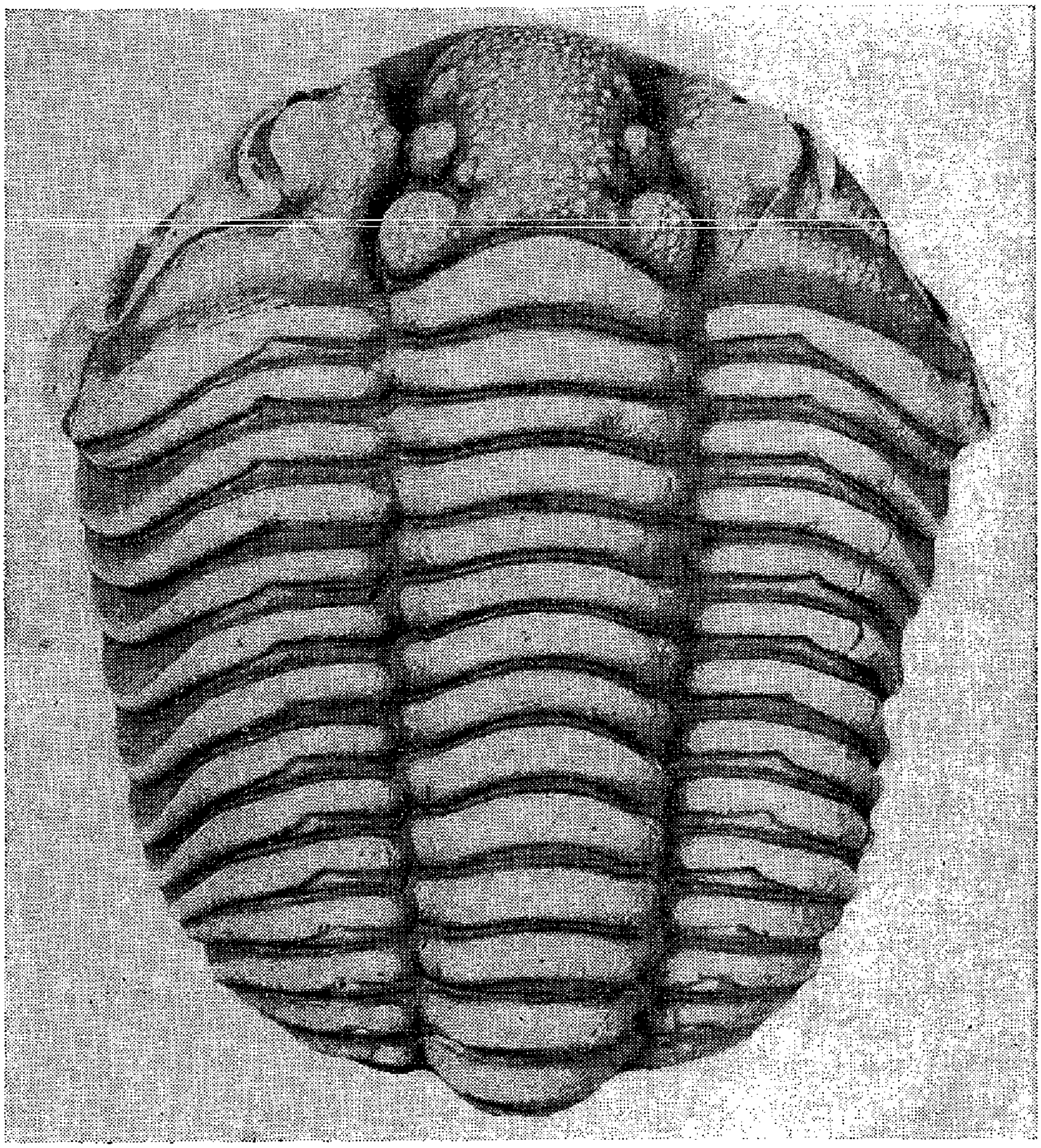
OKLAHOMA GEOLOGY NOTES



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C. N. Gould in Geology Library, about 1901.

Early Days of the Geology Library

Recently Mr. Jack Dickey, Geology Librarian, found a manuscript in the files of the Geology Library. It is in three drafts, one of which is labeled "Dr. Gould's final copy." The manuscript and accompanying photograph are original records of the first years of the University and of the Survey. Gould appears to have written the material in 1924 or soon afterward. The title of the paper would seem to have been intended to read "History of the Geology Library." The paper and the photograph are printed here to give permanent availability to some notes of the first professor of geology at the University who was also geologist on the Territorial Natural History Survey (1901-1908), first State Geologist (1908-1911), and State Geologist in the most active era of the Survey (1924-1931). In so far as can be determined the paper has not been printed elsewhere.

C. C. B.

In June 1900 when I came to the University of Oklahoma to organize the Department of Geology, there was only one building, in the center of a 40-acre campus. This building stood just west of the present Chemistry Hall. At that time there were eight members of the faculty, namely, David R. Boyd, president; Edwin DeBarr taught chemistry; J. S. Buchanan carried history; J. F. Paxton had ancient language; Fred S. Elder, mathematics; V. L. Parrington, English and French; A. H. Van Vleet, all the biological sciences; and Grace King (Mrs. J. D. McGuire) taught music and elocution. George A. Bucklin was registrar and secretary to the president, and Maud Rule (Mrs. C. C. Roberts) was librarian. The University Library contained about 3,000 volumes.

Five young men came to the University in 1900, namely, L. E. Cole, in psychology; W. H. Matlock, for modern languages; L. M. Upjohn, to start the medical school; J. W. Sturgess, ancient languages, in place of Professor Paxton who had leave of absence to travel in Europe; and Charles N. Gould in geology.

