OKLAHOMA GEOLOGICAL SURVEY
THE UNIVERSITY OF OKLAHOMA
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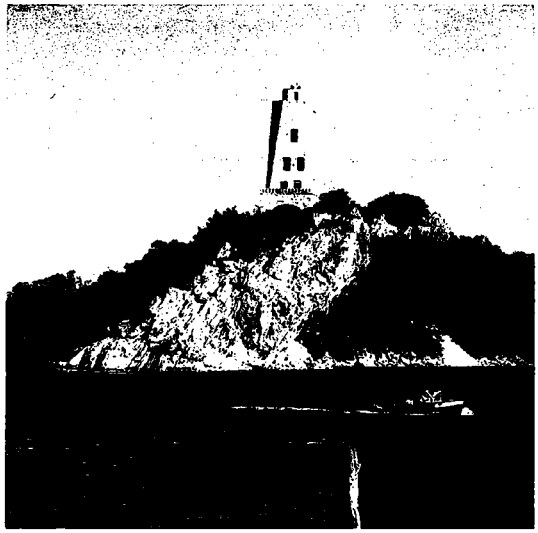
OKLAHOMA GEOLOGY NOTES



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Cover Picture

Devils Kitchen Conglomerate

Illustrated on the cover is the exposure of the Devils Kitchen Member of the Millsap Lake Formation (Deese Group, Desmoinesian) upon which stands the Tucker Tower Museum at Lake Murray, south of Ardmore, Oklahoma. The location is SW¼ SE¼ NW¼ and NW¼ NE¼ SW¼ sec. 10, T. 6 S., R. 2 E., Love County.

The Devils Kitchen Member in the Lake Murray area consists of about 200 feet of sandstone with a 50-foot section of chert-pebble conglomerate near the middle. The conglomerate section is the portion exposed at Tucker Tower and in the spillway of the Lake Murray dam nearby. The rocks of the area are highly deformed; the dip of the strata at this location is about 60° toward the northeast.

(Photograph by K. J. Petrauskas; courtesy of Oklahoma Industrial Development and Park Department)

Louise Jordan

1908-1966

Dr. Louise Jordan died on November 22, 1966, at Mercy Hospital in Oklahoma City, after a long and painful illness. The funeral service was conducted by Dr. E. Kenneth Feaver at the First Presbyterian Church in Norman, Oklahoma, November 25; burial was in the family plot at Youngstown, Ohio. She is survived by her brother, Allen E. Jordan, Brecksville, Ohio, and a cousin, Mrs. Frank Carlisle, Cotter, Arkansas.

Louise came to the Oklahoma Geological Survey April 15, 1955, as petroleum geologist; it was to be her last position in a varied professional career that spanned 36 years.

She was born in Joplin, Missouri, January 3, 1908, to Fred A. and Anna Jordan. Fred Jordan was a successful mining engineer who traveled widely in the practice of his profession. Thus Louise was exposed from her earliest childhood to the lure of both geology and travel, which shaped the course of her life.

Louise was graduated from high school at Port Henry, New York, in 1925 and received her Bachelor of Arts degree in geology and chemistry from Wellesley College in 1929. She went on to graduate work at the Massachusetts Institute of Technology and earned her Master of Science degree in 1931, thereupon taking a position at the American College for Girls, Istanbul, Turkey, where she taught physics until 1933.

She then returned to the United States and was part-time instructor in geology and geography at Mt. Holyoke College while she worked on her Doctor of Philosophy dissertation during the period 1934-1935. In 1935 she returned to Turkey as stratigrapher and micropaleontologist for the Maden Tetkik ve Arama Enstitüsü (Minerals Research and Exploration Institute) of the Turkish Government at Ankara. This was her last overseas professional employment. From 1938 to 1941 she was a geologist with the Anzac Oil Company at Coleman, Texas. She received her Doctor of Philosophy degree from the Massachusetts Institute of Technology in 1939; her dissertation was titled *A study of the Miocene Foraminifera from Jamaica, the Dominican Republic, the Republics of Panama, Costa Rica and Haiti.*

In 1941 Louise joined the staff of the Sun Oil Company as micropaleontologist and stratigrapher and worked for the company in Dallas and Amarillo, Texas, and Tallahassee, Florida, until 1950. During the period 1950-1951 she worked as a geologist for the Florida Geological Survey, and then was a consulting geologist, working primarily in the southeastern and western states, until she joined the Survey staff in 1955.

