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Some Thoughts on the Structure and Evolution of the Ouachita Mountains - Arkoma Basin Region



Oklahoma Geological Survey

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On the cover: OGS Geologist Rick Andrews on the Booch Field Trip, March 2009. Photo by Michelle J. Summers, OGS Staff. Turn to page 13 for more information on the Booch Workshop and Field Trip.

Meet The Survey's New Director

With new chief Randy Keller, geology survey shakes things up

BY JAMES S. TYREE

Published: March 8, 2009

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Talk of rifts among members of the Oklahoma Geological Survey is common, but despite that, interim Director Randy Keller now has the permanent job.

The University of Oklahoma Board of Regents made the move January 28 during its most recent meeting.

The board wasn't worried about the rifts - because in geologists' lingo, they're nothing more than areas where the Earth's crust pulls apart over time.

They're also Keller's specialty.

"If one of these rift zones is successful, then you break a continent completely apart. . . . We've had those kind of rift zones cutting across the U.S. for a couple of billion years," Keller said.

The Oklahoma Geological Survey is a state agency that's chartered in the state constitution and based at OU. Its mission is to investigate and chart Oklahoma's land, water, mineral and energy resources and to make those findings public.

The survey also is known for measuring the state's earthquakes.

Keller became its interim director in November 2007 upon the retirement of 40-year director Charles Mankin. Keller arrived at OU in 2006 as professor and chairman of the ConocoPhillips School of Geology and Geophysics after spending 30 years teaching at the University of Texas-El Paso.

Besides directing the survey, Keller teaches geophysics, leads the geology school, conducts research and travels for work - he spent last week in China.

"Dr. Keller has published over 250 papers and has

been the recipient of more than \$25 million in research funds, and he has directed approximately 100 master's and doctoral students," OU President David Boren told the board in January.

Keller said he wants the survey to work more with the Oklahoma Water Resources Board on groundwater projects. He said the earthquake-monitoring network must be expanded and modernized. Another goal is publishing more science education materials for public schools.

But studying the Earth's rifts - including two major ones in Oklahoma - remains one of his passions.

"The rifts become basins and then basins become filled with water and oil and other resources, so there's a real practical connection, too," he said.



G. Randy Keller

Some Thoughts on the Structure and Evolution of the Ouachita Mountains-Arkoma Basin Region

G. Randy Keller,
Oklahoma Geological Survey

Introduction

The Ouachita orogenic belt is a somewhat under-appreciated but major tectonic feature that winds its way across the southern US, Oklahoma, and Texas before disappearing into Mexico (Flawn et al., 1961; King, 1975) (Figure 1). My students, colleagues, and I have been working to better understand the structure and evolution of the Ouachita orogenic belt for many years (e.g., Keller and Cebull, 1972; Cebull et al., 1976; Kruger and Keller, 1986; Handshy et al., 1987; Keller et al., 1989a,b;

Mickus and Keller, 1992; Keller and Hatcher, 1999). As part of this effort, we have compiled a wide variety of geological and geophysical data and continue to undertake integrated geological and geophysical with them. Several new oil and gas plays are developing in the Arkoma basin (a foreland basin) and within the orogenic belt itself. In addition, we have gained new insights from Kaspar Arbenz's major OGS publication on the Ouachita orogen in Oklahoma and Arkansas (Arbenz, 2008). Thus, it seems appropriate to briefly reexamine the big picture structural setting of this major tectonic