There were no class rooms for geology, no books, no specimens, no apparatus, nothing but a young chap fresh from the University of Nebraska to attempt to carry on the work. After a few weeks on the campus with the permission of President Boyd, I brought from my home at Winfield, Kansas, my private library consisting of about 100 volumes, chiefly government publications, including reports of the United States Geological Survey and of the Bureau of American Ethnology. The University paid the freight of these books. There was no place to display them and they were piled on the floor in the corner of a room.

After some months, and as the result of considerable persuasion on my part, President Boyd authorized the University carpenter, Frank Flood, to build wooden shelves to hold these books. They were displayed in the office of Professor Van Vleet, head of the Department of Biology, where I was permitted to have a desk. These book shelves are shown in the accompanying photograph taken (I believe) in the fall of 1901. To this small beginning, from time to time, I added other books including some textbooks, a few state reports, and a number of government publications.

This library was totally destroyed by fire on January 3, 1903, at which time practically everything of a scientific nature which I possessed went up in smoke. The fire started in a basement room in the night. To this day no one knows how it was started. I had been working in that room until 10 o'clock that night. When the fire was discovered about midnight, all that part of the building was in flames. When the building burned, I lost everything I had—my diplomas, my specimens, my library, and my lecture notes.

The next year after the fire a building, now known as the Science Building located on the North Oval, was erected to house the science departments. In this building geology occupied the top floor, and one room was set aside for a library. President Boyd assisted me in soliciting books from all available sources. Funds were scarce in those days and very few volumes could be purchased, but we secured, largely through the efforts of the Oklahoma delegate in Congress—Dennis T. Flynn—a number of publications from the various scientific departments in Washington. These reports dealt chiefly with Oklahoma and surrounding regions. We also solicited reports of state geological surveys, especially from Texas, Kansas, Arkansas, Missouri, Iowa, Kentucky, Illinois, Indiana, and West Virginia.

About this time we also began to accumulate textbooks and reports on water supply, a subject in which I had become interested. I spent three summers—1903, 1904, 1905 in covered wagon in western Oklahoma, the Panhandle of Texas, northeastern New Mexico, and southeastern Colorado securing data for the Bureau of Reclamation. These data were published in Water Supply Papers 148, 154, and 191 of the United States Geological Survey.

The Department of Geology grew and classes became more numerous. As additional subjects were added other men were employed as assistants—E. G. Woodruff, Frank F. Grout, and Chester A. Reeds. As these men came to teach, additional volumes were added to the library.

In 1908, I was appointed Director of the Oklahoma Geological Survey. Dr. D. W. Ohern, a graduate of Johns Hopkins University, took over the work of the department, and a year later Charles H. Taylor from the University of Chicago came as his assistant. Both of these men brought with them certain volumes, and the library in the top floor of Science Hall began to assume respectable proportions.

In 1920, the present Geology Building was occupied. Professor J. B. Umpleby was then head of the department, and the departmental library was moved from Science Hall to its present location in the Geology Building where it has since remained.

In 1908, during the governorship of Charles N. Haskell, I was appointed State Geologist by the State Geological Commission consisting of Governor Haskell, A. Grant Evans, President of the University, and E. D. Cameron, Superintendent of Public Instruction. During the time of the meeting of the Constitutional Convention in 1906-7, I had seen to it that a provision was included in the constitution for the establishment of a Geological Survey and I wrote the law passed by the first legislature vitalizing this constitutional provision and providing for the administration of the Survey.

By this time, the University had grown to such size all of the rooms in all buildings were occupied and there was no room on the campus for housing the Geological Survey. I rented rooms in two small residences near my home on West Apache Street opposite the present McFarlin Memorial Church, where for two years I carried on the work of the Survey. Again it was necessary to start a geological library. This time it was not quite so difficult for now we had something to offer in exchange. In the meantime I had become a member of the Geological Society of America, the American Institute of Mining Engineers, the American Mining Congress and other scientific bodies, and had made friends and acquaintances among the geologists throughout the United States. It was the policy of the Survey to publish as much material on Oklahoma as possible. My motto was to supply people of Oklahoma as much information as possible at the lowest possible cost and the shortest possible time. I contacted by letter the greater number of State Geologists and Heads of Departments in Universities in America, as well as some in other parts of the world, and arranged for exchange of publications. Ours, of course, were chiefly in the lap of the future, but a number of the men to whom I wrote responded generously and sent their published works in considerable quantities. We established a mailing list for future volumes and I again endeavored to build up for the third time, a library of geology on the campus of the University of Oklahoma.

In the meantime, a second fire had destroyed the main building on the campus in which was housed practically all of the departments except the sciences. Some wooden buildings were soon erected just west of the present Administration Building to serve as temporary structures to house some of the departments, and one of these was assigned to the Geological Survey. The Department of Geology still occupied the top floor of Science Hall. I brought the books from the buildings on Apache Street to the new wooden building on the campus, where the library occupied one room. It consisted very largely of reports of the various state surveys in this country along with a goodly number of government reports, especially those of the United States Geological Survey, the Bureau of Mines, the Bureau of American Ethnology, the Reclamation Service, the Department of Agriculture, and such other bulletins as related to scientific subjects.

In October of 1911, I resigned my position as director of the Geological Survey to engage in private practice, Dr. D. W. Ohern was appointed my successor and carried on the work of the Survey. For a time the Survey was located in the basement of Carnegie Library, now the Education Building. In 1920, it was moved to the Geology Building where it has since remained.

