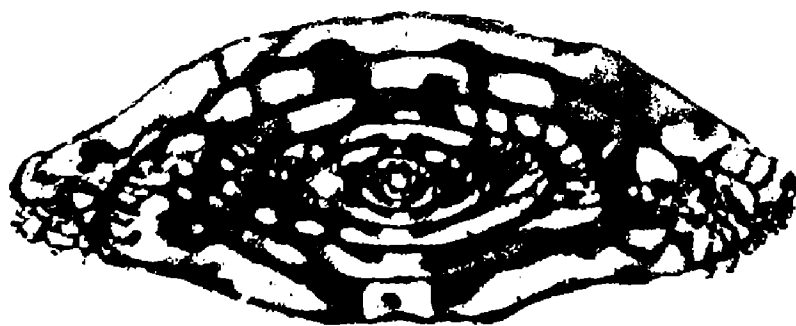


# Oklahoma Geology Notes

OKLAHOMA GEOLOGICAL SURVEY/VOL. 44, NO. 6—DECEMBER 1984

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*On the cover—*

## **Fusulinid from Coal County, Oklahoma**

Shown on the cover is an axial section of *Fusulinella barnettensis* Douglass and Nestell, n. sp. (x30). This paratype specimen was collected from the Atoka Formation (Pennsylvanian) west of Barnett Hill, north of Clarita, Coal County, south-central Oklahoma. Specimens are abundant in a calcarenite that is rich in echinodermal debris and fragments of bryozoans, brachiopods, and foraminifers.

The cover photomicrograph is from a collection of papers published recently by the Oklahoma Geological Survey as Bulletin 136, entitled *The Atokan Series (Pennsylvanian) and Its Boundaries—A Symposium*. This particular illustration appears as figure 2 of plate 3 in a paper by Raymond C. Douglass and Merlynd K. Nestell on "Fusulinids of the Atoka Formation, Lower-Middle Pennsylvanian, South-Central Oklahoma" (p. 19-39).

As its title indicates, the 198-page volume represents the proceedings of a symposium held at The University of Oklahoma March 29, 1982, at the annual meeting of the South-Central Section of the Geological Society of America. The conveners of the symposium, Patrick K. Sutherland, of the OU School of Geology and Geophysics, and Walter L. Manger, of the Department of Geology and University Museum, University of Arkansas, also served as editors of the work.

As Sutherland and Manger state in their preface, "One of the purposes of the Norman symposium and the field trip was to examine both the biostratigraphic and lithostratigraphic bases of the Atokan Series in its type region in Oklahoma. In addition, the symposium provided the occasion for presentation of papers on important sequences of the same age in various parts of North America and for discussions of Early and Middle Pennsylvanian chronostratigraphic terminology as used throughout the continent." The field trip mentioned was held immediately preceding the symposium and was covered by a separate guidebook published by the Survey (Guidebook 20, 1982, 44 p.).

The 14 papers in the publication are followed by the transcript of a general discussion that was tape recorded following the formal presentations.

Bulletin 136 is available from the Survey, at the address given below, for \$18 cloth-bound and \$14 paperbound. The price for Guidebook 20 is \$5.

### **Oklahoma Geology Notes**

**Editor:** Connie Smith

**Editorial Staff:** Elizabeth A. Ham, William D. Rose

**Oklahoma Geology Notes** ISSN 0030-1736, is published bimonthly by the Oklahoma Geological Survey. It contains short technical articles, mineral-industry and petroleum news and statistics, reviews, and announcements of general pertinence

to Oklahoma geology. Single copies, \$1.50; yearly subscription, \$6. All subscription orders should be sent to the Survey at 830 Van Vleet Oval, Room 163, Norman, Oklahoma 73019.

Short articles on aspects of Oklahoma geology are welcome from contributors. A set of guidelines will be forwarded on request.

# Oklahoma Geology Notes

OKLAHOMA GEOLOGICAL SURVEY/VOL. 44, NO. 6—DECEMBER 1984

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# USE OF MINICOMPUTERS IN WATER-RESOURCES INVESTIGATIONS

Jonathon C. Scott<sup>1</sup>

The U.S. Geological Survey is the Federal government's lead agency in earth-science research and has for years attempted to maintain a major role in the application of new technology. In the fall of 1982, the U.S. Geological Survey negotiated a contract with Prime Computer, Inc.,<sup>2</sup> to purchase approximately 75 minicomputers for use in water-resources investigations. This purchase, which was the result of a pilot project using minicomputers (Longwill and others, 1980), has a number of consequences that may be of interest to other organizations attempting to benefit from computer technology.

