OKLAHOMA GEOLOGY NOTES

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Serendipity

Dick Hicklin of Oklahoma City calls attention to a word eminently applicable to petroleum operations. The dictionary defines it as "The ability of finding valuable things unexpectedly." An instance is the trait of a man who falls into a mud hole and climbs out with a diamond in his hand. Dick defines it as the term for a case of an operator who drills a nice closure, passes through an unanticipated unconformity and in low dip enters a prolific sand wedge-out.

Dr. C. W. Tomlinson acknowledges the aptness of the term for himself and partners in the discovery of the Southwest Ardmore Field. The objective was a shallow Pennsylvanian sand in the anticlinal fold within the Pleasant Hill syncline. The hole passed out of Pennsylvanian at 200 feet, had slight Bromide shows, and entered 42 feet of productive Tulip Creek. All connected with that well can be truly said to possess serendipity.

Old Stratigraphic Names Made Available

Carl C. Branson

Names of stratigraphic units must be geographic names. An example is the Checkerboard limestone of Oklahoma. The name was given informally for the appearance of the jointed bed. The name was invalid until C. N. Gould formalized it by naming Checkerboard Creek and designating a point on that creek as type locality.

In sparsely populated areas unused names are scarce and in other regions unimaginative settlers applied such prosaic names as Red Creek, Beaver Creek, Willow Creek, Bald Knob. Only one stratigraphic unit in the United States can have the same name. The name Oswego limestone was earlier used for a unit in New York; the Pawnee limestone of Drake, named from Pawnee, Oklahoma, is invalid because the name Pawnee limestone, from Pawnee, Kansas, is an older published name for another stratigraphic unit.

At a conference in Lawrence, Kansas, held on October 17, 1955, this writer suggested that little-used names, names given to unrecognizable units, and names only vaguely proposed be restored to availability for use as stratigraphic names. The examples used were Shoshone, a tentatively suggested, ill-defined, and unused name in Wyoming; Vinita, used but once (preoccupied, however, by the name of a Virginia Triassic unit), and Norman, used by Gould in 1902 for a vaguely defined unit and by Kirk in 1904 for part of the Garber sandstone.

Oklahoma has numerous names which should be restored to availability. Arkansas has such useless names as Sebastian, Winslow, Paris, Spadra, Norristown, and Tomlinson. Kansas has such unnecessarily unavailable names as Belvidere, Chetopa, and Parsons. The following names are officially declared by the Oklahoma Geological Survey to be abandoned in their earlier sense and to be available for use as stratigraphic names. The names were used for units poorly defined, already named, or unrecognizable. In no case were they used for long nor do the names appear at many places in the literature.

Blue Creek (series). Name given by Wood in 1925 (Geol. Soc. Amer., Bull., vol. 11, p. 135) to the Cambrian clastics below the Arbuckle limestone. Name is from Blue Creek, Comanche County. Unit is Reagan sandstone and the lower and sandy part of the Honey Creek formation. No series concept is warranted.

Bodine (sandstone). Eldridge in 1901 applied the name of an asphaltic sandstone pit in Murray County to an asphaltic sandstone in the Simpson group (U. S. Geol. Survey, 22d Ann. Report, part 1, p. 274). The sandstone is probably a bed in the Bromide formation.

Broken Arrow (formation). Name of the city in Tulsa County given by Wood in 1925 (Okla. Geol. Survey, Bull. 35, p. 71) to a facies of the Labette shale and Nowata shale in the area where Oologah and Lenapah were not recognized. The term is not useful and the name is one of those applied to the Croweburg coal bed.

Cabin Creek (sandstone). Name used in error by Weidman (Okla. Geol. Survey, Bull. 56, p. 23) in 1932 for Little Cabin sandstone. Croneis had used the name in 1930 for a subsurface sandstone in Arkansas.

Cavaniol (group). Drake gave this variant spelling of Cavanal to strata of the upper part of the Hartshorne formation, the McAlester formation, and part of the Savanna formation. (Amer. Phil. Soc., Proc., vol. 36, p. 371, 1897). The name is for Cavanal Mountain. The group concept is not useful and has not been employed.

Chandler (formation). The Pennsylvanian portion (as then understood) of the red beds was named Chandler by Kirk in 1904 (Okla. Dept. Geology Nat. History, 3d Bien. Report, p. 9). The systemic boundary was not established and the concept is not useful. The name is for the city of Chandler, Lincoln County.

