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OKLAHOMA GEOLOGY NOTES

EDWARD OSCAR ULRICH

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Cover Picture

Edward Oscar Ulrich

Edward Oscar Ulrich's scientific career spanned a period of nearly 70 years, during which he made valuable contributions to diverse aspects of geology. Although most of his work was concerned with areas other than Oklahoma, he left an indelible mark upon the geologic literature of the State.

During the late 1920's, Oklahoma received much attention from Dr. Ulrich when he was engaged in studies of the Cambrian, Ordovician, and Canadian (Ozarkian) Systems of the State. He named 19 formations found in Oklahoma: Cambrian—Fort Sill, Honey Creek, Royer, and Signal Mountain; Ordovician—Blakely, Bromide, Cool Creek, Criner, Falls, Joins, McLish, Oil Creek, and Tulip Creek; Devonian—Brushy Creek; Mississippian—Pitkin; Pennsylvanian—Hale, Johns Valley, and Morrow.

Dr. Ulrich also wrote papers on the Mississippian and Pennsylvanian Systems. In 1927 the Oklahoma Geological Survey published his paper *Fossiliferous Boulders in the Ouachita "Caney" Shale and the Age of the Shale Containing Them* as Bulletin 45. In this bulletin Dr. Ulrich proposed the name Johns Valley shale as a new name for the Ouachita Caney. The introduction of this name into the literature aroused much discussion among geologists, but in 1934 the U. S. Geological Survey adopted the name for the boulder-bearing black shale (0 to 1,000 feet) in Mississippian and Pennsylvanian rocks in the area south and east of the Ti Valley-Choctaw belt of the Ouachita Mountains.

Interested from early childhood in fossils, Dr. Ulrich wrote extensively on bryozoans, cephalopods, brachiopods, conodonts, ostracodes, and Paleozoic stratigraphy, totalling about 120 titles, some of which treat Oklahoma in part.

In 1877, at the age of 20, Dr. Ulrich became curator of the Cincinnati Society of Natural History, holding this position until 1879. From 1880 to 1883 he worked in Little Caribou Silver Mines, Boulder, Colorado; from 1883 to 1885 he was in school; from then until 1897 he worked for the Illinois, Kentucky, Minnesota, and Ohio Geological Surveys. In 1897 he joined the U. S. Geological Survey, retiring in 1932. He had joined the U. S. National Museum in 1914, and he continued with it until his death in 1944.

The cover picture, taken of Dr. Ulrich in 1919, was obtained through the courtesy of G. Arthur Cooper, chairman of the Department of Paleobiology, U. S. National Museum.

—R. O. F.

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Prepared by KENNETH S. JOHNSON

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Index

Basement-Rock Report Issued

Bulletin 95, *Basement rocks and structural evolution of southern Oklahoma,* by William E. Ham, Rodger E. Denison, and Clifford A. Merritt, was issued by the Survey on December 22, 1964. The study involved surface and subsurface mapping, isotopic age determinations, chemical analyses, and examination of cuttings and cores of more than 80,000 feet of basement rocks, from which evolved a comprehensive picture of the distribution, structure, and history of the Precambrian and pre-Upper Cambrian Paleozoic rocks of the area. Among the major results of the investigation are: (1) the realization that not all the igneous rocks of the Wichita and Arbuckle Mountains are contemporaneous and that they include two major groups differing in age by more than 500 million years, (2) the recognition of the age and extent of the Southern Oklahoma geosyncline, and (3) an understanding of the profound influence of Precambrian and pre-Upper Cambrian tectonic events upon the subsequent geologic history of the area throughout Paleozoic time.

The report consists of a text of 302 pages and a plastic folder containing five plates. The text is illustrated with 19 illustrations and 12 plates and contains an appendix of petrographic descriptions of basement rocks from 178 wells. Four of the plates contained in the plastic folder are colored maps and structure sections; the fifth plate is of graphic logs illustrated by photomicrographs. Sale price is $5.00 with a paper-bound text, $6.00 with cloth-bound text.