During the 1960's, nearly all water-resources data processing by the U.S. Geological Survey was performed by remote users submitting batch jobs to a centralized computer. (Batch jobs are collections of computer instructions and data to be processed as a unit, and the results to be returned as a unit, by the computer.) Users were charged for the resources their jobs required of the host computer. During the 1970's, computer users began to acquire video display terminals and microcomputers. The new hardware gave users the capability of interacting with the computer more efficiently and caused a proliferation of programs and databases within the U.S. Geological Survey. However, even the new hardware did not meet the computational requirements, and, unfortunately, many duplicative programs and incompatible hardware were acquired. In addition, data-processing procedures and experiences were not directly transferable among the various offices.

To decrease these problems, the U.S. Geological Survey has installed Prime minicomputers in most of its water-resources district and some subdistrict offices throughout the United States. The computers are linked together in a communications network, thus providing a distributed computer system. Users have greater access to computer power and can retrieve and process information more quickly than before. Also, data-processing expenses are easier to plan, because they are not subject to the unpredictable variations of batch-job costs and quantities. Because all offices have compatible hardware

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<sup>1</sup>Hydrologist, U.S. Geological Survey, Water Resources Division, Oklahoma City, Oklahoma.

<sup>2</sup>The use of the brand name in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

and operating systems that can easily interface with the other offices, software- and data-sharing capabilities are enhanced.

The use of distributed computer hardware and databases has caused the U.S. Geological Survey to address some new problems. Computer users who need data that reside on several different machines need to be accommodated. The agency needs either (1) to maintain an amalgamated copy of the distributed databases and develop techniques for keeping it updated, or (2) to devise automated methods for querying multiple databases on the network. The potential for security problems has increased manyfold. With distributed processing, system integrity and environmental security need to be maintained for many sites instead of for a few. The duties of those working in data processing have shifted from the relatively basic requirements of batch-data entry to the much more sophisticated requirements of system operation. For the hydrologist, the availability of computational capabilities has shifted from relatively limited access to a centralized computer to direct connection to a powerful, local minicomputer. To take advantage of the new computer facilities, hydrologists need to become proficient computer users. They need to be able to type, and many need to be able to program.

The goal of distributed data processing is more efficient production of hydrologic studies. The early computers provided rapid access to data on a national scale. Computers made possible hydrologic simulations through digital modeling that would otherwise have been too expensive and time-consuming to perform. A greater degree of productivity will be gained by the distribution of data processing. Hydrologists can now perform their activities more quickly and accurately. New applications have been made available that range from electronic mail and text processing to conversion of digital data to graphic display and vice versa.

The distribution of minicomputers among the U.S. Geological Survey offices is not the final phase of computerization. The next distribution of computer hardware will be a greatly expanded use of microprocessors at measuring sites in the field controlling the acquisition, recording, and transmission of hydrologic information. Planning for the next generation of computers for use in water-resources investigations has begun.

## Reference Cited

- Longwill, S. M., McNellis, J. M., and Posson, D. R., 1980, The use of minicomputers in a distributed information processing system—A feasibility study: U.S. Geological Survey Open-File Report 80-326, 68 p.

## OGS PUBLICATION FUND GROWS

Early this past summer the Oklahoma Geological Survey initiated a program under which a fund would be established to receive donations that would aid in getting manuscripts and maps into print (see *Oklahoma Geology Notes*, v. 44, p. 127). This fund, which is administered through The University of Oklahoma Foundation, was established to alleviate problems created by budget cuts that have prevented publication of results of several scientific and resource investigations.

Response from companies and individuals was almost immediate and has been generous, with donations of \$5,000 each received from Conoco, Inc., Mobil Oil Corp., and Atlantic Richfield Co. Other donors are listed below in the order of receipt of their gifts.

