elias (few) *"Orthoceras"* sp. (common) *Caneyella wapanuckensis* Girty (common) *Station* 4. Dip N45E, < 30°.	0.9
27.	Shale, dark-gray, platy to massive	1.5
26.	Limetone concretinos, gray, in two contácting rows, up to one foot thick in each	1.9
25.	Shale, dark-gray, platy to massive	2.0
24.	Limestone in concretionary streaks, gray	0.1
23.	Shale, dark-gray, platy to massive: single small (0.2 feet thick) limestone concretion at base	0.4
22.	Shale, black, flaky	0.5
21.	Shale, dark-gray, platy to massive	0.3
20.	Limestone, concretionary streaks, gray	0.1
19.	Shale, dark-gray, platy to massive	1.2
18.	Limestone, concretionary streaks, gray	0.3
17.	Shale, dark-gray, platy	2.7
16.	Limestone concretions, flattened-elliptical	0.3
15.	Shale, dark-gray, platy	5.8
14.	Shale, drak-gray, platy to massive	1.0
13.	Shale, dark-gray, platy to massive, with rare conodonts	0.05
12.	Shale, dark-gray, platy to massive, laminated below (mouth of ravine, where the rest of section was measured).	6.0
11.	Shale, black, flaky	2.0
10.	Limestone concretion, gray, flattened-elliptical	0.7
9.	Shale, black, wlaky	6.5
8.	Limestone concretion, gray, flattened-elliptical	0.5
7.	Shale, dark-gray, laminated, with small phosphatic concretions	50.0
6.	Covered	18.0
5.	Shale, dark-gray, flaky	7.0
4.	Shale, dark-gray, flaky to laminated with small phosphatic concretions (partly covered)	29.0
		172.75
	Delaware Creek member:	
3.	Limestone concretion, gray, elliptical; with *Girtyoceras* aff. *G. meslerianum*	0.3
2.	Shale, dark-gray, flaky, mostly covered	5.0
1.	Limestone concretions, septarian; mith *Goniatites choctawensis* face not exposed.	1.5

MEASURED SECTION C

CANEY SHALE

Sand Branch member

Delaware Creek member (164.8 feet):

		Thickness in feet
97.	Zone of large limestone concretions, mostly septarian, elliptical and subspherical	5.0
96.	Covered	20.0
95.	Sandstone, gray, silty (makes waterfall). Dip S36E, < 35°	1.8
94.	Shale, black, finely laminated	3.0
93.	Shale, gray, friable, partly covered	2.5
92.	Shale, black, friable, laminated	0.6
91.	Shale, gray, friable, laminated	1.7
90.	Limestone concretion, gray, elliptical	0.3
89.	Shale, black, laminated	2.0
88.	Covered	18.0
87.	Limestone concretion, septarian	0.9
86.	Covered	5.0
85.	Limestone concretion, gray, elliptical	0.4
84.	Shale, black, laminated	5.5
83.	Shale, gray, laminated. Dip N57E, < 37°	5.0
82.	Shale, black, poorly bedded, laminated, with few 0.05 feet thick limestone streaks	2.5
81.	Shale, gray, silty, calcareous, poorly bedded	0.7
80.	Shale, black, poorly bedded	2.3
79.	Covered	8.0
78.	Shale, black, laminated; mostly covered	6.0
77.	Shale, gray, friable, laminated	1.0
76.	Shale, dark-gray, silty, laminated	2.3
75.	Shale, gray, silty, poorly bedded laminated	4.0
74.	Shale, black, laminated	0.6
73.	Limestone concretion, much elongated along strike, which coincides with trend of bottom of ravine	0.4
72.	Shale, dark-gray, laminated	1.0
71.	Limestone concretion, gray, elliptical	0.2
70.	Shale, dark-gray, laminated	1.3
69.	Limestone concretionary streak	0.05
68.	Shale, dark-gray, laminated	1.0
67.	Limestone concretion, flat	0.1
66.	Shale, dark-gray, friable, laminated	4.0
65.	Limestone concretion, elliptical	0.2
64.	Shale, bladk, friable, laminated	2.5
63.	Shale, dark-gray, friable, laminated; partly covered	5.0
62.	Shale, gray, laminated	5.0
61.	Shale, dark-gray, massive to laminated	4.5