Florinites versus *Cordaianthus*—A Problem in Nomenclatural Procedure*

L. R. Wilson

A recent palynological publication by Maliavkina (1964) raises a point of nomenclatural procedure that if carried to a logical conclusion will create many problems in palynological taxonomy and for paleobotanists in general. Briefly, this procedure is the assignment of fossil Sporae dispersae species to fructification genera and the suppression of original and valid generic names of sporomorphs. The example used here for discussion is *Florinites parvus* because it illustrates the problem and because the writer is coauthor of both the genus (Schopf, Wilson, and Bentall, 1944) and the species (Wilson and Hoffmeister, 1956).

Maliavkina has placed into synonymy with *Cordaianthus* Renault, 1879, a Cordaitales fructification genus, the following Sporae dispersae genera: *Zonaletes* (pars), *Cordaitina,* and *Florinites* (pars). *Florinites parvus* is the only earlier described species transferred in the paper, although fifteen or sixteen others, because of their structural similarity, could also be transferred if this procedure is followed. The specimens of *Florinites parvus* and two other species reported as *Cordaianthus* by Maliavkina (1964) were not observed in fructifications.

Specimens resembling *Florinites pellucidus* have been reported by Wilson (1960) as occurring in sporangia of *Cordaianthus Schuleri,* but it was considered unwise to transfer the Sporae dispersae species *Florinites pellucidus* to *Cordaianthus Schuleri* or even to *Cordaianthus* because the sporomorph species description is so broad that it could involve more that one "natural" species from the same or different genus, geological age, and/or paleoecology. Also it is conceivable that all fossils assigned to *Cordaianthus* may not be phylogenetically similar.

If the practice of transferring Sporae dispersae genera and species to fructification genera becomes general, then a parataxa system will become prevalent, and the result will be confusion of unforeseeable proportion. It is also conceivable that at some future time the fructifications will be assigned to other fossil-plant genera or species. As an example, one might cite what could happen to the Sporae dispersae genus *Lycospora* if the above procedure becomes a general practice. *Lycospora* resembles microspores found in the strobili of dendroid Lycopsidia, but there are spores of modern species of *Lycopodium, Selaginella,* and some trilete filicinean forms that might, in the Sporae dispersae state, be placed in the spore genus *Lycospora.* If *Lycospora* species were transferred to the fructification genus *Lepidostrobus,* or *Sporangiostrobus,* erroneous phylogenetic inferences too numerous to

* Report of one study conducted under National Science Foundation Grant GB-1850.

mention would result. Further, this confusion would be enlarged if species of *Lepidostrobus* were transferred to *Lepidodendron* or other genera. The recognition of similarity between extinct sporomorph species and extinct fructification types is desirable, but it is not objective to state that all Sporae dispersae fossils resembling those in question belong to a certain fructification genus. Observing, for example, that certain sporomorphs are essentially filicinean, cordaitalean, gnetalean, or angiospermous, is desirable and necessary to accomplish certain types of paleoecological goals, but this does not imply a need for nomenclatural procedure such as that noted above.

Maliavkina (1964) described, in addition to reporting *Florinites parvus* from the Siberian Triassic rocks, two new species as *Cordaianthus excelsus* and *C. radiatus* which might be species of *Florinites*. However, the interpretive drawing (pl. 2, fig. 16) of *Cordaianthus excelsus* indicates that a proximal trilete germinal structure is present, which, if correct, would exclude the sporomorph from the genus *Florinites*. Also the description and drawing (pl. 2, fig. 17) of *Cordaianthus radiatus* indicate that a larger germinal cell is enclosed in the saccus than is general for the genus *Florinites*. Further study of the cited and additional specimens is necessary before these species can be assigned to proper genera.

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Gypsum Quarry Operating at Fletcher, Comanche County, Oklahoma

Kenneth S. Johnson

On September 1, 1962, the Castile Mining Company, a subsidiary of Texas Gypsum Company, began operating an open-pit quarry one mile northeast of Fletcher (fig. 1) in northeastern Comanche County, Oklahoma. High-purity gypsum, 97 to 98 percent pure, is being mined from the basal portion of the Cloud Chief Formation (Upper Permian, Ochoan?) and shipped to Dallas, where the Texas Gypsum Company uses the rock for manufacturing wallboard. Mr. Myron Hemmingson, quarry superintendent for Castile, kindly provided information concerning mining operations and gave assistance in obtaining samples through use of the company shot-hole drilling rig.