Louise's work with the Survey resulted in more than 80 publications* on a wide variety of geologic subjects. Her interests were wide-ranging, but her principal goal was the dissemination of basic geologic information among the working petroleum geologists of Oklahoma. In this task she succeeded most admirably. She encouraged and helped many oil-company and consulting geologists to write for publication by the Survey and other organizations; she directed the work of more than a score of graduate students in subsurface geology at The University of Oklahoma; she compiled or supervised the compilation of numerous summary publications, such as the *Subsurface Stratigraphic Names of Oklahoma,* the pipeline maps of Oklahoma, the geologic maps of the pre-Woodford and pre-Pennsylvanian subsurface horizons of Oklahoma, and the geologic index maps of Oklahoma, and, as its supervisor, she made a major contribution to the development of the Core and Sample Library at the University.

She took a serious interest in the affairs of the professional societies to which she belonged. She was a member of the Oklahoma City, Tulsa, and Ardmore Geological Societies. She became a member of the Oklahoma City Geological Society in 1955, served on the editorial board of the *Shale Shaker* for 10 years, and was one of the society's district representatives to the American Association of Petroleum Geologists (1962-1964). The society elected her to honorary membership in July 1966; she was the 14th recipient of the honor. Louise became an associate member of the Society of Economic Paleontologists and Mineralogists in 1937 and a member in 1941. At the time of her death she was technical program chairman for the 42nd annual meeting of the SEPM, which will be held in Oklahoma City in 1968. She became a member of the American Association of Petroleum Geologists in

* A complete bibliography will be published in an early issue of Oklahoma Geology Notes.

1941 and had served as a member of its Committee for Publications since 1964.

In 1963 Louise became a charter member of the American Institute of Professional Geologists and of the Oklahoma Section of the National Association of Geology Teachers; she served as editor of the latter organization until her death. She was chairman of the Eighth and Ninth Biennial Geological Symposia held at The University of Oklahoma in 1963 and 1966.

In addition to attendance at regional and national meetings of the societies to which she belonged, Louise attended a number of international meetings. In 1959 she attended the Fifth World Petroleum Congress at New York, and she was the delegate of the Oklahoma Geological Survey to the last three International Geological Congresses: the 20th at Mexico City (1956), the 21st at Copenhagen (1960), and the 22nd at New Delhi (1964).

It was at the New Delhi congress that she became a founding member of what was her favorite professional society, the Chinar Circle. The Chinar Circle evolved from the misadventures of a pre-congress excursion to Srinagar, Kashmir. The group, including 35 geologists from 23 countries, was snowed in at Srinagar and was prevented from returning to New Delhi until after the close of the congress. However, the 10 snow-bound days were filled with a technical program that rivaled in quality the one presented at New Delhi, and the meeting was marked by an intimacy rarely achieved at an international conclave. For Louise it was the perfect mixture of geology and sociality, and she enjoyed the experience with great relish.

A recital of Louise's professional history falls far short of recording her contribution to the profession, for she made her contribution not merely as a professional but equally well as a person. Her influence on her colleagues and friends was as fruitful as was her work.

My first meeting with Louise was seven years ago, when I appeared before a committee which was to interview me for my present position. I approached this group of strangers with the apprehension of a prisoner brought to judgment for a capital offense. Much to my relief, my interrogators were most cordial, except for a rather impressive steely-eyed woman about midway down the conference table who insisted upon asking the damndest questions, all of them directly delivered and too searching and pertinent to be answered easily. Each time she spoke I saw my chances for employment diminish. It was my understanding that this was *the* Dr. Jordan with whom I would have to work most closely during my first days on the job — if I got it — and the prospect made me wonder why I was there at all.