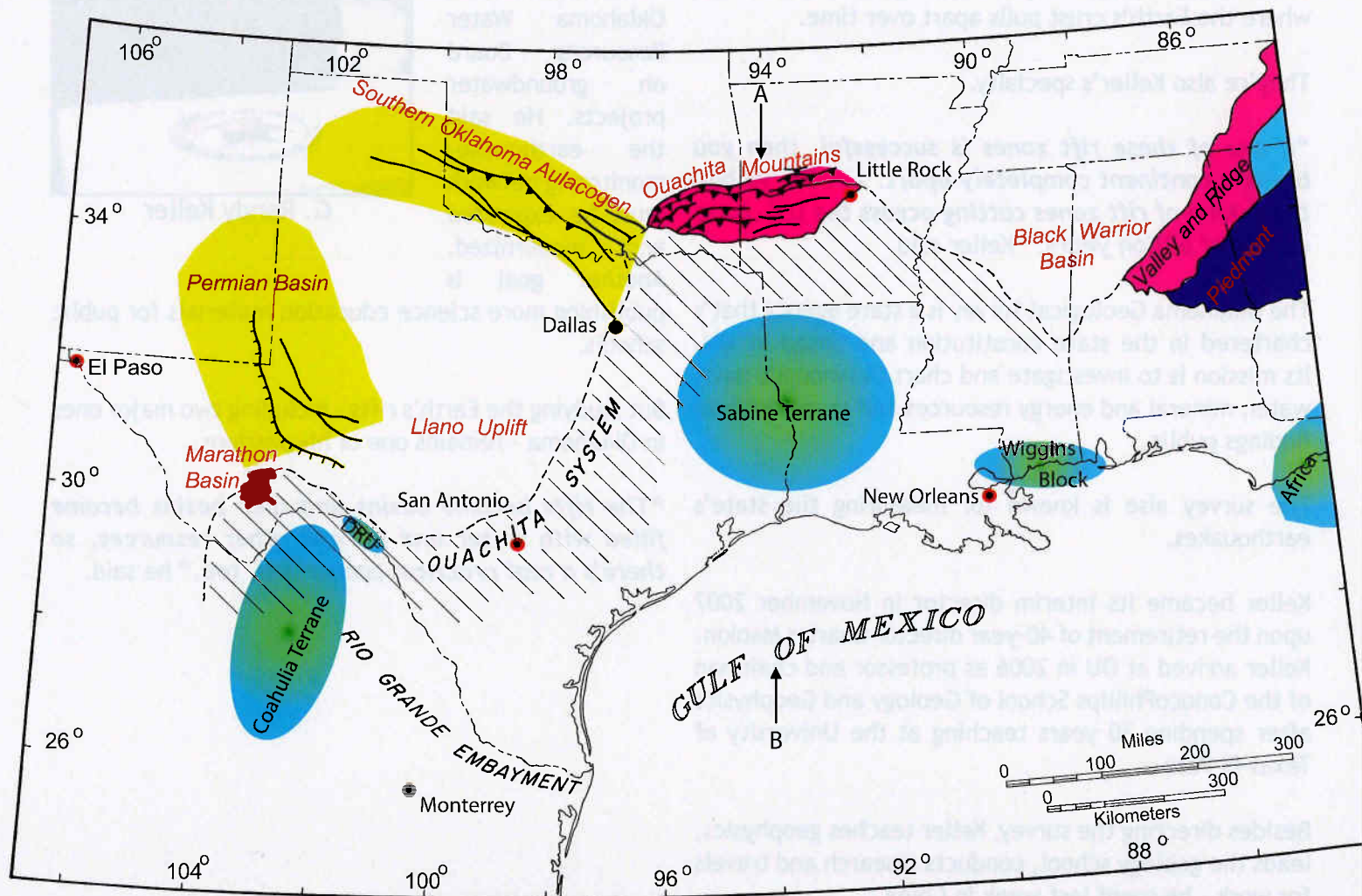


Figure 1. Index map of major tectonic features in the Ouachita orogenic belt region. Location of profile A-B (Figure 5) is shown.

feature and think about what we know and do not know about its structure and evolution. Here I focus on the Ouachita Mountains/Arkoma basin region.

The Precambrian basement that forms the upper crust of the region is relatively young, and some of it formed as recently as about 1.1 Ma during the Grenville orogeny that marked the end of a period of continental growth in the area that is southern North America today (e.g., Mosher, 1998; Whitmeyer and Karlstrom, 2007). This growth formed a supercontinent that is usually called Rodinia, and the paper by Whitmeyer and Karlstrom (2007) includes a very nice movie illustrating this continental growth across the U.S. and the initial breakup of Rodinia. By ~600 Ma, Rodinia began to break apart in the Ouachita region, and a rifted margin developed by about 550 Ma (e.g., Keller et al., 1983; Thomas, 1991). An interesting and widely accepted interpretation is that a piece of lithosphere that broke off of the Ouachita region ended up in southern Argentina (Thomas and Astini, 1996). Until Mississippian time, a typical passive continental margin developed in the Ouachita region along which thick sequences of sedimentary strata were deposited (e.g., Viele and Thomas, 1989; Thomas, 1989). Beginning in the Mississippian, some combination of island arcs, terranes (microcontinents), and South America approached from the south as an ocean of unknown width closed via south-directed subduction producing the Ouachita orogenic belt. The associated “off-shelf, pre-orogenic rocks and the deep-water synorogenic rocks” we encounter in outcrops and drill holes are commonly referred as the Ouachita facies (Viele and Thomas, 1989). Geological studies and our past and ongoing geophysical studies (summarized below) show that this tectonic activity thrust large imbricated slices of continental slope facies (in an accretionary prism at the leading edge of an arc complex associated with the approaching subduction zone) onto the continental shelf that is underlain by extended North American lithosphere. The result is that these Ouachita facies rocks were scraped onto the passive continental margin of Paleozoic North America. The Arkoma foreland basin also formed at this time due in part to this load. For the Ouachita Mountains/Arkoma basin area, the sequence of events from the rifting in Late-Precambrian/Early

Cambrian to end of the orogenic activity in the Pennsylvanian is shown in Figure 2 (Houseknecht and Matthews, 1984; Viele and Thomas, 1989). Since Pennsylvanian time, this region has mostly experienced subsidence and burial.

Integrated Geological and Geophysical Analysis

In order to depict the large-scale structural framework of the Ouachita orogenic belt, we employed the gravity (and magnetic) database that was described by Keller et al. (2006) and is openly available at <http://research.utep.edu/paces>. The complete (terrain corrected) Bouguer anomaly values from the database were gridded, and the resulting map showed a strong northwest to southeast increase in anomaly values that masks the upper crustal features of interest here. Thus, this grid was upward continued to 30km. This procedure simulates the gravity anomaly field that would have been observed if the measurements had been made 30 km above sea level. Since the gravitational attraction of an anomalous mass in Earth's lithosphere decreases rapidly with elevation ($1/r^2$, where $r = 30\text{km}$ plus the depth of the body in this case), upward continuation produces a smooth (regional) grid that was subtracted from the complete Bouguer anomaly grid to produce the grid of residual values that is contoured in Figure 3. This map displays many anomalies that correlate clearly with well known geologic features. The most obvious feature is the prominent triple junction of gravity highs at the center of the map that has the Southern Oklahoma aulacogen (Muenster-Arbuckle-Wichita-Amarillo uplifts) as the northwest trending arm (e.g., Keller and Stephenson, 2007). The other arms follow the interior zone of the Ouachita orogenic belt (Kruger and Keller, 1986) to the northeast and south-southwest. The adjacent Arkoma basin produces the strongest gravity minimum on this part of the map.

An explanation of the large anomalies in the Ouachita Mountains/Arkoma basin region emerges based primarily on an integrated analysis of geological and geophysical data along a transect that extends along the Oklahoma-Arkansas border southward into the Gulf of Mexico (Figure 1). The best-

