



OKLAHOMA GEOLOGY notes

Oklahoma Geological Survey's
Centennial Celebration:
Serving the People of Oklahoma
for Over 100 Years

The University of Oklahoma
MEWBOURNE COLLEGE OF EARTH & ENERGY

Vol. 68, No. 1 & 2

A PUBLICATION OF THE OKLAHOMA GEOLOGICAL SURVEY

Spring/Summer 2008



FEATURING:

- Ordovician K-bentonites Discovered in Oklahoma
- An Ordovician Global Reference Section Recently Selected in Oklahoma

The Oklahoma Geological Survey Celebrates its Centennial

The Oklahoma Geological Survey has the distinction of being the only geological agency mandated in a new state's constitution. In 1906, Congress passed the Enabling Act permitting the citizens of the Oklahoma and Indian Territories to call for a constitutional convention and to prepare a constitution for the new state of Oklahoma. The convention met in Guthrie, Oklahoma, the capitol of Oklahoma Territory in 1906 and the state constitution was written. The Geological Survey committee proposed a provision for the establishment of a Geological Survey and in Section 37 of Article 5 of the new constitution it reads: "The legislature shall provide for the establishment of a State Geological and Economic Survey." The founders believed that natural resources were so vital to Oklahoma's future that they needed a Constitutional provision for an agency to *investigate the state's land, water, mineral, and energy resources and disseminate the results of those investigations to promote wise use consistent with sound environmental practices.* The Survey was established in the 1907 Oklahoma Constitution and the enabling act was signed into law on May 29, 1908.



Dr. A. H. Van Vleet's field camp of the Oklahoma Territorial Geological and Natural History Survey stopped in Blaine County, Oklahoma, in 1900. Roy Hadwell, standing by tent; Paul J. White, sitting; and Charles Newton Gould, right. Dr. Gould helped incorporate the Oklahoma Geological Survey into the Oklahoma Constitution and became its first director on July 25, 1908. He is known as "the Father of Oklahoma Geology" and was an important figure in the early days of the petroleum industry in the State. *Oklahoma Geological Survey Collection, Western History Collections, University of Oklahoma.*

On the Cover: Steam rock drill outfit, eastern Oklahoma. *Holmes Collection, Western History Collections, University of Oklahoma.*



Oklahoma Geological Survey

G. RANDY KELLER
Interim Director

OKLAHOMA GEOLOGY NOTES

EDITORIAL STAFF

Sue Britton Crites
Oklahoma Geology Notes Editor

Laurie Lollis
Graphics Presentation Technician

James H. Anderson
Manager of Cartography

G. Russell Standridge
GIS Specialist

OKLAHOMA GEOLOGY NOTES, ISSN 0030-1736, is published quarterly by the Oklahoma Geological Survey. It contains short technical articles, mineral-industry and petroleum news and statistics, abstracts, notices of new publications, and announcements of general pertinence to Oklahoma geology. Oklahoma Geological Survey at 100 E. Boyd, Room N-131, Norman, OK 73019.

EDITORIAL MATTER: Short articles on aspects of Oklahoma geology are welcome from contributors; please direct questions or requests for general guidelines to the NOTES editor at the address above.

This publication, printed by the University of Oklahoma Printing Services, Norman, Oklahoma, is issued by the University of Oklahoma and the Oklahoma Geological Survey as authorized by Title 70, Oklahoma Statutes 1981, Section 3310, and Title 74, Oklahoma Statutes 1981, Sections 231–238. 1,200 copies have been prepared for distribution at a cost of \$6,582 to the taxpayers of the State of Oklahoma. Copies have been deposited with the Publications Clearinghouse of the Oklahoma Department of Libraries.

OKLAHOMA GEOLOGY notes

Vol. 68, No. 1 & 2

Spring/Summer 2008

4

Ordovician K-bentonites Discovered in Oklahoma

15

An Ordovician Global Reference Section
Recently Selected in Oklahoma

19

Horizontal Drilling Article

24

Granite Wash Workshop Re-Cap

28

Special Oklahoma Centennial Series,
Part 5: One Hundred Years Ago
in Oklahoma, June–July, 1907

51

Upcoming Meetings

Publication Date: October, 2008

Ordovician K-bentonites Discovered in Oklahoma

Stephen A. Leslie

Department of Geology and Environmental Science, James Madison University,
MSC 6903, Harrisonburg, VA 22807

Stig M. Bergström

Division of Geological Sciences, School of Earth Sciences,
The Ohio State University, Columbus, Ohio 43210

Warren D. Huff

Department of Geology, University of Cincinnati, Cincinnati, Ohio 45221

ABSTRACT

For the first time, K-bentonites have been recognized in outcrops of the upper Bromide Formation and near the top of the Womble Shale in Oklahoma. Two confirmed K-bentonites are present in the former unit at the Highway 99 road cut about 5.5 km south of Fittstown. Beds of clay and/or mud just above the top of the Bromide Formation at this locality may also be K-bentonites although this has not yet been confirmed by geochemical studies. K-bentonites appear to be absent in the exposures of the upper Bromide Formation along I-35 in the Arbuckle Mountains and at Mountain Lake Dam. In the Womble Shale two confirmed K-bentonites and five additional clay beds occur near the GSSP section on Black Knob Ridge north of Atoka. At the same locality, there are also three similar clay beds in the lower Bigfork Chert. Because these K-bentonites are present in the stratigraphic interval of the widespread Millbrig and Deicke K-bentonites, some of them may represent the southwesternmost known surface occurrences of these stratigraphically important and much studied volcanic ash beds.

INTRODUCTION

Since the early 1900s many beds of Middle and Upper Ordovician altered volcanic ashes, now referred to as K-bentonites, have been recorded and studied in eastern and central North America (for a summary, see Kolata et al., 1996). Two of these ash beds, the Millbrig and Deicke K-bentonites, reach a prominent size (up to a meter or more) and have been traced over large areas (Huff et al., 1996). These ash beds serve as excellent chronostratigraphic markers in the Turinian and Chatfieldian Stages of the North American Mohawkian Series, an interval that is referable to the late Sandbian Stage in the recently ratified global stage classification of the Ordovician (Bergström et al., 2006).

Based on generally accepted correlations (see, e.g., Ross et al., 1982), the stratigraphic interval of the Millbrig and Deicke K-bentonites corresponds in Oklahoma to the upper part of both the Bromide Formation in the Arbuckle Mountains and the upper Womble Shale in the Ouachita Mountains region.

Although clay beds have long been reported from the top of the Bromide Formation (Decker, 1933), the only published record of possible K-bentonites from the Ordovician of Oklahoma is a brief discussion in Kolata et al. (1996). Based on regional comparison of wire-line logs, these authors suggested that prominent gamma-neutron log deflections at the top and bottom of the Corbin Ranch Submember of the Bromide Formation in the Arkoma Basin subsurface might represent the Millbrig and Deicke K-bentonites, although lack of samples from these beds prevented confirmation of this interpretation. Kolata et al. (1996) also referred to unpublished studies suggesting that Decker's (1933) 'clay beds' at the top of the Bromide Formation at the Highway 99 section 5.5 km south of Fittstown, and at Rock Crossing in the southern Criner Hills (Fig. 1), consist of mixed layer illite/smectite and may be K-bentonites.

Although the precise location of the source volcanoes of the Millbrig and Deicke K-bentonites remains unknown, their regional thickness trends suggest that Oklahoma might represent the very peripheral

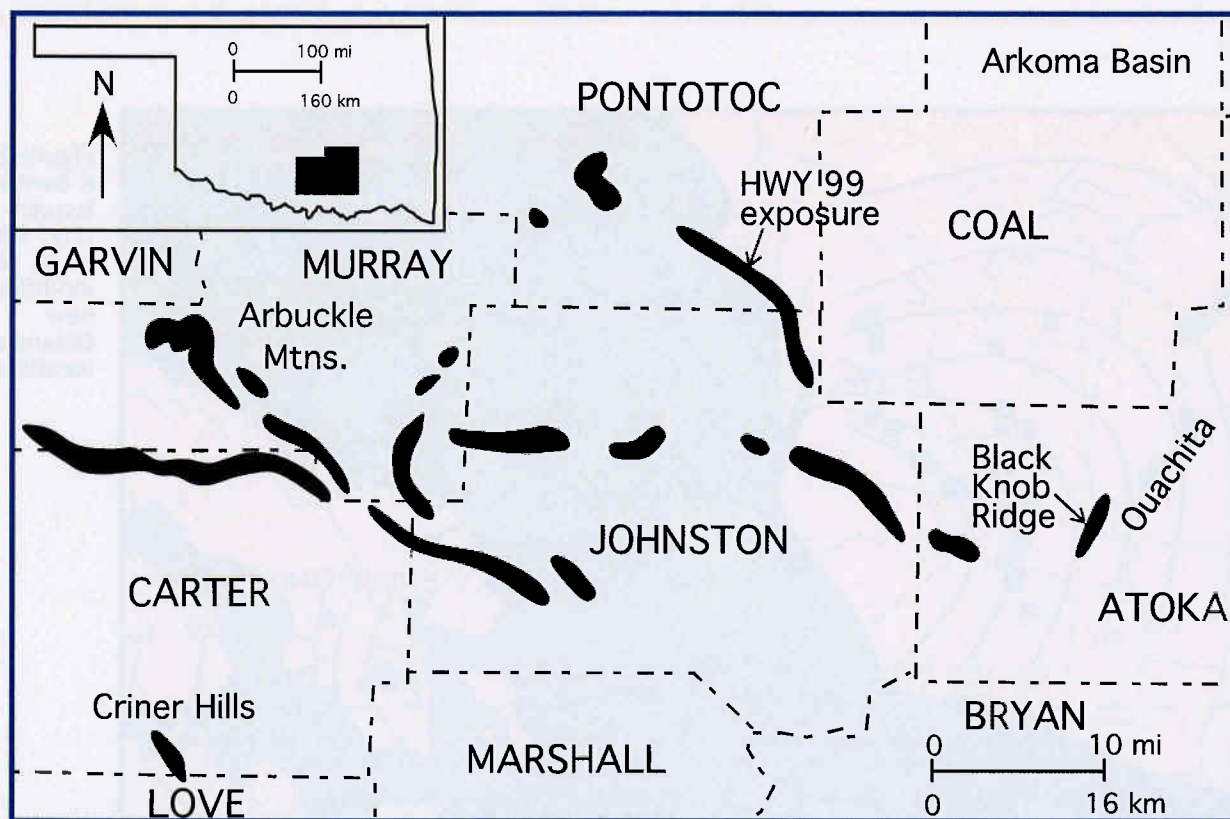


Figure 1. Oklahoma orientation map.

portion of their distribution area (Huff et al., 1996; Fig. 2), and that such ash beds, if present, could be expected to be very thin and inconspicuous in outcrops. Nevertheless, the records of possible K-bentonites prompted us to search for K-bentonites in surface sections of the Bromide Formation and the Womble Shale. Field studies in December 2005 led to the discovery of several gray clay beds, which were later confirmed by X-ray studies to be K-bentonites, in the well-known outcrop of the upper Bromide Formation along Highway 99 approximately 5.5 km south of Fittstown, Pontotoc County (Amsden and Sweet, 1983) and in the exposure of the upper Womble Shale at Black Knob Ridge, 5 km north of Atoka, Atoka County (Fig. 1). Preliminary information about these discoveries was presented by Leslie et al. (2006). Subsequent fieldwork in January 2007 resulted in the discovery of several additional clay beds at these sections but confirmation of the K-bentonite nature of the latter beds requires a geochemical investigation which is still in its early stage. These discoveries have attracted considerable interest, and here we present some of our preliminary data on these K-bentonites, especially those related to their occurrence and geo-

chemistry. We plan to summarize all our data in a more comprehensive publication when additional information becomes available, especially regarding the geochemistry of the newly discovered clay beds.

CURRENTLY KNOWN K-BENTONITES IN THE ORDOVICIAN OF OKLAHOMA

As noted above, confirmed K-bentonites are currently known only from the Highway 99 and Black Knob Ridge sections. Our search for volcanic ash beds in the upper Bromide Formation and the lower part of the overlying Viola Springs Formation in the well-known exposures along I-35 on the southern and northern flanks of the Arbuckle Mountains and in the quarry near Mountain Lake dam (Finney, 1986) has been unsuccessful. Decker's (1933) 'clay bed' at the top of the Bromide Formation at the outcrop just upstream of the highway bridge at Rock Crossing in the southern part of Criner Hills has been re-collected and geochemical analyses is inconclusive as to whether it is or is not a K-bentonite bed. This clay interval consisted of a lower clay bed and an upper clay bed and iron oxide interval resting on the Bromide-Viola Springs

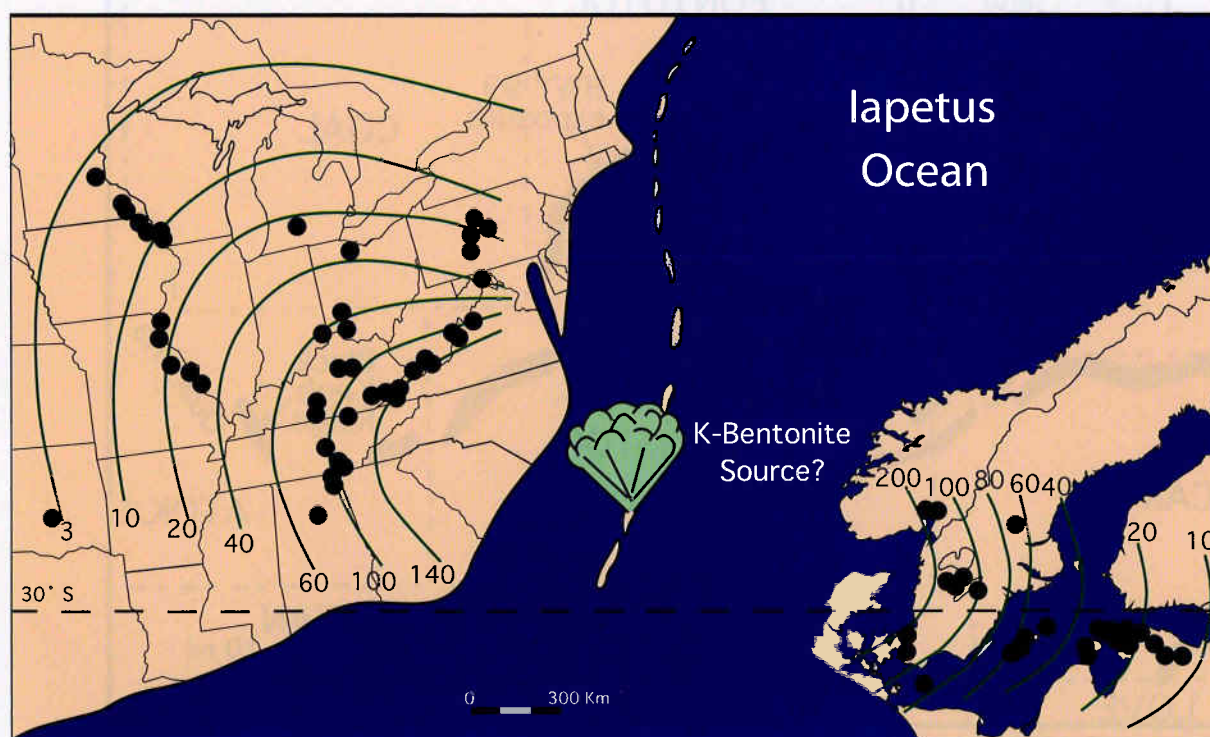
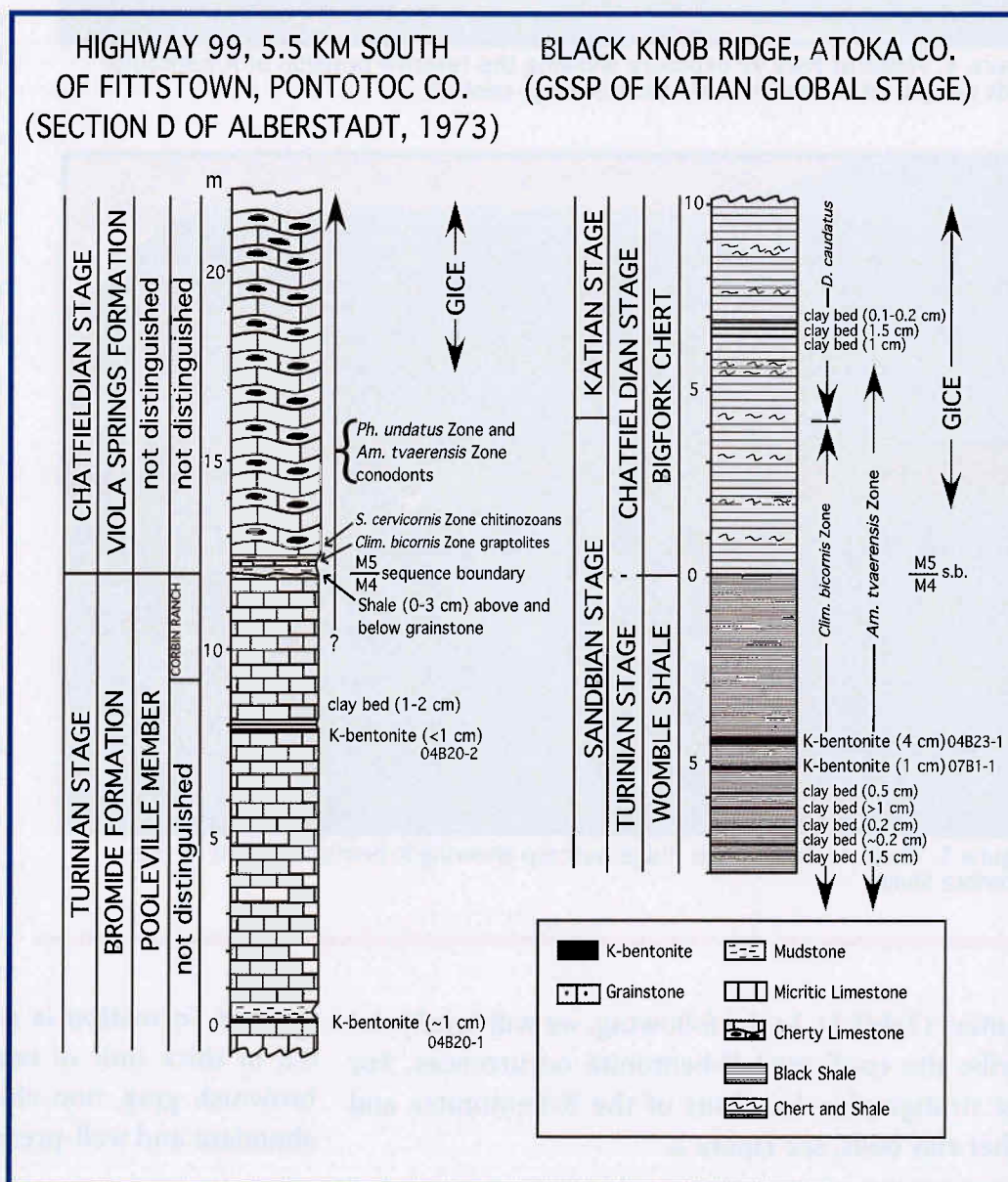


Figure 2. K-bentonite isopach map (Fig. 3 in Huff et al. (2006) modified with new Oklahoma localities).