Type Locality of Earliest Known Oklahoma Fossil

CARL C. BRANSON

In the Notes (vol. 18, p. 180) the locality from which *Goniatites choctawensis* Shumard was collected was quoted from Shumard as "on the farm of Mr. J. Blackburn, in the Choctaw Nation." Dr. A. M. Gibson of the University of Oklahoma Division of Manuscripts found that no such name as J. Blackburn appears on the tribal rolls. Mr. R. H. Dott, who was Director of the Oklahoma Geological Survey for 17 years, took a keen interest in the history of early exploration. He wrote, after seeing the Note, that he has a print of "Military Map of Indian Territory" by Lt. E. H. Ruffner, published in 1875 and that it shows a "Mrs. Blackburn's" about 20 miles east and 6 miles north of Limestone Gap. Dr. Gibson lent me a copy of the map from the Phillips Collection and as nearly as can be determined Mrs. Blackburn's house is near the present village of Weathers in southeastern Pittsburg County.

In Girty's redescription of *Goniatites choctawensis* (U. S. Geol. Survey, Bull. 377, 1909) he notes the occurrence of the species at six localities. One of the better localities is Station 2047, blue shale and limestone concretions, north of center of sec. 16, T. 3 N., R. 18 E., in creek bed. This locality is about 10 miles northeast of Weathers. Locality 2078 is equally good and is about 10 miles west of Weathers (from concretions in black shale in lower part of Caney shale, near center of sec. 4, T. 2 N., R. 15 E., where small run crosses chert ridge).

Considering the uncertainty of location of the Blackburn place and the probability that the collections were made at a distance from the house, it seems likely that this is the Blackburn farm meant and that the type locality of *Goniatites choctawensis* is in southeastern Pittsburg County or southwestern Latimer County in Johns Valley shale.

Associated species at Locality 2047 are (Girty, 1909, p. 9): *Gastrioceras caneyanum* and *Caneyella nasuta;* at Locality 2078: *Caneyella wapanuckensis, C. nasuta, C. richardsoni, C. percostata, Orthoceras caneyanum, O. crebriliratum, O. indianum, Gastrioceras caneyanum, Girtyoceras meslerianum, Trizonoceras lepidum.* Either of these faunules accords with that of the Delaware Creek member.

Propane Storage in Shale, Seminole County, Oklahoma

LOUISE JORDAN

Construction of a 110,000-barrel underground storage facility for propane in Seminole County was completed in the middle of July 1955 for Sinclair Oil & Gas Company. The location of the underground cavity was determined by the economic and geological requirements that the cavern be (1) sufficiently close to Sinclair's No. 13 Gas Products Plant, and (2) in an area relatively condemned for oil exploration, uncomplicated by faults or fractures where a non-porous limestone to be used as a roof at a depth of over 250 feet is underlain by a shale preferably over 20 feet in thickness and devoid of sandstone or other porous strata.

A tentative location, SW¼ NW¼ sec. 9, T. 8 N., R. 7 E., was selected for detailed geological study by core drill. In all, six core holes were drilled and cored into the Nellie Bly shale; electric logs were made. Hole No. 6 was cored with 3¾-inch bit from a depth of 10 feet to 339 feet, total depth, and some sections were cored in the other five tests. The location satisfied the requirements for an underground propane cavity in that (1) the Belle City limestone, argillaceous and dense, varying in thickness from 11 to 13 feet, has 2.68 to 5.4 percent porosity and practically no permeability; (2) a massive 40-foot bed of shale underlies the limestone at a depth ranging from 276 to 345 feet; (3) no faulting is present; (4) the location is less than five miles from No. 13 Gas Products Plant in an area practically condemned for oil production.

Rock sections encountered in three core tests (Nos. 1, 5 and 6) are illustrated in Figure 1. Test No. 1 is 650 feet from the west line and 350 feet from the south line of SW¼ NW¼ sec. 9. Test No. 5 is 50 feet north-