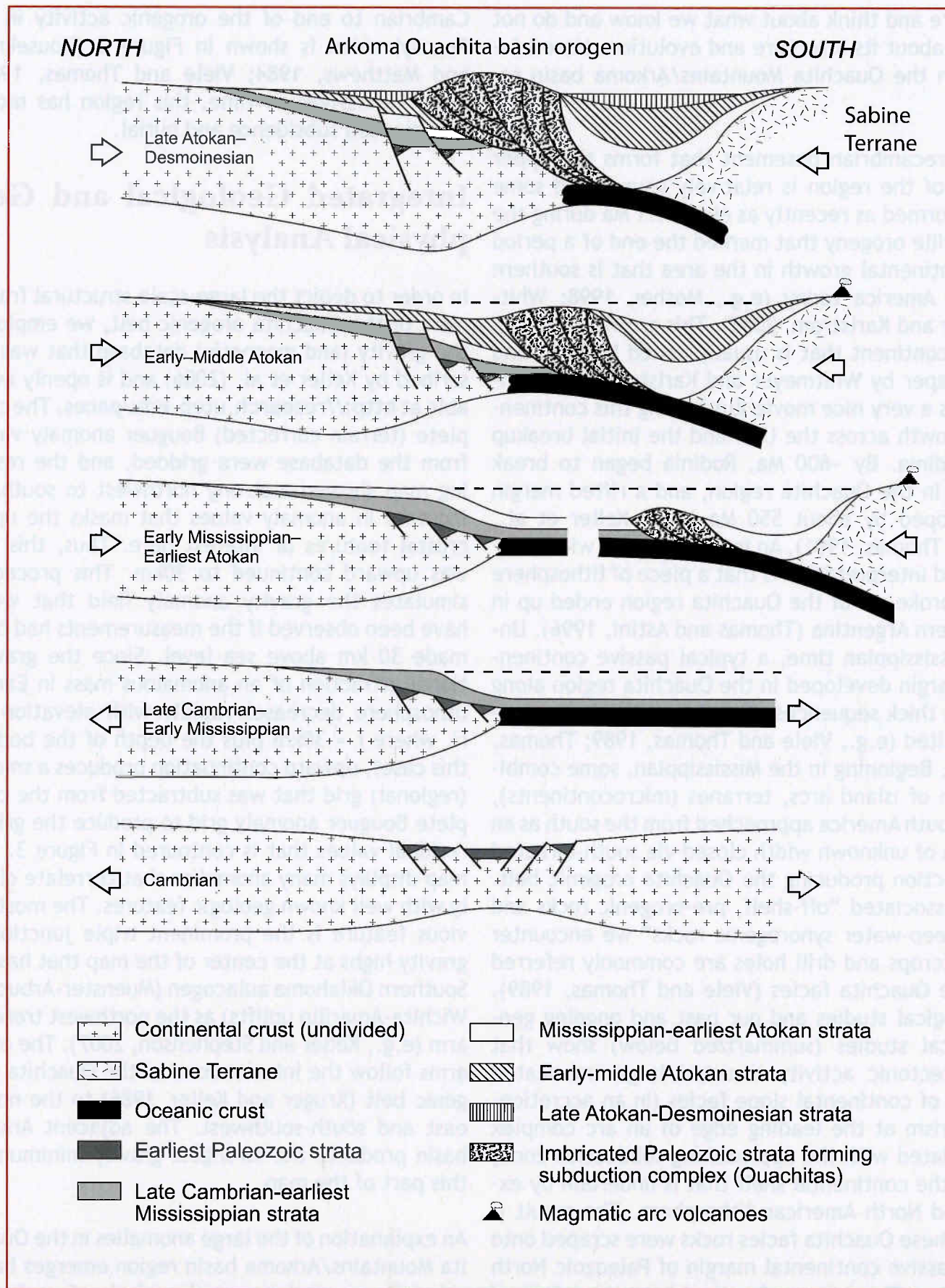


Figure 2. Cartoon diagram showing the tectonic evolution of the Ouachita orogenic belt with hypothetical cross sections depicting tectonic evolution of southern margin of North America in the Ouachita Mountains-Arkoma basin region. Modified from Houseknecht and Matthews (1985).