TABLE 1

SAMPLE #	SAMPLE DESCRIPTION/LOCATION
KB1 (04B22-2)	K-bentonite in the Corbin Ranch Member of the Bromide Formation, 11.5 m below the base of the Viola Ls., Fittstown, Sec. D
KB2 (04B22-1)	K-bentonite in the Corbin Ranch Member of the Bromide Formation, 7.40 m above KB1, 4.10 m below the base of the Viola Springs Formation, Fittstown, Sec. D
KB3 (04B23-1)	K-bentonite 4.3 m below the top of the Womble Shale at Black Knob Ridge
RC1	Lower clay bed at Rock Crossing at the contact of the Bromide and Viola Springs formations
RC2	Upper clay bed and iron oxide interval at Rock Crossing at the contact of the Bromide and Viola Springs Formation

Figure 3. Stratigraphic sections measured at Highway 99 and at Black Knob Ridge showing the relative position of K-bentonite beds.



The Highway 99 section south of Fittstown

Ever since the description of this long section by Decker (1933), this outcrop has been a standard field trip stop visited by many geologists and described in several publications (see, e.g., Alberstadt, 1973; Amsden and Sweet, 1983; Finney, 1986, 1988; and Young et al., 2005). Several tens of meters of the upper Bromide Formation, most of the Viola Springs Formation, and the unconformable contact between these formations are excellently exposed and easily accessible in the road cut, most of which is not heavily vegetated (Fig. 4). The lithological contrast between the mostly thick-bedded, rather pure, light gray micrites of the Bromide Formation and the overlying cherty, more thin-bedded, dark-gray and partly shaley Viola Springs Formation is striking. The unconformity between these formations is marked by a laterally impersistent, up to a few cm thick, grainstone that in part of the exposure contains a 0-3 cm thick shaley bed (Finney, 1988) that undoubtedly represents the 'clay bed' recorded by Decker (1933). This bottom layer of the Viola



Figure 4. Photo of Hwy 99 exposure showing the relative position of K-bentonite beds compared to the Bromide-Viola Springs contact.

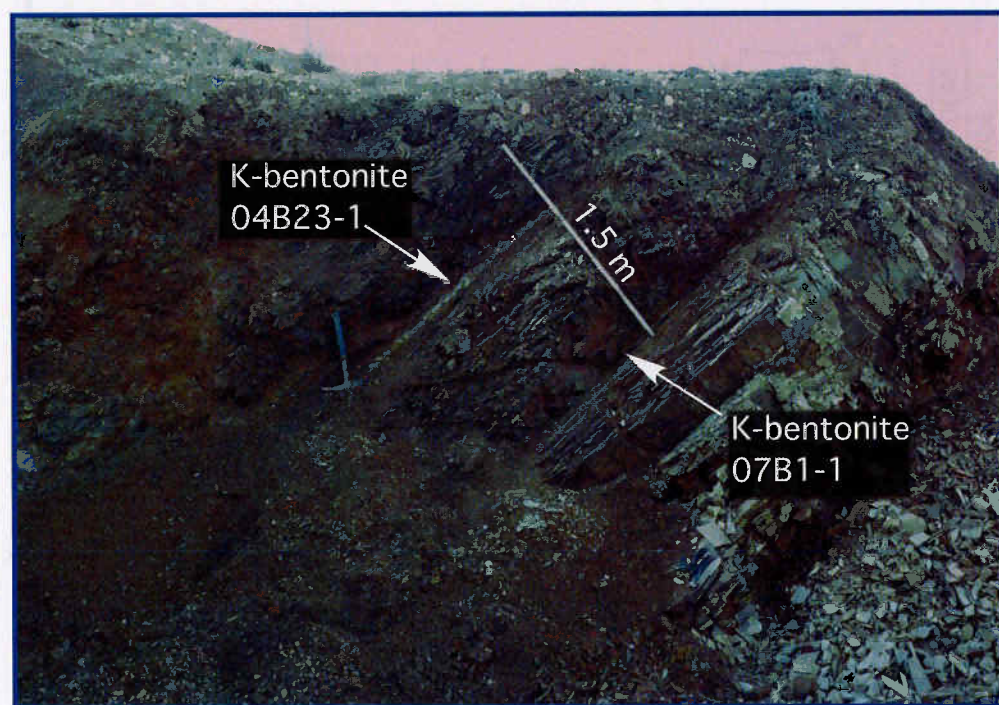


Figure 5. Photo of Black Knob Ridge outcrop showing K-bentonite beds in the Womble Shale.

contact (Table 1). In the following, we will briefly describe the confirmed K-bentonite occurrences. For the stratigraphic locations of the K-bentonites and other clay beds, see Figure 3.

Springs Formation is overlain by an approximately 0.5 m thick unit of regularly bedded, fine-grained, brownish gray, non-cherty limestone that contains abundant and well-preserved graptolites.

The stratigraphically lowest confirmed K-bentonite in this section is located approximately 11.5 m below the top of the Bromide Formation. This bed, herein referred to as KB1, is a gray, approximately 1 cm thick, bed of clay that occurs at the bottom of a 0.5 m thick shaley interval that forms a prominent reentrant in the rock wall. The next younger K-bentonite, which is less than 1 cm thick, is located at another reentrant about 4 m below the top of the Bromide Formation. It is herein referred to as KB2. Approximately 0.5 m above this bed is another reentrant with an 1-2 cm thick, shaley or muddy, layer that might be another K-bentonite although this needs to be confirmed by geochemical studies.

In terms of lithostratigraphy, all these beds occur in the Pooleville Member of the Bromide Formation. The two highest beds are located just below the base of the Corbin Ranch Submember as this unit is recognized by Amsden and Sweet (1983). The lower 0.5 m of the Viola Springs Formation is firmly dated biostratigraphically. It contains graptolites diagnostic of the *Climacograptus bicornis* Zone (Finney, 1986), conodonts of the *Phragmodus undatus* Zone (Amsden and Sweet, 1983), and chitinozoans of the *Spinachitina cervicornis* Zone (Goldman et al., 2005).

The K-bentonite bearing interval of the upper Bromide Formation has not yielded diagnostic graptolites and chitinozoans at this locality, but the Corbin Ranch Submember and older strata down to about 25 m below the top of the Bromide Formation contain *Phragmodus undatus*, the index of the *P. undatus* Zone. The level of first appearance of this species appears significantly older in this section than in some other areas and supports the opinion expressed by Leslie and Bergström (1995); namely, that the appearance of *P. undatus* is diachronous regionally and this complicates the interpretation of the base of Sweet's (1984) *P. undatus* Chronozone. We classify the K-bentonite interval in the upper Bromide Formation as being within the *P. undatus* Zone.

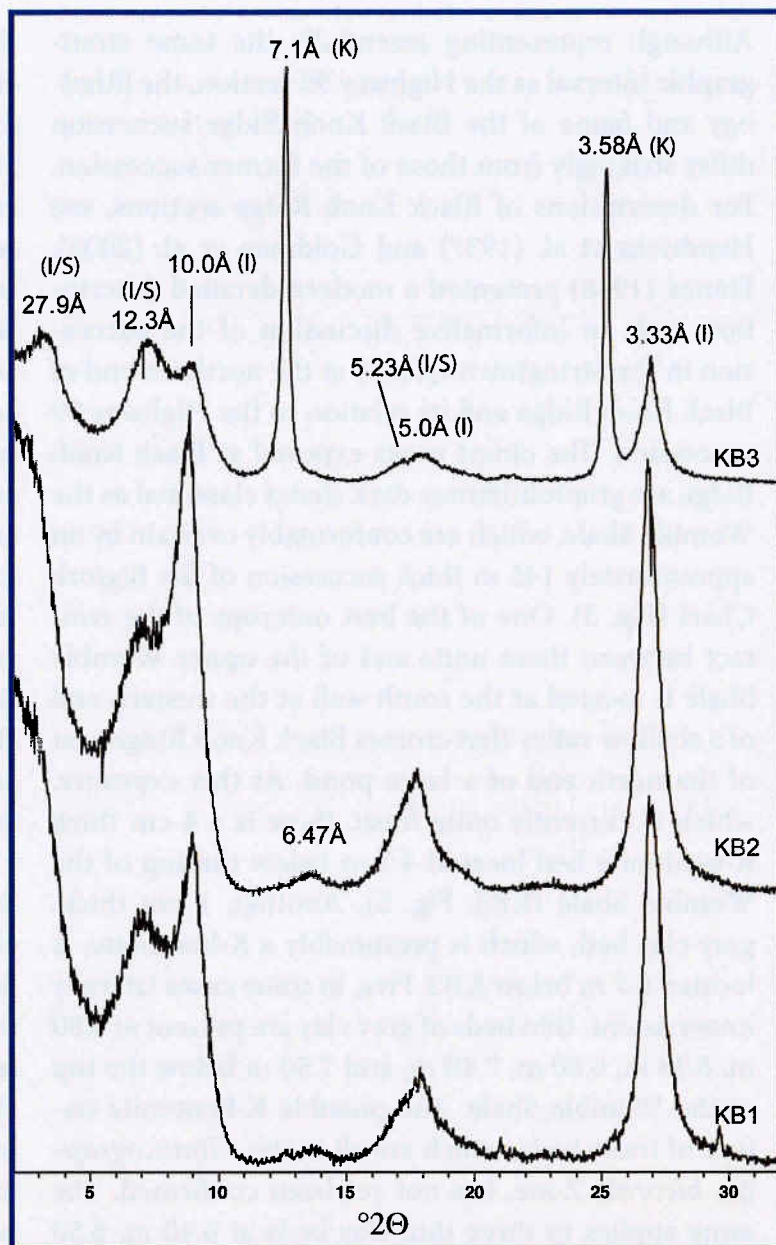


Figure 6. Powder X-ray diffraction patterns of oriented, ethylene glycol-saturated samples of the <2 mm size fraction of samples KB1, KB2 and KB3. Clay mineral abbreviations are (I) illite, (I/S) mixed-layer illite-smectite, (K) kaolinite. See text for sample locations.

The Black Knob Ridge section.

This section is situated on the western slope of Black Knob Ridge about 5 km north of Atoka in the westernmost part of the Ouachita Mountains. The base of the *Diplacanthograptus caudatus* Zone in this section was recently ratified by the International Commission on Stratigraphy as the Global Stratotype and Point (GSSP) for the base of the Katian Stage, which is the middle stage of the global Upper Ordovician Series (Goldman et al., 2005; Bergström et al., 2006).

Although representing essentially the same stratigraphic interval as the Highway 99 section, the lithology and fauna of the Black Knob Ridge succession differ strikingly from those of the former succession. For descriptions of Black Knob Ridge sections, see Hendricks et al. (1937) and Goldman et al. (2005). Finney (1988) presented a modern detailed description with an informative discussion of the succession in the Stringtown Quarry at the northern end of Black Knob Ridge and its relation to the Highway 99 succession. The oldest rocks exposed at Black Knob Ridge are graptoliteiferous dark shales classified as the Womble Shale, which are conformably overlain by an approximately 145 m thick succession of the Bigfork Chert (Fig. 3). One of the best outcrops of the contact between these units and of the upper Womble Shale is located at the south wall at the western end of a shallow valley that crosses Black Knob Ridge east of the north end of a large pond. At this exposure, which is currently quite fresh, there is a 4 cm thick K-bentonite bed located 4.3 m below the top of the Womble Shale (KB3, Fig. 5). Another, 1 cm thick, gray clay bed, which is presumably a K-bentonite, is located 0.7 m below KB3. Five, in some cases laterally impersistent, thin beds of grey clay are present at 5.80 m, 6.38 m, 6.80 m, 7.40 m, and 7.50 m below the top of the Womble Shale. The possible K-bentonite nature of these beds, which are all in the *Climacograptus bicornis* Zone, has not yet been confirmed. The same applies to three thin clay beds at 6.40 m, 6.50 m, and 6.80 m above the base of the Bigfork Chert. The latter beds, which are situated in the basal *Diplacanthograptus caudatus* Zone, are of special interest in that they are located no more than 2-3 m above the base of the Katian Stage and might have potential for radiometric dating of this important chronostratigraphic horizon.

GEOCHEMICAL STUDY OF THE CLAY BEDS

The clay mineral fraction of samples KB1, KB2 and KB3 (Table 1) consists of R1 ordered illite/smectite (I/S) with the illite content at about 70%, discrete illite and, in the case of KB3, clear evidence of kaolinite (Fig. 6).

Illite/smectite is, with few exceptions, the dominant clay mineral component of Lower Paleozoic K-bentonites throughout the world and reflects both the vitric-rich nature of the original tephra and also its calc-alkaline character. I/S ratios are a function of several factors, including thermal history, amount of time exposed to metasomatism, availability of potassium and aluminum in the system, and initial composition of the glass alteration products, generally considered to have been smectite. The clay mineral fraction of the two beds at Rock Crossing is dominated by kaolinite with lesser amounts of illite/smectite and discrete illite (Fig. 7). Kaolinite is less common in Ordovician K-bentonites than in Silurian K-bentonites, which frequently contain kaolinite, in some cases as the dominant clay mineral (Huff et al., 1997). Residual kaolins typically reflect a high availability of alumina and slightly acidic environmental conditions, as might be expected in a partially restricted shallow marine setting.

Bulk sample immobile trace element values of samples KB1, KB2 and KB3 were compared with existing database compilations for the Deicke and Millbrig in the upper Mississippi Valley (Kolata et al., 1987) as a test of chemical similarities between the two regions. Figure 8 is a Ti-Zr bivariate plot of 50 Deicke and Millbrig samples with the three KB samples plotted for comparison. KB3 plots well in the Deicke population while the other two do not. This lends strong support to the biostratigraphic evidence that KB3 is the Deicke K-bentonite. Further refinement of this approach is shown in Figure 9, which is a Hf-Ta-Th ternary plot of the same Mississippi Valley samples. KB3 falls clearly in the Deicke field and thus strengthens its correlation with the eastern Midcontinent Ordovician K-bentonite framework.

CONCLUDING REMARKS

The lithologically conspicuous Bromide/Viola Springs Formation contact occupies the same position in terms of biostratigraphy and relation to the Guttenberg $\delta^{13}\text{C}$ excursion (GICE) (Young et al., 2005) as the geographically widespread M4/M5 sequences boundary (Holland and Patzkowsky, 1996)

Figure 7. Powder X-ray diffraction patterns of oriented, ethylene glycol-saturated samples of the <2 mm size fraction of samples RC1 and RC2. Quartz is denoted by Q. See text for sample locations.

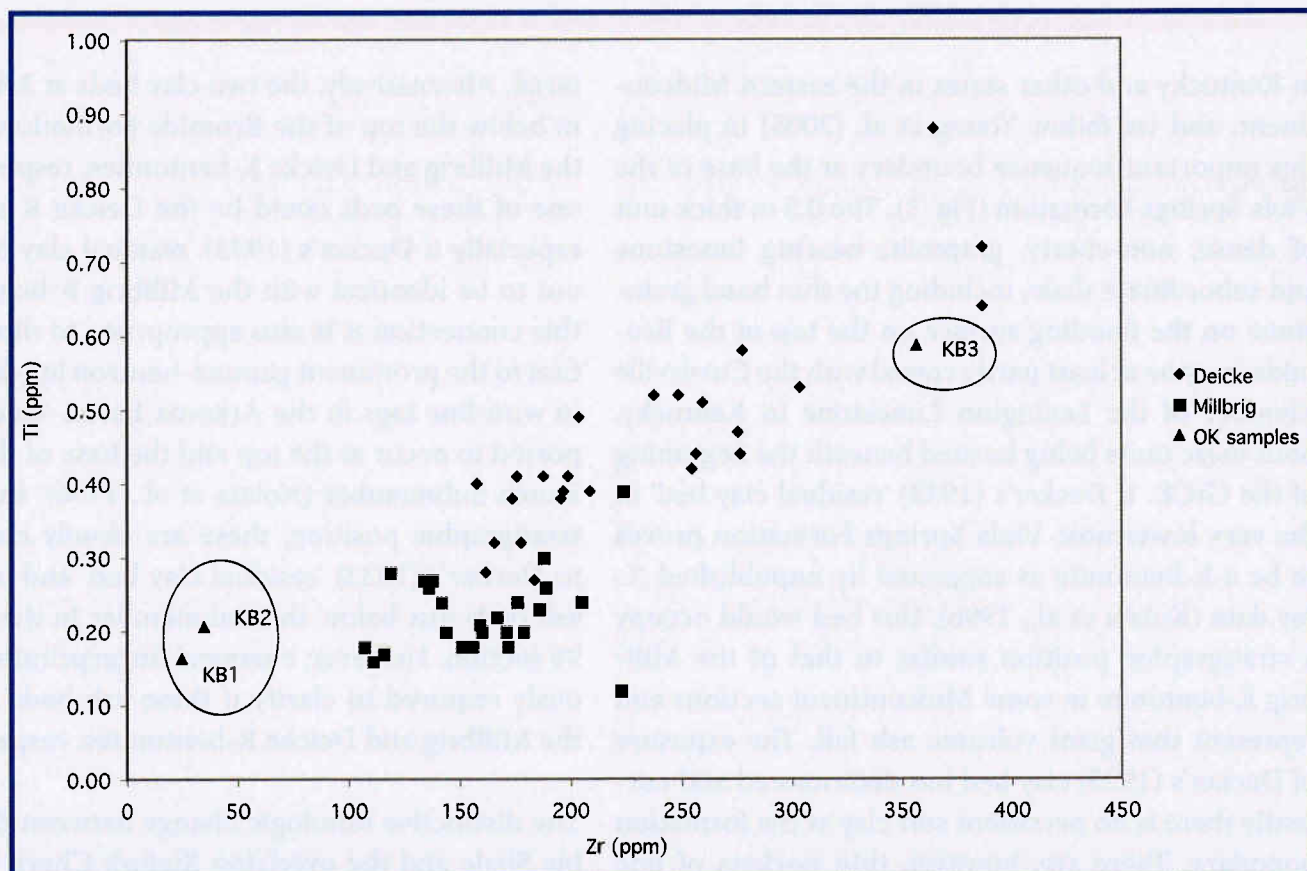
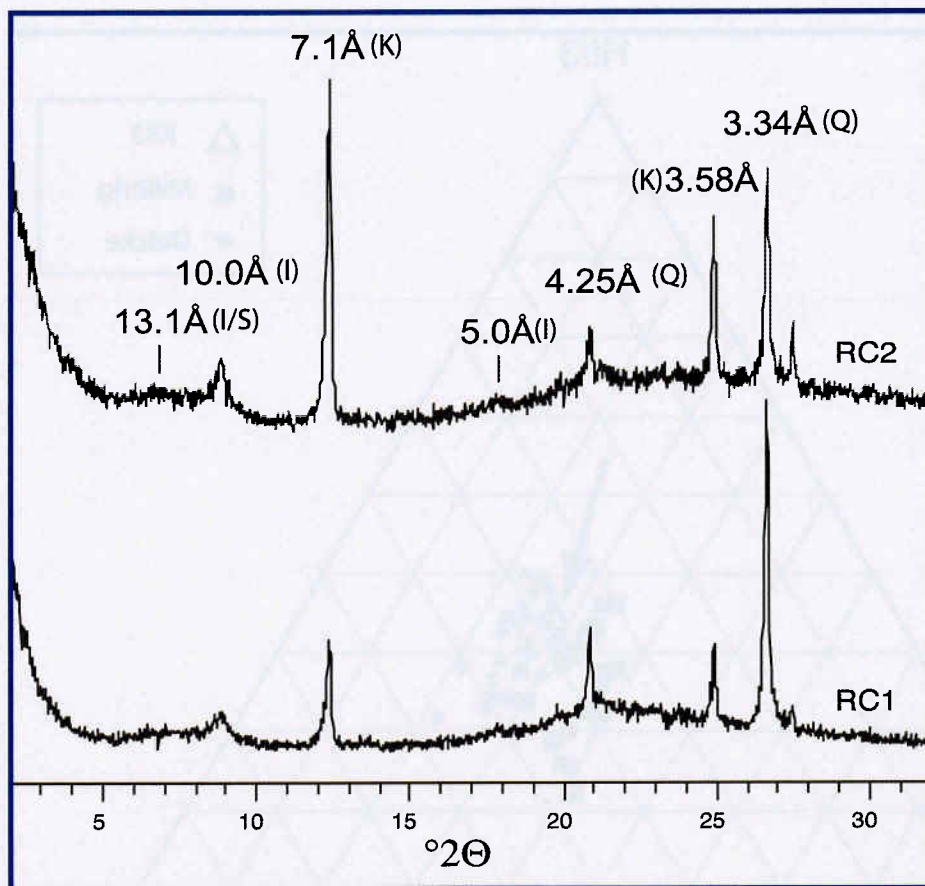