Chapman (dolomite). Named for Chapman's amphitheater in Blaine County and applied to dolomites in the top part of the Blaine by Cragin (Amer. Geologist, vol. 19, p. 353, 358, 363, 1897). Not a recognizable member. If validated the name would preoccupy Chapman sandstone of Maine, a well known formation named in 1899.

Claremore (formation). Name given by Gould et al. (Okla. State Univ., Research Bull. 3, p. 6, 1910) to a vaguely defined unit including Ft. Scott limestone and subjacent strata. Named for the city of Claremore, Rogers County.

Comet Creek (bed). An outlier of Lower Cretaceous was named for the creek in Custer County by Hill (Amer. Jour. Sci., vol. 150, p. 228, 1895).

Craig (shale). Clark and Cooper in 1927 (Okla. Geol. Survey, Bull. 40-H, fig. 3) published the name from Ohern's manuscript. The unit was not understood and approximates pre-Warner Pennsylvanian in Craig County, the source of the name.

Criner (formation). Name given by Ulrich (U. S. Nat. Museum, Proc., vol. 76, article 21, p. 73) in 1930 to a part of the Simpson group. The unit may be the Corbin Ranch formation of Harris and may include the Pooleville member of the Bromide of Cooper. The name is from the Criner Hills of Carter and Love Counties.

Curl (formation). Name given to the strata from the base of the Hogshooter to the top of the Lenapah by Ohern (Okla. State Univ., Research Bull. 4, p. 26, 1910). Named for Curl Creek, Nowata County.

Custer (formation). Roth in 1932 grouped the Whitehorse, Cloud Chief and Quartermaster and considered them of Triassic age. The grouping is not recognized and the name is not used. The name is from Custer County. (Jour. Geology, vol. 40, p. 688, 689).

Dixon (sandstone). Eldridge states that he named the unit for the Indian upon whose allotment the rock occurs (U. S. Geol. Survey, 22d Ann. Report, part 1, p. 277, 1901). The sandstone is probably in the Oil Creek formation. If restored, the name would invalidate the well known Dixon limestone, Silurian, of Tennessee, named in 1903. The name has also been used for a Kentucky Pennsylvanian sandstone, a schist in New York, and an Upper Cretaceous chalk in Nebraska.

Eleventh Street (limestone). Named by Dott in 1935 for Eleventh Street in Tulsa (Okla. Acad. Sci., Proc., vol. 16, p. 68). Later found to be the Lenapah limestone.

Enid (formation). Name of city in Garfield County applied by Gould in 1905 (U. S. Geol. Survey, Water Supply Paper 148, p. 39) to a thick

group indefinitely defined and consisting of Permian red beds to base of gypsum in the Blaine.

Falls (formation). A name given by Ulrich in 1930 (U. S. Nat. Museum, Proc., vol. 76, article 21, p. 73) to an Ordovician unit in the Arbuckle Mountains. Named for Falls Creek, Murray County.

Flat-top (sandstone). Named for a hill in Pittsburg County by Chance in 1890 (Amer. Inst. Min. Eng., Trans., vol. 18, p. 653). Informally proposed. Flattop schist is a Precambrian unit in North Carolina; Flat-top limestone is a Devonian or Mississippian bed in Colorado. Flat Top sand is a subsurface unit in southern Oklahoma.

Garvin (beds). Name of Garvin County given to undifferentiated Permian red beds in subsurface by Denison (Amer. Assoc. Petroleum Geologists, Bull., vol. 7, p. 627, 1923).

Geronimo (series). Named for the Apache chief; thus not geographic. Given by Bain in 1900 (Geol. Soc. America, Bull., vol. 11, p. 135) to a poorly understood sequence beneath the Permian in the Wichita Mountain region.

Glass Mountain (formation). Cragin in 1900 used the name for an indefinite Permian unit exposed in the Glass Mountains of Major County (Amer. Geologist, vol. 19, p. 353, 355).

Glenn (formation). Named by Taff (U. S. Geol. Survey, Folio 98, 1903) from Glenn, Carter County, to apply to all rocks below the Pontotoc and above the Caney shale. Unit is a lumping of four series.

Greer (division). Named for Greer County by Gould in 1902 (Okla. Geol. Nat. History Survey, 2d Bien. Report. p. 42, 52) to designate rocks of the Blaine and rocks mistakenly thought to correlate with it.