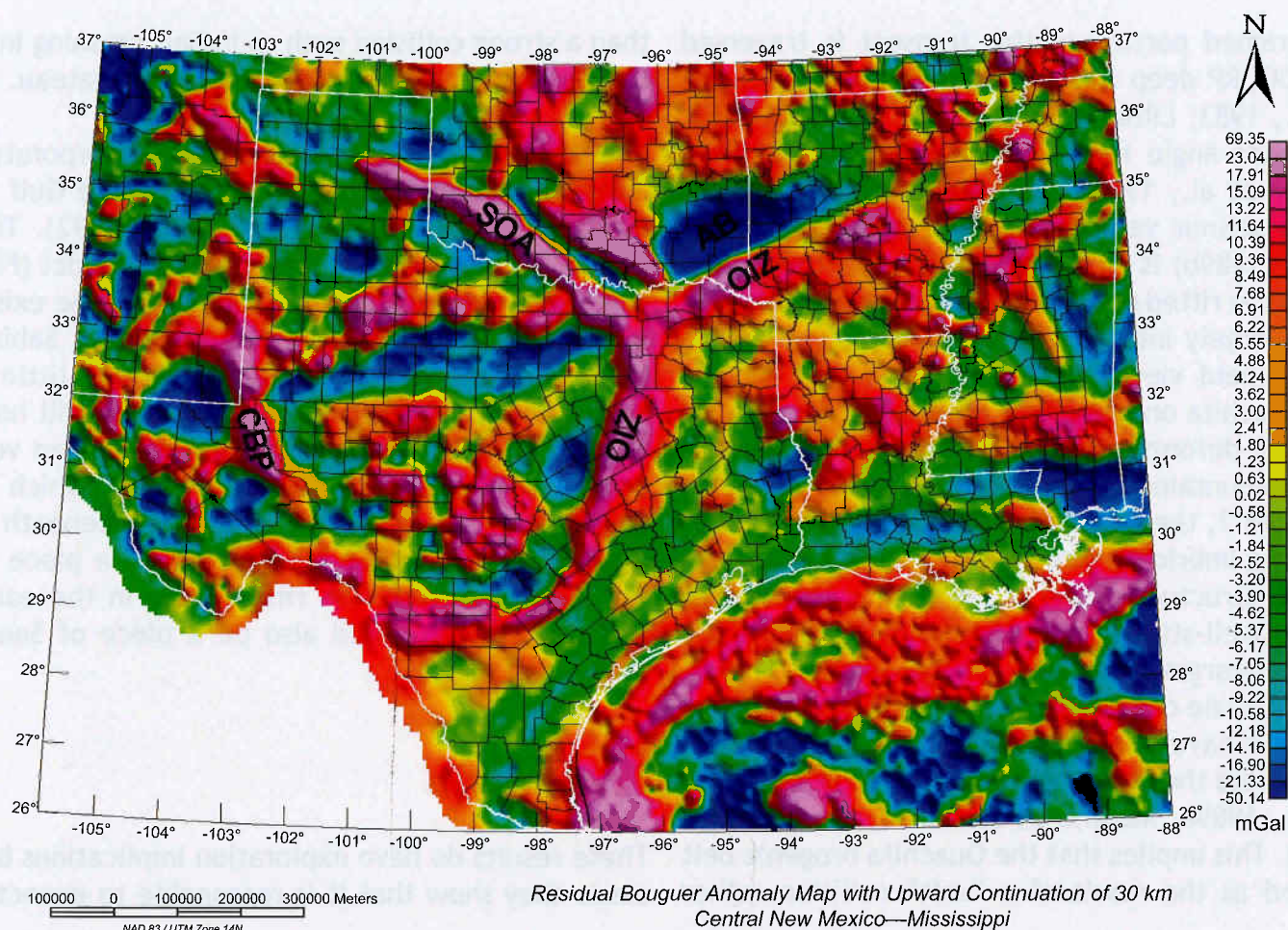


Figure 3. Residual gravity anomaly map of the Ouachita orogenic belt area. The regional anomaly removed was calculated by upward continuing the original complete Bouguer anomaly values to 30 km and subtracting these smooth regional values from the Bouguer anomaly values. CBP: Central Basin Platform OIZ: Ouachita Interior Zone AB: Arkoma Basin SOA: Southern Oklahoma Aulacogen

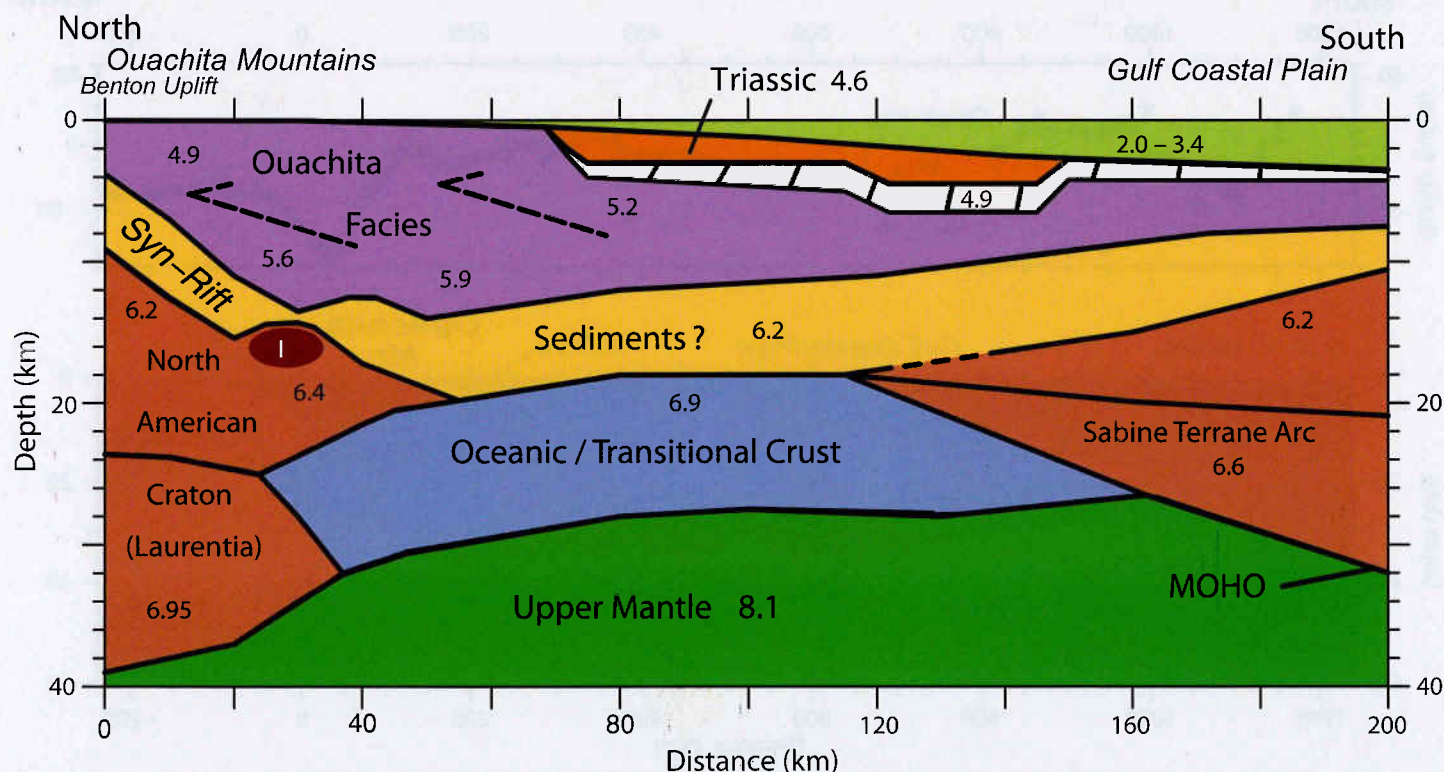


Figure 4. Ouachita PASSCAL seismic experiment velocity model. Modified from Keller et al. (1989b) and Keller and Hatcher (1999). Numbers are velocities in km/s. I - intrusion probably formed during Cambrian rifting.

constrained portion of this transect is traversed by COCORP deep seismic reflection profiles (Lillie et al., 1983; Lillie, 1983) and the Ouachita PASS-CAL wide-angle reflection/refraction experiment (Keller et al., 1989b). A slightly updated version of the seismic velocity model presented by Keller et al. (1989b) is shown in Figure 4. This model shows the rifted margin of Paleozoic North America to be largely intact, which is surprising given the widely held view that the collision that formed the Ouachita orogenic belt produced extensive intraplate deformation in the form of the Ancestral Rocky Mountains (Kluth and Coney, 1981). As shown in Figure 2, the amount of shortening in the upper crust via imbricate thrusting is substantial, but the overall structure shown in Figure 4 is very similar to the well-studied and undeformed Mid-Atlantic passive margin of the U. S. (Holbrook et al., 1994). Crustal-scale cross-sectional models very similar to Figure 4 have been constructed along other profiles across the Ouachita orogenic belt (e.g., Keller et al., 1989a; Moreno et al., 2000; Harry et al., 2003). This implies that the Ouachita orogenic belt formed as the result of a "soft" collision rather

than a strong collision such as India's crashing into to Asia to form the Himalaya and Tibet plateau.