MEASURED SECTION C

60.	Shale, gray, clayey, finely laminated	2.5
59.	Shale, gray, laminated	0.5
58.	Shale, gray, clayey, finely laminated	2.4
57.	Shale, black, poorly bedded; dip N35E, < 30°	0.8
56.	Limestone concretion, flat	0.2
55.	Shale, black, poorly bedded	1.5
54.	Covered	12.0
53.	Shale, gray, clayey, thinly laminated	0.6
52.	Shale, dark gray, laminated	1.8
51.	Shale, gray, clayey	1.5
50.	Shale, black, laminated (roughly laminated in basal part)	4.0
49.	Shale, gray, laminated	3.0
48.	Shale, black, roughly laminated	0.8
47.	Shale, gray, silty, friable, laminated	2.0
46.	Sandstone, gray, calcareous, banded	0.3
45.	Shale, black, silty, fissile	0.7
44.	Sandstone, gray, silty	0.8
43.	Shale, gray, laminated	0.7
42.	Shale, black, silty, fissile	0.8
41.	Shale, gray, roughly laminated	0.8
40.	Limestone concretionary streak	0.1
39.	Shale, gray, roughly laminated, finely banded	1.0
38.	Shale, gray, silty, friable, laminated	0.7
	Ahloso member (48.2 feet):	
37.	Mudstone, gray, silty, roughly laminated, banded; with *Lingula paracletus. Station* 9. Dip N48E, < 32°	2.4
36.	Covered	2.0
35.	Limestone concretion, flattened—elliptical	0.3
34.	Covered	13.0
33.	Sandstone, gray, silty, laminated	4.0
32.	Sandstone, gray, silty, flaggy, finely banded; dip N39E, < 65°	5.0
31.	Covered	8.5
30.	Limestone concretion, gray to buff; with *Goniatites choctawensis. Station* 8. (The concretion with what appears to an ordinary speciment of *Goniatites choctawensis sensu lato* is quite like the ordinary limestone concretions that carry this goniatite occasionally in the overlying Delaware Creek shale, exposed in this same ravine. However, the nearest horizon with this kind of concretions in the Delaware Creek is so far down the ravine, that it is physically impossible for them to float down the slopes of the ravine and	

	quite a bit up the ravine in order to be lodged at the place low in the Ahloso where the concretion (Bed 30) has been found. Hence the occurence of its goniatite must be considered the first record of *G. choctawensis* (or any goniatite) in the Ahloso. The common fossils in the Ahloso, and particularly *Lingula,* indicate shallower waters than those of the Delaware Creek and the local occurrence of the Delaware Creek facies in the Ahloso seems to indicate an earlier local advance of this facies in Ahloso time.)	1.0
29.	Covered	12.0
	Sycamore sandstone (51.5 feet):	
28.	Sandstone, buff, laminated; dip SE, < 85°	6.0
27.	Clay, light-gray, silty	1.0
26.	Sandstone, clayey, laminated	0.8
25.	Clay, silty	2.0
24.	Sandstone, silty	0.3
23.	Clay, silty	1.0
22.	Sandstone, clayey, consolidated below	2.0
21.	Clay	0.3
20.	Sand, silty, friable	2.0
19.	Shale, buff, silty, friable, laminated	6.0
18.	Covered	12.0
17.	Clay, light-gray to buff, silty	4.0
16.	Sandstone, brownish, clayey, friable	2.5
15.	Clay, silty	3.0
14.	Sandstone, clayey, friable, laminated	2.0
13.	Clay, silty, friable, laminated	3.5
12.	Sandstone, greenish, massive to thin bedded	1.2
11.	Mudstone, light-green, laminated to crumbly	1.2
10.	Clay, gray, laminated	0.7
	Woodford chert (19.6 feet exposed)	
9.	Chert, greenish-gray	0.2
8.	Clay, greenish-gray	0.4
7.	Chert, greenish-gray	0.8
6.	Chert, greenish-gray, laminated	0.6
5.	Chert, greenish-gray	0.6
4.	Shale, gray, clayey	0.4
3.	Chert, greenish-gray	0.3
2.	Shale	0.3
1.	Chert, in beds 0.2-0.3 feet thick, interbedded with siliceous shale	16.0
	base not exposed	

MEASURED SECTION D

CANEY SHALE

Sand Branch member (not measured)

Delaware Creek member (140.6 feet):

(along ravine)