Hominy (formation). A name on Gould's map of 1905 and taken from the town of Hominy, Osage County (U. S. Geol. Survey, Water Supply Paper 148, p. 32). The formation is a grouping of a thick sequence of Pennsylvanian and Permian rocks.

Kingfisher (formation). Name taken from town in Kingfisher County. Vaguely defined Permian unit, name not used again. (Cragin, Amer. Geologist, vol. 19, p. 352, 1897).

Lincolnville (chert). Informal name in zinc-mining district from name of town in Ottawa County. Name published by Weidman (Okla. Geol. Survey, Bull. 56, p. 17) for a bed in the Keokuk, but not formally proposed as a stratigraphic name.

Marietta (clays). Clays now classified as Weno were named for the town in Love County by Hill in 1894 (Geol. Soc. America, Bull., vol. 5, p. 302). An earlier usage of the name was by White in 1891 for a Permian sandstone in Ohio, and a later one was by Savage in 1930 for a Pennsylvanian unit in Illinois.

Memorial (shale). A manuscript name of R. H. Dott for Holdenville shale, named for Memorial Park in Tulsa. Moore published the name in 1936 (Kans. Geol. Survey, Bull. 22, p. 58, 67).

Minco (division). Named for the town of Minco, Grady County, by Green (Amer. Assoc. Petroleum Geologists, Bull., vol. 21, p. 1518, 1521, 1937) and applied to strata from top of Herington or top of Stratford to base of Marlow.

Muskogee (group). Gould et al. in 1910 applied the name to the rocks from the top of the Mississippian to the base of the Calvin sandstone (Okla. State Univ. Res. Bull. 3, p. 6, 7). The name is that of Muskogee County. The concept is valueless.

Narcissa (sandstone). The name was inadvertently given by Weidman (Okla. Geol. Survey, Bull. 56, p. 24, 1932) to the unit he recognized as the Little Cabin sandstone. The name is from the town in Ottawa County. It was published only because it was on the map that had been prepared for the report.

Newkirk (limestone). Hutchison in 1911 gave the name of the Kay County seat to the Herington limestone (Okla. Geol. Survey, Bull. 2, p. 206).

Oklahoma (series). Name proposed by Ashley in 1923 for the lower part of the Permian system (Eng. and Min. Jour.-Press, vol. 115, p. 1106). Keyes in 1896 proposed an Oklahoman series for Permian rocks and he modified the concept in 1901 (Amer. Geologist, vol. 18, p. 22; vol. 28, p. 299).

Okmulgee (group). Moore in 1931 gave the name of the city and county to a poorly defined and unrelated sequence (Kan. Geol. Soc., 5th Ann. Field Conference, chart).

Peaceable (sand). The name appears on Plate 64 of Taff, probably taken from Peaceable Creek, Hughes County (U. S. Geol. Survey, 19th Ann. Report, part 3, 1899). The name Gerty sand is contemporaneous and is the established name.

Poteau (stage). Winslow gave the name to the higher Pennsylvanian strata of eastern Oklahoma, essentially the Boggy formation (N. Y. Acad. Sci., Trans., vol. 15, p. 51, 1896). The name is from Poteau Mountain, LeFlore County. The unit is not useful and should be suppressed with the associated stage names Sebastian and Tomlinson.

Quapaw (chert). A miner's term from the name of the village in Ottawa County used informally by Weidman (Okla. Geol. Survey, Bull. 56, p. 17, 1932).

Ralston (group). The name of the city of Ralston, Pawnee County, was given by Gould et al. to the strata between the base of the Pawhuska and the base of the Wreford (Okla. State Univ., Res. Bull. 3, p. 7, 13). If validated the name preoccupies the name Ralston formation; Eocene, of Wyoming.

Ramona (formation). The name was given to the rocks from the base of the Dewey limestone to the top of the Avant limestone (Ohern, Okla. State Univ., Res. Bull. 4, p. 36, 1910). The name is from that of the town in Washington County.

Sand Creek (formation). Sand Creek is a stream in Osage County and Gould gave its name to the strata from the base of the Grayhorse to the top of the Foraker (Okla. Geol. Survey, Bull. 35, p. 79). The concept is not useful.