The structure shown in Figure 4 was incorporated into a longer model that extends into the Gulf of Mexico (Figure 1) (Mickus and Keller, 1992). The details of the southern portion of this model (Figure 5) are not strongly constrained, but the existing data clearly show that the prominent Sabine block is a continental structure. However, little is known about its origin other than some drill hole data show that it experienced Pennsylvanian volcanism (Nicholas and Waddell, 1989), which is consistent with southward subduction beneath it (Figure 2). The Sabine block could be a piece of North America that was rifted away in the early Paleozoic, but it could also be a piece of South America or Africa.

Discussion

These results do have exploration implications because they show that it is reasonable to expect a

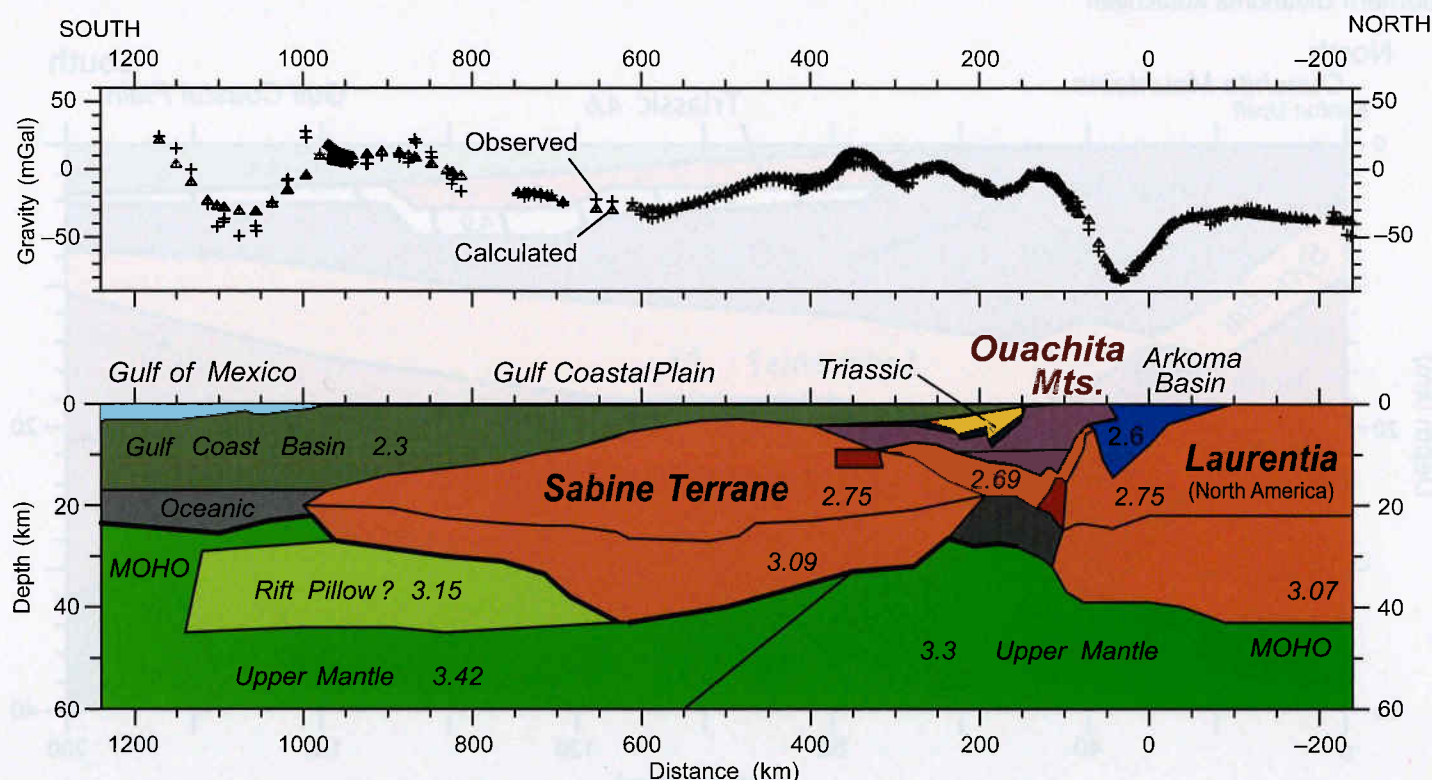


Figure 5. Integrated crustal model extending from southern Missouri to the Gulf of Mexico (Figure 1). Modified from Mickus and Keller (1992). Numbers are densities in g/cm^3 .

preserved middle to early Paleozoic shelf sequence beneath the Ouachita facies rocks all along the orogenic belt. The big question in this regard is what would the thermal regime be? As noted by Kruger and Keller (1986), the Arkoma basin gravity low (Figure 3) is excessively large compared to the known or suspected thickness of the middle and late Paleozoic sedimentary strata it contains. There is no evidence for an anomalous deep crustal feature beneath the basin, but the data are limited. However, appealing to a thick Cambrian section associated with the rifting that broke up Rodinia seems to be a better explanation that needs to be explored further.