Figure 8. Ti-Zr scatter plot of upper Mississippi Valley Deicke and Millbrig samples plus KB1, KB2 and KB3. Data from Kolata et al. (1987).

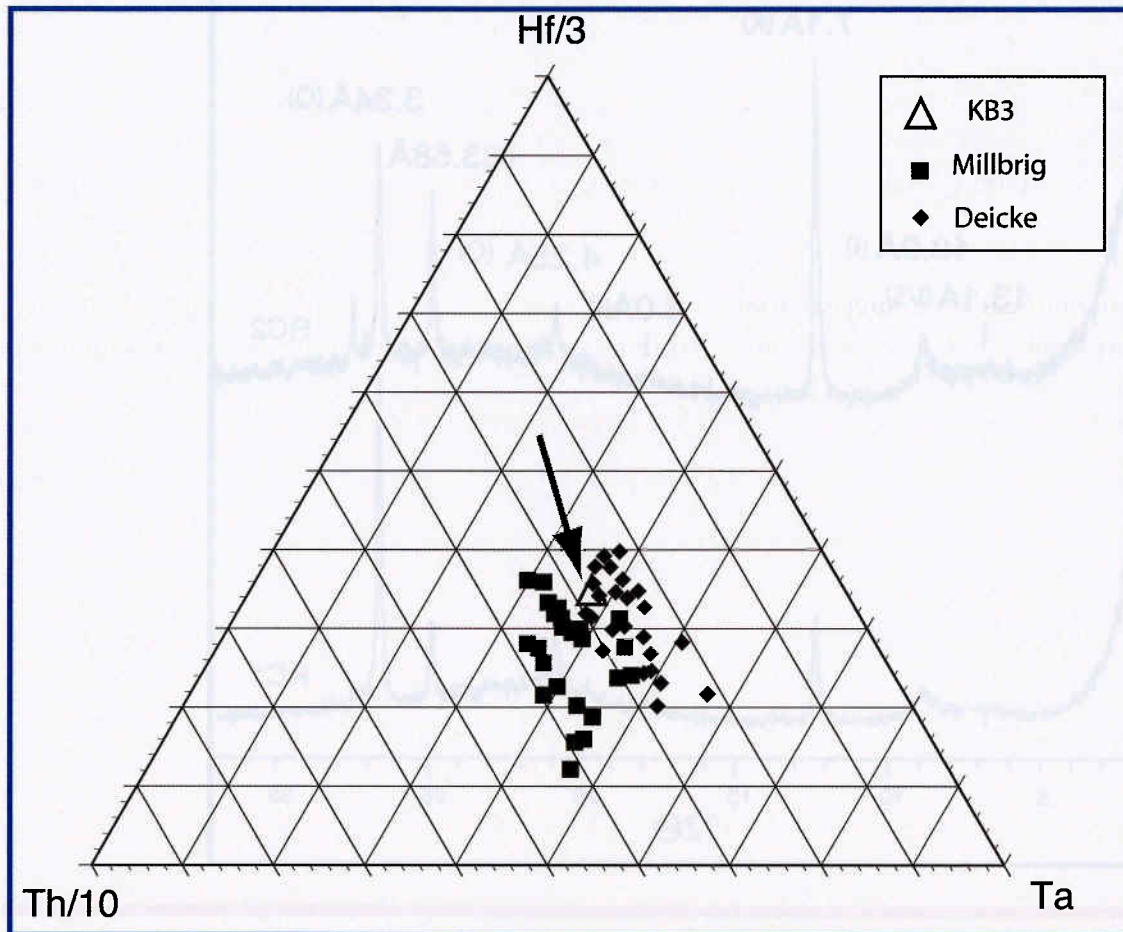


Figure 9. Hf-Ta-Th ternary plot of upper Mississippi Valley Deicke and Millbrig samples plus KB3. Data from Kolata et al. (1987).

in Kentucky and other states in the eastern Midcontinent, and we follow Young et al. (2005) in placing this important sequence boundary at the base of the Viola Springs Formation (Fig. 3). The 0.5 m thick unit of dense, non-cherty, graptolite-bearing limestone and subordinate shale, including the thin basal grainstone on the flooding surface on the top of the Bromide, may be at least partly coeval with the Curdsville Member of the Lexington Limestone in Kentucky, both these units being located beneath the beginning of the GICE. If Decker's (1933) 'residual clay bed' in the very lowermost Viola Springs Formation proves to be a K-bentonite as suggested by unpublished X-ray data (Kolata et al., 1996), this bed would occupy a stratigraphic position similar to that of the Millbrig K-bentonite in some Midcontinent sections and represent that giant volcanic ash fall. The exposure of Decker's (1933) clay bed has deteriorated and currently there is no persistent soft clay at the formation boundary. There are, however, thin pockets of fine clastic material that may be residual K-bentonite ma-

terial. Alternatively, the two clay beds at 3.5 and 4.10 m below the top of the Bromide Formation could be the Millbrig and Deicke K-bentonites, respectively, or one of these beds could be the Deicke K-bentonite, especially if Decker's (1933) 'residual clay bed' turns out to be identical with the Millbrig K-bentonite. In this connection it is also appropriate to direct attention to the prominent gamma-neutron log deflections in wire-line logs in the Arkoma Basin, which are reported to occur at the top and the base of the Corbin Ranch Submember (Kolata et al., 1996). In terms of stratigraphic position, these are closely comparable to Decker's (1933) 'residual clay bed' and one of the ash beds just below this submember in the Highway 99 section. However, chemical fingerprinting is obviously required to clarify if these ash beds represent the Millbrig and Deicke K-bentonites, respectively.

The distinctive lithologic change between the Womble Shale and the overlying Bigfork Chert, biostratigraphic data (Goldman et al., 2005), and the position

of the beginning of the GICE suggest that the M4/M5 sequence boundary is at the contact between these formations at Black Knob Ridge. The two confirmed K-bentonite beds in the Womble Shale occupy a similar stratigraphic position as the two beds just below the Corbin Ranch Submember in the Highway 99 section and they might represent the same ash falls. As noted above, the geochemical data suggest that the clay bed at the 4.3 m level is the Deicke K-bentonite. Possible equivalents to the slightly older clay beds in the Womble Shale have not been found in the Highway 99 section where the next older K-bentonite is as much as 12 m below the top of the Bromide Formation. Likewise, counterparts to the clay beds in the lower Bigfort Chert have not been discovered in the lower part of the Viola Springs Formation at the Highway 99 section or in the excellent outcrops along I-35 on the north and south flanks of the Arbuckle Mountains. As is obvious from the discussion above, our study of the Oklahoma Ordovician K-bentonites is still at a preliminary stage and additional information, especially geochemical data, will substantially add to our current knowledge about these volcanic ash beds. The principal results now at hand may be summarized as follows:

- (1) Late Mohawkian (Turinian) K-bentonites are present in Oklahoma;
- (2) all discovered ash beds are thin, which is consistent with the fact that they occur in the periphery of the distribution area of the products of explosive volcanism in the western Iapetus; and
- (3) a few beds occur in a stratigraphic position comparable with those of the Millbrig and Deicke K-bentonites in the eastern Midcontinent and may represent these gigantic ash falls.

We hope that chemical fingerprinting will help clarify the identity of these K-bentonites and extend to Oklahoma their regional use as isochronous marker beds.

ACKNOWLEDGMENTS

We are much indebted to Stanley C. Finney, Daniel Goldman, Peter M. Sadler, Brian K. Sell, and Seth A. Young for field assistance. Charles E. Mitchell provided critical review and suggestions that improved the manuscript. We thank Doug Howard for granting continued access to his land on Black Knob Ridge. Funding for the research program under which this work was completed was generously provided by the NSF EAR 0750726 and the Petroleum Research Fund #48553 to Leslie.

REFERENCES CITED

- Alberstadt, L. P., 1973, Articulate brachiopods of the Viola Formation (Ordovician) in the Arbuckle Mountains, Oklahoma: Oklahoma Geological Survey Bulletin 117, p. 1-87.
- Amsden, T. W.; and Sweet, W.C., 1983, Upper Bromide Formation and Viola Group (Middle and Upper Ordovician) in eastern Oklahoma: Oklahoma Geological Survey Bulletin 132, p. 1-76.
- Bergström, S. M.; Finney, S. C.; Chen Xu; Goldman, D.; and Leslie, S. A., 2006, Three new Ordovician global stage names: Lethaia, v. 39, p. 287-288.
- Decker, C. E., 1933, Viola Limestone, primarily of Arbuckle and Wichita Mountain region, Oklahoma: Bulletin of the American Association of Petroleum Geologists, v. 17, p. 1405-1435.
- Finney, S. C., 1986, Graptolite biofacies and correlation of eustatic, subsidence, and tectonic events in the Middle and Upper Ordovician of North America: Palaios, v. 1, p. 435-461.
- Finney, S. C., 1988, Middle Ordovician strata of the Arbuckle and Ouachita Mountains, Oklahoma: Contrasting lithofacies and biofacies deposited in southern Oklahoma aulacogen and Ouachita geosyncline: Geological Society of America, Centennial Field Guide, South-Central Section, v. 4, p. 171-176.
- Goldman, D.; Leslie, S. A.; Nölvak, J.; and Young, S., 2005, The Black Knob Ridge section, southeastern Oklahoma, USA: A possible Global Stratotype-section and Point (GSSP) for the base of the Middle Stage of the Upper Ordovician Series: Ratified pro-

- posal: Website of the International Commission on Stratigraphy (<http://www.stratigraphy.org/BKR.pdf>). 44 pp.
- Hendricks, T. A.; Knechtel, M. M.; and Bulge, J., 1937, Geology of the Black Knob Ridge, Oklahoma: Bulletin of the American Association of Petroleum Geologists, v. 21, p. 1-29.
- Holland, S. M.; and Patzkowsky, M. E., 1996, Sequence stratigraphy and long-term paleoceanographic change in the Middle and Upper Ordovician of the eastern United States: Geological Society of America Special Paper 306, p. 117-129.
- Huff, W. D.; Kolata, D. R.; Bergström, S. M.; and Zhang, Y-S., 1996, Large-magnitude Middle Ordovician volcanic ash falls in North America and Europe: Dimensions, emplacement and post-emplacement characteristics: Journal of Volcanology and Geothermal Research, v. 73, p. 285-301.
- Huff, W.D.; Morgan, D.J.; and Rundle, C.C., 1997, Silurian K-bentonites of the Welsh Borderlands: Geochemistry, mineralogy and K-Ar ages of illitization: Nottingham, British Geological Survey, Technical Report WG/96/45, 25 p.
- Kolata, D.R.; Frost, J.K.; and Huff, W.D., 1987, Chemical correlation of K-bentonites in the Middle Ordovician Decorah Subgroup, upper Mississippi Valley: Geology, v. 15, p. 208-211.
- Kolata, D. R.; Huff, W. D.; and Bergström, S. M., 1996, Ordovician K-bentonites of eastern North America: Geological Society of America Special Paper 313, p. 1-84.
- Leslie, S. A.; and Bergström, S. M., 1995, Element morphology and taxonomic relationships of the Ordovician conodonts *Phragmodus primus* Branson and Mehl, 1933, and *Phragmodus undatus* Branson and Mehl, 1933: Journal of Paleontology, v. 69, p. 967-978.
- Leslie, S. A.; Bergström, S.M.; and Huff, W. D., 2006, Volcanic ash beds discovered in the upper Bromide Formation and Womble Shale (Ordovician) in Oklahoma: The westernmost occurrences of the Millbrig and Deicke K-bentonites?: Geological Society of America, Abstracts with Programs, v. 38(1), p. 31.
- Ross, R. J., Jr.; and 28 co-authors, 1982, The Ordovician System in the United States. Correlation Chart and Explanatory Notes: International Union of Geological Sciences Publication no. 12, p. 1-73.
- Sweet, W. C., 1984, Graphic correlation of upper Middle and Upper Ordovician rocks, North American Midcontinent, USA, in Bruton D. L. (ed.), Aspects of the Ordovician System: Palaeontological Contributions from the University of Oslo, no. 195, p. 23-35.
- Young, S. A.; Saltzman, M. R.; and Bergström, S. M., 2005, Upper Ordovician (Mohawkian) carbon isotope ($\delta^{13}\text{C}$) stratigraphy in eastern and central North America: Regional expression of a perturbation of the global carbon cycle: Palaeogeography, Palaeoclimatology, Palaeoecology, v. 222, p. 53-76.

An Ordovician Global Reference Section Recently Selected in Oklahoma

Daniel Goldman

Department of Geology, University of Dayton, Dayton, Ohio 45469

Stephen A. Leslie

Department of Geology and Environmental Science, James Madison University, MSC 6903
Harrisonburg, VA 22807

Stig M. Bergström

Division of Geological Sciences, School of Earth Sciences, The Ohio State University,
Columbus, Ohio 43210

Jaak Nõlvak

Institute of Geology, Tallinn University of Technology, Ehitajate tee 5, 19086 Tallinn, Estonia

Seth A. Young

Department of Geological Sciences, Indiana University, Bloomington, Indiana 47405-1405

Stanley C. Finney

Department of Geological Sciences, California State University at Long Beach,
Long Beach, California 90840

Ordovician fossil faunas are characterized by a marked biogeographic differentiation that results in a minimal similarity between most North American faunas and those of major Ordovician areas elsewhere in the world. This provincial distribution of most fossils has led to establishment of different schemes of fossil-based regional stages in, for instance, North America, Baltoscandia, China, and

the British Isles. Because these chrono-stratigraphic units have been largely based on shelly fossils with distributions restricted to a particular region, it has been impossible in most cases to establish a precise international correlation of these regional stages. Furthermore, some general terms, such as the "Middle Ordovician," have a vastly different stratigraphic scope in different parts of the world causing confusion among

stratigraphers and non-stratigraphers alike. Indeed, in view of the fact that many of today's geology studies are of more than regional nature, there has been an urgent need for an international chrono-stratigraphic classification.

This need was realized by the International Commission on Stratigraphy and its numerous sub-commissions in the 1970s. Since that time, hundreds of stratigra-

phers and other geologists have been involved in a multinational effort to develop a new, firmly defined, global chronostratigraphic classification of the Phanerozoic and the Proterozoic. The goal of this work has been to define stages and series that have the potential to be used globally because they are defined in terms of fossils that are as widely distributed as possible. In the case of the Ordovician, the fossils used are graptolites and conodonts. In practice, the base of a global stage is defined as the level

of first appearance of a particular species in a particular stratigraphic section, which is referred to as Global Stratotype Section and Point (GSSP). The GSSP serves as the international reference standard for the base of that particular global stage. Its top is defined as the base of the next younger global stage at its GSSP. The time-consuming work of finding the best biostratigraphic level for the base of a stage and the best section in the world for that level is handled by the International Subcommissions

and their Working Groups. Commonly, the selection of a GSSP has required 10 years or more of field-work around the world, numerous discussion meetings, and careful evaluations of candidate sections before a final vote by the Subcommittee members. If their decision and the formal GSSP proposal are approved by the International Commission on Stratigraphy, this Commission will ratify the stage as a global chronostratigraphic unit.