It is no surprise to those who knew Louise that my first day on the job was a most pleasant one; that steely-eyed woman had somehow miraculously transformed herself into a gracious, warm, considerate lady. But, more than that, from the first moment she treated me as an equal and as a colleague whose advice was worth seeking.

I give this bit of personal history as an example of the apparent contradiction, the mixture of tenderness and sternness, that was Louise's personality. She was gentle and sensitive. She was thoroughly

feminine, and even carried with her a faint aura of girlishness. But she was not soft. She possessed an unbridled curiosity. She held firmly rooted convictions that were never compromised. But her devotion to objectivity was such that she could not deny merited respect, and even affection, to some who held the most contrary views. Despite her gentility, she always insisted upon calling a spade a spade. She hated error and despised falseness, and, because of this, she was often "hard to live with." For she strove ceaselessly to determine the accuracy and correctness of not only all her work but also of the work of her colleagues, her students, and her friends. In such matters she was stubborn and determined, and to her it mattered not whether an item was of great significance; the fact that it was unchecked, unproved, or incorrect made the tiniest mote important to her.

Louise abhorred procrastination and her attitude on the subject frequently made even the most industrious of her colleagues feel like drones. The most considered and unanswerable explanation of why something had not been done usually left her unsatisfied.

To the uninitiated, her directness of manner may have appeared as tactlessness. It was a deceptive impression, for she was incapable of malice — or indifference. Although blunt and direct in her language, she never spoke without sincere concern for all those with whom she came into contact. But she rarely avoided a discomfiting remark when she felt that it was a necessary statement for the benefit of her listener; and she never gave advice — she issued instructions. This was strong medicine for all her friends, but, like grandma's sulphur and molasses, it was never fatal, to either ego or friendship, and frequently it was the correct and only remedy for the malady of the moment. Such intercourse, to her, was not a one-way street. She expected and sought candid responses, and she never hesitated to seek advice or help when she needed it.

Because of these traits, no one was capable of working with Louise without being rewarded by it. The quality of the work of many Oklahoma geologists is today far better than it would have been otherwise, yet, to be sure, not nearly so good as Louise wanted it. Such a contribution to our profession cannot be measured or recorded with scientific accuracy. But it is there, a legacy as real as gold, but far more priceless.

In her private life Louise was no different. She was gregarious but in a critical way. To be counted as one of her friends was a high compliment. She loved gardening and had one of the most beautiful home gardens in Norman, containing numberless species of cultivated plants. She read omnivorously, but she was "hooked" on travel, and such books were her favorites. She traveled as much as opportunity allowed, both in the United States and abroad, and she looked forward to retirement only because it meant an enlargement of such opportunity.

Like any woman, she was not immune to the blandishment of praise, but she was never cozened by it; the sincere compliment was gracefully accepted with a most attractive display of pleasure and gratification, the false one fell upon deaf ears. As much as she appreciated recognition, it was not her criterion of success, for undeserved recognition,

unsupported by solid accomplishment, was meaningless to her, and the satisfaction of work well done was a more bountiful fulfillment than any commendation.

Industry and thrift, the hallmarks of a bygone era, were cardinal guides in her life, but they presented no hindrance to her acceptance and enjoyment of the world in which she lived. She entertained her friends frequently. She was excessively but never foolishly generous, both of herself and her property. She donated readily to alumni funds and other causes, particularly scholastic, but charitable as well. In her professional relationships the mere hint of a need for assistance would bring her immediately to a colleague's side. Her supervision of graduate student's thesis problems evoked in her an emotional involvement matching, and sometimes exceeding, that of the students themselves. And, in like manner, few of her friends failed to become beneficiaries of kindnesses, large and small, that could never be repaid.

To make a distinction between Louise's private life and professional life is artificial, for to her they were one. Geology was her life and geologists were her friends. Even in her last days, although bedridden and in pain, she strove to continue her work in much the same manner as she had in health. Her illness followed an erratic course of recovery and relapse, and we gauged the slope of the curve by her attitude toward matters upon which some of us needed consultation; the more critical and stubborn she was, the more hopeful we became; an easy consultation, in which she was acquiescent and apparently satisfied, was a signal for gloom.