Dolese Brothers Co.  
Bogert Oil Co.  
CEJA Corp.  
Earlsboro Oil and Gas Corp.  
Kenneth Rees (Heartland Exploration)  
Sun Exploration and Production Co.  
Alex P. Aven  
Clyde Petroleum, Inc.  
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Harper Oil Co.  
Cheyenne Petroleum Co.  
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Chevron U.S.A., Inc.  
Home Petroleum Corp.  
GHK Gas Corp.  
Baruch-Foster Corp.  
Shell Western E&P, Inc.  
Enserch Exploration  
John Hoard

The amount in the fund stands currently (as of October 25) at \$27,750, which represents a substantial start toward the goal of \$100,000, and the Survey is grateful to all these donors for their support of its efforts.

These contributions have now made possible the completion of a number of projects. A new core catalog has already been published, and a report on Marshall County is well along in preparation. Other studies of interest to pe-

roleum and other economic geologists that will come into print more quickly because of the publication fund include a report on the geology and mineral resources of Payne County, a report on the coal geology of Craig and Nowata Counties, and another on the coal geology of Rogers and Mayes Counties.

A map of Oklahoma showing oil and gas fields has been completed and is undergoing cartographic preparation. A circular on "Stability Problems Associated with Abandoned Underground Mines in the Picher Field, Northeastern Oklahoma" is also scheduled for publication.

In addition to the help it offers in publishing these new reports, the fund will assist in reprinting some important publications that are out of print, particularly the landmark Bulletin 95 on basement rocks and the geologic map and sections of the Arbuckle Mountains. Also scheduled for reprinting are indexes to subsurface mapping for 1940-60 and two supplements that provide subsurface sources through 1966.

"We are extremely grateful to our contributors for the firm commitment they have made to our publication efforts," Charles J. Mankin, OGS director, said. "This generous response will help us fulfill our responsibility of making the results of our investigations available in the most appropriate and timely manner."

## **CORRESPONDENCE COURSE IN HYDROLOGY SCHEDULED TO BEGIN IN JANUARY**

The availability of an Interactive Remote Instructional System (IRIS) for teaching applied hydrology has been announced by Wright State University in Dayton, Ohio. This correspondence course was developed for the Soil Conservation Service, U.S. Department of Agriculture, to prepare its personnel for professional work in ground water. The program will be available to non-SCS registrants beginning in January 1985.

The program is offered in two 6-month courses and may be taken at either a basic or an advanced level. The courses are oriented toward practice rather than theory and provide the participant with both knowledge and skills in exploration, evaluation, development, and management of ground-water resources. University credit at both undergraduate (basic) and graduate (advanced) level is available if desired.

Personal contact between participants and tutors is maintained through lesson correspondence by mail, through telephone contact via a WATS line, and through an optional orientation seminar at the beginning of the course. Personal progress is supervised by a tutorial staff, and a personal tutor is assigned to each participant.

The levels of work offered are those of comparable university courses. Participants are expected to be familiar with elementary science (including geology) and mathematics through algebra. Some advanced mathematics and computer-science concepts are introduced at the advanced level, but the program is not rigorously mathematical in its content or approach.

For further information, contact Dr. Ronald G. Schmidt, Director, IRIS Program, Department of Geological Sciences, Wright State University, Dayton, OH 45435. The telephone number is (513) 873-3448.

## ENERGY FUTURE EXAMINED AT NIGH'S ENERGY CONFERENCE

A crowd of Oklahoma high school students and a number of others involved in the energy industry were able to hear and ask questions of some of the State's and nation's leading experts at Governor Nigh's Fifth Annual Energy Conference, held November 14 at the Lincoln Plaza Forum in Oklahoma City.

After an entertaining opening session, led by Gerard Katz, executive director of the National Energy Education Day Project, the audience heard a congressional perspective from U.S. Senator Don Nickles and U.S. Representative Mike Synar, both of Oklahoma. While agreeing that another severe oil shortage is a definite possibility, the two congressmen emphasized different issues in their addresses.

Nickles, who was first to speak, said that the marketplace does a much better job of distribution and regulation than does the federal government. He cited some 28 different categories for the pricing of natural gas as an example of the confusion created by some government regulations. He pointed out that natural gas is the only major commodity still regulated by the federal government.

Nickles also blasted the windfall-profits tax and said that while it has not been eliminated, its damaging effects on the economy have been lessened somewhat. Currently, he said, income from two barrels of oil per day is exempt from the tax. In January, this exemption will rise to apply to three barrels per day. He also noted that the tax has been eliminated on "stripper" wells, those wells producing less than 10 barrels of oil per day.