In the case of the Ordovician, the

SYSTEM	GLOBAL	GLOBAL	KEY GRAPTOLITE/ CONODONT(C) BIOHORIZONS	NORTH AMERICAN	
				SERIES	STAGE
ORDOVICIAN	UPPER	HIRNANTIAN	← <i>P. acuminatus</i> (GSSP Dob's Linn)	CIN-	GAMACHIAN
		KATIAN	← <i>N. extraordinarius</i> (GSSP Wangjiawan North)		RICHMONDIAN
					MAYSVILLIAN
	MIDDLE	SANDBIAN	← <i>D. caudatus</i> (GSSP Black Knob Ridge)	MO-	EDENIAN
					CHATFIELDIAN
		DARRIWILIAN	← <i>N. gracilis</i> (GSSP Fågelsång)	WHITEROCKIAN	TURINIAN
		DAPINGIAN	← <i>U. austrodentatus</i> (GSSP Huangnitang)		CHAZYAN ?
			← <i>B. triangularis</i> (C) (GSSP Huanghuachang)		RANGERIAN
	LOWER	FLOIAN	← <i>T. approximatus</i> (GSSP Diabasbrottet)	IBEXIAN	BLACKHILLSIAN
		TREMADOCIAN	← <i>I. fluctivagus</i> (C) (GSSP Green Point)		TULEAN
					STAIRSIAN
					SKULLROCKIAN

Figure 1. Global chronostratigraphic classification of the Ordovician System, GSSP localities and index fossil species, and comparison with the regional North American standard series and stage classification. Because the base of several of the North American chronostratigraphic units have never been precisely defined by diagnostic fossils, their proposed correlation to global units is approximate. [Note: CIN- = Cincinnati; MO- = Mohawkian.]

Ordovician Subcommittee adopted in 1995 a subdivision of the system into three series, the Lower, Middle, and Upper Series. Further Subcommittee work, which has been chronicled by Webby (1998) and Finney (2005), led to the subdivision of the system into seven stages (Bergström et al., 2006). It is appropriate to stress that this new global chronostratigraphic classification does not in any way exclude the use of more or less well-known regional stage terms when this is advantageous based on the local geology and the composition of the local faunas. That is, the two stage schemes, although different, should be complimentary to each other.

The purpose of this note is to direct attention to the fact that **one of the recently ratified GSSP sites is located in Oklahoma.** Three

of the others are in China, two in Sweden, and one in eastern Canada. **The Oklahoma GSSP is the only Ordovician or Silurian one in the USA, and hence an important and unique section not only for this state.**

This global reference section is situated on the western slope of Black Knob Ridge, about 5 km north of Atoka, Atoka County (Fig. 2). For a detailed description of this outcrop, see Goldman et al. (2006, 2007). After several years of worldwide investigations, a formal vote in 2005 by the members of the International Subcommittee on Ordovician Stratigraphy resulted in the decision that the base of the global Middle Stage of the Upper Ordovician should be the level of the first appearance of the distinctive graptolite *Diplacanthograptus caudatus* (Fig. 3).

In a separate vote, the Black Knob Ridge succession was favored over another candidate GSSP, namely an outcrop at Hartfell Spa in the southern Uplands of Scotland. The establishment of this GSSP was formally ratified by the International Commission on Stratigraphy in 2006. In the same year, **the Commission approved that the new stage should be named the Katian Stage** (Bergström et al., 2006). The name is derived from Katy Lake (now drained) that is (or was) located just southwest of the Black Knob Ridge GSSP.

The base of the Katian Global Stage is well exposed on Black Knob Ridge in the lower part of the hill slope about 4 m above the base of the Bigfork Chert (Bergström et al., 2007, Goldman et al., 2006, 2007). The index graptolite is relatively common in the extensive exposure

Figure 2. View of the Black Knob Ridge GSSP section. Looking north. The arrow marks the position of the base of the global Katian Stage.



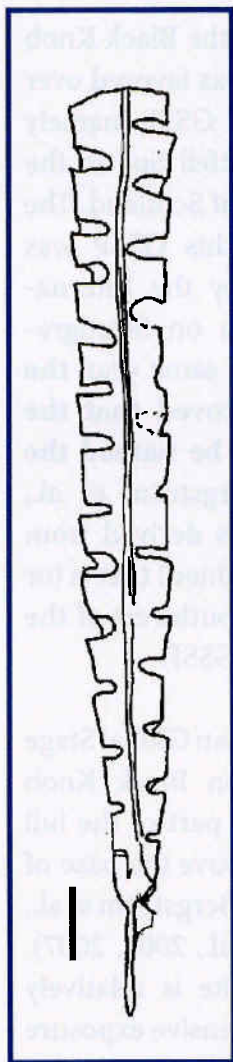


Figure 3. Camera lucida drawing of the stratigraphically important and globally distributed graptolite *Diplacanthograptus caudatus* (Lapworth), the stratigraphic appearance of which marks the base of the global Katian Stage. Scale bar is 1 mm. The illustrated specimen is from the Bigfork Chert at Black Knob Ridge (illustration modified from Goldman and Wright, 2003, Fig. 1).

of the lower Bigfork Chert at this locality as are conodonts on dark shale bedding plane surfaces and chitinozoans. This, in combination with the presence of K-bentonite beds (Bergström et al., 2008) and rocks suitable for carbon isotope geochemistry (Goldman et al., 2006, 2007), makes this exposure an excellent GSSP.

We expect that formal dedication ceremonies of this GSSP will take place in the near future. We feel that the State of Oklahoma can take pride in having this unique international reference section and hope that suitable arrangements

will be made to preserve it for its future use by geologists in Oklahoma and elsewhere in the world. It should be noted that local authorities at some other Ordovician global reference sections have fully recognized their scientific importance. This is particularly the case in China where elaborate 'geoparks' with monuments, multi-lingual explanation signs, and other markers designating these reference localities as important natural heritage sites have been established (Chen et al., 2006).

Acknowledgements

This work was supported by ACS/PRF grant# 43907-B8 to Dan Goldman and Steve Leslie, and Estonian Science Foundation grant #SF0140020s08 and ETF 7640 to Jaak Nölvak.

References cited

- Bergström, S. M.; Finney, S. C., Chen Xu, Goldman, D.; and Leslie, S. A., 2006, Three new Ordovician global stage names: Lethaia, v. 39, p. 287-288.
- Bergström, S. M.; Leslie, S. A.; Huff, W. D.; and Sell, B. K., 2008, Ordovician K-bentonites discovered in Oklahoma; Oklahoma Geology Notes v. 68, no. 1 & 2, p. 4-14.
- Chen Xu; Zhang Yuan-Dong; Bergström, S. M.; and Xu Hong-Gen, 2006, Upper Darriwilian graptolite and conodont zonation in the global stratotype section of the Darriwilian Stage (Ordovician) at Huangnitang, Changshan, Zhejiang, China: Palaeoworld, v. 15, p. 150-170.
- Finney, S., 2005, Global Series and Stages for the Ordovician System: A progress report: Geologica Acta, v. 3, p. 309-316.
- Goldman, D.; Leslie, S. A.; Nölvak, J.; and Young, S., 2006, The Black Knob Ridge section, southeastern Oklahoma: A possible Global Stratotype-section and Point (GSSP) for the base of the Middle Stage of the Upper Ordovician Series. Ratified proposal. Website of the International Commission on Stratigraphy (<http://www/stratigraphy.org/BKR.pdf>), 44-pp.
- Goldman, D.; Leslie, S. A.; Nölvak, J.; Young, S.; Bergström, S.M.; and Huff, W.D. 2007, The Global Stratotype Section and Point (GSSP) for the base of the Katian Stage of the Upper Ordovician Series at Black Knob Ridge, Southeastern Oklahoma, USA. : Episodes, v. 30, p. 258-270.
- Goldman, D.; and Wright, S. J., 2003, A revision of "*Climacograptus*" *caudatus* (Lapworth) based on isolated three-dimensional material from the Viola Springs Formation of central Oklahoma, USA: INSUGEO, Serie Correlación Geológica, v. 18, P. 33-37.
- Webby, B. D., 1998, Steps towards a global standard for Ordovician stratigraphy: Newsletters in Stratigraphy, v. 36, p. 1-33.



Curved drilling assembly used by Grand Directions, LLC, for horizontal drilling.

Horizontal Drilling Workshop

Candidate Selection for Horizontal Drilling with Case Studies in Oklahoma

*By Bob Westermarck, Grand Directions, LLC
and Sue Britton Crites, OGS Staff*

Over 190 attendees participated in this one-day workshop held June 18, 2008 in Norman, Oklahoma. The presenter was Bob Westermarck, president of Grand Directions, LLC, a wholly-owned subsidiary of Grand Resources, Inc. He shared some of their experiences in conducting horizontal drilling, emphasizing ***the need for team approach in planning a horizontal well project.***

Planning is a critical phase for drilling oil and gas wells, but this has become routine for most active operators. However, planning an economically successful horizontal well requires a strong technical team reviewing detailed aspects of geology and engineering that are not generally considered in drilling vertical wells. According to Westermarck, these multi-disciplined teams (composed of the

reservoir engineer, geologist, completions engineer, drilling engineer, drilling related contractors, completion related contractors, as well as the field supervisors) should meet in an open meeting, where everyone's opinion is respected.

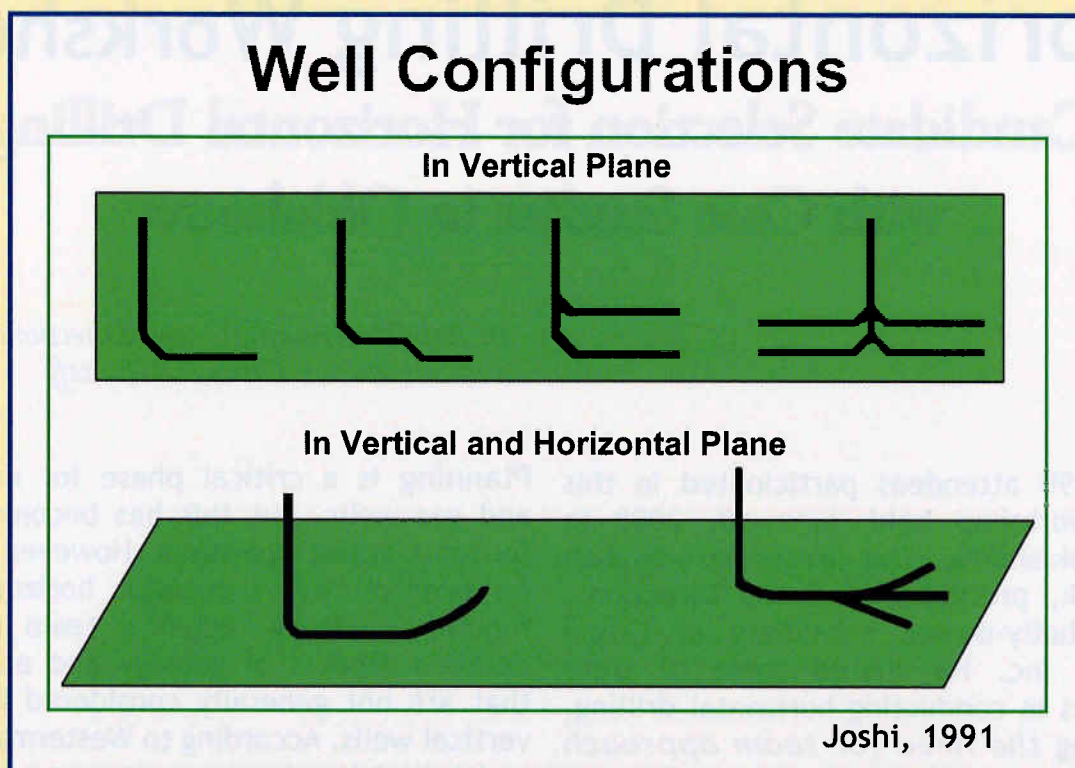
The workshop material reviewed the candidate selection process for drilling horizontal wells for improved primary and secondary recovery. Current available horizontal drilling options were discussed with the focus on medium- and short-radius techniques. Oklahoma field case studies were presented to provide insight into the development of the unique business and technological approach to horizontal drilling discussed in this workshop.

In addition to addressing this team approach to drilling and completion, Westermarck discussed the fact that all existing wells, including dry holes, should be reviewed as possible horizontal drilling candidates; however, ***"a new well can be drilled when old wells do not provide economic access to potential***

reserves." A comparison between a typical horizontal well program and the risk-managed approach explored the pros and cons of both methods.

Some of the material Westermarck presented was from ***"Horizontal Well Technology,"*** by Dr. Sada D. Joshi. He highly recommended this book for geologists considering horizontal drilling.

According to Joshi, issues such as well rate, well reserves, actual well cost, and the probability of success should be addressed in advance of deciding to go with a horizontal well. Approximate onshore well costs, for example, show that a new horizontal well from the surface will cost 2 to 2.5 times what a vertical well will cost; also, a re-entry horizontal well will cost an average of 0.6 to 1.2 times more than a vertical well. Additionally, stabilized rates of horizontal wells are 2 to 4 fold more than stabilized rates of vertical wells.





Horizontal well reserves are observed to be the same as to 6 times higher than vertical well reserves. In certain cases where vertical wells are uneconomical, per well reserves of a horizontal can be significantly higher than a vertical well's reserves.

When comparing the performance of 12,080 horizontal wells and 137,950 off-set vertical wells drilled as of 2001, the facts regarding productivity improvement factors included:

- 1) Medium productivity improvement factor is in the range of 3 to 5.
- 2) After five years of production, the cumulative oil production from horizontal wells is about 2 times larger (range 1.5 to 3) than the cumulative oil production from vertical wells.
- 3) About one in three horizontal wells have been economic failures. Thus, economic success rate of horizontal wells is 66%.

Westermarck indicated that ***“you must thoroughly understand the key parameters for planning a successful horizontal well project.”*** Key

parameters include the fracture intensity and direction. In primary recovery, the well should be perpendicular to natural fractures; whereas, in secondary recovery, the well should be parallel to natural fractures. Other parameters include the net pay/contiguous zone, well spacing, and the vertical and horizontal permeability, actual drilling costs, completion costs, the wellbore size and length, cooperation in various disciplines, and confidence in reservoir simulation (utilizing modeling).

The workshop addressed the following questions:

How do I determine which of my reservoirs are valid horizontal well candidates?

Collect sufficient reservoir and production data to be able to build a computer model of the reservoir. Perform history matching to gain confidence on the simulation results. Predict the production effects of various horizontal completions options to determine the most reasonable approach to applying horizontal wells to accelerate reserve recovery.

How do I choose which horizontal drilling system is appropriate for my reservoir?

An engineering assessment of the completion techniques necessary to economically recover the reserves will largely determine if the horizontal well can be an openhole completion or will require tubulars placed in the curve and/or in the horizontal sections. The critical issue is wellbore stability and the need for zonal isolation to construct a low-maintenance, long-life completion.

What are the costs associated with drilling horizontal wells using various drilling systems?

Based on studies of over 25,000 horizontal wells world wide, an expert has recognized key relationships between horizontal and vertical well costs.

- ☐ One third of horizontal wells are not economic successes.
- ☐ When the cost ratio for a proposed horizontal well approaches or exceeds 2.5 to 3.0 times the cost of a vertical well in the same field, the chances for an economic success are greatly reduced.

This means when evaluating the cost benefit of the horizontal candidate, if the proposed drilling and completion design costs are approaching 2.5 to 3.0 times the cost of a typically completed vertical well in the field, there is very little room for error and proceeding with assumptions rather than data can become very costly.

Do you need to drill a new well or can you use an existing well?

Many techniques are available to use existing vertical wells and exit through the casing. Depending on the completion techniques required, the costs for using existing wells compared to new wells will generally favor

existing well utilization. However, geologic considerations and current reservoir data collection opportunities must be weighed carefully with any potential cost savings.

Will an open hole provide a satisfactory completion technique?

This is determined by understanding the long-term borehole stability issue associated with the candidate reservoir. This issue is critical in determining the answer to openhole completions versus installing casing or liners in the curve or lateral sections.

How can your drilling and completion operation minimize formation damage?

Overbalanced, poorly-designed and maintained drilling fluids will cause excessive formation damage. The lower the bottom hole pressure (BHP) of the target reservoir, the more difficult it is to mediate any damage caused from the drilling and completion process.

Underbalanced drilling, when properly conducted, will help to minimize formation damage reducing or eliminating remedial action required to restore well bore productivity. The drilling fluids needed for underbalanced operations are determined by reservoir BHP. For low BHP situations, air or air mist/foam drilling may be required.

If you choose to drill underbalanced, can you safely drill with air?

Air drilling oil and gas wells has been an accepted industry practice for over 60 years. Grand Directions has been drilling with an air/foam-mist system for the last three years with no safety problems. However, many organizations/individuals are concerned with downhole and/or surface fires, and therefore require additional procedures to mitigate this safety concern.

What kind of rig is necessary to drill horizontal wells?

When new wells are planned to be drilled horizontally, the drilling rig is usually employed to drill both the vertical and horizontal portions of the wells. However, depending on the equipment requirements for the curve and lateral sections, a smaller (less costly) workover rig may be moved in after the drilling rig has completed the vertical section.

When existing wells are to be used for horizontal completions, often a workover rig can be outfitted to handle the physical requirements of the operations less expensively than employing a drilling rig to do the work.

How do you determine and control the actual direction and location of the wellbore?

This is a two-pronged question:

1. How to determine the best direction to drill is determined by a thorough study of the geologic deposition, structural history and the reservoir fluid flow patterns resulting from withdrawal and injection activities. The size of the target and any spatial constraints associated with the target must be determined and specified in the well path plan.
2. How to control well path direction is the realm of the drilling operations. Many improvements in the directional surveying and tool-steering services have occurred in the past 15 years. Generally, the tighter the need for wellbore placement control, the more expensive the process.

Can you run open- and cased-hole logs in horizontal wells?

The idea of drilling horizontal into a known reservoir should produce openhole logs of consistent petrophysical measurements. This

has not been the experience most people have had with regards to openhole logs from horizontal wells. When fracture identification and orientation with respect to the well bore are critical to the productivity of the horizontal well, openhole logs become keystone to the horizontal well project.

For example, understanding the injection profile of a horizontal injection well proved invaluable in reconfiguring the DOE pilot horizontal waterflood.

If necessary, how do you stimulate horizontal wells?

Many horizontal wells drilled today in the various "oil shale" plays in the USA require massive hydraulic fracture stimulation treatments, often costing as much as the horizontal section of the well. The wells must be drilled and completed with this in mind, as this is the technique that has evolved in a particular basin, providing the most economical cost-benefit ratios.

About the speaker:

The speaker, Bob Westermarck, President of Grand Directions, LLC, has 37 years experience as a drilling and production engineer. Westermarck has found that an active interdisciplinary approach has proven successful in rejuvenating old water-flooded fields and utilizing inexpensive, under-balanced horizontal technology.