At present the Castile Mining Company operations are confined to this one quarry, employing four people and shipping approximately 2,000 tons of quarry-run rock each week via truck. The total output is consumed by the Texas Gypsum Company plant in the production of about 400,000 square feet of wallboard per day. Future plans call for installation of crushing equipment at the quarry to provide agricultural gypsum products for local sale.

Location of the quarry site near Fletcher, about 60 miles southwest of Oklahoma City and 18 miles north-northeast of Lawton, resulted from an exploratory drilling program in the area and consultation with Dr. William E. Ham of the Oklahoma Geological Survey. In the area selected for quarrying it was found that massive gypsum at the base of the Cloud Chief is of high purity, does not contain layers of shale or other contaminants, and is as much as 65 feet thick. Furthermore, although some lenses of residual anhydrite were found in other gypsum deposits of the district, none occurs in the land leased by Castile.

Reserves on the 80 acres under lease are about 5 million tons of gypsum, which will last about 50 years at the present rate of production. Additional resources immediately northeast and southwest will enable future expansion of quarry operations in the Fletcher area.

In this part of Oklahoma, gypsum in the lower part of the Cloud Chief Formation is preserved as nearly horizontal outliers along the Permian axis of the Anadarko syncline. Individual outliers are variable in size (up to 25 square miles) and are largely covered by Quaternary deposits and soil. The upper surface of the gypsum is everywhere, eroded in these outliers, so that the original thickness of the evaporite bed in this area is unknown. Forty miles northwest of Fletcher, where the top of the gypsum is uneroded, the unit is about 100 feet thick.

Gypsum in Castile's quarry is white to pinkish-white fine-grained alabaster with scattered thin selenite veins which are subparallel to bedding. Also present are scattered single-crystal porphyroblasts of selenite, up to 0.5 inch in diameter, which constitute about 5 percent of the rock. The larger porphyroblasts have caused some concern for Texas Gypsum Company in its wallboard plant, for, whereas alabaster readily powders in the grinding operation, these selenite porphyroblasts generally emerge in large flakes which are not easily calcined.

On May 25, 1964, continuous samples were obtained from two air-drilled holes made at the quarry (figs. 1, 2). Inasmuch as the

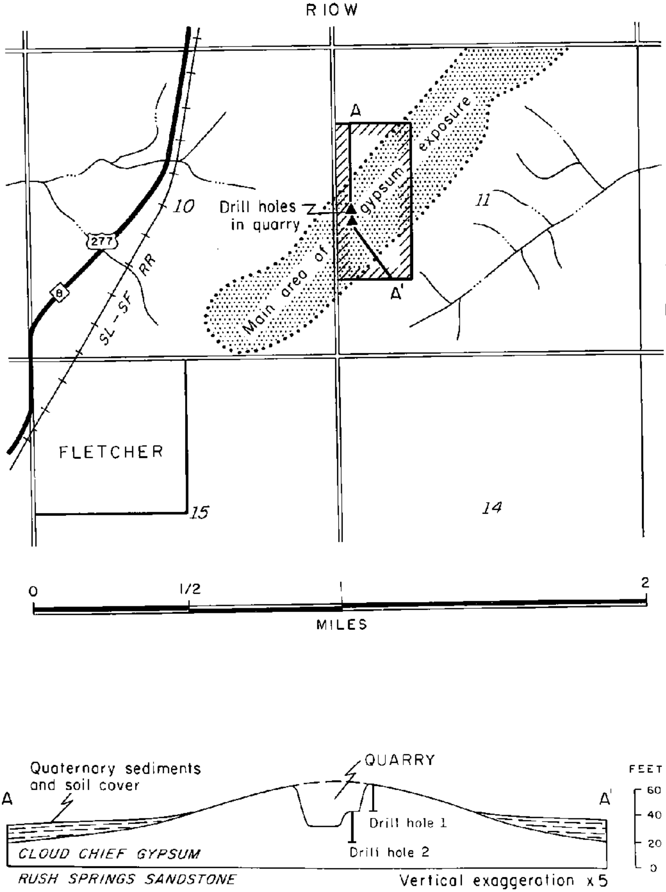

Figure 1. Map of the Fletcher area showing area of principal exposure of Cloud Chief Gypsum and limits (hachured lines) of the Castile Mining Company property. Below is a generalized cross section through the quarry area.