		Thickness in feet
49.	Zone of large limestone concretions, mostly septarian, elliptical and flattened elliptical, up to 1.5 feet thick in diameter? each	5.0
48.	Covered	37.0
47.	Shale, black, flaky	3.0
46.	Covered	2.0
45.	Limestone concretion, septarian	0.4
44.	Shale, black, flaky to laminated	4.0
43.	Shale, gray, laminated	4.0
42.	Shale, black, laminated	0.8
41.	Limestone concretion, gray to rusty, flattened elliptical	0.4
40.	Shale, black, laminated	4.0
39.	Limestone concretion, flattened elliptical	0.2
38.	Shale, black, laminated; in middle part two thin rusty sandy streaks	4.5
37.	Limestone concretion, dark-gray, much elongated along strike, with black cherty nodules in middle part	0.6
36.	Covered	19.0
35.	Shale, black, laminated; dip N28E, < 35°	8.0
34.	Limestone concretion, ls., pancake-shaped	0.3
33.	Covered	6.0
32.	Shale, black, laminated	1.0
31.	Covered	5.5
30.	Limestone concretions, gray, weathered buff, elliptical and subspherical; with poorly preserved *Goniatites choctawensis?*	0.4
29.	Shale, black, laminated	1.0
28.	Limestone concretion, gray, elongate along strike; with poorly preserved *Goniatites choctawensis* (?)	0.2
27.	Shale, black, laminated, mostly covered	5.0
26.	Limestone concretion, gray, elongate along strike	0.15
25.	Shale, black, laminated	3.0
24.	Limestone concretion, buff-gray, flattened-elliptical	0.3
23.	Shale, black, laminated	13.0
22.	Limestone concretion, buff-gray, with *Goniatites choctawensis. Station 6.*	.3
21.	Covered	8 .0
20.	Limestone concretion, ls., fragmentary, in bottom of ravine; with large *Goniatites choctawensis*	0.5

MEASURED SECTION E

19.	Shale, black, laminated	13.0
	Ahloso member (49.2 feet):	
18.	Shale, dark-gray, silty, massive to laminated, with *Lingula paracletus* and *Orbiculoidea. Station* 5	1.0
17.	Covered	25.0
16.	Limestone concretion, gray, silty, roughly laminated; dip N43E, < 41°	0.7
15.	Shale, gray, silty, finely banded, laminated	11.0
14.	Shale, gray, silty, laminated	2.0
13.	Shale, gray, silty, coarsely laminated	.5
12.	Shale, gray, silty, flaggy	2.0
11.	Shale, gray, silty, laminated	1.0
10.	Shale, brownish-green, silty	5.0
	Sycamore sandstone (51.5 feet):	
9.	Sandstone, silty, laminated	28.0
8.	Sandstone, silty, flaggy	1.5
7.	Covered	11.0
6.	Sandstone, greenish-gray, silty, laminated	1.0
5.	Covered	10.0
	Woodford chert	
4.	Chert, greenish-gray, crumbly, mostly covered	14.0
3.	Chert, greenish-gray, flags A.2-0.3 foot thick, interbedded with siliceous shale	3.0
2.	Shale, siliceous	20.0
1.	Limestone, gray to light-gray, thin bedded	14.+
	base of Woodford not exposed.	

MEASURED SECTION E

Ahloso shale (not measured)

Sycamore sandstone (37.2+ feet):

		Thickness in feet
28.	Clay, light greenish-gray	0.5+
27.	Sandstone, light greenish-gray, spotted buff, silty, massive, friable. Strike N11E, < 30°	1.5
26.	Sandstone, greenish-gray, spotted buff, silty, roughly laminated	0.7
25.	Sandstone, greenish-gray, silty, laminated	0.5
24.	Clay, light greenish-gray, silty	0.1
23.	Sandstone, light greenish-gray, spotted buff, silty, friable	1.0
22.	Sandstone, buff, silty	0.6
21.	Clay, light greenish-gray, silty, laminated	1.7
20.	Sandstone, gray, weathers to buff, laminated	0.4
19.	Sandstone, gray to dark-gray, roughly laminated	0.7
18.	Clay, light-gray, spotted buff, silty, finely laminated	0.7

17.	Sandstone, gray, silty, laminated	1.0
16.	Clay, light greenish-gray, silty	0.4
15.	Sandstone, greenish-gray, silty, friable	0.2
14.	Clay, light greenish-gray, silty	0.5
13.	Shale, gray, silty, flaky to laminated	5.5
12.	Sandstone, greenish-gray, silty, laminated to massive	1.5
11.	Covered	1.5
10.	Sandstone, greenish-gray, silty, laminated	1.0
9.	Shale and silty clay, laminated, mostly covered	4.0
8.	Sandstone, gray, silty, flaggy to massive (makes waterfall). Strike N65W	1.3
7.	Sandstone, gray, silty, laminated, friable	3.0
6.	Sandstone, gray, weathers buff, flaggy to massive. Brachiopods in upper 0.4: *Orbiculoidea,* "pseudo-*Composita,*" *Productella* cf. *P. hirsutiformis,* and new undescribed genus related to *Horridonia* (encountered in lower part of Sycamore limestone of Ardmore basin)	1.0
5.	Shale, gray, silty	2.0
4.	Sandstone, gray, silty, laminated, friable	13.0
3.	Covered	7.0
2.	Shale, black, fissile	0.1
	Woodford chert:	
1.	Chert, greenish	

Our interpretation of the Caney shale places the typical formation as a Mississippian unit consisting of the Meramecian Ahloso member, the Delaware Creek member (later Meramecian and early Chesterian), and the late Chesterian Sand Branch member. The type section is that in section 14, T. 2 S., R. 7 E., here given as Section A, augmented by Sections B to D. The Goddard shale is considered a facies of the Sand Branch member. The Johns Valley shale as presently interpreted contains in its lower part, probably an Ahloso equivalent, definitely a Delaware Creek equivalent, and possibly a Sand Branch equivalent. The Delaware Creek correlates with the Moorefield of northeastern Oklahoma and Arkansas. The Sand Branch contains a fauna similar to those of the Fayetteville and the Pitkin of northeastern Oklahoma.