"The windfall-profits tax is one of the most anti-free-enterprise acts ever to pass Congress," Nickles said. "The free-enterprise system should mean the freedom to succeed or the freedom to fail."

Congressman Synar, who also spoke out against the windfall-profits tax and for the deregulation of natural gas, said that failure to accept the realities and complexities of our energy situation could be very dangerous. Synar said that he is continuing his efforts to help formulate plans for any disruption in oil supplies, but has seen less movement toward emergency planning than he would like. He noted that in the event of a crisis, the energy supplies of our allies are also vulnerable, and the United States would have certain commitments to them as well. He urged planning for a sharing system for the national Strategic Petroleum Reserve and urged that this system be tested through a planned drawdown to see how well it actually works.

Synar remains hopeful, however, saying that he believes we still have the resources and foresight to make us less vulnerable. But he is concerned with the slowing of conservation efforts, and emphasized that conservation itself is a valuable resource. He urged also greater development of enhanced-recovery techniques and "creation of a climate to encourage exploration."



"We must sustain our quest for renewable energy resources. The government must step in where industry does not and cannot support research," he added. Synar said he would like to see the federal government play a role in the research and development of synthetic fuels, but opposes the use of government funds to support their commercialization.

The country should also work vigorously to develop its abundant coal resources, he said, adding that he is disappointed in the administration's cuts in programs for coal research.

"We must find cleaner and more efficient methods to use coal for this country," he said, noting that the vast reserves represent an extraordinary fuel resource.

After questions from the audience, conference goers were able to hear a panel discussion on the state of America's energy security/insecurity. Moderator Jay T. Edwards, executive director of The University of Oklahoma's Energy Center, introduced panelists Joseph C. Story, president of Gulf Consulting Services, and a former member of Aramco Policy and Planning Staff, Dhahran, Saudi Arabia; Jeffrey A. Jones, deputy director of energy programs, Office of the U.S. Secretary of Defense; and Margaret W. Sibley, acting director of policy and evaluation, Office of Energy Emergencies, U.S. Department of Energy.

The panelists placed great emphasis on the nation's strategic reserves in staving off a crisis in case foreign oil supplies dwindle. Sibley said that the United States now has a 90-day supply of oil if all import sources were eliminated, and an 800-day supply if Persian Gulf supplies only were cut off. She noted that we are still in the process of adding to these supplies.

She also pointed to a diversification of U.S. oil sources, saying that we now buy more oil from Mexico than from Saudi Arabia.

Jones also feels confident about our reserves, but said that the United States would be forced to compete in the marketplace for supplies within weeks of a major conflict should the nation be involved in a defensive action.

Story emphasized the need to look ahead, saying that it takes 4-5 years to develop resources after they have been discovered.

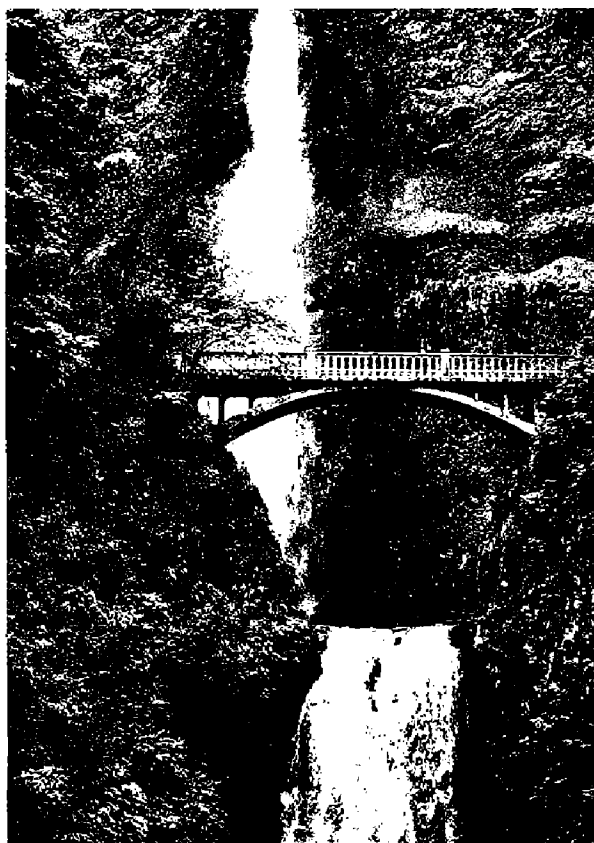
At the noon luncheon, Oklahoma Corporation Commissioner Jim Townsend introduced keynote speaker Frank A. McPherson, chairman and chief executive officer of Kerr-McGee Corp.