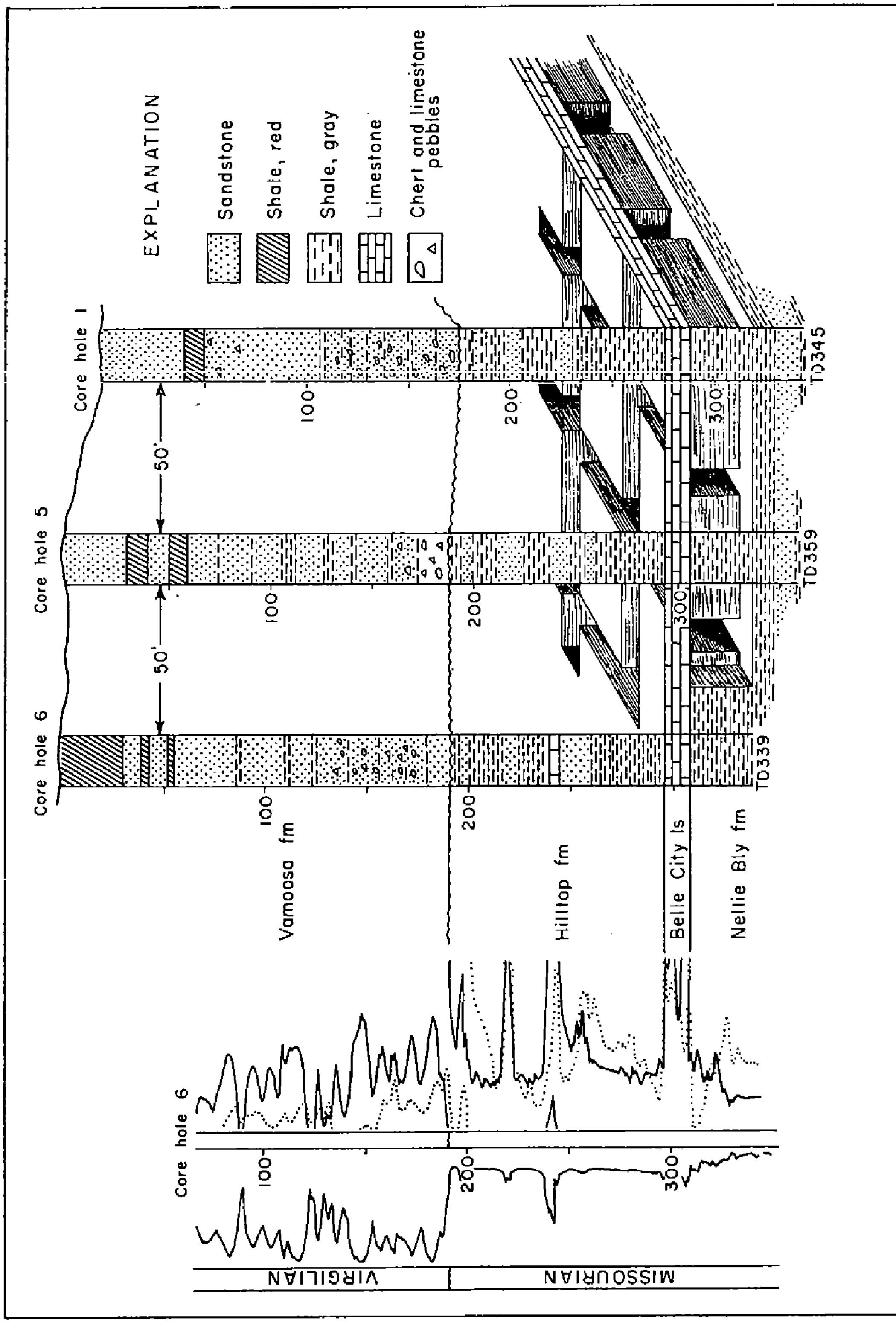

FIGURE 1. Diagrammatic sketch of underground propane storage facility mined in shale of Nellie Bly formation showing correlation of three core test and electric log in one test.

west of No. 1 and No. 6 is 50 feet northwest of No. 5. The Vamoosa formation, Early Virgilian in age, crops out at the surface. Cores from test No. 6 indicate that red shales are present only in the upper portion. The lower portion of the Vamoosa consists of interbedded medium- to fine-grained sandstone and gray shale. Pebbles of limestone, cherty limestone and chert occur at various positions within the formation and at the base of the formation in five core tests. In test No. 6, the hole was not cored from 190 to 210 feet, and it seems probable that a chert conglomerate is also present but was not obtained in samples. Tanner (1956, p. 92), describing the Vamoosa in Seminole County, states that chert cobbles in the

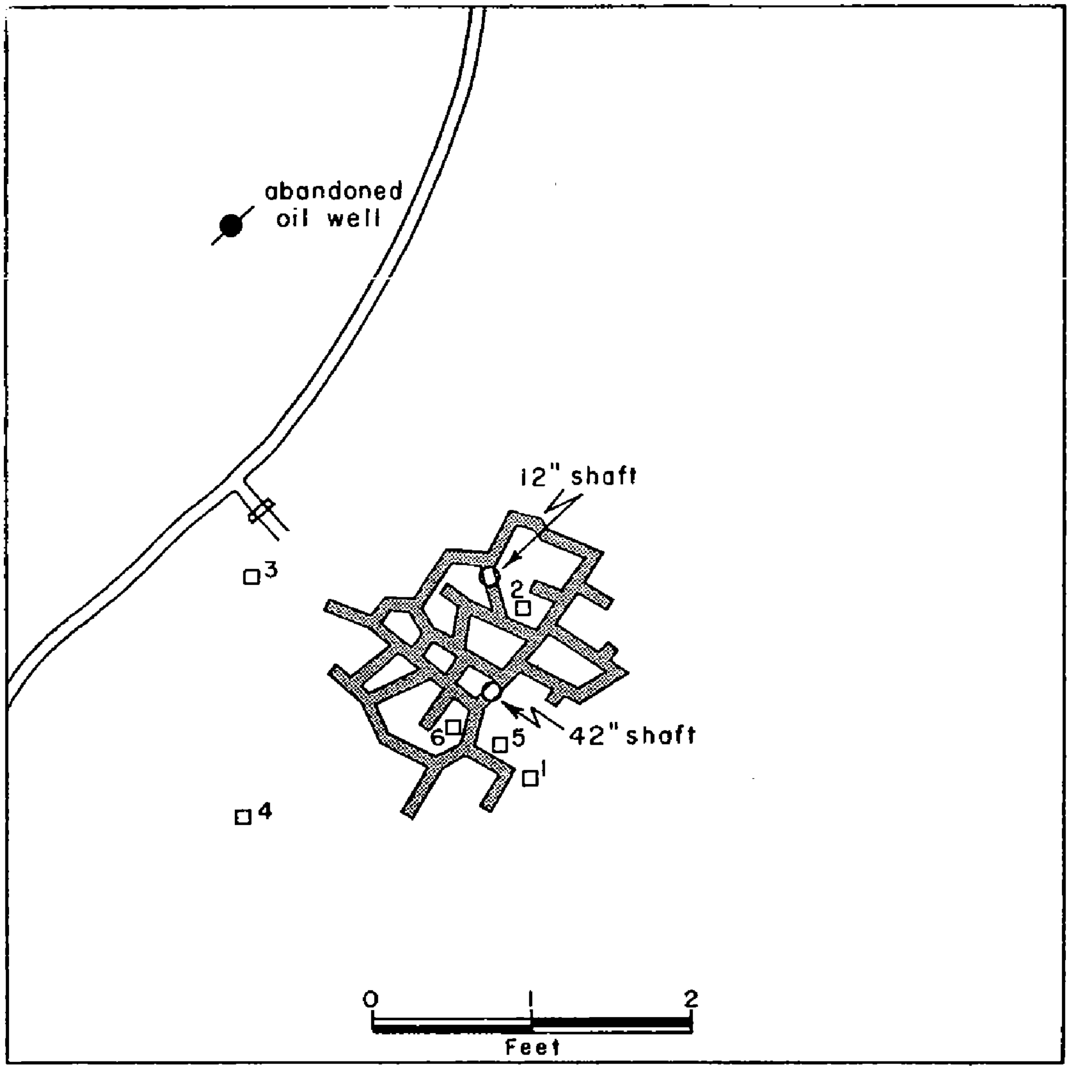

FIGURE 2. Plan of underground propane storage facility of Sinclair Oil & Gas Company, SW¼ NW¼ sec. 9, T. 8 N., R. 7 W., Seminole County, Oklahoma.
□ Location of core hole.