A common element in many geological investigations is comparisons with features that may be analogous. Thanks to a series of large seismic experiments in Central Europe in which I have been involved (e.g., Grad et al., 2003), we have also had the opportunity to conduct comparative studies between southern North America and Central Europe. These studies show that these regions share many aspects of their Neoproterozoic and Phanerozoic tectonic evolution (e.g., Keller and Hatcher, 1999; Keller and Stephenson, 2007). The efforts in Europe primarily targeted the structure and evolution of the complex collage of major tectonic features in the Trans - European suture zone (TESZ) region,

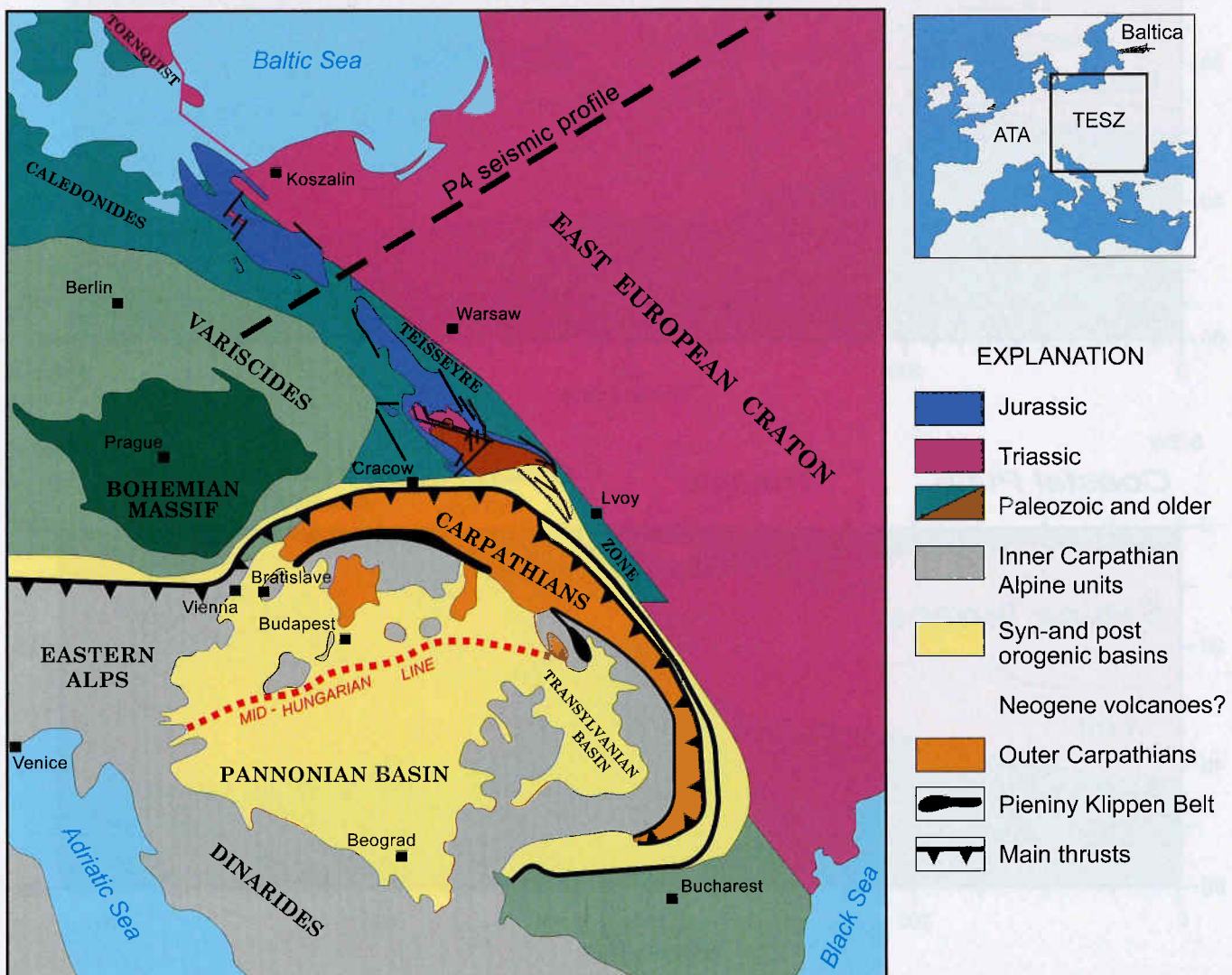


Figure 6. Index map of major tectonic features in Central Europe showing the location of the Trans-European Suture Zone (TESZ) and the P4 profile of the POLONAISE'97 seismic experiment. Modified from a figure provided by the EUROPROBE project (<http://www.geofys.uu.se/eprobe/index.htm>).

as well as the Carpathian Mountains and the Eastern Alps, the Pannonian basin, and the Bohemian massif (Figure 6). In the TESZ region, these efforts delineated the rifted margin of Baltica, and it is quite similar to the crustal model for the Ouachita margin (Figure 7). Thus, our integrated seismic and gravity modeling efforts indicate that the Variscan orogeny in Central Europe and the Ouachita orogeny appear to be the result of “soft” collisions that

have left the pre-orogenic rifted margins largely intact. An interesting implication of these results is that there is a potential for petroleum resources in the lower Paleozoic passive margin strata that lie beneath the thrust sheets of both the Ouachita and Variscan orogenic belts. In addition, features such as the Arkoma basin and Lublin trough in southern Poland may contain significant thicknesses of prospective lower Paleozoic strata.