Smithville (chert lentil). A chert lentil in the Stanley shale was given the name of the village in McCurtain County by Miser and Honess (Okla. Geol. Survey, Bull. 44, p. 11, 1927). The name has not been used and if allowed to stand preoccupies the well known name of a Lower Ordovician limestone of Arkansas.

Stony Hills (formation). The name was suggested by Cragin (Amer. Geologist, vol. 19, p. 358, 1897) as more appropriate than Dog Creek. The name was taken from Stony Hills, Blaine County.

Strange (formation). The name of the Strange ranch was applied by Decker to a dolomite facies of the McKenzie Hill formation (Okla. Geol. Survey, Circular 22, p. 24). Dolomitization is localized within the McKenzie Hill and the dolomite facies is not stratigraphically significant.

Table Mountain (sandstone). A local name for Duncan sandstone mentioned by Gould in 1924 (Amer. Assoc. Petroleum Geologists, Bull., vol. 8, p. 328). The name is for Table Mountain in Garvin County. If used it would invalidate Table Mountain formation, Cenozoic of California.

Talihina (chert). Taff gave the name to the Ordovician, Silurian and Devonian rocks of the Potato Hills (U. S. Geol. Survey, Folio 79). The sequence is now divided into formations.

Taloga (formation). Cragin applied the name to Cloud Chief and Quartermaster rocks (Amer. Geologist, vol. 19, p. 362). The name is that of a village in Dewey County.

Ti Valley (series). The name was given by Cooper (Jour. Geology, vol. 55, p. 268, 1947) to rocks he considered Morrowan and Atokan. The valley is in Pittsburg County.

Tiger Creek (sandstone). A fusulinid-bearing sandstone in Creek County named by Taff (U. S. Geol. Survey, Bull. 661 B, p. 73, 1917) and later made the basal member of his Bristow formation (1925). It appears to be the Paola "limestone" member of the Oread formation.

Tulsa (group). The name of the county was applied by Gould et al. to strata of the Marmaton group (Okla. State Univ., Res. Bull. 3, p. 6, 10).

Wanette (division). The name was proposed by Green for the rocks from the top of the Brownville to the top of the Stratford (Amer. Assoc. Petroleum Geologists, Bull., vol. 21, p. 1518, 1937). The name is from the town in Pottawatomie County.

Wilburton (group). Moore in 1931 grouped Atowa and early Krebs rocks under the name of Latimer County town (Kan. Geol. Soc., 5th Ann. Field Conference Guidebook, chart).

Woodward (group). The name of the county was given by Gould to a poorly understood sequence including Dog Creek, Whitehorse and Day Creek (Okla. Dept. Geology Nat. History, 2d Bien. Report, p. 42, 49, 1902).

Geochemical Prospecting

Geochemistry is defined in Webster's International Dictionary as the study of the chemical composition, and of actual and possible chemical changes, in the crust of the earth, whereas Mason in his Principles of Geochemistry (1952) defines geochemistry as concerned with:

1. The determination of the relative and absolute abundance of the elements***in the earth.
2. The study of the distribution and migration of the individual elements in the various parts of the earth***with the object of discovering the principles governing this distribution and migration.

The reader may take his choice. The layman may show a preference for the dictionary definition and that would be understandable. In any event, it seems clear that geochemistry is a specialized field of the over-all science of chemistry and is limited to naturally occurring materials; that is, it is not interested in chemical synthesis other than those brought about by natural causes.

Geochemical prospecting is obviously concerned with the discovery, extent, and recoverability of mineral materials, including rocks and minerals (ores), coal, asphalt, petroleum, water, and certain gaseous materials found in the earth or in the atmosphere. Hawkes in his bulletin "Geochemical Prospecting" (1957) states that the subject includes "any method of mineral exploration based on systematic measurements of the chemical properties of a naturally occurring material." He does limit the measurements to mineral materials probably because considerable use is made of both chemical and botanical studies of vegetation as a means for locating areas potentially ore bearing.

Without attempting to discuss the how and why, that is, the causes and processes of ore deposition and the numerous contributing factors it may be stated that the analyses of rocks, soils, waters, and vegetation are made for the purpose of locating "geochemical anomalies or areas where the chemical pattern indicates the presence of ore in the vicinity." Practical mineral exploration depends upon information on *average* abundance of certain elements in earth materials and on natural laws that control the disposition of the elements and the formation of anomalies where the concentration is above the average. In order for geochemical prospecting to be effective it is essential, according to Hawkes, that there be "a thorough understanding of geochemical anomalies, how they form, how they find them, and how to appraise them when they are found." In other words, geochemical prospecting may not be as simple as indicated in the definition.