lowest 100 feet of the formation increase in diameter from a maximum of three inches in T. 6 N., to a maximum of seven inches in T. 11 N. Near the Wewoka Brick and Tile Company shale pit about 1,200 feet north of U. S. Highway 270, sec. 11, T. 8 N., R. 7 E., Tanner (1956, p. 154) describes a conglomerate with chert pebbles up to four inches in diameter, and an undulatory contact with the underlying Hilltop formation exhibiting about 12 feet of relief in the distance of 50 feet. Parts of cores taken by a 3¾-inch bit could be a part of a cobble.

The Hilltop formation, overlain by the Vamoosa formation, ranges in thickness from 96 feet in test No. 1 to 104 feet in test No. 6. It consists of gray thin-bedded shale containing thin beds of fine-grained calcareous sandstone in the upper part and becoming calcareous in the lower part. The Belle City is described as a gray-brown fossiliferous limestone with thin interbeds of calcareous shale. The underlying Nellie Bly formation consists of over 40 feet of gray calcareous shale, in part fossiliferous, resting upon about 10 feet of gray fine-grained shaly sandstone.

Conventional mining methods and equipment were employed by Fenix and Scission, Inc., Tulsa, to form a modified room-and-pillar mine for storage of propane. The shaft was located where the Belle City limestone is nearest the surface at 308 feet (585 feet above sea level) in the area; was sunk to a depth of 335 feet (558 feet above sea level); and floored with concrete after 26-foot high drifts or tunnels had been started. (A picture of the headframe above the shaft where the 42-inch casing was cemented after excavation is on the cover of the January 1959 issue of the *Shale Shaker.*) Nellie Bly shale was excavated to form the storage cavern. Drifts were cut along the strike and downdip from the mine shaft as shown by the plan of the cavity (Figure 2). Height of the tunnels ranges from 15 feet at the western edge to a maximum of 28 feet at the eastern edge; average width of tunnels is 8 feet. The highest part of the cavity is at the location of the 42-inch shaft. A 14-inch well was drilled through the Belle City limestone 150 feet north of the main shaft and 12-inch casing set to allow installation of a standby pump. Pipe strings of 8⅝-inch diameter with foot valves at the bottom were run into both the 42-inch and 12-inch casings. The foot valve opens when the pump is set in place and closes when it is necessary to pull the pump. Pump pressure of 200 pounds per square inch at the gasoline plant's storage tanks transfers the propane from the tanks into the underground cavity and two 4- by 7-inch deep-well type centrifugal pumps remove it for shipment. Liquefied propane under 150 pounds-per-square-inch pressure is stored in summer and withdrawn in winter to meet market demand. This method of storage is relatively new and only a few such cavities have been constructed in the United States.

REFERENCES: Oklahoma City Geol. Soc., 1955, Highway geology of Oklahoma: Oklahoma City Geol. Soc. p. 82. Oklahoma City Geol. Soc., 1959, Cover Comments: Shale Shaker, January, vol. 9, no. 5, p. 1. Oil and Gas Journal, 1954, Sinclair nears completion on 110,000-barrel mine for LPG: Oil and Gas Journal, June 14, 1954, vol. 53, no. 6, p. 100.

Tanner, W. F., 1956, Geology of Seminole County, Oklahoma: Okla. Geol. Survey, Bull. 74, 172 p. 9 pl., 20 fig.

Some Available Publications

Several geologists have recently found copies of C. W. Honess' report on "Geology of the southern Ouachita Mountains of Oklahoma" on second-hand book dealers shelves. These were variously priced at $3.50 to $5.00. This fine bulletin is Oklahoma Geological Survey Bulletin 32, printed in 1923 with funds subscribed by geologists of the State. It is not out-of-print, but can be obtained from this office for sixty cents, postpaid.

The organization called Bureau of Geology was founded by C. W. Shannon when Jack Walton closed the Oklahoma Geological Survey (1923-1924). In its brief career it published Bulletin 2, "Geology of the Stonewall quadrangle," by George D. Morgan; Circular 2, "Boggy unconformity and overlap in southern Oklahoma," by George D. Morgan; Circular 3, "Geology of southern LeFlore and northwestern McCurtain Counties, Oklahoma," by C. W. Honess; and Bureau Monthly, vol. 1, no. 1. Neither Bulletin 1, nor Circular 1 was issued, and the monthly died with its first number. Bulletin 2 is obtainable at this office for $1.10 and the two circulars are ten cents each.

C. C. B.

The Geology of the Ouachita Mountains
A Symposium

On March 20 and 21, after the annual meeting of the American Association of Petroleum Geologists, a highly important field trip was held in the Ouachita Mountains. Dr. Lewis M. Cline of the University of Wisconsin was leader and the field trip committee had arranged for many of the geologists who had worked in the Ouachitas to be there and to participate in the discussions. Some of these contributors were H. D. Miser, Bruce Harlton, Thomas E. Hendricks, Maxim K. Elias, Allan M. Bennison, Richard B. Laudon, Horace Griley, Richard Laudon, William D. Pitt, William E. Ham, C. W. Tomlinson, Peter T. Flawn, August Goldstein, Berton J. Scull. Contributions to the discussion were by Walter H. Bucher, Marland Billings, John Maher, and others. The trip was excellently arranged by Dan E. Feray, William J. Hilseweck, William B. Heroy, Philip F. Oetking and many others of the Dallas Geological Society and the Ardmore Geological Society.