McPherson said that importing one-third of the nation's crude oil puts the United States in a dangerous position. He also gave the audience a detailed account of Kerr-McGee's recent activities in coal production, and encouraged the students present to pursue energy-related careers.

In afternoon sessions, Conoco, Inc., provided the students with a simulated energy-exploration situation.

A wrap-up session for the students was conducted by Robert H. Rowland, executive director of Enterprise Square, U.S.A.

*Connie Smith*



## EDITORS MEET IN OREGON

Portland, Oregon, was the site of the 18th annual meeting of the Association of Earth Science Editors. President John T. Dickman, Chemical Abstracts Service, Columbus, OH, presided at the meeting, which was held October 7-10.

Two concurrent sessions convened Monday morning. A journal-management panel under the chairmanship of Jerry W. Henry, Society of Exploration Geophysicists, Tulsa, viewed ways to improve the journal-publication process.

Orrin Pilkey, Duke University, Durham, NC, spoke on the review system from the editor's standpoint. He saw this system as essential toward maintaining quality in the geological literature and curbing or monitoring questionable practices such as "double-dipping" (publishing the same paper twice) and "shingling" (publishing overlapping papers by the same author). At the same time he recognized the importance of cherishing authors as the journal's most important resource and emphasized the care needed to see that

*the review system does not harm the truly great paper.*

Judy C. Holoviak, American Geophysical Union, Washington, DC, explained how the use of microcomputers in editorial management helps to track the progress of individual papers through the publication mill.

Concluding the panel session on journal management was a presentation by Ghassan Rassam, American Geological Institute, Alexandria, VA, whose

←  
Upper and lower Multnomah Falls, Columbia River Gorge area. Owing to the regional north dip, streams on the south (Oregon) side of the gorge typically descend as waterfalls; such falls are mostly absent on the north (Washington) side.

topic was the role of secondary services with respect to the editor and publisher. In contrast to primary services, such as journal and book publishing, he defined secondary services as encompassing activities such as abstracting and indexing. He noted that although the secondary services could not exist without the primary services, there are ways in which the secondary services can benefit the primary services: for example, more and more information generated by secondary services is being channeled into on-line databases rather than into print. He suggested several ways in which the primary services can help the secondary services: (1) maintain a regular publication schedule, (2) present a clear table of contents, (3) give authors' names and addresses, (4) give complete bibliographic identification, and (5) include complete information with maps, such as title, author, and scale.

In a concurrent session, Douglas M. Kinney, Geological Survey Associates, Bethesda, MD, gave an overview of the mapping and editing problems involved in his firm's part in the preparation and printing of the more than 400 sheets organized into 13 atlases that resulted from the Ocean Margin Drilling Program. Factors to be considered included selection of cartographic-preparation methods, printer, and publication scale.

Susan L. Tingley, Nevada Bureau of Mines and Geology, Reno, NV, told of how her agency has adopted ways of keeping costs down in publishing four-color maps: (1) having some cartographic preparation done outside; (2) printing on a 42- X 58-in. press, four maps at a time; and (3) eliminating map



Field-trip leaders point out salient geologic features of the Columbia River Gorge. View is toward the east; the state of Washington is on the left, Oregon on the right.

jackets and printing text on the map sheet itself rather than in a separate booklet.

A "publisher's roundtable on strategic planning," chaired by A. F. (Fred) Spilhaus, Jr., American Geophysical Union, Washington, DC, focused on expectations for the publishing environment in the next 3 to 5 years.

Eugene R. Hampton, U.S. Geological Survey, Reston, VA, commented that successful editors of the future will be accustomed to using electronic equipment and will be combination manuscript typists, typesetters, layout artists, and designers.

Wendell Cochran, Geological Survey Associates, Bethesda, MD, advised anyone in his audience who is thinking about buying a typewriter to consider instead a microcomputer and a printer, which can be obtained for a few thousand dollars. More and more authors are supplying manuscripts in the form of computer disks rather than "hard copy," he said.