A Re-Cap of the Granite Wash Workshop— March 6, 2008

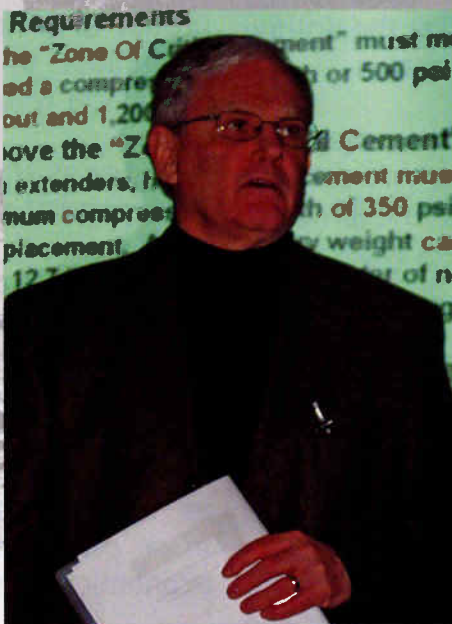
Bill Grieser

Halliburton Energy Services

Mid Continent Wash Plays

Presenter: Bill Grieser

There are over 4200 wells completed in southern mid-continent wash plays including Granite Wash A-F, Des Moines, Strawn, Cherokee, and Atoka Wash from 1956 to present. The wash trend spans from the northwest counties of Hutchinson and Carson in the Texas panhandle to the southeast counties of Washita and Comanche counties in Oklahoma. Present day activity is focused on the Texas panhandle counties of Hemphill, Wheeler, and Roberts.

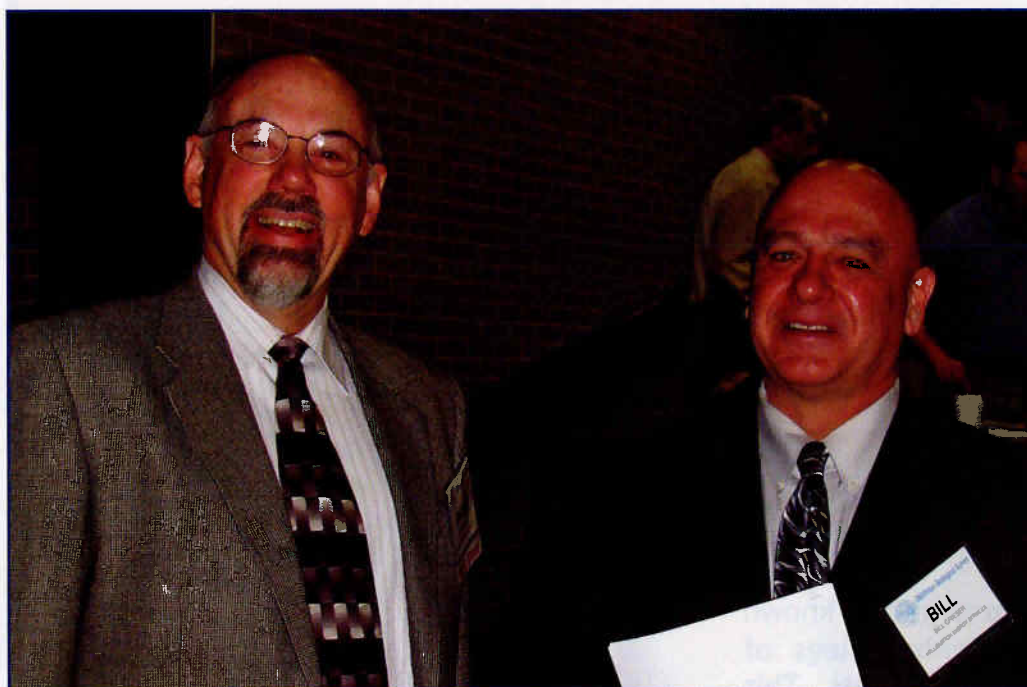


John Ringhisen

Granite Wash Casing Profile

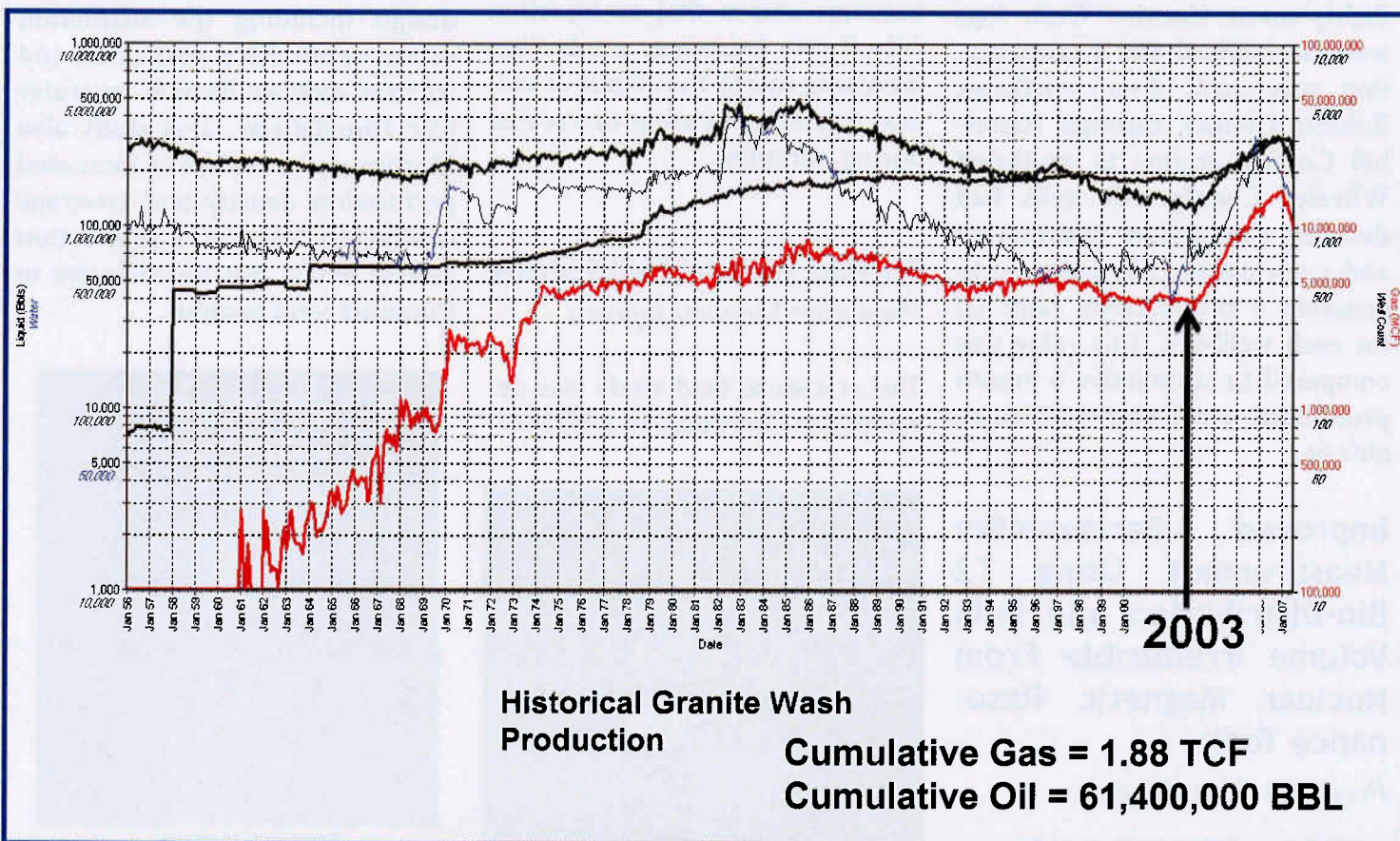
Presenter: John Ringhisen

Granite Wash casing and cement designs vary when you cross state lines. The Texas District 10 Railroad Commission has specific rules regarding surface casing depth requirements, cement compressive strength and stage cementing rules. Controlling mud loss and isolating the corrosive Brown Dolomite is the biggest challenge in both Texas and Oklahoma.



Dr. Randy Keller, Interim Director of the Oklahoma Geological Survey (left) shown with Bill Grieser, Halliburton Energy Services. Photo by Sue Britton Crites.

The Granite Wash is an alluvial wash which was eroded from the ancestral Wichita/ Amarillo Uplift and deposited along the bordering north and south flanks. A multitude of operators have completed over, 4,200 wells in the Granite, Des Moines, Strawn, Cherokee and Atoka Wash from 1956 to present. Depths range from 300 ft to 19,000 ft and pay zone span from 10-4000 ft. Peak production rates of 14MMcf/d and 2000 BOPD have been reported. However, the high degree of variability in production outcome and pay quality has made sustainable development of this play a challenge. *Photo courtesy of Bill Grieser.*



Public data shows a relatively flat number of Granite Wash completions from 1964-1974. The number of wells increased to almost 2000 through the last boom period 1977-1985. The next surge in activity occurred in 2003 with over 1000 wells added. Cumulative gas 1.88 TCF and +61 million bbls of oil has been produced from was reservoirs in Oklahoma and Texas panhandle.



Chris Talley

Log Normalization and Categorization Help with Pay Identification

Presenter: Chris Talley

Eighty-seven Granite Wash logs were normalized and a cross section was made from northeast Roberts County, through Hemp-hill County, ending in northeast Wheeler County. All wells had detailed completion information and a normalized Kh was used to generate a productivity ratio (J) for each wellbore. This value was compared to cumulative 6 month production which showed reasonable fit.

Improved Permeability Measurement Using T2 Bin-Distribution and Bulk Volume Irreducible From Nuclear Magnetic Resonance Tools

Presenter: Ken Huggins

This Granite Wash case study compared standard porosity based permeability measurements to permeability measured by NMR.

Permeability is controlled by packing and grain size distribution. A bin perm equation was developed based on the relationship of pore size to T2 time. Production versus Bin Perm shows better fit than Coates or Timur Perm.

What Can We Learn From Granite Wash Fracture Stimulation Pressure Response

Presenter: Bob Shelley

Pre frac injection tests outlined in SPE15151 was performed on numerous Granite Wash completions. This analysis helps predict maximum job size, prop concentration, and leakoff rate for each individual completion. Production outcome shows that as injection fall-off rate increases, production increases, due to the degree of natural fractures, existing or created during pumping.

Buffalo Wallow Field Study

Presenter: Stephen Ingram

This statistical field study was developed in coordination with geol-



Bob Shelley

ogists and production engineers at Forest Oil Corporation. This revisited study provided the opportunity to evaluate the long term implications of changes in stimulation design including the adaptation of micro-emulsion surfactant and friction reducer breaker in water frac stimulations. This study also illustrated the results of increased perforation density and coverage leading to long term production benefit which was inconclusive in the short term analysis.



Ken Huggins



Stephen Ingram



Chris Stevenson

acre spacing and Frye Ranch is approved for 40 acre spacing.

Average drilling cost \$2MM/well with 42 day spud to sales. Initially operators in Buffalo Wallow completed the Caldwell, Britt, and GW-A,B,C only. Forest determined that additional economic net-pay exists in the GW-E, F & Atoka and it now selectively completes in those zones as well. Capillary strings are required to unload liquids in most completions.

pared to magnetic resonance image logs (MRIL). Examples showed that the MRIL identified pay that would have been overlooked using conventional open hole log analysis.

Taking The Next Step

Presenter: Chris Stevenson

Forest Oil Corporation acquired 33,000 gross acres in March 2005. Acreage increased to 51,000 acres in 2007. Forest has drilled about 150 Granite Wash wells since April 2005. Buffalo Wallow is approved for and being drilled on 20

Magnetic Resonance Data Identification Of Production in Difficult Carbonate Reservoirs

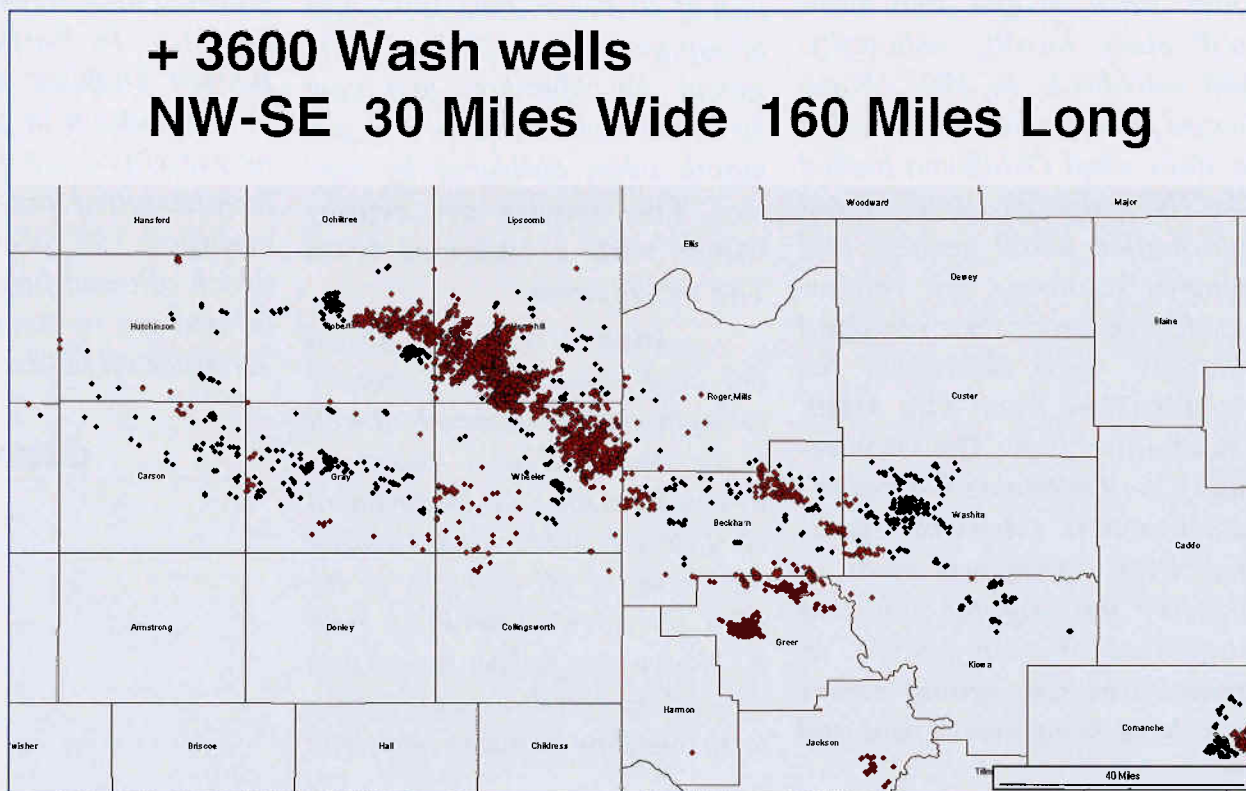
Presenter: Elizabeth Culp

This case study included four Atoka age carbonate wash wells with log interpretation from standard triple combo and mud log com-



Elizabeth Culp

Granite Wash producing wells span from northwest counties of Hutchinson and Carson in the Texas panhandle to the southeast counties of Washita and Comanche in Oklahoma.



A HUNDRED YEARS AGO IN OKLAHOMA JUNE — JULY 1907

Compiled by
Kenneth V. Luza
Oklahoma Geological Survey, 2008

Oklahoma began a year-long centennial celebration in January 2007. A monthly summary of the following articles and/or wire-service stories provides some insight into what took place locally, nationally, and worldwide in 1907. Some period photographs are included to show what Oklahoma looked like 100 years ago. Articles and information about geology and mineral resources are emphasized. Articles, or their abridged versions, were abstracted for republication from **The Daily Oklahoman** (now **The Oklahoman**), an Oklahoma City newspaper, unless otherwise specified. Every effort was made to preserve the original tone and expression of each feature. In some cases type-setting errors may have been overlooked and

may have led to misinterpreting the reporter's meaning or intent.

The Daily Oklahoman had a daily average circulation of 20,305 in June 1907. The newspaper was published daily except for Monday; and cost 5¢ at the news stand or 45¢ per month when delivered by carrier. **The articles are republished with permission from The Oklahoman.**

June — On June 5, Brown Oil and Investment Company brought in an 800-barrel oil well in the Morris oil field. Representatives from the U.S. Department of Interior were investigating the waste of oil and gas in Indian Territory oil fields on June 8. Heavy rain fell on June 9 that caused the North Canadian River to overflow its banks and flood

El Reno and parts of Oklahoma City. A pipeline under construction was to bring natural gas to Oklahoma City and nearby communities. Panther attacks were reported near Wewoka and Capitol Hill. In Portland Oregon, Barney Oldfield drove a mile in competition in one minute, a new world record. On June 26, a tornado killed three men and demolished 150 oil-well derricks, which allowed large volumes of oil and gas to escape the Indian Territory oil fields.

❧

Sunday, June 2, 1907, p. 1

BIG OIL CO. STUCK IN OUSTER SUIT

Austin, Texas, June 1.—A jury today found the Waters-Pierce Oil Company of Missouri guilty of violating the antitrust laws of Texas, convicted it of having entered the state by fraud, and fined it \$1,623,900. The defense this afternoon filed a motion for a new trial and the case will be taken to the federal courts. The State filed a petition with District Judge Brooks for the appointment of a receiver, also an injunction to restrain the company from moving any of its property from the State.



June 2, 1907, p. 1

TURNS MINER TO WIN GIRL'S LOVE

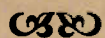
GERMAN NOBLEMAN WEDS MISSOURI GIRL AFTER PROVING HIMSELF WORTHY

Joplin, Mo., June 1.—Baron Paul von Zglitzki of Berlin, Germany, and Miss Helen Nicholson of this city were married at the home of the bride's parents at high noon today.

Miss Nicholson is the daughter of Franck C. Nicholson, a wealthy mine operator and consulting engineer. She met her husband in Paris a year ago while visiting the capitals of Europe.

The baron for the past three months has been working in the mines here as a spade

hand in order to become familiar with the operation of the property over which he will have control, and in order to prove his worthiness of the love of the rich miner's daughter.



June 2, 1907, p. 6

GIRLS IN DEMAND; BOYS NOT WANTED

SUPERINTENDENT OF PROV- IDENT ASSOCIATION SAYS THERE IS DISCRIMINATION

"Ever since George Washington was caught with chips on his kicker-bockers and with a hatchet in his hand and owned up that he did it, the American public has been suspicious of boys."