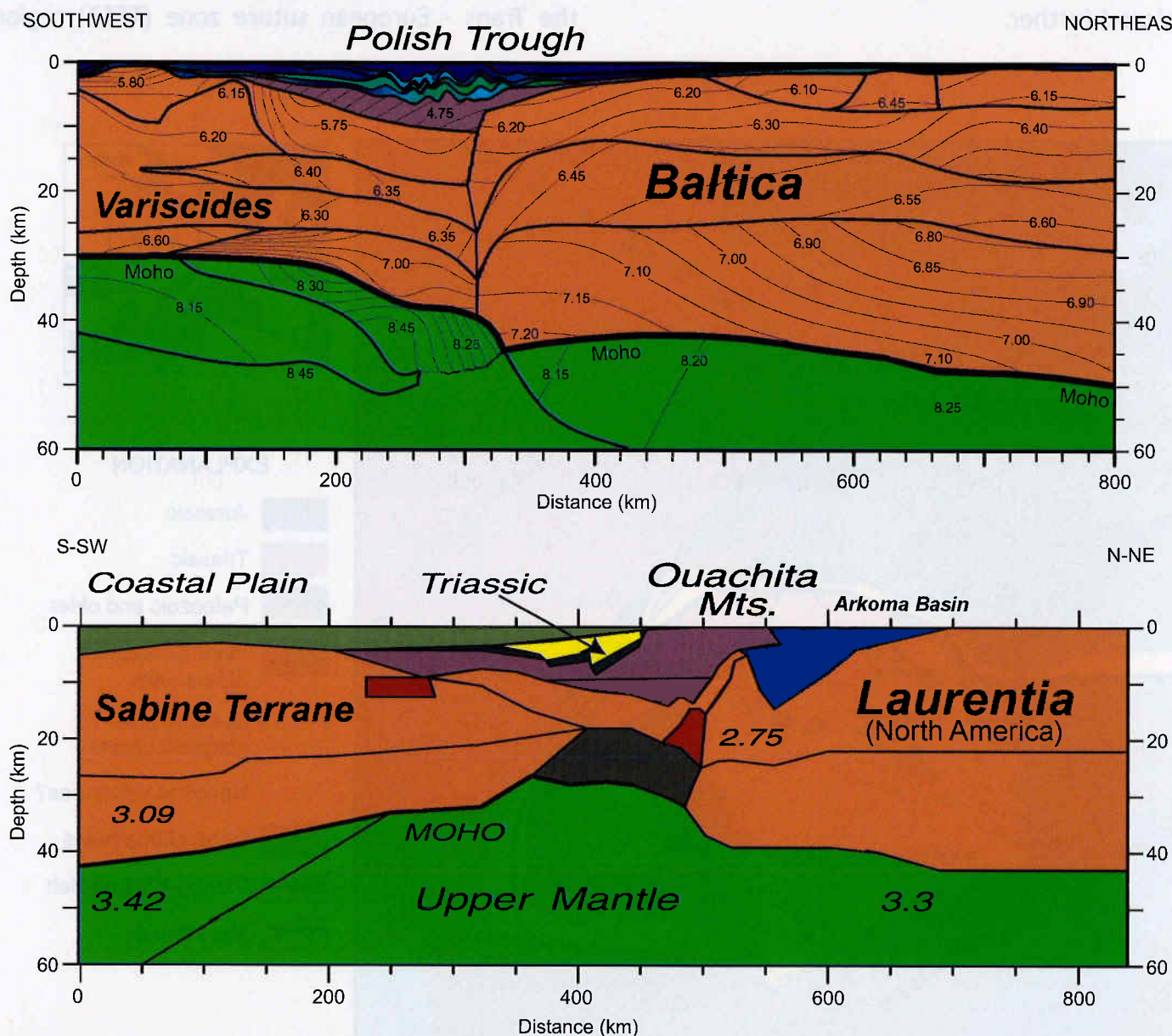


Figure 7. Comparative diagram of the crustal structure across the Ouachita and Variscan orogenic belts. For the P4 profile (Figure 6), the numbers are seismic velocities in km/s. For the Ouachita profile, the numbers are densities in gm/cm³ because the velocity model in Figure 4 was extended by integrated modeling with gravity data.

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OKLAHOMA GEOLOGICAL SURVEY WORKSHOP:

The Booch Gas Play in Southeastern Oklahoma: Regional and Field – Specific Petroleum Geological Analysis

*Dan T. Boyd,
Oklahoma Geological Survey*

On Wednesday, February 25, 2009 the Oklahoma Geological Survey presented the “Booch Gas Play Workshop” at the Moore-Norman Technology Center in Norman, Oklahoma. Designed to provide participants with both a general and field-specific understanding of the Booch, the workshop began with a rigorous regional review followed by a detailed examination of three Booch gas fields. These fields, Brooken (Texanna SW) Field, Reams Southeast Field, and Pine Hollow South Field, were chosen to highlight elements critical to Booch gas production. The geological analysis, which was presented by OGS geologist Dan Boyd was supplemented by a presentation of Booch drilling and completion practices from Max Tilford (Tilford Pinson Exploration, LLC). A long-time Oklahoma operator intimately familiar with Booch operations, Tilford tracked the history of several real-life examples from an operator’s perspective.

The Booch stratigraphic interval produces natural gas in Oklahoma from the Arkoma basin and the southern part of the Cherokee platform (Figure

1). It is defined in the subsurface as stratigraphically equivalent to the lower three quarters of the lower Desmoinesian (middle Pennsylvanian) McA-