Stuart E. Jenness, National Research Council of Canada, Ottawa, Ontario, identified five needs of readers: (1) something of interest, (2) timeliness of content, (3) awareness of what is being published and by whom, (4) access to the literature, and (5) sufficient time to read, browse, reflect, and do something about what has been read. He said that in the near future the electronic revolution would pertain only to items 3 and 4.

Ghassan Rassam, American Geological Institute, Alexandria, VA, in viewing the size of the market with respect to increased information, noted that out of about 500,000 geologists in the world, some 50,000 U.S. geologists produce about 40 percent of the world's geological literature. He saw a growing trend among organizations to open-file manuscripts rather than to publish in the traditional manner.

Jerry W. Henry, Society of Exploration Geophysicists, Tulsa, assessed the outlook for future markets by saying that although the slump in the oil industry during the past 2 years had created a glut of geological scientists and technicians, the societies will continue to grow and that the demand for good, useful publications will remain strong.

A field excursion through the Columbia River Gorge and the Hood River Valley to Mount Hood occupied Tuesday afternoon and evening. The group saw some spectacular scenery, including such prominent volcanic peaks as Mount Adams, Mount Hood, and Mount Jefferson, as well as several waterfalls along the route. Observed in some of the Tertiary basaltic-lava flows were classic pillow structures and colonnade and entablature jointing patterns.

The meeting concluded Wednesday with a panel discussion, chaired by Tres Smith, on how to go about reporting information on natural hazards to the general public. This topic was selected because of the relatively unstable geologic setting of the Pacific Northwest, and particularly because of the activities stemming from the cataclysmic eruption of nearby Mount St. Helens in May 1980.

At the association's annual business meeting the symbolic gavel was presented by outgoing president John Dickman to Judy Holoviak, incoming

president. Other new members of next year's board of directors are Rex C. Buchanan, vice president and president-elect, and Jean C. Thyfault, Geological Society of America, Boulder, CO.

Representatives from the Oklahoma Geological Survey at the meeting were William D. Rose, geologist-editor and AESE past president, Elizabeth A. Ham, associate editor and member of the AESE award committee, and T. Wayne Furr, manager of cartography.

Next year's meeting is scheduled for Lawrence, Kansas, October 20-23.

*William D. Rose*

## OGS CHEMISTRY LAB IN TOP 10

The Oklahoma Geological Survey's analytical chemistry laboratory has been ranked in the top 10 of all laboratories in the United States participating in the "round-robin" analytical analysis of water samples for the U.S. Geological Survey, Charles J. Mankin, director of the OGS, announced recently.

In the November-December 1983 analysis, the lab was ranked as the top laboratory in the program.

"It should be noted that not all areas of our Survey have the opportunity for direct comparison of their performance with counterpart organizations throughout the country. In fact, I suspect that any area of activity within the Survey would compare most favorably with similar activities in other organizations anywhere in the country," Mankin added. "Thus, on a relative scale, the success of the chem lab is an indication of the high level of performance of the Oklahoma Geological Survey."

The OGS chemistry lab staff consists of Stephen J. Weber, chief chemist; Robert M. Powell, chemist; Keith A. Catto, chemist; and N. Jill Bowen, laboratory assistant.

## 1984 SURVEY FIELD TRIP SHOWS STAFF THE UPS AND DOWNS OF WORK IN THE FIELD

Photographs have surfaced recently from the annual Oklahoma Geological Survey field trip for employees and their families that clearly point up the hazards of travel over some of the State's back roads. The photographs of the floundering bus reminded some staff members of the picture from the Survey's history, Special Publication 83-2, that showed geologists pushing an early-model car. The field trip was undertaken to help employees and their families learn more about the geology of the State and to better understand the role that each of them plays in carrying out the functions of the OGS.

The field trip was led by Ken Johnson, associate director of the OGS, and about 40 participants enjoyed the opportunity to examine the Blaine County area of northwestern Oklahoma. The trip focused on examining the geology of Permian red beds and evaporites on the north flank of the Anadarko Basin and the geomorphic features that result from differential erosion of thick units of sandstone, shale, and gypsum.