To know Louise Jordan was a fortunate and remarkable experience for all of us. No one can have had this experience without having been bettered by it. The manner of her death was a bitter irony. To have one who has given so much to others in consideration, sympathy, concern, and friendship treated so brutally by fate seems somehow unfair. Yet, in her last painful months, Louise never ceased to be what she had always been, thus giving us her final gift, a rare example of character and integrity which few of us can emulate. The following excerpt from Dr. Feaver's memorial, given at the funeral service, most vividly describes her as we saw her.

> Louise Jordan was a brave and stubborn combatant. She only grudgingly gave ground to this invader that sought to take her life too soon. She knew the dimensions of her struggle and the size of her foe; but she did not hesitate. With courage and determination she fought on and so nobly as to give strength and dignity to her contest.
>
> This manner of living did not come lately. It was part and parcel of her life. She brought to her days here on earth the co-ordinated action of knowledge and spirit. She knew the worth and the meaning of knowledge. She equipped herself with a good and expanding store of it. But she also knew that knowledge is a lifeless tool until it is put to work by a person of spirit and commitment.

Her judgment at this point was remarkably sound and her willingness to live with it is memorable.

Louise Jordan graced her days with the sensitivity of knowing and believing that the days entrusted to her, however long, were significant. In them she had opportunity to establish herself as a person, a person grateful for all that came to her and inspired by the challenges ever presented to her. She lived unafraid and she died unafraid.

—A. N.

Dr. Louise Jordan Memorial Fund

The death of Louise Jordan on November 22, 1966, deprived the geological profession of a most valued associate and friend. In addition to her numerous duties as petroleum geologist of the Oklahoma Geological Survey, Dr. Jordan devoted much time and energy to the direction of graduate theses in the School of Geology and Geophysics at The University of Oklahoma. During her eleven years at the Survey she directed more than twenty such problems and assisted in the advising of graduate students on many more. Her interest in the guidance of graduate students was a deeply sincere one.

Because of her devotion to such matters, the *Dr. Louise Jordan Memorial Fund* has been established in The University of Oklahoma Geology Foundation, with the concurrence of her brother, Allen E. Jordan, who has donated a portion of Dr. Jordan's estate to the fund. The fund is to be used for direct assistance to graduate students working on geological problems.

Donations may be made to The University of Oklahoma Geology Foundation, Oklahoma Memorial Union, Norman, Oklahoma 73069, with the specification that the gift be applied to the *Dr. Louise Jordan Memorial Fund.*

Technique for Illustrating Palynological Succession in Sedimentary Deposits*

L. R. Wilson

Several types of graphic presentations that illustrate palynological succession in stratified sediments have been in use for many years. Among the common types are line and bar graphs and flare and circle diagrams. All give direct visual information about palynological assemblages but do not quantitatively synthesize the information as an integer. The technique described here utilizes the bar-graph histogram (fig. 1) from which the relative values of each stratigraphic level are developed into cumulative curves on a second graph (fig. 2). The point of each cumulative curve at the median quartile is then transferred to a third, or quartile-summary, graph (fig. 3). The resulting curve is a summary of median-quartile points and indicates the quantitative status of the palynomorph assemblage at each stratigraphic level and its relation to all others. This technique has value in that the palynomorph stratigraphic assemblages can be compared as single points and can indicate trends in local paleoecology, paleogeography, and paleoclimatology.

A postglacial peat deposit is used here for demonstration but any sedimentary section containing palynological materials, or other abun-

* A study supported by National Science Foundation Grant GB-1850.