Figure 2. Open-pit quarry in the Cloud Chief Gypsum. Drill hole 1 was started on upper level where shot-hole rig is seen, and drill hole 2 was started on middle level seen in center of picture.

quarry was opened where the gypsum was thickest, the uppermost 5 feet of gypsum had been removed by the time the quarry was visited, and only 60 feet of rock was still available for sampling. Drill hole 1 (NW¼ NW¼ SW¼ sec. 11, T. 4 N., R. 10 W.) started at the highest point in the quarry and was drilled to a depth of 20 feet. Drill hole 2, also 20 feet deep, was drilled about 100 feet north of drill hole 1. The second hole was started on a floor level 20 feet below the top of the first hole, and thus a complete 40 feet of section was sampled continuously. An attempt to drill the basal 20 feet of the deposit was unsuccessful. Therefore, of the 65 feet of gypsum that had been present when the quarry was opened, samples from drill hole 1 represent rock from 40 to 60 feet above the base, and samples from drill hole 2 represent rock from 20 to 40 feet above the base.

The two composite samples from these drill holes were analyzed chemically at the Survey's geochemical laboratory (table I). The samples were high-purity gypsum, with calculated theoretical purities

TABLE I.—CHEMICAL ANALYSES OF CLOUD CHIEF GYPSUM FROM QUARRY AT FLETCHER

(Figures are in weight percent; J. A. Schleicher, analyst)

DRILL HOLE	1	2
LABORATORY NO.	10684	10685
SiO_2	0.32	0.59
Al_2O_3	0.19	0.25
Fe_2O_3	0.05	0.04
CaO	32.46	32.09
MgO	0.13	0.53
CO_2	0.41	0.64
SO_3	45.85	45.72
H_2O	20.49	20.29
Total	99.90	100.15
CALCULATED COMPONENTS		
$CaSO_4 \cdot 2H_2O$ (gypsum)	97.92	96.96
$CaSO_4$ (anhydrite)	0.56	1.04
$CaCO_3$	0.61	0.14
$MgCO_3$	0.27	1.11

of 97.92 percent for drill hole 1 and 96.96 percent for drill hole 2. Anhydrite constitutes 0.56 and 1.04 percent of the two samples, and the total of both calcium and magnesium carbonates is 0.88 and 1.25 percent, respectively. Of the other compounds which were analyzed, silica makes up 0.32 and 0.59 percent, and aluminum and ferrous oxides together constitute 0.24 and 0.29 percent, respectively.

Castile Mining is one of eight companies currently mining gypsum from the large reserves in western Oklahoma; its Fletcher quarry is the first such operation in Comanche County. Two other companies produce gypsum from the Cloud Chief Formation, near Cement in Caddo County and near Colony in Washita County. From the Blaine Formation even larger production is obtained, by three companies in Blaine County, by one in Canadian County, and by one newly operating company near Duke in Jackson County. Gypsum production in Oklahoma in 1964 was 577,000 tons, valued at $1,543,000.

Oologah is now Oologah

The *Sixth Report of the United States Geographic Board, 1890 to 1932* gave the spelling of the Oklahoma name Oologah as Oolagah. The decision was in error and has been inconsistently followed, as was pointed out by Branson (1964). A recent reversal of the decision by the Board (1964) corrected the error.

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Decisions on Oklahoma Place Names

Carl C. Branson

Place names, and in some cases their pronunciation and definition of the feature, are made by the U. S. Board on Geographic Names. The organization was the United States Board on Geographic Names in the Coast and Geodetic Survey from 1890 to 1906. From 1906 to 1934 the name was United States Geographic Board, and it was an independent agency. From 1934 to 1947 the board was called Board on Geographical Names in the Department of the Interior, and in 1947 it again became the Board on Geographic Names, in the Department of the Interior. It is now an agency in the U. S. Geological Survey.

The first Board published six reports tabulating decisions and the Board on Geographical Names published 41 lists of decisions. The new Board on Geographic Names has published Lists of Decisions numbered according to the year in which the decisions were made; for instance, 5904, the fourth list of the year 1959.