The Sycamore sandstone exposed below the Caney type section is quite unlike the Sycamore of its type area and may be a facies grading into the Ahloso member.

References Cited

Branson, C. C., Elias, M. K., and Amsden, T. W., 1959, Type of *Goniatites choctawensis*: Okla. Geology Notes, vol. 19, p. 157-164.

Branson, E. B., and Mehl, M. G., 1940, Caney conodonts of Upper Mississippian age: Denison Univ., Sci. Laboratories, Jour., vol. 35, p. 167-178.

MISSISSIPPIAN	CHESTERIAN	Caney sh. — Sand Branch mem.	Johns Valley shale	Goddard shale
	MERAMECIAN	Caney sh. — Delaware Cr. mem.		"Caney" shale
		Caney sh. — Ahloso member		absent
		Sycamore ss.		
				Sycamore limestone
			Jackfork group	
	OSAGEAN (?)		Stanley group	
	KINDERHOOKIAN	absent	Arkansas — Upper Division	Welden limestone
DEV.	CHATTANOOGAN	Woodford shale	Arkansas — Middle Division	Woodford shale

CORRELATION OF MISSISSIPPIAN STRATIGRAPHIC UNITS IN SOUTHERN OKLAHOMA

REFERENCES

Elias, M. K., 1956, Upper Mississippian and Lower Pennsylvanian formations of south-central Oklahoma: Petroleum Geology of Southern Oklahoma, vol. 1, Amer. Assoc. Petroleum Geologists, p. 56-134.

Elias, M. K., 1953, New data on Dinantian-Namurian equivalents in America: Congress Carbonifere, Heerlen, Third, Comptes Rendue, p. 189-201.

Elias, M. K., 1959, Some Mississippian conodonts from the Ouachita Mountains: The Geology of the Ouachita Mountains, Dallas and Ardmore Geol. Societies, p. 141-165.

Girty, G. H., 1909, The fauna of the Caney shale of Oklahoma: U. S. Geol. Survey, Bull. 377.

Gould, C. N., 1925, Index to the stratigraphy of Oklahoma: Okla. Geol. Survey, Bull. 35.

Harlton, B. H., 1933, Micropaleontology of the Pennsylvanian Johns Valley shale of the Ouachita Mountains, Oklahoma, and its relationship to the Missisippian Caney shale: Jour. Paleontology, vol. 7, p. 3-29.

Harlton, B. H., 1938, Stratigraphy of the Bendian of the Oklahoma salient of the Ouachita Mountains: Amer. Assoc. Petroleum Geologists, Bull., vol. 22, p. 852-914.

Harris, R. W., and Hollingsworth, R. V., 1933, New Pennsylvanian conodonts from Oklahoma: Amer. Jour. Science, vol. 225, p. 193-204.

Miser, H. D., 1934, Carboniferous rocks of Ouachita Mountains: Amer. Assoc. Petroleum Geologists, Bull., vol. 18, p. 971-1009.

Miser, H. D, and Honess, C. W., 1927, Age relations of the Carboniferous rocks of the Ouachita Mountains of Oklahoma and Arkansas: Okla. Geol. Survey, Bull. 44, 28 pages.

Morgan, G. D., Geology of the Stonewall quadrangle, Oklahoma: [Okla.] Bureau of Geology, Bull. 2.

Taff, J. A., 1901, Description of the Coalgate quadrangle: U. S. Geol. Survey, Geologic Atlas, folio 74.

Taff, J. A., 1902, Description of the Atoka quadrangle: U. S. Geol. Survey, Geologic Atlas, folio 79.

Taff, J. A., 1903, Description of the Tishomingo quadrangle: U. S. Geol. Survey, Geologic Atlas, folio 98.

Taff, J. A., 1909, Grahamite deposits of southeastern Oklahoma: U. S. Geol. Survey, Bull. 380, p. 286-297.

Ulrich, E. O., 1927, Fossiliferous boulders in the Ouachita "Caney" shale and the age of the shale containing them: Okla. Geol. Survey, Bull. 45, 48 pages.

Westheimer, J. M., 1956, The Goddard formation: Petroleum Geology of Southern Oklahoma, vol. 1, Amer. Assoc. Petroleum Geologists, p. 392-396.