A symposium volume was issued with the guide book. The volume of 208 pages and 17 maps and cross sections contains 17 original articles presenting latest data on Ouachita Mountain problems. The book represents a significant contribution to understanding of the geology of this complex area. The editors and others who helped them deserve most high praise and many thanks from all geologists.

The symposium volume contains 16 geologic articles. In his chapter, Dr. Tomlinson presents evidence against low angle overthusts and fensters, discusses the exotic boulders, and speculates on the age of the oldest rocks in the core area and of the Stanley and younger beds.

Flawn presents a regional concept of Ouachita structural relationships and concludes that orogeny began in Mississippian time and persisted at places into late Permian. H. D. Miser outlines evidence for presence of fensters, attributes the exotic boulders to submarine landslips from fault scarps, discusses metamorphism and vein quartz occurrences. Thomas A. Hendricks summarizes the evidence for low angle thrusting and dates the movements as Atokan to Middle Pennsylvanian, and possibly as late as Early Permian. B. J. Scull writes of mineralization and dates the emplacement of the igneous rocks and minerals as early Upper Cretaceous.

William E. Ham points out that the Bigfork, Polk Creek, and Middle Arkansas are like their Arbuckle Mountain equivalents. He contrasts thicknesses of units in the Arbuckles and Ouachitas and concludes that the Oklahoma Ouachita area was not geosynclinal in pre-Stanley time. William D. Pitt summarizes his evidence for interpretation of the core area in Oklahoma as an anticlinorium and gives his conclusions regarding the Arkansas core area. Charles E. Decker, in a posthumous paper, the corrected copy of which was received one week before his death, summarizes the graptolite faunas of the Ouachitas.

August Goldstein, Jr., gives an account of his petrographic work on the sandstones and concludes that there were Ordovician and Mississippian geosynclines in the mountains. Carl C. Branson attempts to fit Ouachita late Paleozoic stratigraphy into the regional pattern. Richard B. Laudon gives his interpretation of relationships to McAlester Basin strata. Bruce H. Harlton modifies and redefines his earlier concept of the Round Prairie and Prairie Mountain formations and introduces the new name Game Refuge formation for the upper unit of the Jackfork group.

Maxim K. Elias describes the conodont faunas of Mississippian formations. He describes the new subgenus *Harltonodus*, four new species and one new subspecies. Scull, Glover and Planalp present a detailed description of Atoka sedimentation, classify the main area of deposition as geosynclinal, and conclude that the source area was to the east. Cline and O. B. Shelburne compare the Stanley-Jackfork-Johns Valley-Atoka sequence to flysch. They describe the formations and present their conceptions of correlation and age. Their discussion of the exotic boulders is the most complete of any presented heretofore. C. C. B.

Gypsum as an Oxidizing Agent

ALBERT L. BURWELL

Gypsum an oxidizing agent? Yes, it is under certain conditions. The essential conditions are the presence of an oxidizable material and a temperature sufficiently high to enable the reaction to take place. To illustrate; it may be assumed that gypsum dissociates as follows:

$$CaSO_4.2H_2O \rightarrow CaO + 2H_2O + SO_2 + O$$

and that the oxygen is consumed by an oxidizable material also present. If the oxidizable material is a reduced sulfur compound such as pyrite, then the reaction might take place in this manner:

$$2FeS_2 + 2O \rightarrow Fe_2S_3 + SO_2$$

In the glass industry advantage is taken of the oxidizing property of gypsum, and of other sulfates, to control the color of the product. For example, it is known that the natural amber color of glass is due to the presence of iron sulfide (FeS) and that to produce an emerald green colored glass most of this sulfur must be oxidized. Also, it should be noted that the batch prepared for melting often contains carbon even though gypsum is another batch ingredient the carbon being added to reduce pyrite (FeS_2) to ferrous sulfide (FeS), thereby obtaining amber color tending toward the red rather than toward the green. The incongruous use of both a reducing and an oxidizing agent in a batch can be explained by the fact that the reducing agent, carbon, is consumed before the dissociation of the oxidizing agent, gypsum, takes place. A similar situation exists when both sulfur and gypsum are ingredients in a batch.

Another advantage in glass manufacture obtained from the use of gypsum lies in its aid as a "fining agent," that is, its aid in producing a clear seed-free product. The whole subject of oxidation and fining through the use of gypsum in the glass batch is treated in "Gypsum in Glass" by Tooley, Hopkins, and Hamilton. This pamphlet is published by the United States Gypsum Co., 300 W. Adams St., Chicago, Ill.

Of course, depending upon one's viewpoint, it might be contended that gysum is not really an oxidizing agent but instead is itself reduced through the agency of sulfur or sulfides or of carbon or reducing gases. This would be more reasonable where gypsum or other calcium sulfate is substituted for limestone in the manufacture of portland cement, thereby yielding sulfur dioxide rather than carbon dioxide as a byproduct. In this case the reducing agent is finely ground coal or coke although it is claimed that hydrogen, water gas, or other hydrocarbon material may be used. The main reduction is obtained at about 1100°C whereas the sintering to yield cement granules is done at about 1450°C. The gases leaving the kiln contain about 10 percent SO_2 with minor amount of oxygen. Therefore, the proper amount of air is introduced and the SO_2 converted in the usual manner to SO_3, then to sulfuric acid.