The total number of decisions on Oklahoma names is but 62. Some of these are modifications or reversals of previous decisions. The decisions noted, arranged alphabetically, are as follows (asterisk indicates modified or revised decision):

Acker Creek (not Eckler Canyon). Osage County.
 List 6303, p. 38.

Alluwe (not Al-lu-we). Village in Nowata County.
 Sixth Report, p. 90.

Arkansas River. Colorado, Kansas, Oklahoma, and Arkansas.
 Sixth Report, p. 102. Pronunciation said to be ark'-en-saw, which is incorrect for Kansas. In List 5904, p. 39.

Bear Creek (not Cowskin Creek). Pawnee County.
 List 5904, p. 39.

Big Cabin Creek (not Cabin Creek). Craig County.
 Lists 4907-4909, p. 14.

*Big Caney River. See Caney River.

Boggy Creek (not Bossy Creek, Gypsum Creek). Jackson and Harmon Counties.
 List 6002, p. 42.
 This is considered a bad decision. Local residents call it Gypsum Creek and it is such on the *Geologic Map of Oklahoma* and on Highway Department maps. The many Boggy Creeks in southeastern Oklahoma are well known and are better described by the name.

*Bossy Creek. See Boggy Creek.

Canadian River (not Red or Canadian, nor Upper Canadian). New Mexico, Texas, and Oklahoma.
 Sixth Report, p. 190.

*Caney Creek. Elk County, Kansas, to Washington County. Tributary of Caney River.
Sixth Report, p. 191.
Changed in List 6302, p. 53, to Little Caney River.

Caney River. Elk County, Kansas, Washington and Rogers Counties.
Sixth Report, p. 191.
Modified in List 6302, p. 53 (not Big Caney River).

Carrizo Creek. Colorado and Cimarron County.
Sixth Report, p. 197.

Cavanal Mountain and railroad station (not Kavanaugh). Le Flore County.
Sixth Report, 203.

*Choteau Creek and village. Mayes County.
Sixth Report, p. 219.
Changed in Lists 4801-4806 to Chouteau.

Chouteau (not Choteau). Mayes County town.
Lists 4801-4806, p. 12. Change of earlier decision.

Chouteau Creek (not Choteau). Mayes County.
Lists 4801-4806, p. 12. Change of earlier decision.

Cimarron River (not Seme-rone). New Mexico, Colorado, Kansas, and Oklahoma. Pronounced sĕm-a-rōn.
Sixth Report, p. 221.

Cowskin Creek. Pawnee County. Tributary of Bear Creek.
List 5904, p. 39.

*Eckler Canyon. See Acker Creek.

Elk River (not Cowskin). Delaware County.
Sixth Report, p. 287.

El Reno (not Elreno). City and township in Canadian County.
Sixth Report, p. 288.

Fourche Maline (not Fourche Malene nor Malin). Latimer and Le Flore Counties.
Sixth Report, p. 309.

Friendship Creek (not Gyp Creek). Washita County.
List 6401, p. 49.

Gans (not Gann). Town and township, Sequoyah County.
Sixth Report, p. 317.

Gerty (not Guertie nor Raydon). Town in Hughes County.
Sixth Report, p. 322.

Going Snake (not Goingsnake). Village in Adair County.
Sixth Report, p. 328.

Greenleaf Lake. Muskogee County.
List 5006, p. 21.

*Guertie. See Gerty.

Gyp Creek. Washita County.
List 6401, p. 49.

Gypsum Creek. See Boggy Creek.

Honess Mountain. Le Flore County.
List 6102, p. 42.

*Kavanaugh Mountain. See Cavanal Mountain.

Kellyville (not Kelleyville). Creek County.
Sixth Report, p. 421.

Kiamichi Mountains (not Kiamitia nor Kimishi). Le Flore County.
River. Choctaw, Le Flore, and Pushmataha Counties.
Sixth Report, p. 426.

Legas Lake (not Childers Lake). Wagoner County.
List 6401, p. 40.

Little Caney River (not Caney Creek, not Middle Caney Creek).
Change of former decision.
List 6302, p. 53.

McAlester (not Mac Allster, Mac Allister, nor South McAlester).
Pittsburg County.
Sixth Report, p. 483.