Persons interested in the subject are referred to "Principles of Geochemical Prospecting" by H. E. Hawkes, U. S. Geological Survey Bulletin 1000-F, obtainable from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price 40¢. Obtainable from the same source is "Geochemical Prospecting Abstracts" by Jane E. Erikson, U. S. Geological Survey Bulletin 1000-C, priced at 20¢, which contains much information on methods of sampling and analysis.

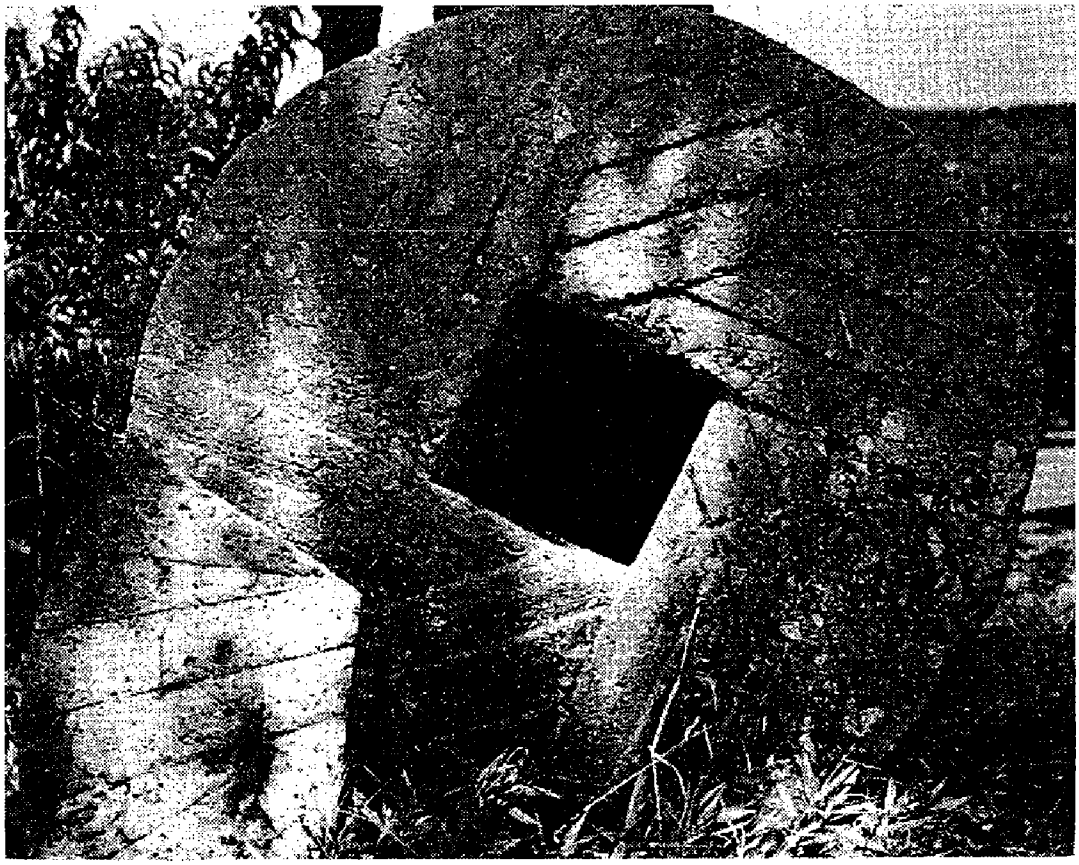
A.L.B.

Paleontologists Add to Historical Record

Two Oklahoma micropaleontologists, Dr. W. S. Hoffmeister of Carter Research Laboratories and Dr. L. R. Wilson, consultant with the laboratories and on the staff of the O. U. School of Geology and the O. G. S., saw a millstone in the grounds of Gilcrease Museum in Tulsa. The chert from which it was shaped contains fossils, and among these the two scientists saw charophytes which they recognized as from the Tertiary of the Paris Basin. The millstone was traced back to a salt works at Salina, Oklahoma. No other French millstone has been found as far west in the United States.

Charophytes are fresh-water primitive plants. Their spore case is composed of spiral elongated cells upon which the plant deposited calcium carbonate. In the case of the occurrence in the French chert, these had later become silicified. The tracing of the source of the Gilcrease millstone is recorded in The Link of July-August 1957.