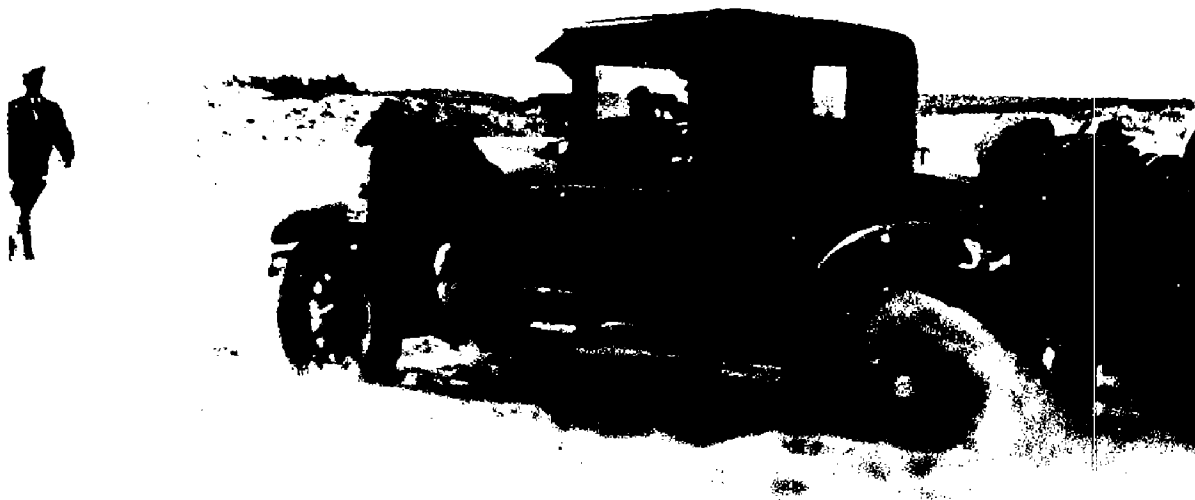
The first stop was at Trench Canyon, about 7 mi west of Watonga, where the crossbedded Rush Springs Sandstone contains excellent examples of pot-holes and other erosional features scoured by sand- and gravel-laden streams crossing the outcrop. The second stop, also the lunch stop, was at Roman Nose State Park, where cyclic sequences of dolomite, gypsum, and shale in the Blaine Formation form a series of benches and escarpments as a result of differential erosion of resistant dolomite or gypsum beds and nonresistant shale beds.

The third and final stop was at the mouth of Salt Creek Canyon, a deeply incised, rugged canyon developed by downcutting and headward erosion of Salt Creek into the face of the Blaine Escarpment about 3 mi south of Southard. The canyon walls, rising abruptly some 300 ft above the creek bottom, consist of outcrops of the thick Flowerpot Shale capped by resistant gypsum beds of the Blaine Formation. In the floor of the canyon are (1) natural salt-water springs that result from dissolution of subsurface salt (halite) layers about 100 ft beneath and west of the Canyon, and (2) salt plains along the creek banks, where brine has evaporated, leaving encrustations of salt that in the past were harvested by Indians and early settlers.

The specific sites visited on this field trip, and many other sites in northwestern Oklahoma, are described in the Survey's Educational Publication 3, *Guidebook for Geologic Field Trips in Oklahoma: Book II, Northwest Oklahoma*. The publication can be ordered from the Survey at the address given

inside the front cover of this issue. The price for the 42-page book is \$2.

When push came to shove in the field in the early days (see photo, opposite page, above), at least vehicles were easier to push than the large bus being "dug" out by (left to right) Lloyd Blackmon, Brian Cardott, Tom Weaver, Kenneth Johnson, and David Pennington (opposite page, below).



*"Sand Draw"*



# OKLAHOMA ABSTRACTS

## GCAGS and Gulf Coast Section SEPM Annual Meeting Shreveport, Louisiana, October 24-26, 1984

The following abstract is reprinted from the *Bulletin* of the American Association of Petroleum Geologists, v. 68, no. 9. The page number is given in brackets below the abstract. Permission of the authors and of the AAPG to reproduce the abstract is gratefully acknowledged.