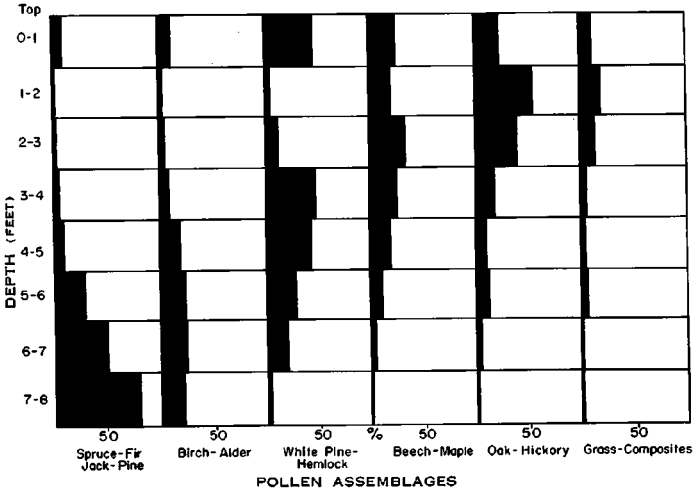

Figure 1. Histograms showing relative percentages of pollen types in assemblages from eight levels in a Massachusetts peat bog.

dantly occurring fossils, could be used. A number of Oklahoma Pennsylvanian coals have been studied by use of the technique. It also can be adapted to heavy-mineral or other geological investigations that are similarly analyzed and many types of neoecological studies can utilize the technique.

The postglacial deposit is in a glacial kettle hole at the edge of a late Pleistocene lake terrace of the Connecticut River near Greenfield in north-central Massachusetts. The deposit is approximately 5 acres in area, covered with a swamp forest of *Picea, Abies, Betula, Alnus, Acer, Ulmus,* and *Tilia.* The adjacent upland forest contains species of *Pinus, Tsuga, Acer, Fagus, Quercus, Carya, Betula,* and *Populus.* An

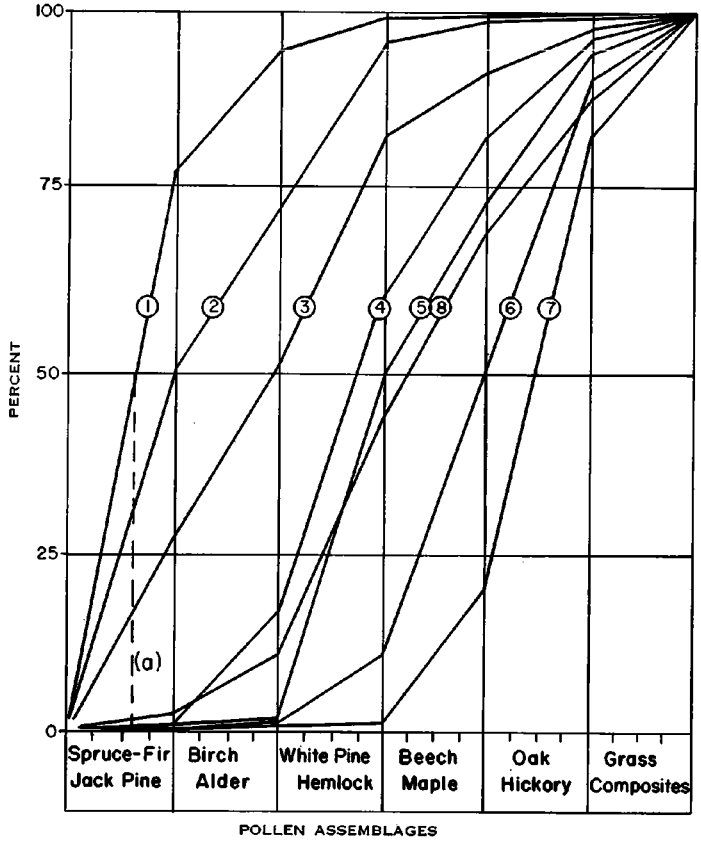

Figure 2. Cumulative curves plotted from same data used for histograms of figure 1.

8-foot core of peat was collected for study from near the center of the peat bog. The underlying sediment is sand and boulder clay. The core was divided into 1-foot segments, prepared for study by the common peat-processing technique, and ten permanent microscope smear slides were made for each level.