The same two micropaleontologists had earlier recognized living charophytes in a flooded coal strip-pit one mile north of Fleming, Kansas. This occurrence appears to extend the known geographic range of the group.



Millstone from French Tertiary, containing
Brachychara medicaginula. Grambast and Grambast, 1954.

Rejected Oklahoma Stratigraphic Names

Carl C. Branson

No two stratigraphic units in the United States may have the same name. A unit which received the same name later than the other should be renamed. Oklahoma units which have been given names already used elsewhere are listed below and the replacement name is listed in cases where such replacements have been made.

Ada formation. The name was given by Shideler in an abstract to the "Fernvale" of Oklahoma (Geol. Soc. America, Proc. for 1936, p. 36, 1937). The name had earlier been used by Morgan for a Pennsylvanian formation and by Reger for a Mississippian shale of West Virginia.

Addington formation. Early Permian red beds were given the name by Bunn in 1930 (Okla. Geol. Survey, Bull. 40-PP, p. 8). The name is that of a town in Jefferson County. The name had been used for a sandstone member of the Wise formation of Virginia.

Alden limestone. The name was used by Decker in 1933 (Tulsa Geol. Soc., Digest, vol. 2, p. 55, 56) for the Arbuckle unit later named Kindblade limestone. The name had been used by Van Tuyl in 1925 for a Mississippian limestone in Iowa.

Beaver gypsum. The name was given by Cragin in 1897 (Amer. Geologist, vol. 19, p. 359) to a gypsum occurring near Beaver City and in Beaver County. The bed is in the Cloud Chief formation. The name had been used in 1890 for Cambrian or Ordovician in Texas and in 1895 for a Lower Cambrian unit in Tennessee.

Bristow formation. A name given to the predominantly sandstone sequence in the vicinity of Bristow, Creek County, by Fath (U. S. Geol. Survey, Bull. 759, p. 13, 1925). It is essentially the upper part of the Missourian and part of the Vamoosa formation. The name had been used in 1924 for a shale and sandstone in the Chester of Indiana.

Brushy Creek chert. The Devonian cherts on Brushy Creek in Pittsburg County were named by Ulrich in 1927 (Okla. Geol. Survey, Bull. 45, p. 30). The name had earlier been used for a Pennsylvanian sandstone in Illinois. The unit is now called Pinetop chert.

Bull Creek limestone. The limestone on Bull Creek in Osage County was named by Greene in 1918 (Amer. Assoc. Petroleum Geologists, Bull., vol. 2, p. 121). The name had been used in 1893 for a Pennsylvanian sandstone in Texas. The member is the Birch Creek limestone.

Cameron sandstone. The sandstone in the McAlester formation below the Stigler coal was named for the town of Cameron, LeFlore County, by Thom and the name was published by Wilson (Amer. Assoc. Petroleum Geologists, Bull., vol. 19, p. 504, 507, 1935). The name had been used in 1934 by Caster for a red shale in the Mississippian of Pennsylvania. No replacement of the Oklahoma name has been made.

Cimarron anhydrite. Schweer applied the name to a bed in the Hennessey of Woods County in 1937 (Amer. Assoc. Petroleum Geologists, Bull., vol. 21, p. 1553). The name had been used by Cragin in 1896 for a Permian group in Kansas and by Keyes in 1904 for Permian of New Mexico.

Delhi dolomite. If corrected to correspond with the name of the town, Gould's name Delphi is preoccupied by the name Delhi limestone (Devonian) of Ohio and by the name Delhi formation (Mississippian) of California.

Delphi dolomite. Gould unaccountably spelled his member name Delphi although he named it for the village of Delhi, Beckham County (Okla. Dept. Geology Nat. History, 2d Bien. Report, p. 42, 56). The unit is the Mangum dolomite. The name Delphi had been used previously for a Devonian black shale in Indiana and was used in 1930 for a Middle Devonian unit in New York.

Dillard formation. Maxwell gave the name Dillard to the Pink-crinoidal member of the Chimneyhill (Northwestern Univ., Summaries of Doctoral Dissertations, vol. 4, p. 134, 1936). The name had been used for a Lower Cretaceous "series" in Oregon and was replaced by Clarita member (Amsden 1957).