This is the way a "student of boys" accounts for the fact that Provident Association of Oklahoma City is constantly asked by families living in the two territories to furnish bright little girls, whom they may adopt into their homes, while few requests are received for boys. While Rev. W. A. Pierce, superintendent of the association, expresses no opinion as to the unpopularity of homeless boys, he says that at the present time he can supply homes for a number of girls, ten or twelve years old, while hardly anyone seems to want to adopt a boy.



Wednesday, June 5, 1907, p. 9

CAMPAIGN AGAINST COFFIN NAILS ON ORGANIZER WILL ENDEAV- OR TO EDUCATE PUBLIC AGAINST USE OF CIGARETTES

A campaign against the cigarette has been inaugurated in Oklahoma City, and will be continued all during the summer months, reaching a climax next fall when schools reopen. J. B. Lister, an organizer for the National Anti-Cigarette League, is in the city and will engage in the work.



June 5, 1907, p. 14

4,000 CRUSHED; MANY STARVING STEAMER BRINGS REPORT OF TERRIBLE EARTHQUAKE DISASTER IN CHINA

Victoria, B. C., June 4.—The steamer *Shawmut* brought news of a disastrous loss of life following an earthquake at Hsing Kiang. Telegram received from Peking in Tokyo, shortly before the *Shawmut* sailed, reported that 4,000 persons were crushed to death, a vast number of houses destroyed, and many persons left starving.





Turkey Fat lead-zinc mill west of Commerce, Oklahoma, ca. 1907. Lead and zinc ore was first discovered in the Commerce area on the Turkey Fat lease. *Western History Collections, University of Oklahoma.*

Thursday, June 6, 1907, p. 9

BABY TREMBLER FELT IN FRISCO

**SLIGHT SHOCK LASTS TEN
SECONDS BUT NO DAMAGE
IS REPORTED**

San Francisco, June 5.—An earthquake shock lasting about ten seconds was felt here at 12:27 this morning. The oscillations were from north to south. No damage has been reported.



June 6, 1907, p. 9

800 BARELL OIL WELL IN THE MORRIS FIELD

Tulsa, I. T., June 5.—The future of the Morris oil field, forty miles south of the Glenn Pool, was assured today by the bringing in of an 800-barrel well on the Doyle lease by the Brown Oil and Investment Company.



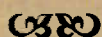
June 6, 1907, p. 9

VESSEL BLOWUP HUN- DRED DROWNED

Tunis, June 5.—A Turkish sailing vessel, laden with contraband ammunition bound for Tripoli, has been blown up in the vicinity of Port Zarzis. Her entire crew as well as eighty fishermen who were alongside at the time, were drown.

The vessel had on board a number of rifles and 500 barrels of powder. The local authorities

learned that she was about to take advantage of the absence of guard ships to try to disembark her cargo on the beach. They thereupon ordered a number of armed boats belonging to sponge fishers to prevent the landing.



Saturday, June 8, 1907, p. 7

FORT SILL RANGE IS IN CONDITION EVERYTHING IN READINESS FOR ANNUAL SHOOT OF OKLAHOMA GUARDSMEN

Lawton, Okla., June 7.—The Fort Sill target range, which is to be the scene during the next eight or ten weeks of many thousand competitive pistol and rifle shots, has been placed in fine condition for the competition of the Oklahoma National Guard and the regular army officers and men of the southwestern division. The post competitions will close in a few days and the guard selectmen will begin the annual summer shoot June 24.



Sunday, June 9, 1907, p. 11

U.S. DEPLORES WASTE OF OIL EXPERTS SENT FROM WASHINGTON IN- STRUCTED TO INVESTI- GATE THE CONDITIONS

Collinsville, I. T., June 8—Experts representing the Interior Department have been in this locality for several days, in-

vestigating the alleged waste of oil and gas, and it is believed that a strong protest will be made to Secretary Garfield on the subject. Thousands of barrels of crude petroleum are wasted daily, and float down the Caney River. Men are stationed at all bridges across the Caney and Verdigris Rivers to prevent fires from destroying them.

An oil operator said today that he would gladly exchange the largest oil well in this field for the waste oil, to say nothing of millions of cubic feet of natural gas that are permitted to escape into the air. As evidence of how gas is considered as a fuel, a big gas company has just made a contract with the Commercial Club in this city to furnish gas to manufacturers at two and quarter cents per 1,000 cubic feet, and agree to furnish quantities up to 100,000,000 [cubic] feet a day.

An immense gas well, owned by Col. J. R. Noble of Denver, Colorado, is said to be the largest gasser ever discovered, producing more than enough to supply the largest city in the United States, and has been "running wild" for several weeks.



Monday, June 10, 1907, p. 1

The newspaper printed a special Monday edition with some results of the Democrat Twin Territories primary held Saturday, June 8.

CANADIAN FLOODS EL RENO; RIVER THREE MILES WIDE

El Reno, [Okla.], June 9.—From the heavy rainfall of last night the North Canadian River at this point commenced rising rapidly shortly before noon today and by four o'clock was out of its banks. This evening the flood reached that part of the residence district near the old Choctaw Depot in the northwestern part of the city and in many houses is three to four feet deep. The river at this point is now three miles wide, having flooded the bottoms on the north side of the stream and presenting the appearance of a great lake.

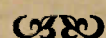
The river at Oklahoma City was rising at the rate of eight inches an hour yesterday evening. Before midnight the stream was out of its banks, and a flood similar to those experienced in June two and three years ago seems to be at hand.



June 10, 1907, p. 5

WON'T REINSTATE MARRIED TEACHERS BOARD OF EDUCATION WILL HOLD MEETING TONIGHT, STAND NOT CHANGED

The board of education will not reconsider its action in refusing to hire married women as teachers in the Oklahoma City public schools, according to Frank J. Merrill, president of the board.





C. F. Colcord Mansion, 421 NW 13th Street, Oklahoma City, Oklahoma. *Oklahoma Historical Society.*

Tuesday, June 11, 1907, p. 5

RED LIGHT DISTRICT WILL HAVE TO MOVE

PROPERTY OWNERS ON WEST GRAND PRESENT PROTEST TO CITY COUNCIL

As a first step towards the segregation of the "red light" district, business men and property owners on West Grand Avenue between Broadway and the Santa Fe tracks last night petitioned the city council to remove all objectionable houses beyond the business district.



Wednesday, June 12, 1907, p. 3

LIGHTNING STRIKES IN THE SAME PLACE

FATAL CORNER IN PASTURE WHERE ANIMALS HAVE MET SUDDEN DEATH

Collinsville, I. T., June 11.—The often repeated saying, "Lightning never strikes twice in the same place," was disproved today at a point two miles east of the city, when five head of fine horses were killed during a thunder storm, making the third time lightning has struck in the same place. These horses were standing in the southeast corner of large pasture on a high bluff

bank of Lightning Creek where stock has been killed twice before. Oil men say this bluff contains iron or other minerals that attracts the lighting.



June 12, 1907, p. 5

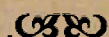
10-STORY HOTEL IS A CERTAINTY

COLCORD AND GALBREATH MAKE FORMAL ANNOUNCEMENT OF THEIR PLANS

C. F. Colcord and Robert Galbreath, who recently purchased the six lots on the north

side of Grand Avenue, immediately west of Robinson Avenue, last night issued a signed statement to the effect that they had decided to commence the construction of a ten story fire-proof hotel, up to date in every particular, to be built on the above named (Colcord). The hotel will have a frontage on Grand Avenue (now West Sheridan Avenue) and (South) Robinson Avenue, and alleyways on the north and west, and will be independent and separate from any other building, making every room in the house an outside room.

The 12-story Colcord Building was completed in 1910. On the evening of December 1, 1910, over 10,000 people attended the Colcord's grand opening (The Oklahoman, 1910 a; b). At that time, the Colcord Building was the tallest building in Oklahoma City and severed as a hotel/office building. The hotel was restored by Tulsa Developer, Paul Coury, and his associates; and it reopened in 2006 as a luxurious boutique hotel (O'Brien, 2005).

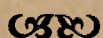


June 12, 1907, p. 10

THIRTEEN MILES OF PIPE LINE FINISHED CREW NOW WORKING EAST OF EDMOND—RAIN DELAYS OPERATIONS

Thirteen miles of pipeline that is to bring natural gas to Oklahoma City from the Tulsa field has been completed out of this city, and the crew of workmen is now operating east of Ed-

mond. The recent rainy weather delayed construction of the line considerably, but the crew is now making up for lost time and laying the pipe at the rate of half a mile a day.



Thursday, June 13, 1907, p. 5

OKLAHOMA CITY GETS NEW TRAIN NUMBER OF CHANGES MADE IN TIME CARD BY THE SANTA FE

Taking effect Sunday, June 16, a number of changes will be made in the time of Santa Fe trains running through Oklahoma City. These new changes are caused by the action of the company in annulling the fast mail train, which has heretofore run out of Kansas City as far west as Newton, Kansas, every morning. This train will be continued, but will hereafter run as a local passenger, instead of as a fast mail train.



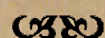
June 13, 1907, p. 12

FAIR BUILDINGS TO BE HANDSOME PLANS ARE PREPARED BY ARCHITECT—BIG GRAND STAND CONTEMPLATED

Much progress is being made toward maturing plans for the full quota of buildings that are to be ready for the State Fair and Exposition to be held this fall in Oklahoma City. Architect Coady [?] will have not only the plans

but specifications and details ready by next Monday night for the main buildings, after which sealed bids will be invited from contractors who wish to bid on all or a portion of the work.

Plans have also been submitted for the beautiful building at the main entrance to the grounds to be known as the administration building. The grandstand will be ample proportions and will be strictly modern, and of a capacity to comfortably seat an immense audience.

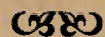


Friday, June 14, 1907, p. 1

GOVERNMENT TO GIVE AID RUINATION OF RAILWAY CREDIT MAY MEAN GOV- ERNMENT OWNERSHIP

New York, June 13.—That the government will be forced to lend its credit to aid the railroads was the statement made today by J. J. Hill.

"The public in its exasperation," said Mr. Hill, "will demand that the railroads lay certain rails and provide more cars. The railroads will answer that they cannot; that their credit has been ruined. The government will be obliged to step in and lend its credit to supply this deficiency. The situation might lead to government ownership of railroads."





Turkey Creek mine near Hughes, Latimer County, Indian Territory, 1906. *Western History Collections, University of Oklahoma.*

June 14, 1907, p. 1

FIVE DIE IN QUAKE

Santiago, Chile, June 13.—A severe earthquake was experienced today at Valdivia. Several buildings and the railroad bridges were destroyed, and five persons were killed.



Sunday, June 16, 1907, p. 1

PANTHER ATTACKS MEN NEAR WEWOKA

Wewoka, I. T., June 15.—Residents of Wewoka are in a state of terror as a result of the discovery that two wild animals, supposed to be panthers, are making their home in the woods along Wewoka Creek. Already one boy has been killed, [and] a man's face so horribly torn that he will be disfigured for life, while his horse [also] was killed from under him.



Tuesday, June 18, 1907, p. 1

AMBASSADOR BRYCE GUEST AT HOME OF INDIAN CHIEF

Lawton, Okla., June 17.—British Ambassador Bryce, Governor Francis of St. Louis, United States Judge Parker, and President Davidson of the Frisco Railroad were guest of Chief Quannah Parker of the Comanches at the chief's mountain home, thirteen miles west of here last night and dined with Chief Parker and his family.

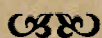


June 18, 1907, p. 2

MINERS DENOUNCE JUSTICE M'KENNA

REFUSE TO VOTE THANKS FOR DISSENTING OPINION IN OFFICIALS' CASE

Denver, [Colo.], June 17.—An effort was made in the convention of the Western Federation of Miners today to bring to an end the controversy that has arisen between the miners and the Industrial Workers of the World. After a long debate the convention voted down a proposition to amend the federation constitution. Justice McKenna of the United States Supreme Court gave a dissenting opinion favoring Meyer, Haywood, and Pettibone in their appeal for habeas corpus.

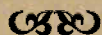


Wednesday, June 19, 1907, p. 1

MINE BLOWUP KILLS SEVEN PEOPLE

Scranton, Pa., June 18.—Seven men were killed outright and two others were seriously injured in two explosions of mine gas in the Johnson No. 1 Mine, at Priceburg late today. The first explosion, which occurred about 3 o'clock, was caused by the carelessness of a door tender who by leaving the door open allowed gas to accumulate in the workings. One man was injured as a result of this explosion. The second explosion, which resulted in the death of seven men and the injury of another, resulted from the ignition of the deadly fire damp

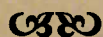
that accumulated after the first explosion.



June 19, 1907, p. 1

CONDITION OF SCALES IS SERIOUS

"Mayor Scales is a very ill man," is the statement made last evening by Dr. J. W. Riley, who attended Dr. A. J. Ryan in performing the surgical operation which was undergone by the mayor Monday afternoon. "In the operation, it was discovered that gangrene of the gall bladder was indicated, and it was possible the mayor would not have lived 24 hours had the operation been postponed for that length of time. The seriousness of his condition may be realized when it is known that the gangrene infection was located near one of the most vital glands in the human organism."



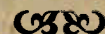
June 19, 1907, p. 5

SITE SELECTION IS NOW DECIDED

FEDERAL BUILDING WILL BE LOCATED AT THIRD AND ROBINSON

All doubt concerning the selection of the northwest corner of Third Street and Robinson Avenue as the federal building site were dispelled when *The Oklahoman* received, yesterday, the following telegram from Washington: "Northwest corner of Third and Robinson Streets se-

lected for Federal building site." (Signed).



June 19, 1907, p. 6

DRILLING FOR OIL AND GAS PLANNED

Sulphur, I. T., June 18.—The Sulphur Oil, Gas, and Mineral Development Company has been organized and capitalized at \$150,000.

The stockholders are chiefly home capitalists who believe that both oil and gas can be found in great quantities in and near Sulphur. This company will begin drilling at once. They will sink a number of wells and make a thorough test of the Sulphur field. In all six artesian wells in the city, some oil has been found. In each of them, before the artesian flow was struck, gas continually escaped in quantities sufficient to burn.



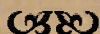
June 20, 1907, p. 12

CHICKASHA IS HOST TO THE RUB DOCTORS

NEXT MEETING OF OS- TEOPATHS PROBABLY WILL BE HELD HERE

Chickasha, I.T., June 19.—The first annual convention of the Osteopathic Medical Association of Oklahoma is in session in this city today. More than 40 osteopathic doctors from the state are here attending the convention. Dr. W. S. Corbin of this city was elected president. The

place of meeting for next year has not been chosen. Oklahoma City is a candidate and probably will get the honor.



Saturday, June 22, 1907, p. 7

WAGON RUNS OVER DRIVER OF AUTO CAPITOL HILL RESIDENT IS INJURED BY LAUNDRY COMPANY'S VEHICLE

Contracts have been signed F. M. Agee, a resident of Capitol Hill, who is proprietor of a mill at 7000 West Second Street in this city, is walking with a cane, the result of having been run down by a laundry wagon.

Mr. Agee states that the wagon was being driven at a speed of not less than 15 miles an hour when it collided with him. He was crossing the street at the time, it was raining, and the umbrella he held to protect himself from the shower made it impossible for him to see the wagon approaching.

"I have an automobile" said Mr. Agee last night, "and drive it over the streets of Oklahoma City, but never in my most speed-mad moment have I ever driven my machine at an equal speed to that being made by that laundry wagon. If the police are to shoot holes in auto tires to prevent speeding, I think laundry wagons should be included."

According to Mr. Agee's statement, the driver of the wagon made no attempt to check the speed of his horse either before the collision or after, but contin-

ued on down the street without trying to ascertain the extent of his victim's injuries.



Sunday, June 23, 1907, p. 1

"COTTON WILL GO UP TO 25 CENTS" STARTLING CLAIMS ARE MADE BY LEADING INSPECTOR

"That cotton will command fifteen cents next fall is a cinch, that it will reach twenty cents is a strong probability, and that it will go to twenty-five cents is a 10 to 1 shot," was the startling announcement made in a letter received yesterday by W. H. Stafford, a prominent Oklahoma City buyer, from F. M. Cordell, a member of the New Orleans cotton exchange and one of the most reliable cotton crop inspectors in the south.

The writer adds that he has just returned to New Orleans from a personal inspection of the cotton region of Arkansas, Louisiana, and Mississippi. "It is very poor" is his comment.



June 23, 1907, p. 2

MAJORITY FAVORS COMBINED TOWN CITY CLERK OF CAPITOL PRESENTS ARGUMENTS IN FORM OF ANNEXATION

A majority of the taxpayers of Capitol Hill are desirous of being annexed to Oklahoma City and do not believe that in

becoming a part of the city their taxes would be increased, according to Dr. W. R. Clement, city clerk of Capitol Hill. He avers that the petition being circulated has been signed by nearly every representative businessman in the town and that there are 12 or 15 citizens who refuse to sign it. "The biggest roar against annexation is being raised by non-resident property owners who live in Oklahoma City," said Dr. Clement. "They argue that it will raise taxes."

"The fact of the matter is that the tax levy in Oklahoma City is less than 1 per cent higher than ours, which is nearly offset by our school tax, which is 20 mills, while in Oklahoma City [it] is but 18 mills," said Dr. Clement.



June 23, 1907, p. 19

OLDFIELD SETS NEW SPEED RECORD FOR AUTOISTS

Portland, Ore., June 22.—Barney Oldfield drove a mile against time in 62½ seconds today and a mile in competition in one minute flat. Both are world records.



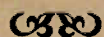
Tuesday, June 25, 1907, p. 1

300 FIGHT OIL FIELD FLAMES

Sapulpa, I. T., June 24.—One of the most disastrous fires in the history of the Glenn Pool

is raging six miles southeast of this city on the property of the Quaker, Texas, and Victor Oil Companies. The estimated loss at present is \$75,000.

The fire broke out about 2 o'clock Sunday morning in a 35,000-barrel tank owned by the Quaker Oil Company and spread rapidly to neighboring tanks until six 1,600-barrel tanks of the Texas Oil Company were in flames. Three hundred men have been battling with the flames, which it is not expected to subdue for 48 hours. Smoke in great volumes has been pouring over Sapulpa.



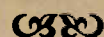
June 25, 1907, p. 5

LOCAL MEN MAKE RICH OIL STRIKE OKLAHOMA CITY MEN ARE INTERESTED IN A WELL AT JENNINGS

W. C. Brisscy and George W. Fox, two Oklahoma City men, are interested in one of the best flowing wells in the Mid-Continent oil field. It is known as the Meadows deep well and is located at Jennings. It has been recently bailed out and flowed two-thirds of a tank in four hours through 1,500 feet of water. The flow is said to be so great that the three two-inch mains from the well to the tank were not sufficient to carry the oil, and another two-inch line was con-

nected the first of the week.