Perhaps it would be better to say that in both the manufacture of glass and the manufacture of portland cement where gypsum is a batch ingredient, reactions take place involving oxidation and reduction.

Our main purpose in discussing the question is to again call attention to the diverse uses of gypsum and anhydrite and the fact that Oklahoma possesses tremendous quantities of high quality material waiting to be utilized.

First Production in Custer County, Oklahoma

Magnolia Petroleum Company has determined the character of its gas discovery in the Hunton limestone at the No. 1 Miller (SE¼ NW¼ sec. 22, T. 15 N., R. 16 W.) in Custer County. Gas flowed in a test from Hunton limestone perforated at 14,383 to 14,472 feet at a rate of 7.2 million cubic feet daily and from a lower zone in the Hunton at 14,773 to 14,818 feet at a rate of 8.4 million cubic feet daily. After light acid treatment, open flow potential was 95 million cubic feet of gas daily. This is the first commercial production for the County and also is one of the few wells to penetrate Arbuckle limestone in this part of the State. Previous deep Silurian-Devonian production had been found in Caddo County by Denver Producing and Refining in discovery of the Cogar Field, sec. 16, T. 10 N., R. 9 W., where, establishing the world's deepest producing record in 1948, Hunton produced gas at 14,550 feet. Chester (Mississippian) rocks were reached at 11,792 feet, Woodford (late Devonian) at 14,258 feet, Hunton (Silurian-Devonian) at 14,386 feet, Sylvan (Ordovician) at 14,823 feet, Viola at 14,920 feet, Simpson at 15,420 feet, dolomite at 15,850 feet and Arbuckle from 16,072 to 17,000 feet, total depth.

Shallow wells, 1,000 feet or less, were drilled in Custer County as early as 1920. In 1923, a well reached the depth of 4,212 feet in the northeast corner of T. 15 N., R. 15 W., but it was not until 1951 that a deep test over 9,000 feet was drilled in the County. The well, No. 1 Newcomb in sec. 10, T. 13 N., R. 16 W., was deepened in 1953 by Parker Drilling Company to 13,589 feet. High pressure caused a blowout of gas and condensate during coring from sandstones believed to be Morrowan (Early Pennsylvanian) in age. This was the first definite evidence of possible hydrocarbon production for the County. Drilling difficulties resulted in junking and plugging of the hole. Huber Corporation in its well just one 40-acre location to the south is testing currently at 11,710 to 11,786 feet.

Three deep tests were drilled in T. 15 N., R. 16 W., in the three-year period 1953-1955. Parker No. 1 B. Miller (C NE¼ SW¼ sec. 22, a 40-acre location south of the present discovery), penetrated Upper Mississippian rocks to a total depth of 11,973 feet in December, 1952. Magnolia drilled the No. 1 W. W. Jones to 11,672 feet in sec. 24 in 1955, but in 1954 drilled the No. 1 F. Jones (C SE¼ SE¼ sec. 22), which was completed as a low-capacity gas well in Springeran sandstones, and was temporarily abandoned in 1956. Historically, this well must be considered the first production for the County, but the new well is the first commercial well and production is from a new zone for the area, the Hunton limestone.

L. J.

Rock for Portland Cement Manufacture

"Lack of uniformity in portland cement is an important cause of non-uniform concrete strengths. That there are large differences in the strength-producing properties of cements from different sources is well known, although not as generally taken into account in concrete control as it should be. That significant differences, above specification minima, occur for different shipments from the same mill has not been generally recognized."

This quotation is taken from "Variations in Portland Cement" by Stanton Walker and Delmar L. Bloem in recent publication No. 76, National Ready Mixed Concrete Association.

It is not difficult to understand that cements from different mills produce different quality concrete since the raw material (rock) used by each mill is bound to be different. Differences in quality of concrete mixed from cement produced by a certain mill is not so easily understood. According to Nathan C. Rockwood in the September (1958) issue of Rock Products "the timeworn alibi that there are so many variables in making and placing concrete that one can seldom pin some defect on a single factor—the kind of coarse aggregate, fineness modulus of the sand, even the water-cement ratio, etc., is no longer an entirely satisfactory answer."

Of course, the rock used by any particular cement mill is not uniform in composition. Generally, its composition varies both laterally and with depth. Limestones are generally stratified, with each stratum differing from every other one. Some strata are relatively thick, and others relatively thin. It seems evident that the procurement from a quarry of a batch charge exactly like any previous or future charge is not likely. Therefore, in order to obtain uniform cement, dependence must be placed upon chemical analysis of each bath and proper blending. Further, a petrographic examination of each batch of raw material might uncover mineralogical changes in the rock. If the mineral composition and chemical composition are constant, some factor other than the rock used in the cement manufacture must be responsible for differences in the finished concrete. A. L. B.

New Oklahoma Topographic Maps

In April 1958 the Notes carried an article on new topographic mapping in the State (vol. 18, p. 71-72). Progress on such maps has been and is rapid. Coverage on the 1:250,000 scale is now complete and sheets of the entire State are obtainable. The names of these sheets are Dalhart, Perryton, Woodward, Enid, Tulsa, Clinton, Oklahoma City, Ft. Smith, Lawton, Ardmore, McAlester, Wichita Falls, Sherman, Texarkana.

The old 1:125,000 series has not been added to since 1909, yet they are the largest available scale of topographic mapping in all or large parts of 30 quadrangles.

The 1:62,500 (15-minute series) now has 57 published sheets and 55 in progress, scheduled, or authorized. The 1:24,000 (7½-minute) series has 85 published sheets and 50 sheets being prepared. Complete coverage divided into 7½-minute areas would require 1,219 sheets. Of this area the equivalent of 502 sheets is now covered by completed or planned modern mapping on a scale of 1:62,500 or greater. Conspicuous for complete lack of topographic maps at a scale greater than 1:250,000 are the Oklahoma panhandle and the adjacent counties, Harper, Ellis, Woodward, and Woods.