Elm Creek limestone. The name of a creek west of Miami, Ottawa County, was given to a thin ferruginous limestone in the Hartshorne formation by Weidman (Okla. Geol. Survey, Bull. 56, p. 25, 1932). The name had been used in 1893 for a Permian limestone in Texas and in 1918 for a Missourian limestone in Texas. Weidman's name has not been replaced and there seems little reason to give the thin and poorly known bed a name.

Enterprise sandstone. The name of the Haskell County village was given to the unit now known to be the Bluejacket sandstone (Tulsa Geol. Soc., Digest, vol. 1, p. 37, 1932). In any case the name had been used previously for a greensand (Eocene) in Mississippi and for a shale in the Kansas Permian.

Grand River limestone. Brant gave the name to the unit which has later been proved to be the Hindsville limestone in his thesis (Univ. of Tulsa, 1941) and the name was published in 1951 (Tulsa Geol. Soc., Field Guide, p. 27, 32). The name had been used for a Pennsylvanian unit in Michigan.

Hawkins limestone. Part of Reeds' Oolitic member of the Chimneyhill was named Hawkins by Maxwell (Northwestern Univ., Summaries of Doctoral Dissertations, vol. 4, p. 134, 1936). The name had been used for an Upper Paleozoic formation in Washington and for a Cambrian limestone in New Mexico. Amsden in 1957 gave the new name Ideal Quarry to the member.

Hickory sandstone. The sandstone member of the Oil Creek formation was called Hickory by Edson in 1935 (Amer. Assoc. Petroleum Geologists, Bull., vol. 19, p. 1127). The name had been used earlier for an Upper Cambrian sandstone in Texas. No replacement of the preoccupied name has been made and none seems necessary.

Hollis limestone. The name was used by Guthrey and Milner for a Deese limestone. The Hollis quartzite of Alabama was named in 1926. Tomlinson has given the name Natsy member to the unit (1937).

Homer limestone. A lentil in the Holdenville shale was named for Homer School, near Ada, by Morgan (Bureau of Geology, Bull. 2, p. 104, 1924). The name had been used in 1921 for a member of the Wayan formation (Cretaceous) in Idaho. No replacement of the preoccupied name has been made.

Jolly limestone. A thin limestone in the Savanna formation was named for the J. S. Jolly farm in Pontotoc County by Morgan (Bureau of Geology, Bull. 2, p. 74, 1924). The name was used in 1912 for a Pennsylvanian limestone in Kentucky. The preoccupied name has not been replaced, nor should it be without detailed study of the outcrops.

Nebo formation. Ulrich suggested the name of a village in Murray County for a formation in the Simpson group, and Decker published the name (Amer. Assoc. Petroleum Geologists, Bull., vol. 14, p. 1495, 1496, 1930). The name had been used for a Lower Cambrian unit in Tennessee and Ulrich in 1930 gave the name Oil Creek to the Oklahoma formation.

Paoli sandstone. The name of the village in Garvin county was given to a sandstone member of the Wellington by Green (Amer. Assoc. Petroleum Geologists, Bull., vol. 20, p. 1465, 1936). The name had been used for a Mississippian limestone in Indiana. Although Wilmarth (Lexicon of Geologic Names in the United States, p. 1599) shows a usage of the name for a Pennsylvanian limestone in Kansas, that name is correctly Paola.

Rock Creek limestone. The name of the creek in Osage County was given by Greene in 1918 to a limestone member of the Vamoosa formation (Amer. Assoc. Petroleum Geologists, Bull., vol. 2, p. 122). The name was earlier used for a Pennsylvanian limestone in Illinois, for Pleistocene beds in the Texas Panhandle, for a gabbro in British Columbia. Bowen had named the same limestone Labadie in the same year, and this is the accepted name.

Shawnee sandstone. A Pennsylvanian sandstone in Pittsburg County was named by Taff in 1899 (U. S. Geol. Survey, 19th Ann. Report, plate 64). A Pennsylvanian limestone in Ohio had been given the name Shawnee in 1878. Haworth named the Shawnee formation in Kansas in 1898 and this unit has since been raised to group status. The Shawnee sandstone of Taff was named Thurman sandstone in the text of his 1899 report (p. 439).

Webster formation. An unpublished name of Ulrich for the limestone now called Corbin Ranch. The name Webster was published by Edson (Amer. Assoc. Petroleum Geologists, Bull., vol. 19, p. 1122, 1935), but the name had been used by Shepard in 1905 for a Devonian "group" in Missouri.