It was estimated by conservative oil men, when the well was first shot, that it would make at least 500 barrels, but since cleaning it out, it is now estimated that it will run between 500 and 1,000 barrels of high grade oil, testing 44 gravity. This is the first deep well in the Mid-Continent Field. The first string of casing collapsed from the pressure at 2,800 feet, and heavy casing was brought from Pennsylvania.



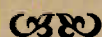
Ponca City, Oklahoma tornado, April 25, 1912. *Western History Collections, University of Oklahoma.*

June 25, 1907, p. 6

TO CHOOSE SITE FOR BIG BREWERY

**ANHEUSER-BUSCH COMPAN-
Y REPRESENTATIVES WILL
BE IN THE CITY TODAY**

Representatives of the Anheuser-Bush Brewing Company will be in the city today for the purpose of selecting a site for a building to be erected by that company for its territorial offices, which are to be removed to this from Guthrie.

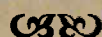


Wednesday, June 26, 1907, p. 1

SUPREME COURT DISSOLVES JUDGE PANCOAST'S INJUNCTION ACTION UPHELD; ELECTION TO BE CALLED SOON

**AJUSTICES BURWELL, IR-
WIN, AND PANCOAST OP-
POSING OPINION**

By a vote of five to two the Supreme Court holds that it has no jurisdiction to restrain the constitutional convention in the question of county division. By a vote of four to three the Supreme Court upholds the action taken by the convention regarding the election ordinance. President Murray has called the convention to reconvene on July 10. The election will be held and statehood now is drawing near.



June 26, 1907, p. 7

THRONE OF KING CARLOS TOTTERS

**GREAT DEMOCRATIC WAVE
RESULT OF ACT OF DESPO-
TISM PERMITTED BY RULER**

London, June 25.—A correspondent of the Tribune says, in a letter mailed from Lisbon, June 19, that King Carlos throne is in imminent danger of being swept away by the rush of a great democratic wave swollen suddenly to dangerous proportions by the act of despotism on May 1.



Thursday, June 27, 1907, p. 1 and 3

DEATH AND DAMAGE IN TORNADO'S WAKE

**FIERCE STORM SWEEPS
O'ER MID-CONTINENT
OIL FIELDS**

**THREE RIG BUILDERS ARE
KILLED NEAR SAPULPA**

Three lives were lost, hundreds imperiled, and property valued at thousands of dollars destroyed by a fierce tornado that swept across the northern portion of Indian Territory and northeastern Oklahoma yesterday morning.

Bartlesville, Collinsville, Sapulpa, Tulsa, Ramona, I. T., and Cleveland and Pawnee, Okla., are among the towns visited by the twister, and each sustained slight damage. The loss of life and the greatest property destruction occurred in the Mid-Continent oil field, where it is estimated that 150 derricks have been destroyed and hundreds

of thousands of dollars damage done to oil and gas property.

Sapulpa, I. T., June 26.—Three men were killed and 150 oil well derricks were demolished by a tornado that swept this vicinity from the southwest at 8:30 o'clock this morning. As a result of tearing up of oil and gas pipes, with the toppling over of the many derricks, a great number of the wells have broken open and large volumes of oil and gas are escaping. Polecat Creek is covered with a layer of oil a foot thick, which has caught on fire and is now burning fiercely for more than a mile.

The flames are leaping to the clouds, and the entire country is illuminated from the blaze. The roar of the escaping gas from a dozen different localities can be plainly heard.



Friday, June 28, 1907, p. 1

STATE BAPTIST HOS- PITAL TO BE BUILT HERE; COST \$100,000

**TEN LOTS ARE GIVEN
FOR SITE**

**INCORPORATION IS UNDER
WAY; TO BE NAMED AFTER
DONOR**

Oklahoma City is to have a state Baptist Hospital, on McKinley and West Eighth Street, which will cost, when completed, between \$90,000 and \$100,000. This does not include the value of the lots, which were donated by Miss Martha Ibbotson, af-

ter whom the hospital will be named.

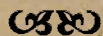


June 30, 1907, p. 1

CAPITOL HILL RESIDENTS SCARED

YOUTH IS PURSUED BY FEROCIOUS ANIMAL BUT ESCAPES

Capitol Hill citizens are terrorized because of the presence of a panther, and one of large dimensions and ferocious disposition, has been several times seen in that populous suburb immediately south of Oklahoma City. And this is no make-believe panther, or mountain lion, that is causing the residents of the outskirts of a city of 40,000 inhabitants to remain closed indoors nights.



June 30, 1907, p. 19

PLANS CONTROL OF THE BIG SCHOOL LAND ACREAGE

Guthrie, Okla., June 29.—The secretary of the School Land Leasing Board has issued the following explicit statement regarding control of the big school land acreage in Oklahoma: "The statehood enabling act provides that the school lands shall all be leased under the present rules until such time as the state legislature shall make different provision. No change in the rules for leasing can, therefore, be made

until the meeting of the first state legislature."



July—*The Daily Oklahoman* had a daily average circulation of 20,491 in July 1907. *Saint Anthony's Hospital* in Oklahoma City announced a campaign to raise money for a new hospital wing. On July 9, delegates to a joint convention of the *Oklahoma Retailers' Association*, *Twin-Territorial Lumber Dealers' Association*, and *Oklahoma Vehicle Dealers' Association* began to arrive. General Manager John W. Shartel with the *Oklahoma City Railway Company* announced that construction of a power house near Belle Isle Park will begin in ten days on July 10. The constitutional convention adjourned July 16. The election to ratify or reject the proposed constitution was set for September 17, the anniversary of the adoption of the U. S. Constitution in 1787. The U.S. Geological Survey has surveyors collecting data for a topographic map of the new state.

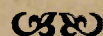


Tuesday, July 2, 1907, p. 1

REPUBLICANS TO POSTPONE AGAIN TULSA CONVENTION WILL AWAIT ADJOURNMENT OF CONSTITUTIONAL CONVENTION

Guthrie, Okla., July 1.—It is very probable that the republicans will again withhold the date of their state convention at

Tulsa until the constitutional convention has finally completed its work.



July 2, 1907, p. 1

CENSUS OFFICIALS ARRIVE; HAMON SCORING ON FRANTZ

FORCE OF CLERKS HERE TO PROBE ALLEGED GERRYMANDER

SHUTS FRANTZ OUT OF PIE DISPENSER'S PLACE—MANY APPLICANTS

Guthrie, Okla., July 1.—Ten census officials, headed by William C. Hunt, statistician, arrived here today to commence the work of taking a census of the state. A suite of offices will be secured tomorrow and a big force of enumerators and clerks will be put to work immediately.

The appointment of 1800 enumerators for the special census in Oklahoma promises to cause an outbreak of the old core between J. L. Hamon, chairman of the Republican state central committee, and Governor Frank Frantz. It was first reported that Frantz would be sole advisor to Chief William C. Hunt at Guthrie and be allowed to hand bits of the pie to his followers. Yesterday afternoon Hamon received a telegram from S. N. D. North, census director in Washington, which removes the plum dispensing from Frantz's hands and places it with the state chairman.





May 4, 1920 tornado that damaged the Blue Bonnet mill east of Picher, Oklahoma. Baxter Springs, Kansas Heritage Center and Museum. [On May 10, 2008, a tornado damaged and/or destroyed over 40% of Picher, Oklahoma.]

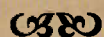
July 2, 1907, p. 6

WEATHER BUREAU ISSUES A REPORT

AVERAGE TEMPERATURE DURING JULY FOR 16 YEARS SHOWN TO BE 79 DEGREES

Data concerning weather conditions during the month of July for the past sixteen years has been compiled by the United State Weather Station at Epworth University campus, which shows the average temperature sixteen Julys to be 79 degrees. The maximum temperature during that time was 104, on July 3, 1894. The minimum temperature was 56 on July 10, 1905.

The warmest month recorded was July 1901, when the average temperature was 85. The coolest July was that of 1906, when, owing to the great amount of rain, the mean temperature was 76, three degrees below the average for the sixteen years.



July 4, 1907, p. 1

CELEBRATION IS BE- GUN EARLY

ARRIVAL OF THE FOURTH IS ANNOUNCED BY MANY BOOMS

MAYOR'S PROCLAMATION

ASKS THAT ALL OF THE BUSI- NESS HOUSES BE CLOSED TODAY

Crackers will pop, rockets will sizz, the Declaration of Independence will be read, small boys will get burned, and tonight they will slip into bed, tired but happy with a sense of patriotic duty well done.

The festivities today opened at midnight with a salute. Guns roared out a welcome to the 131st anniversary of American freedom and from then until day break an intermittent crack of smaller noise makers could be heard. At sunrise a salute of 17 guns was given and the events of the day opened in

earnest. Acting Mayor L. L. Land proclaimed the Fourth day of July as a legal holiday.



Saturday, July 6, 1907, p. 1

OIL KING TO TESTIFY BEFORE COURT TODAY

OTHER BARONS WILL GO ON THE GRILL

Chicago, July 5.—Accompanied by his bother, William Rockefeller, John D. Rockefeller, president of the Standard Oil Company, will appear before Judge K. M. Landis in the United States District court tomorrow at 10 a.m.. It is supposed that H. H. Rogers will be in court. They will be on the stand regarding the supposed secrets of the corporation that became known to District Attorney Sims and the other local agents of the Department of Justice.



Sunday, July 7, 1907, p. 1

JOHN D. TAKES ROLE OF AN OYSTER

OIL KING TESTIFIES, BUT NET RESULT IS NOT SATIS- FACTORY

Chicago, July 6.—John D. Rockefeller, president of the Standard Oil Company of New Jersey, occupied the witness stand in the United States district court today while Judge Landis plied him with questions regarding the financial strength and the

business methods of the corporation of which he is the head.

Mr. Rockefeller was very willing and an equally unsatisfactory witness. He was ready to tell all that he knew, but he said that he knew practically nothing.



July 7, 1907, p. 1

ST. ANTHONY'S HOS- PITAL TO BE CONSID- ERABLY ENLARGED

Steadily increasing demands on the already overcrowded accommodations at St. Anthony's Hospital probably will cause the Sisters of St. Francis to open a campaign for funds to complete the original plans of the building by the construction of a wing 100 by 50 feet, three stories, and basement on the north side of the present structure. This addition is needed by all who are familiar with conditions at the hospital. One of the sisters in charge said last evening that the 100 beds they now have in the hospital are always filled, and that almost daily they are compelled to turn away patients because they cannot afford accommodations for them.



Tuesday, July 9, 1907, p. 1

DELEGATES ASSEMBLE FOR BIG CONVENTION

BIG MEETING CONVENES TODAY

1,500 STRANGERS TO BE OKLAHOMA CITY VISITORS

Delegates to the joint convention of the Oklahoma Retailers' Association, Twin-Territorial Lumber Dealers' Association, and Oklahoma Hardware, Implement, and Vehicle Dealers' Association are arriving on almost every train.

President A. L. Kirby, of the retailers, from Owl, I. T., said "We expect this convention to be the largest commercial assembly held in the Southwest this year."



July 9, 1907, p. 4

OIL MEN ARE ANXIOUS OVER INSURANCE RATE

Keifer, I. T., July 8.—Recent losses by tornado and lightning have set the oil producers of the Mid-Continent Field thinking about the insurance question. Stored oil in a field full of new development all the time is not a very attractive risk for an insurance company because of the constant danger from fire, yet there is one insurance company in the field that writes such insurance exclusively and there are others that will take a risk now and then if it appears to be good.



Wednesday, July 10, 1907, p. 1

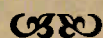
WILL BEGIN WORK ON \$200,000 POWER HOUSE

COMPANY NOW READY TO BEGIN CONSTRUCTION

"The Oklahoma City Railway Company will commence construction on its proposed \$200,000 power house near Belle Isle Park within ten days," was the statement made by General Manager John W. Shartel last night after consultation with the consulting engineer Knok, of Chicago, who is here to look over

the situation and give expert advice.

Mr. Shartel said the formal opening of Belle Isle Park and Lake as a pleasure resort will take place a week from next Sunday, at which time a temporary pavilion will have been constructed, the boat house completed, and the bathing beach and paddle pool arranged for use. When the lake is completed it will supply 30 miles of waterway for boating.



July 10, 1907, p. 1

FRAMERS OF THE CONSTITUTION REASSEMBLE IN GUTHRIE TODAY

WILL MEET EVERY OBJECTION AGAINST INSTRUMENT

Guthrie, Okla., July 9.—Placing immediate statehood above every selfish and party interest, the delegates to the constitutional convention, which reassembles in this city tomorrow, will meet every objection urged against the proposed

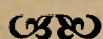


Oklahoma Railroad Company's Bell Isle power house, 1910. *Oklahoma Historical Society.*



Capping a well in eastern Oklahoma. *Oklahoma Historical Society.*

instrument by the Republican Party by correcting and eliminating the sections complained of, according to the sentiment of the delegates that have already arrived in Guthrie.



Thursday, July 11, 1907, p. 1

**BUSINESS MEN OF
TWO TERRITORIES TO
FIGHT CATALOG
ESTABLISHMENTS
GREAT RETAIL CONVEN-
TION WILL ADJOURN THIS
AFTERNOON, FOLLOWING**

THE ANNUAL ELECTION OF A DOUBLE SET OF OFFICERS

Following the election of officers, the three business organizations that have been in session in Oklahoma City since Tuesday morning and which, combined, have made up what is declared to be the greatest commercial convention ever held in the Southwest, will adjourn at 3 o'clock this afternoon. While it is said that there will remain some unfinished business when the visitors leave for their homes, it is declared that a working basis has been established that will enable the members of the trio of great commercial bodies to accomplish many things for

the advancement of the retail trade of Oklahoma and Indian Territory. Mail order houses, universally recognized as the greatest enemy of country merchants, will be the target for an organized fight during the next twelve months as a result of the 1907 convention.

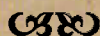


Saturday, July 13, 1907, p. 5

RIVERS OF BLAZING OIL THREATEN AN ILLINOIS CITY

Bridgeport, Ill., July 11.—After working all day damming the streets in which ran

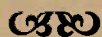
rivers of blazing oil from exploding tanks of an oil refinery west of the village, the citizens of Bridgeport today managed to save their homes from a fate somewhat similar to that of Pompeii. Dikes were made to cut off the flames from the residences and damage was confined to the refinery and its vicinity. The loss will total \$150,000. No lives were lost.



July 13, 1907, p. 7

PIPELINES ARE DELAYED; FLOW IS 200,000 BARRELS

Bartlesville, I. T., July 12.—The question most frequently asked by producers, royalty owners, and representatives of the general public in the Mid-Continent field is "How soon will the pipeline companies be taking all of the oil." Months ago the announcement that two independent pipelines would be built to the Gulf of Mexico raised expectations to a high point, and there were visions of higher prices in a short time. So far the operations of the Gulf Pipe Line Company and the Texas Company have resulted in no advantage to this field. The question is, "How soon will the operations of these companies result in the expected benefits?"



Sunday, July 14, 1907, p. 1

ELECTION CALL IS HELD UP AGAIN

Guthrie, July 13.—H. A. Noah of Alva, attorney for the people of Woods County, today applied to the United States Supreme Court for a writ of super-sedeas to stay the recent decision of the Oklahoma Supreme Court overruling the injunction previously issued by Judge Hancock which prevented the election on the constitution so long as it contained the provision dividing organized counties in Oklahoma.

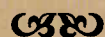


July 14, 1907, p. 6

EPIDEMIC OF HUGGING ENLIVENS JERSEY CITY

THREE OFFENDERS ALREADY IN THE PENITENTIARY AND LIST GROWING

New York, July 13.—There is an epidemic of promiscuous hugging in Jersey City that is keeping the police busy. Several arrests of huggers have been made within a week and three men are now breaking stone in the Hudson County penitentiary.



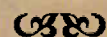
July 14, 1907, p. 23

EVEN ENGLISH CROWDS CHEER AS MAY SUTTON WINS CHAMPIONSHIP

PLUCKY CALIFORNIA GIRL ONCE MORE HOLDS THE BRITISH TENNIS TITLE IN AN EASY GAME

London, July 13.—In the

All-England Tennis Championship ladies' singles of Wimbledon last week, May Sutton of California defeated Mrs. Chambers in the championship round. Miss Sutton thus won back the title of British champion of which she was deprived last year by Mrs. Chambers, who was then Miss Douglas.



Tuesday, July 16, 1907, p. 1

STATE ELECTION WILL BE HELD SEPTEMBER 17

FINAL ROLL CALL IN CONSTITUTIONAL CONVENTION, SIGNING OF INSTRUMENT, AND ADJOURNMENT

Guthrie, Okla., July 15.—The election to ratify or reject the proposed constitution will be held on September 17, the anniversary of the adoption of the United States Constitution in 1787. This was finally agreed to today and the election ordinance was adopted. It gives Governor Frantz ten days after the adoption of the ordinance in which to issue the election proclamation, and it is provided that the original parchment copy of the constitution and election ordinance shall be filed officially with Filson on or before July 25.

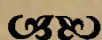


Wednesday, July 17, 1907, p. 1

CONSTITUTIONAL BODY ADJOURNS ONE HUNDRED THOUSAND

**COPIES OF AMENDED
CONSTITUTION ARE TO BE
PRINTED FOR
FREE DISTRIBUTION**

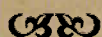
Guthrie, Okla., July 16.—Final adjournment of the constitutional convention was taken this morning at 8:20 o'clock, following the signing of the constitution by 81 democratic delegates and four republicans. The convention at 7 o'clock this morning met and signed the constitution. Considering the early hour, the attendance was encouragingly satisfactory, and the delegates showed earnestness and consistency in the closing hours of the convention.



July 17, 1907, p. 1

**NEED 200 MORE
SCHOOL TEACHERS**

Guthrie, Okla., July 16.—According to J. E. Dyche, Territorial Superintendent of public instruction, at least 200 additional school teachers will be needed to fill vacancies in new schools in Oklahoma this fall. Two-thirds of the certificates to teach in Oklahoma are held by women.

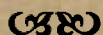


July 17, p. 33

**CRISIS IN KOREA IS
DRAWING NEAR
THRONE IS WEAKENED
MORE THAN AT ANY TIME
SINCE QUEEN'S MURDER**

Seoul, via Tokyo, July 16.—The crisis in Korean affairs

and consequent panic in court circles was heightened Saturday when the emperor learned that Viscount Hayashi, foreign minister of Japan, was coming to Seoul to untangle the knot caused by the sending of a deputation to The Hague to protest against Japan's attitude toward Korea.