Mountain Fork (not Little River, Mountain Fork River, Mountain Fork Little River, Mountain Fork of Little River).
List 6303, p. 38

Muskogee (not Muscogee). City in Muskogee County.
Revision of previous decision.
Sixth Report, p. 539.

Nelagoney Creek and town (not Nelagony). Osage County.
Sixth Report, p. 548.

Neosho River. Kansas and Oklahoma.
Revision of previous decision.
Pronounced nē-ō′-shō. Commonly called Grand River in Oklahoma.
Sixth Report, p. 548.

North Fork Red River.
List 5903, p. 46.

Nowata (not Noweta). City in Nowata County.
Sixth Report, p. 563.

*Ockmulgee. See Okmulgee.

Oklahoma. State. Pronounced ō-kla-hō′-ma.
Sixth Report, p. 569.
List 5401, p. 48.

Oklahoma City. City in Oklahoma County.
Sixth Report, p. 570.

Okmulgee (not Ockmulgee nor Okmulkee). City in Okmulgee County.
Sixth Report, p. 570.

Oktaha. Town in Muskogee County.
Sixth Report, p. 570.

Old Retrop (not Retrap Center, Retrop Center). Washita County.
Name is patronymic Porter, spelled backwards.
List 6401, p. 49.

Oologah. Town in Tulsa County.
Revision of former decision for Oolagah.
List 6401, p. 49.

Ouachita Mountains. Arkansas and Oklahoma.
Sixth Report, p. 577.

Petros. Railroad station, Le Flore County.
Sixth Report, p. 599.

Ponca City (not Ponca nor Ponka). City in Kay County.
Revision of earlier decision.
Sixth Report, p. 613.
Prairie Dog Town Fork Red River (not Red River, not South Fork Red River).
List 5903, p. 46.
*Raydon. See Gerty.
Red River.
Sixth Report, p. 636. As Oklahoma-Texas boundary east of 100th Meridian.
List 5903, p. 46.
List 6003, p. 41.
*Retrop Center. See Old Retrop.
Sallisaw (not Salisaw nor Salaiseau). Creek, town, and township, Sequoyah County.
Sixth Report, p. 661.
Salt Fork Red River.
List 5903, p. 46.
Savanna (not Savannah). Township and village in Pittsburg County.
Sixth Report, p. 674.
*Seme-rone River. See Cimarron River.
Sequoya (not Se-quo-ya nor Sequoyah).
Believed to be in error.
Sixth Report, p. 682.
Straight Creek (not Bois d'Arc). Bryan County.
Sixth Report, p. 723.
Tulsa. City in Tulsa County.
Sixth Report, p. 772.
Wauhillau (not Wau-hil-lau). Township in Adair County.
Sixth Report, p. 805.
Wetumpka (not Wetumka). Town in Hughes County.
Revision of previous decision.
Sixth Report, p. 811.
Decision needs reversal. Town name is spelled Wetumka on all current maps, post office is Wetumka, and formation name is Wetumka.
Wewoka (not We-wo-ka). Town in Seminole County, creek in Seminole and Hughes Counties.
Sixth Report, p. 811.

Color on an Oklahoma Rugose Coral

Carl C. Branson

A specimen of a rugose coral was collected by Allen Graffham and purchased for our collection. The single specimen came from the Fayetteville Shale (Chesterian) in a road cut on Will Rogers Turnpike northeast of Vinita, Craig County (NE¼ sec. 13, T. 25 N., R. 20 E.). The specimen was identified by Graffham as *Neozaphrentis* Grove, but the calyx (written calice by most authors of coral papers) is not cleaned out nor are serial sections available, and the generic assignment must remain doubtful.

The specimen is 31 mm high and is marked by nine brownish bands of color, the lower ones broad and regular, the upper ones narrow and irregular. They are normal to the axis of growth and thus terminate at the oblique calyx margin. The pattern is not considered to be a normal pattern of the coral hard parts. It seems unlikely that the bands are repeated iron-stained deposits of corallite material formed as the sea water received more iron, even though pyrite is common in the Fayetteville. The orientation of the bands is, however, parallel to the growth lines. Inasmuch as only one specimen is at hand, it is possible, although an unlikely coincidence, that the bands are stains from the rock as it weathered and that there is a slight differential permeability in the corallite at different levels parallel to the growth lines.