Step one in the analysis is the production of a bar graph. An analysis of 200 specimens per level, using portions of all ten slides, was completed and tabulated. With that information at hand the relative percentages of two or more ecologically related genera or species were combined for construction of bar-graph histograms. The genera and species combined are shown in figure 1. The combination of ecologically related types has the advantage of securing higher relative percentages and the emphasizing of these units on the bar graphs. Combining may not be desirable or necessary in some investigations. The arrangement of the palynological units on the bar graph is an important factor in the technique. The order is determined by the strati-

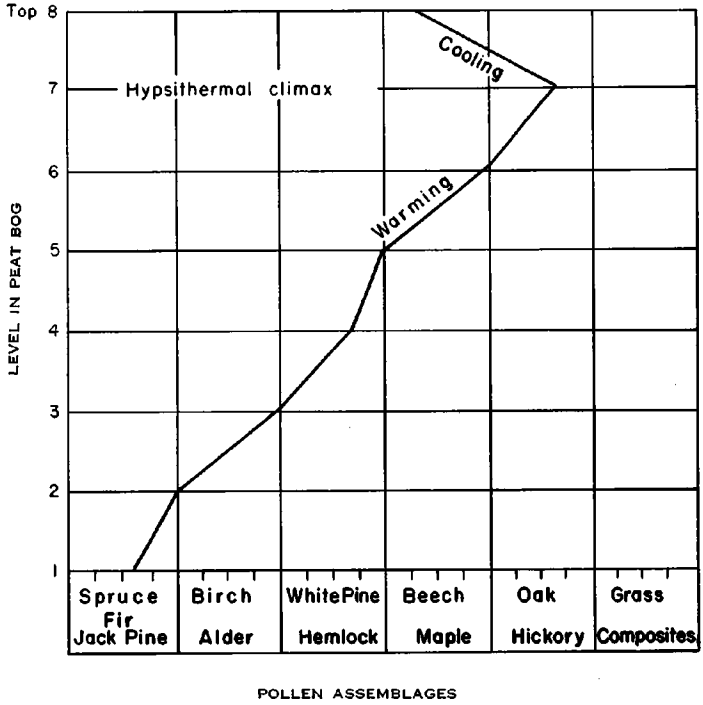

Figure 3. Quartile-summary curve plotted from data derived from median-quartile intercepts of cumulative curves of figure 2. Postglacial climatic changes are indicated.

graphic level where each unit reaches its maximum abundance. Each succeeding unit should be higher in the section than its predecessor. Note in figure 1 that spruce-fir-jack pine had its maximum abundance in the 8- to 7-foot level, birch-alder had its maximum abundance in the 7- to 6-foot level, white pine-hemlock reached its maximum in the 4- to 3-foot level, and the succeeding three groups are also progressively arranged by level of maximum occurrence. When the groups are graphed using a progressive maximum-abundance arrangement the successional trends become clearly observable and deviations from those trends are readily recognized as will be seen in the 1- to 0-foot level in figure 1.

Step two in the analysis is the drawing of the cumulative-curve graph shown in figure 2. The construction of this graph differs from figure 1 in that the ordinates represent percentages, not stratigraphic levels, and are divided into quartiles. The arrangement of the palynological entities is the same as in figure 1 and must be strictly observed. The width of the abscissa intervals can vary and the subdivisions shown within each interval are merely convenient location indices to establish median-quartile positions on the graph for transfer to figure 3. The drawing of the cumulative curve for each stratigraphic level, beginning at the bottom level, follows standard statistical procedure. The cumulative curves of figure 2 represent the samples of figure 1 and are labeled 1 to 8 from bottom to top. The relative percentage of spruce-fir-jack pine is plotted and lined on the graph (curve 1 of fig. 2), birch-alder percentage is added as the next point, then white pine-hemlock and succeeding entities which together should total 100 percent. Each succeeding stratigraphic level from the bar graph is similarly plotted. Then vertical lines are drawn from the points where each curve crosses the median-quartile (50-percent) line to a position at the base of the graph. The dashed line (a) from cumulative curve 1 of figure 2 is an example of the procedure. It is this position point that will be transferred to the quartile-summary curve of figure 3. The use of the median quartile rather than the first or third is statistically more accurate, for the first quartile position on the cumulative curve does not give sufficient importance to the later stages of assemblage succession and the third quartile position may in some cases eliminate the early stages.