July 17, 1907, p. 11

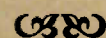
**GREAT EXCITEMENT
IN MORRIS OIL FIELD**

Muskogee, I. T., July 16.—Morris is a way station on the Frisco ten miles east of Okmulgee, thirty miles west of Muskogee, and 25 miles south of the Glenn Pool. There have been five oil wells drilled there. Two of them have been dry holes and three have brought in big wells. It is the most development of new territory in the oil business that has been brought in since the Glenn Pool was discovered. One well there flowed 500 barrels an hour when it was first brought in. Of course, the production settled in the well, as it always does, but it is believed to be an enormous well.

The oil sand is found at 1,300 feet at Morris. It is found at 1,600 to 1,700 in the Glenn Pool and at 1,800 in Muskogee. The oil is the same grade as Muskogee.

The Morris field was brought in as a wildcat proposition by some local persons boring for oil or gas. The Devonian Company brought in the first big well and three companies now

developing their leases are the Tiger Oil Company, Devonian Oil Company, and Barnsdall & Company. Nearly all of the land has already been leased.

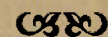


Thursday, July 18, 1907, p. 6

**UNCLE SAM OIL CO.
ASSET DISPOSED OF
RECEIVER MORSE MAKES
RECORD BREAKING SALE
OF RESIDUUM**

Topeka, July 16.—Receiver J. C. O. Morse, of the defunct Uncle Sam Oil Company, today made a 50,000 barrel sale of residuum to an Emporia company for \$20,000. This was from the Cherryvale refinery and is the largest sale ever made in the Mid-Continent Field.

Residuum is used to make kerosene and gasoline at refineries. This is the company of which H. H. Tucker now in the Leavenworth jail, was the promoter.



July 18, 1907, p. 7

**MARVELOUS RECORD
MADE IN INFANT OIL
WELL DISTRICT**

Muskogee, I. T., July 17.—The Glenn Pool is considered one of the greatest and most wonderful oil producing sections in the world. It was a little less than two years ago that the first oil well was brought in by Galbreath and Chesley as a purely

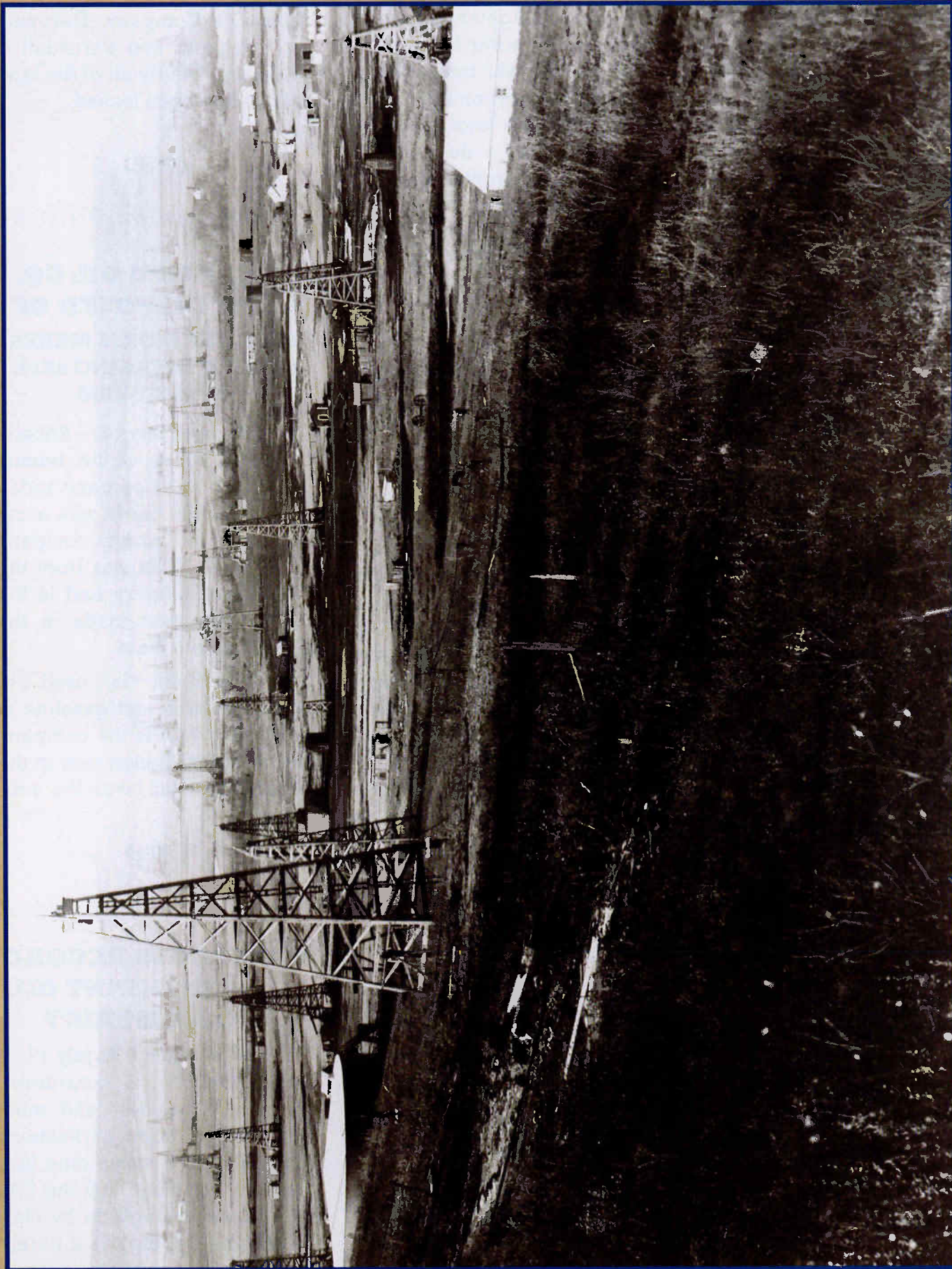


Photo of part of the Glenpool Field (south and west of Tulsa). Western History Collections, University of Oklahoma.

wildcat proposition. Today there are 519 producing wells in the Glenn Pool and the average daily production from the wells is 125,000 barrels.

It is interesting to know that since the first well was brought in at the Glenn Pool there has been put in storage in addition to the pipeline runs, over 5,000,000 barrels of oil. On July 1, there was in steel tanks in the field, 6,515,000 barrels; in earthen tanks, 1,500,000 barrels; in settling tanks 235,000 barrels, total: 8,250,000 barrels. In addition to this, however, the Prairie Oil and Gas Company has shipped north and placed in storage, together with what has been shipped south in tank cars to Texas, 2,250,000 barrels more in storage.

This tremendous production of oil includes only a few sections of land that is known as the Glenn Pool and does not embrace any oil produced in the other sections of the Mid-Continent field.



July 18, 1907, p. 11

TOPOGRAPHY WILL BE SHOWN BY MAP REPRESENTATIVES OF GOV- ERNMENT INSPECT WORK NOW IN PROGRESS HERE

William Beaman, of Washington, D. C., a representative of the United States Geological Survey, was in Oklahoma City last evening after inspecting the work of surveyors who are securing data for a complete topo-

graphic map of the new state of Oklahoma.

Two parties are in the field in Oklahoma and one in Indian Territory. It is expected that preliminary maps of Luther, Merrick, Newalla, Burnett, and Norman quadrangles in Oklahoma and Wyandotte Quadrangle in Indian Territory will have been completed by January 1, 1908.



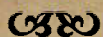
July 19, 1907, p. 1

RIOT QUELLED WITH CLUBS AND GUN

BUD LEDBETTER, ARMED MAKES POLITICIANS QUIET DOWN

Muskogee, I. T., July 18.—Bud Ledbetter, a democratic deputy marshal, carrying two big guns and with a six-shooter strapped to his side, was the presiding officer at a Republican county convention here this afternoon during a thrilling portion of the session.

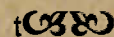
After a disgraceful riot, which was precipitated when Henry Asp of Guthrie attempted to make a speech and was forced from the hall, delegates to the state convention were chosen who are for a state ticket, for Frantz for governor, and for the constitution under protest.



July 19, 1907, p. 1

KOREAN EMPER- OR ABDICATES HIS THRONE AT SEOUL TODAY

Tokyo, July 19.—A dispatch from Seoul says that the emperor convened the elder statesmen at 1 o'clock this morning. The cabinet ministers waited in an adjoining room while the emperor conferred with the elder statesmen. After a two-hour conference his majesty finally yielded and made up his mind to abdicate.



Thursday, July 25, 1907, p. 3

BIG HORN DANCE NOW IN PROGRESS INDIANS OF 47 CLANS AS- SEMBLED FOR GREAT ANNUAL CELEBRATION

Muskogee, I. T., July 24.—In the 47 Indian towns (clans) of the Creek Nation there are now being held the annual green corn dances. The bootlegger is busy and the Indian, after he has danced, will eat green corn for the first time this year. An Indian will not eat roasting ears until after the green corn dance. This is an old superstitious custom rigidly observed among full bloods. The custom is so old that it is impossible to get a clear idea as to its origin.



An assemblage of Cheyenne and Arapaho in front of the Traders store at Fort Reno, July 1885, Oklahoma Territory. Oklahoma Historical Society.

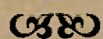


Saturday, July 27, 1907, p. 1

CITY MUST BE CLEANED; HEALTH BOARD'S RULING

**INSPECTORS WILL EN-
FORCE LAWS IN
"SPOTLESS TOWN"**

"Spotless Town" is the watchword adopted by the newly created board of health. Oklahoma City will be cleaned from end to end, it proclaims, until it is indeed a city beautiful. No time, no effort, no money will be spared to bring about a perfect sanitary condition. Inspectors will be kept busy every day investigating reports of unsanitation and violation of the city health laws.



Sunday, July 28, 1907, p. 1

J. J. M'ALESTER IS SWINDELED OUT OF \$10,000 ON GOLD BRICK GAME

South McAlester, July 27.—J. J. McAlester, president of the American National Bank of this city was today swindled into paying \$10,000 cash for a worthless brass brick. A brick was offered to the banker by a man representing himself to be a miner. It was taken to Muskogee, appraised at the government office, and stated to contain 80 per cent pure gold. When the deal was completed, the McAlester banker was given the imitation instead of the brick the appraiser had examined. The swindle was discovered a few hours after the transaction. Mr. McAlester is the democratic candidate for railroad commissioner and one

of the most influential bankers in Indian Territory. Five hundred dollars reward has been offered for the swindler's arrest.



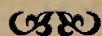
July 28, 1907, p. 15

LITTLE FARMS ARE SENDING BIG RANCHES TO OBLIVION

Guthrie, Okla., July 27.—Livestock statistics gathered from the returns of the Oklahoma Equalization Board for taxation for the year 1907, add convincing proof that the big ranch is soon to be a thing of the past in the territory, being rapidly displaced by the smaller farms.

While there has been a big increase in the number of draft animals, there has been an

equally large increase in ranch stock. The counties which have the largest increases in corn and cotton acreage also show big increases in horses and mules. The longhorn steer herds are decreasing and hog production is up.



Tuesday, July 30, 1907, p. 2

NO MORE HUGGING ON DANCE FLOORS

Omaha, Neb., July 29.—There is to be no hugging in waltzes and other round dances in fashionable circles in Omaha. The dancing masters of this city, according to an announce-

ment made by one of them today, have signed an agreement not to teach hugging by pupils at their academies and not to permit it by pupils or others who may attend the "hoys" given under their auspices.



Wednesday, July 31, 1907, p. 7

DELEGATES GO TO CONVENTION TODAY REPUBLICANS WILL START FOR TULSA AT 2 O'CLOCK THIS AFTERNOON

The Oklahoma County delegation to the state Republican convention at Tulsa will leave this city over the Frisco at

2 o'clock this afternoon in a special train.

The special will consist of two day coaches and three sleepers and will start from Eldorado, in Greer County [now Jackson County], at 5 o'clock in the morning. It will arrive in Oklahoma City at 1:15 o'clock and leave at 2 o'clock for Tulsa. The Pullman berths will be retained for the occupants of the special during the convention being set out on a siding at Tulsa and held there.



Bell Isle street car line, Oklahoma City, Oklahoma. *Oklahoma Historical Society.*



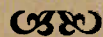
University of Oklahoma's men's baseball team, ca. 1905. *Oklahoma University Collection, Western History Collections, University of Oklahoma.*

July 31, 1907, p. 11

**RAILROAD RAPIDLY
NEARING THE CITY
THE CANADIAN VALLEY
LINE CROSSED THE BORDER
WITH ITS STEEL RAILS**

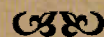
Reports from Beaver City state that the Canadian Valley Railroad, which is building from New Mexico to Oklahoma City, with a spur to Guthrie, has crossed the Oklahoma line with steel laying gangs and has sixteen miles of rails laid in Oklahoma. It was the original intention of this company to complete their line into Oklahoma City by

January 1, 1908, but owing to difficulties experienced in securing capital it is not expected that trains will be in operation for more than a year after that date.



REFERENCES

- O'Brien, B. J., 2005, Downtown OKC's Colcord Building to become boutique hotel: *Journal Record* (Oklahoma City), January 28.
- The Oklahoman, 1910a, Sunday, November 27, v. 22, no. 165, p. 11.
- The Oklahoman, 1910b, Friday, December 2. v. 22, no. 170, p. 13.



—Upcoming Meetings

2008

OCTOBER

16 2008 Oklahoma Oil & Gas Trade Expo, Oklahoma City, Okla.; information: Oklahoma Commission on Marginally Producing Oil and Gas Wells; phone (405)604-0460 or 800/390-0460. Website: www.marginalwells.com

21 and 23 Oklahoma Gas Shales Field Trips, Oklahoma City, Okla. A one-day field trip, that will visit three extended stops in the western Arbuckle Mountains and eastern Criner Hills in southern Oklahoma. Exposures of the Woodford Shale will be viewed to compare and contrast source-rock and reservoir quality for gas shales, correlate lithologies in outcrop to electric logs in the subsurface, and examine the occurrence, extent, and orientation of fractures in outcrop that are the source of permeability in the subsurface.

Field trip attendees must also register for the conference. Limited number of field trip seats available.

Information: Oklahoma Geological Survey; phone (405)325-3031 or (800)330-3996. E-mail: mjsummers@ou.edu; website: <http://www.ogs.ou.edu>.

22 Oklahoma Gas Shales Conference, Oklahoma City, Okla. The Woodford Shale (Late Devonian-Early Mississippian) is currently the most important gas-shale play in Oklahoma. The play has expanded from the western Arkoma Basin to the Ardmore Basin, northeast Oklahoma shelf, and Anadarko Basin. Successful Woodford gas-shale wells require an understanding of source-rock characteristics and reservoir properties, as well as the application of specialized completion techniques.

Conference topics include Woodford and Caney Shale Geology, stratigraphy, electric-log response, source-rock characteristics, reservoir properties, drilling and completion practices, hydrocarbon production, and regional gas-shale projects.

Information: Oklahoma Geological Survey; phone (405)325-3031 or (800)330-3996. E-mail: mjsummers@ou.edu; website: <http://www.ogs.ou.edu>.

29 The Real Deal Midcontinent Prospect Expo, sponsored by the Oklahoma City Geological Society and the Oklahoma Geological Survey, Clarion Meridian Convention Center, Oklahoma City, Okla. This event is designed to address the needs of the mid-continent geological community, including geologists, consultants, engineers, geophysicists and landmen. Plan to come and network at a reasonable cost!

Host a booth to sell prospects, a vendor/exhibit booth to network, or plan to sign up as an attendee to network, shop for prospects, and listen to presentations by: Brian Cardott, Oklahoma Geological Survey: "Overview of Woodford Gas-Shale Play in Oklahoma, 2008 update", and Jim Puckette, Oklahoma State University: "Revisiting Old Areas: Improving Correlations and Enhancing Exploration Success", and additional talk on land issues, speaker TBA.

Information: Oklahoma Geological Survey; phone Michelle Summers (405)325-7313 or Sue Crites (405)325-8076 or (800)330-3996; e-mail: mjsummers@ou.edu or scrites@ou.edu; website: <http://www.ogs.ou.edu>.

NOVEMBER

10–13 Society of Exploration Geophysicists (SEG), Las Vegas, Nev. Website: <http://www.seg.org>.

2009

FEBRUARY

17–18, Oklahoma Aggregates Association 8th Annual Meeting and Field Trip, Meridian Convention Center, Oklahoma City, Okla. Information: Jim Rodriguez, 405/524-7680; website: <http://www.okaa.org>.

MARCH

4 Oklahoma Aggregates Association "Aggregates Day at the Capitol", Oklahoma State Capitol Rotunda, Oklahoma City, Okla. Information: Jim Rodriguez, 405/524-7680; website: <http://www.okaa.org>.

4 - 5 Sequence Stratigraphy & Reservoir Characteristics of the Booch Sandstones, McAlester Formation (Desmoinesian), Arkoma Basin, Oklahoma Field Trip. Oklahoma State Capitol Rotunda, Oklahoma City, Okla.

Information: Field Trip Leaders: Neil Suneson at 405/325-7315 or 800/330-3996, e-mail: nsuneson@ou.edu; Dan Boyd at 405/325-8898 or 800/330-3996; e-mail: dtboyd@ou.edu; or, contact: Michelle Summers at 405/325-3031 or 800/330-3996; e-mail: mjsummers@ou.edu. Website: <http://www.ogs.ou.edu>.



University of Oklahoma women geology students sitting on ledge of Hunton limestone beside a small creek in front of the Harrigan homestead, Arbuckle Mountains. *Western History Collections, University of Oklahoma.*

Created by the Oklahoma Territorial Legislature in 1890, the University of Oklahoma is a doctoral degree-granting research university serving the educational, cultural, economic and health-care needs of the state, region and nation. The Norman campus serves as home to all of the university's academic programs except health-related fields. Both the Norman and Health Sciences Center colleges offer programs at the Schusterman Center, the site of OU-Tulsa. The OU Health Sciences Center, which is located in Oklahoma City, is one of only four comprehensive academic health centers in the nation with seven professional colleges. OU enrolls more than 30,000 students, has more than 2,300 full-time faculty members, and has 20 colleges offering 158 majors at the baccalaureate level, 166 majors at the master's level, 81 majors at the doctoral level, 26 majors at the first professional level, and 24 graduate certificates. The university's annual operating budget is \$1.46 billion. The University of Oklahoma is an equal opportunity institution.