More specimens will be sought. Coralline hard parts are not known to have color patterns, and it is unlikely that one would have.

Figure 1. Successive lateral views (left to right) of specimen of a rugose coral with color bands, x2, OU 4483. Specimen was rotated right to left.

(Photographs by Jan Cannon)

Status of Topographic Mapping in Oklahoma

Carl C. Branson

Topographic maps are invaluable to highway planners, irrigation engineers, tax assessors, city planners, soils scientists, water-resources men, and other specialists. To geologists they provide bases for areal mapping, for mineral-reserve calculation, for structural studies, for geomorphologic research. Oklahoma lags far behind most states in topographic coverage. Twenty-one states are completely mapped. Complete coverage of the State at a scale of 1:24,000 (7.5-minute quadrangles) would require 1,198 quadrangles, of which 185 are printed, 139 in process, and 64 authorized—a total of 388 (about one-third of the area of the State). An additional area equal to 289 7.5-minute quadrangles is published on 15-minute quadrangles, and an area equal to eight 7.5-minute quadrangles is in process for 15-minute maps. The total coverage by maps of useful scale will, when these are completed, cover 695 7.5-minute quadrangles (58% of the State).

The coverage is far from uniform. Counties which have no modern topographic maps printed or planned are Cimarron, Texas, Beaver, Harper, Woods, Woodward, Nowata, Craig, and Adair. Several counties will be less than 20 percent covered (Delaware, Pittsburg, Mayes, Hughes, Ellis, Greer, and Major).

Our boundaries are being mapped rapidly in that adjacent states are procuring maps of the boundary quadrangles. With Missouri we have five touching quadrangles, of which two are published, and three are in process. With Arkansas we share twenty-six quadrangles, of which fourteen are published, and two are in process. Along the Red River Oklahoma shares sixty-nine 7.5-minute quadrangles with Texas. Of these, twenty-seven are published on the 7.5-minute size, and eighteen on the 15-minute scale. In the adjacent Texas Panhandle area forty-one quadrangles touch Oklahoma. Two are published as 15-minute quadrangles, and one is published and eleven are in process, as 7.5-minute quadrangles. We touch New Mexico in only four quadrangles, none mapped. Nine of our quadrangles touch Colorado, none yet mapped. Kansas quadrangles which touch Oklahoma number sixty, of which eleven are published and seven are in process.

Most mapping has been at the request of Federal agencies (Air Force, Corps of Engineers, Bureau of Mines, Reclamation Service, etc.). Mapping is done on a match-funds basis on high priority. Only Oklahoma City (40 quadrangles) and Tulsa (17 quadrangles) have been able to enter into such agreements. The State has put (so far as known) no money into such mapping. Twenty-two of the 15-minute quadrangles were mapped at 7.5-minute standards and could be prepared and printed at that scale at small cost. A thorough job would require upgrading of 120 15-minute quadrangles to 7.5-minute scale, new mapping of 503 quadrangles. In the ordinary course of events all of the State will be mapped on 15-minute quadrangles or larger by about 1980, by which time many quadrangles will need revision of the presentation of culture (houses, roads, pipelines, etc.).

New Theses Added to O.U. Geology Library

The following doctoral dissertations were added to The University of Oklahoma Geology Library in February 1965.

Stratigraphy of Red Peak Formation, Alcova Limestone, and Crow Mountain Member of Popo Agie Formation (Triassic) of central Wyoming, by Richard R. Bower.

A palynological investigation of the Lower and Upper McAlester coals (Pennsylvanian) of Oklahoma, by James E. Dempsey.

Permian subsurface evaporites in the Anadarko basin of the western Oklahoma-Texas Panhandle region, by David L. Vosburg.

ERRATA

Oklahoma Geology Notes, February 1965, Volume 25, Number 2

Page 34, line 33: For Early Ordovician to Middle Silurian age read Early Ordovician to Middle Silurian ages.

Page 45, line 10: For **Chosonodina lunata,** new species read **Chosonodina? lunata,** new species.

OKLAHOMA GEOLOGY NOTES

Volume 25 March 1965 Number 3

IN THIS ISSUE