C. C. B.

A Water-Miscible Mountant for Palynology

L. R. Wilson

Mounting media used in palynological studies include Canada balsam, Diaphane, Euparal, glycerine jelly, polyvinyl alcohol, corn syrup, HEC solution, and others. The first three mentioned require dehydration of the fossil preparation either by a series of alcohols and xylol or other solutions. The remaining several mountants are water-miscible and all, except HEC solution which has been recently described by Jeffords and Jones (1959), have been in use for a number of years.

In palynological work it is desirable to use mountants that harden quickly, do not discolor, form bubbles, crack, crystallize, and are not affected by heat. The microslide preparations also must be permanent and should not require special temperature or moisture storage facilities. Clearcol is such a mountant, and though it has been known for many years, it seems to have escaped the attention of palynologists. Recently it has been subjected to a number of tests in the Oklahoma Geological Survey palynology laboratory and has proven superior to all other mounting media in common usage. Clearcol is a liquid with a refractive index of approximately 1.4 and consists of a mixture of plastics and solvents which on drying becomes a clear non-crystalline solid. Earlier descriptions of Clearcol have been given by Zuck (1947, 1959). In 1947 Zuck reported that fungi in the collections of the Bureau of Plant Industry that had been mounted in Clearcol were in excellent condition after 18 years.

The Clearcol slide-making schedule that has proved satisfactory is as follows: (1) Lay out alcohol-cleansed slides and cover glasses on the laboratory table. (2) Pour several cubic centimeters of aqueous palynological preparation into a watch glass and place it under the low power of a microscope. (3) Spread a thin film of Clearcol on a cover glass leaving a 1/16th to ⅛ inch of glass margin around the edges. (4) Revolve the watch glass under the microscope to concentrate the microfossils and with a slender pipette withdraw a small drop of the preparation. (5) Transfer the drop to the Clearcol film and with a glass rod thoroughly but gently mix. Do not let the solution reach the edge of the cover glass. (6) Place the cover glass on a slide-warming table or in an oven with a temperature not above 40° C. Drying will be completed in about 20 minutes and the preparation will be hard. The fossils should be resting in contact with the cover glass and not suspended in the mounting medium. (7) Invert the cover glass and place it preparation-side down in a drop of Canada balsam, Diaphane, or Bio-plastic. The narrow margin about the Clearcol mountant will now be occupied by the balsam, etc., and will become an effective sealant. (8) Place the slide on a warming table or in an oven for approximately one hour and then cool the slide if it is to be immediately studied.

While testing Clearcol, it was found that too rapid drying occurs if the temperature of the oven is warmer than 40° C. Minute cracks develop around the edges of the preparation. Bubbles may develop if the preparation is stirred vigorously. Fresh spores and pollen that have been fixed in acetic acid can be mounted directly into Clearcol and Bismark brown appears to be one of the best stains for spores and pollen mounted in this medium. The speed of hardening, permanence, and transparency make

Clearcol nearly ideal for the palynologist. It may be secured from H. Willard Clark, 33 South High Street, Melrose 76, Massachusetts.

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Quicksand

A stratum of quicksand halted progress on a tunneling operation near Grand Rapids, Minnesota. Attempts to stabilize this sand by means of grouting failed, and soil-solidification chemicals were resorted to, with very satisfactory results. The process is called the Joosten process after a Dutch mining engineer who developed the method.

The process is carried out in two steps. First, an almost saturated solution of sodium silicate (water glass) is forced into the sand under pressure. This is immediately followed by a strong saline solution, usually calcium chloride, which reacts with the silicate to form a gel that fills the spaces between the sand particles, cementing them, and effecting a complete seal. The pressure will have driven the water back, and on release the gel prevents the return of the water.

The particulars of this tunneling operation, together with more complete information on the process, its good points and its limitations are to be found in the February issue of Industrial & Engineering Chemistry (1959). The reader will undoubtedly think of other applications for this process.

A. L. B.

Permian Sea-Scorpion From Oklahoma

Carl C. Branson

A recent paper by Kjellesvig-Waering in which he reclassifies the eurypterids (sea-scorpions) recalls the lone representative of the group known from Oklahoma. The specimen was found and described by C. E. Decker as *Eurypterus oklahomensis*. Dr. Decker and I sought for the specimen in the paleontology collections, but were unable to find it. The locality was given as "near Red Rock." Dr. Decker told me that the spot is 1½ miles southeast of Red Rock, Noble County, in a ledge near the road on the slope of a small hill. It is possible that the locality from which L. R. Wilson and I collected plants last fall is Decker's locality.

Decker had overlooked the paper in which C. O. Dunbar had described *Eurypterus* (*Anthraconectes*) *sellardsi* from beds of comparable age in Kansas. The Oklahoma specimen is now regarded as belonging to that species and the species is referred to the genus *Adelophthalmus*. This genus, described by Jordan and Meyer in 1856, is placed in the family Hughmilleriidae, the only eurypterid family which survived the Devonian.

The Permian has provided to date only *Adelophthalmus chinensis* Grabau (L. Permian of Chihli, China), *A. sellardsi* (Dunbar), *A. douvillei* (DeLima) from Portugal, and the bizarre *Campylocephalus oculatus* (Kutorga) from near the city of Perm in Russia.

The Oklahoma specimen was collected from a gray fine-grained sandstone in the Wellington formation. This level is the fourth Fallis sandstone as mapped by Roger L. Billings (1956), who figures the locality (Figure 18). The fossil bed is a channel fill at the base of the sandstone and above the underlying dolomite and greenish gray shale.

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