### Submarine-Fan Sedimentation, Ouachita Mountains, Arkansas and Oklahoma

R. J. MOIOLA and G. SHANMUGAM, Mobil Research and Development Corp., Dallas, TX

More than 10,000 m (32,808 ft) of interbedded sandstones and shales comprise the Upper Mississippian and Lower Pennsylvanian flysch succession (Stanley, Jackfork, Johns Valley, Atoka) in the Ouachita Mountains of Arkansas and Oklahoma. Deposited primarily by turbidity current and hemipelagic processes in bathyal and abyssal water depths, these strata formed major submarine-fan complexes that prograded in a westward direction along the axis of an elongate remnant ocean basin that was associated with the collision and suturing of the North American and African-South American plates.

A longitudinal fan system is visualized as the depositional framework for these strata, which were deposited in a setting analogous to the modern Bengal fan of the Indian Ocean. Facies analysis of the Jackfork formation indicates that inner fan deposits are present in the vicinity of Little Rock, Arkansas; middle fan channel and interchannel deposits occur at DeGray Dam and Friendship, Arkansas; and outer fan depositional-lobe deposits are present in southeastern Oklahoma.

Boulder-bearing units (olistostromes), many with exotic clasts, were shed laterally into the Ouachita basin. They occur throughout the flysch succession and in all fan environments (i.e., inner, middle, and outer). This relationship may serve as a useful criterion for recognizing analogous longitudinal fan systems in the rock record. [1217]

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OKLAHOMA ABSTRACTS is intended to present abstracts of recent unpublished papers relating to the geology of Oklahoma and adjacent areas of interest. The editors are therefore interested in obtaining abstracts of formally presented or approved documents, such as dissertations, theses, and papers presented at professional meetings, that have not yet been published.





Don Nickles

## OKLAHOMA RECEIVES COPY OF ORIGINAL LAND SURVEYS

The official land survey of Oklahoma, which for more than 100 years has been stored away by the federal government, was turned over to the State at a 2:30 p.m. ceremony in Oklahoma City on November 19. Oklahoma Senator Don Nickles presented the records to the head of the State Department of Libraries.

Beginning in the 1870's, while Oklahoma's land was officially designated as Indian Territory, federal surveyors were sent in to mark off and divide the land into rectangular plats so that an accurate record of land ownership could be kept. All public-land states underwent surveying, but Oklahoma is the only state that did not gain possession of its own land-survey records.

The original 2,000 plats and 235 volumes have been stored by the Bureau of Land Management and by the National Archives in Washington, D.C. The records have all been reproduced onto 8,000 microfiches.

"Because this original government survey is the basis for all land ownership in the State, it is vital that Oklahomans have access to clear copies of these records," Nickles said. "Many of the original maps and field notes are in a very deteriorated condition, but they have all been transferred onto microfiches and can finally be turned over to the State for Oklahomans' reference."

Congress approved funding for reproducing the records in 1977, but the massive task of copying the surveys was still not completed when Nickles became involved in the issue in 1982 at the request of the Oklahoma Society of Land Surveyors.

Nickles received the records from an official of the Bureau of Land Management, and in turn presented them to Robert Clark, Director of the Oklahoma Department of Libraries, which maintains the State's archives.

## NOTES ON NEW PUBLICATIONS

### *Petroleum Geochemistry, Genesis and Migration*

This collection of articles from *International Geology Review*, 1968–81, was selected by Hollis D. Hedberg and John F. Mason.

Order from: American Geological Institute, 4220 King St., Alexandria, VA 22302. The price is \$17.95.

### *The Earth's Sedimentary Shell*

*The Earth's Sedimentary Shell* is V. I. Vernadskiy's 20th lecture and is available in translation as AGI Reprint Series V.

Order from: American Geological Institute, 4220 King St., Alexandria, VA 22302. The price is \$15.

### *Principal Structural Features of Kansas*

A map showing the principal structural features of Kansas displays sedimentary basins, arches, faults, anticlines, synclines, principal towns, cities and county seats. Large regional features, such as buried erosional limits of Mississippian rock, are also included. Map insets give Precambrian rock type and fault distribution, a Kansas physiographic map, a cross section of stratigraphic sequences, major pre-Mississippian structural provinces with some minor structures, and a generalized geologic cross section of Kansas. Map size, 40×58 in., scale, 1:500,000 (1 in. = 8 mi).

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Volume II of the Minerals Yearbook, covering the year 1982 and published by the U.S. Bureau of Mines, contains chapters on the mineral industry of

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