The final step in the analysis is the construction of a quartile-summary graph of information derived from the cumulative curves in figure 2. The ordinates of the graph are stratigraphic levels and the abscissa contains the same palynological entities and arrangement as in figures 1 and 2. The point of each cumulative curve in figure 2 where it crosses the median quartile line is now transferred to the quartile-summary graph and the points are connected. The resulting curve is a summary of the palynological succession through the sedimentary section.

An examination of figure 3 shows that palynological succession in the Greenfield peat bog began with spruce-fir-jack pine pollen, developed through birch-alder, white pine-hemlock, beech-maple, and oak-hickory assemblages to within one foot of the bog surface and at that level there was a return to the beech-maple assemblage. The regional vegetation at present is of that type but also contains a large com-

ponent of other elements shown by the histogram in figure 1. The pollen assemblages at each peat level are indicative of the forest composition at those time levels and the summary graph shows as a progressive line, the trend of succession. Forest succession and migration is a function of time, local ecology, and climatic change, all of which may be reflected in the preserved peat pollen assemblages. That the climate was warmer (Hypsithermal Period) in the recent past has been postulated on evidence from numerous disciplines, including palynology. The return of the Greenfield bog pollen assemblage to a beech-maple from an oak-hickory assemblage is in agreement with other evidence that the climate is presently cooler than it was several thousand years ago.

The graph technique can be applied to bore-hole studies in the manner described above but, for easy comparison with electric logs, the quartile-summary graph should be plotted on the same scale as that of the electric log.

Most bore-hole sections contain large portions of marine or brackish-water sediments and fossils of those types must be included. A convenient procedure is to convert all the palynomorphs from the bar graphs into one of the following classes: (1) marine, (2) nearshore or brackish, (3) strand or swamp, and (4) upland. These assemblages are plotted as cumulative curves and then the median quartile points are transferred to a quartile-summary graph. The resultant curve gives information concerning the paleobiota, environment of deposition, unconformities, and structural relations of the subsurface rocks.

Geologic Atlas of Texas

The first quadrangle (Texarkana) of the *Geologic Atlas of Texas* was issued in July 1966. The atlas, published by The University of Texas Bureau of Economic Geology, will eventually consist of 47 quadrangles, or portions thereof, at a scale of 1:250,000. The project is under the direction of Virgil E. Barnes, with the assistance of numerous oil-company geologists and the geological surveys of the neighboring states. Compilation of the Texarkana sheet was done primarily by the Geologic Atlas Project Committee of the East Texas Geological Society.

The Texarkana quadrangle is in the northeast corner of Texas, bounded by latitudes 33° and 34° and by longitudes 94° and 96°. It thus includes portions of Oklahoma and Arkansas. The Oklahoma portion is the area north of the Red River to the latitude of Hugo from the eastern tip of Bryan County to the Arkansas-Oklahoma state line.

The map shows the distribution of 35 geologic units, from Cretaceous to Recent, in as many colors and color patterns, and it is excellently drafted (by the scribe-drafting technique) and printed. It is available folded in an 11½-by-9½-inch envelope with an accompanying booklet of explanations, from the Bureau of Economic Geology, The University of Texas, Austin, Texas 78712. A small quantity is available at the Oklahoma Geological Survey. The price is $2.00.

Type Locality of *Cordania falcata*

A. Allen Graffham*

Whittington in 1960 (p. 411-412) described a new species of *Cordania* from the Haragan Formation in Oklahoma as *Cordania falcata.* The specimen designated as the holotype (USNM 136468) was one collected by Harrell L. Strimple, and the locality was given as White Mound, NW¼ NE¼ sec. 20, T. 2 S., R. 3 E., Murray County.

The author had seen the specimen in the Strimple collection, prior to its acquisition by the U. S. National Museum, and had seen the collecting site on several occasions in the company of Strimple. The true locality indicated by Strimple is NW¼ SE¼ NW¼ sec. 8, T. 1 S., R. 8 E., Coal County, Oklahoma. That this is the correct type locality for *Cordania falcata* has been confirmed by Strimple in a letter to the author, dated September 29, 1965, in which he stated, "The specimen of *Cordania* was found many years ago by my wife, Melba Strimple, in a slab of limestone just off the cattle path, about a third of the way up the hill, which is near Hunton townsite, west of Clarita, in Coal County, Oklahoma."