Wildhorse sandstone. A sandstone along Wildhorse Creek was named by Brockway and Owens in 1923 (Okla., Acad. Sci., Proc., vol. 3, p. 96). This is probably Dott's Unit 4 and lies in the Wellington formation. The name had been used for a dolomite lentil in the Missourian of Osage County and was later given to a Pleistocene formation in Oregon.

Wolf Creek dolomite. In a short article Decker gave the name Wolf Creek to Arbuckle rocks above the McKenzie Hill. This is perhaps the Butterly dolomite. The name Wolf Creek had been used since 1892 for a Devono-Carboniferous conglomerate in New York. (Tulsa Geol. Soc., Digest, vol. 2, p. 55, 1933).

Ardmore Society Holds Trip in Criner Hills

The Ardmore Geological Society held a field conference in the Criner Hills on September 13 and 14, 1957. The area was chosen because of the interest generated by recent discoveries of oil in the region.

The conference was attended by 227 registrants and was led by Drs. E. A. Frederickson and Hugh E. Hunter of the University of Oklahoma. Robert C. Lang, III, spoke after the Thursday dinner and later discussed subsurface conditions at some of the stops. Dr. C. W. Tomlinson and G. Carl Hale contributed to these discussions. The weather was fine, the arrangements were ideal, and bus transportation was a factor in making travel easy and on schedule. The committee did an outstanding job in preparing the trip and several service companies contributed generously to equipment, refreshments, and entertainment.

The guide-book is an excellent publication. It was edited by James H. Kempf of Seaboard, aided by an editorial advisory committee of 3, by 8 volunteer draftsmen, and by two men who contributed photographs. The book contains a memorial to Clinton E. Nearhood, Vice President of the Society, who was suddenly taken from us on July 6. It contains a long article on the geologic history of the Criner Hills by Robert C. Lang, III, short articles on 5 oil fields, abstracts of theses on the Devils Kitchen conglomerate and on Desmoinesian stratigraphy. In the pocket are a photomosaic map of the area, a paleogeologic map by B. K. Reed, a geologic map of the southern Ardmore Basin from Shell plane-table sheets, and a colored geologic map of the Criner Hills by E. A. Frederickson.

The road log was prepared by H. T. Weichbrodt and Jack W. Williams, with geologic comments by E. A. Frederickson and H. E. Hunter. Copies of the 79-page book with the four maps in the pocket are obtainable from the Society for $6.50; bound in hard cover, $8.00. The book contains an extraordinary amount of original information and should be in the library of every geologist interested in southern Oklahoma. C.C.B.

Study of a Kansas Nodular Bed

Two geologists of the State Geological Survey of Kansas have just published an excellent study of an unusual marine facies in the Virgilian of that state. The bed is a one-foot shale containing phosphatic concretions. Its stratigraphic position is at the top of the Haskell limestone and in the base of the Robbins shale, both in the Douglas group. The nodules are primarily of calcite and collophane. These nodules carry a faunule of shark teeth and spines, paleoniscid brain casts, scales, and bones, cephalopods, arthropods, and *Orbiculoidea.*

The shale above the nodule zone contains a mixed faunule with numerous conodonts and foraminifers. A thin goethite layer contains a molluscan faunule. The nodule zone is more closely related to the Haskell limestone than to the Robbins shale. The environment of deposition is considered to be one of shallow, foul marine waters.

In Oklahoma a similar faunule occurs in the nodules in the black shale between the Breezy Hill limestone and the Blackjack Creek limestone member of the Fort Scott formation. The nodules carry fish remains, shagreen granules of sharks, an edestid, goniatites, and *Orbiculoidea.* Other

nodule zones, which have not been investigated, are those at the base of the Pawnee limestone, at the base of the Verdigris limestone, and at the base of the Tiawah limestone. These are black shale zones below limestones. Two nodule zones above limestones occur in Oklahoma, one at the top of the Tiawah limestone and one at the top of the Checkerboard limestone. These should be studied in the same manner as the excellent investigation of Halsey W. Miller and Ada Swineford. Their article is "Paleoecology of nodulose zone at top of Haskell limestone (Upper Pennsylvanian) in Kansas," Amer. Assoc. Petroleum Geologists, Bull., vol. 41, p. 2012-2036, September 1957. C.C.B.