In this area there is a well-developed bench about half way up the scarp, and the horizon from which the holotype and the topotype (illustrated herein, fig. 1) came is approximately 25 feet below the top of the bench. Both specimens came from slabs (or possibly the same slab)

* Geological Enterprises, Ardmore, Okla.

Figure 1. Cordania falcata, **OU 5245, approximately x4.**

of Haragan Limestone exposed near the cattle path that goes up the scarp along a fence at that spot.

The topotype illustrated here was collected by the author in 1963 and is in the University of Oklahoma paleontological collections (specimen OU 5245). To the best of the author's knowledge, this specimen and the holotype are the only essentially completely preserved specimens known, although a number of fragments of *C. falcata* have been recovered in the same general area during the past few years.

Reference Cited

Whittington, H. B., 1960, **Cordania** and other trilobites from the Lower and Middle Devonian: Jour. Paleontology, vol. 34, p. 405-420.

Note on the Laverne Formation

Mart P. Schemel

During the course of recent investigations involving the Laverne Formation of northwestern Oklahoma, it was discovered that an early error in citation of the original reference to the formation had been perpetuated in recent literature. In addition, the situation regarding the type locality of the Laverne is somewhat dubious. The purpose of this note is to document briefly certain facts. The history of the usage of the name Laverne has been thoroughly reviewed by Schoff (1956).

In the early *Lexicon of Geologic Names of the United States* by Wilmarth (1938, p. 1158), the cited reference (Gould, 1927, p. 127) is not the earliest publication of the name Laverne. The same publication was cited in the recent Lexicon by Keroher and others, (1966, p. 2120), as the original reference. The Laverne Formation was named and described by V. V. Waite in a manuscript that was quoted extensively by Gould and Lonsdale (1926, p. 33). This was the first and only publication of data from the Waite manuscript, which was later lost.

The Laverne Formation is currently without a definite type locality. Neither the published excerpts of the Waite manuscript nor accompanying comments on the Laverne Formation by Gould and Lonsdale included a description or designation of a type locality. It is not definitely known, of course, if Waite described a type section or not. All subsequent authors have assumed, mainly because of the name, that the type locality is somewhere in the vicinity of the town of Laverne, in western Harper County. A. J. Myers (1959) mapped Laverne deposits west and south of the town but did not designate an exposure in this area to serve as a type locality.

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Myers, A. J., 1959, Geology of Harper County, Oklahoma: Okla. Geol. Survey, Bull. 80, 108 p.
Schoff, S. L., 1956, Laverne Formation: Okla. Geol. Survey, Okla. Geology Notes, vol. 16, p. 3-5.
Wilmarth, M. G., 1938, Lexicon of geologic names of the United States, including Alaska, pt. 1, A-L: U. S. Geol. Survey, Bull. 896, p. 1-1244.

New Survey Publications Issued

The following publications were issued by the Oklahoma Geological Survey in December 1966.

BULLETIN 113. *Pennsylvanian fusulinids in the Ardmore basin, Love and Carter Counties, Oklahoma,* by Dwight E. Waddell. 128 pages, 13 plates, 11 text-figures. $4.00 cloth bound, $3.00 paper.

This report concerns the occurrence of seventeen species of fusulinids (four new) of the genera *Fusulinella, Fusulina, Wedekindellina,* and *Triticites* in the Pennsylvanian Dornick Hills, Deese, and Hoxbar Groups. A statistical method of discriminating species is presented in detail.

GUIDE BOOK XVI. *Late Paleozoic conodonts from the Ouachita and Arbuckle Mountains of Oklahoma,* by Maxim K. Elias. 39 pages, 2 plates. $2.00 paper bound.

Twenty-three species and subspecies (three new) of the genera *Gnathodus* (subgenus *Harltonodus*), *Neoprioniodus, Hindeodelloides,* and *Ligonodina* are described and illustrated and their occurrences correlated with the standard biostratigraphic zones of Western Europe.

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