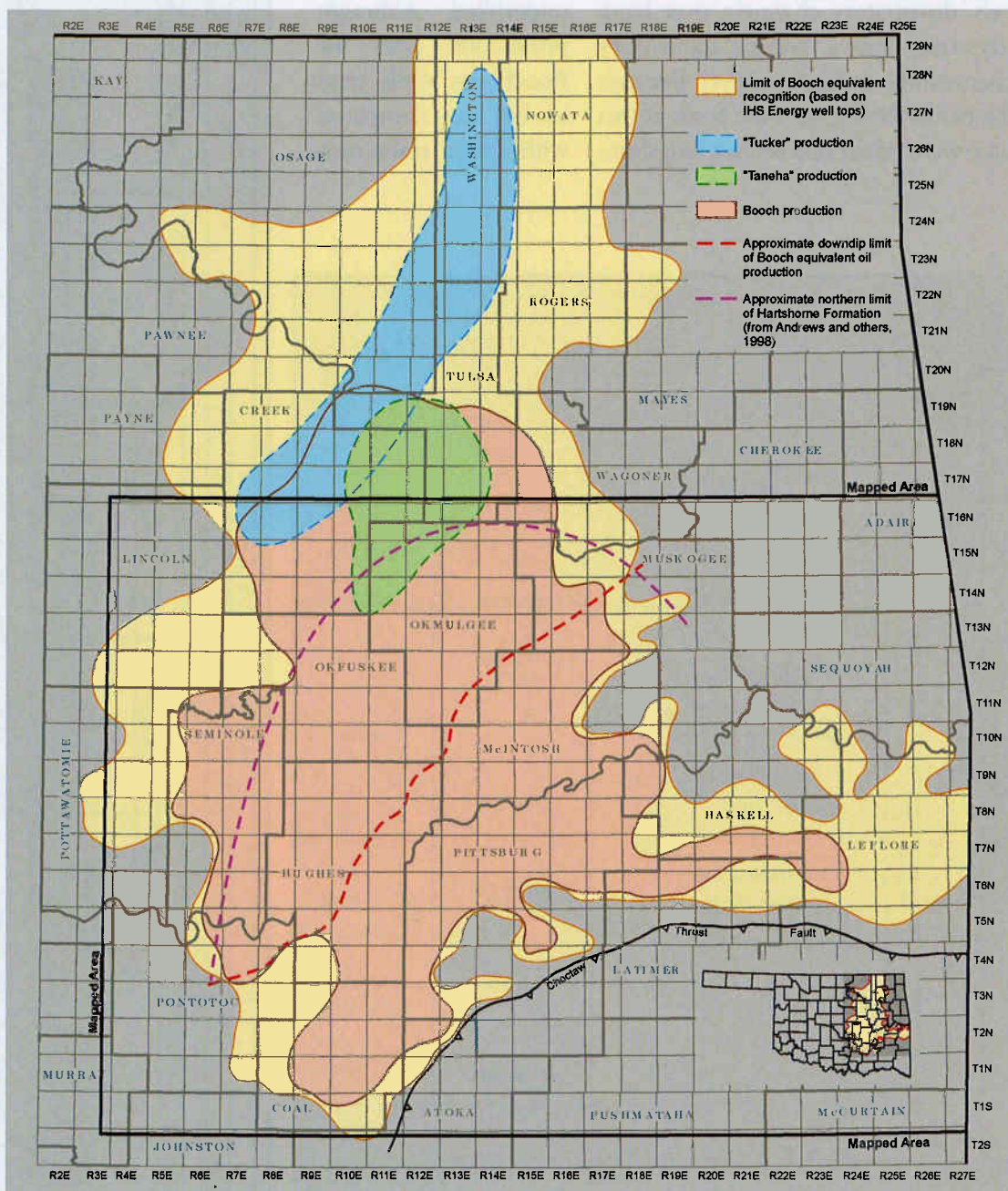


Figure 1. Booch & Equivalent Production Map

ester Formation (Figure 2). The Booch is composed of eight northerly sourced progradational sequences bounded by flooding surfaces. On well logs, each of the eight parasequences exhibit a distinct coarsening upward profile as the environment of deposition progressed from distal marine, to delta front, to delta plain, to in some cases, incised valley (Figure 3). The depositional environments represented by the sandstone reservoirs that occur at the top of Booch parasequences include distributary-mouth bars, tidal channels, distributary channels, over bank (crevasse) splays, and/or multi-story channel-fills (incised valleys). Because the deltas feeding into the basin at this time were tidally dominated, longshore

movement of sand was nonexistent (Figure 4). For this reason Booch exploration has concentrated on accurately tracing the paths taken by deltas as they prograded into the basin (Figure 5).

The Booch appears to be dominantly self-sourced, with its sandstone reservoirs charged by adjacent marine shales and coals. Although gas-prone source kerogen is abundant in these beds, these source rocks tend to be immature, causing most traps to be underfilled. Although production rates for Booch gas wells tend to be low compared with other reservoirs,

its shallow depth and inexpensive drilling costs have made it a favorite target for Oklahoma operators. This is both as the primary objective and as a secondary 'bail-out' zone for wells targeting the Hartshorne, which lies immediately below the Booch.

The sandstones of the Booch Formation have produced oil and natural gas in Oklahoma since before Statehood,

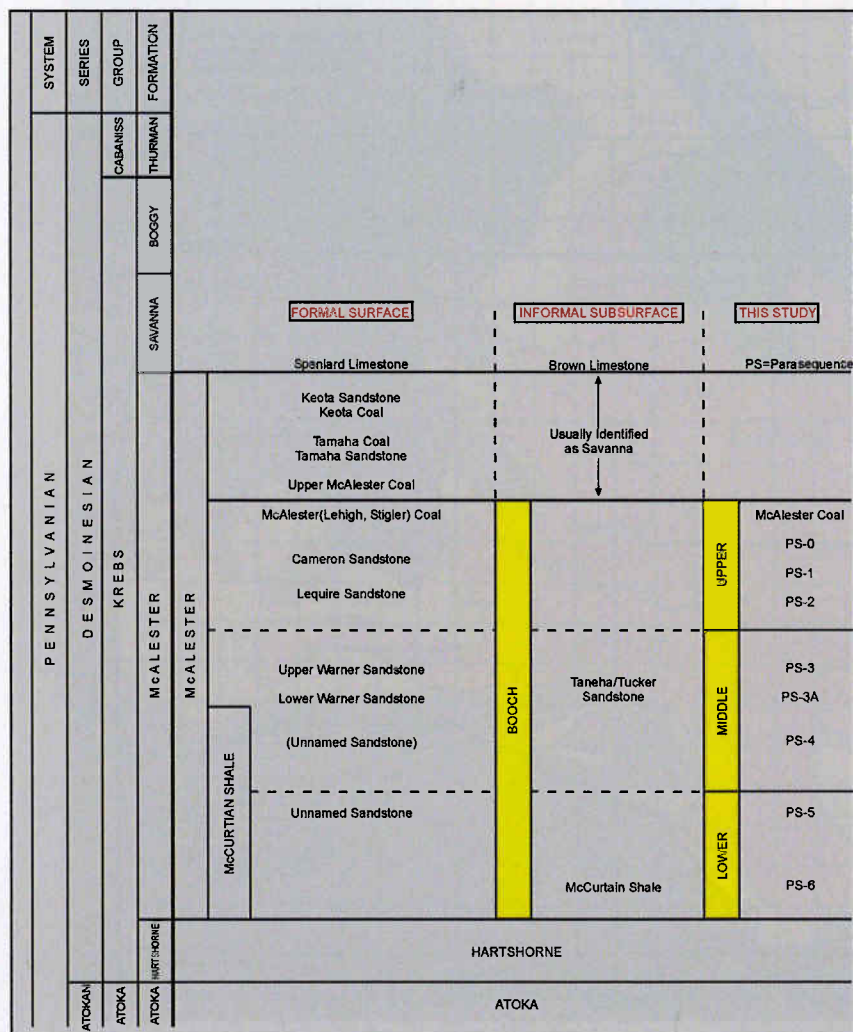


Figure 2. Booch Stratigraphic Nomenclature Chart

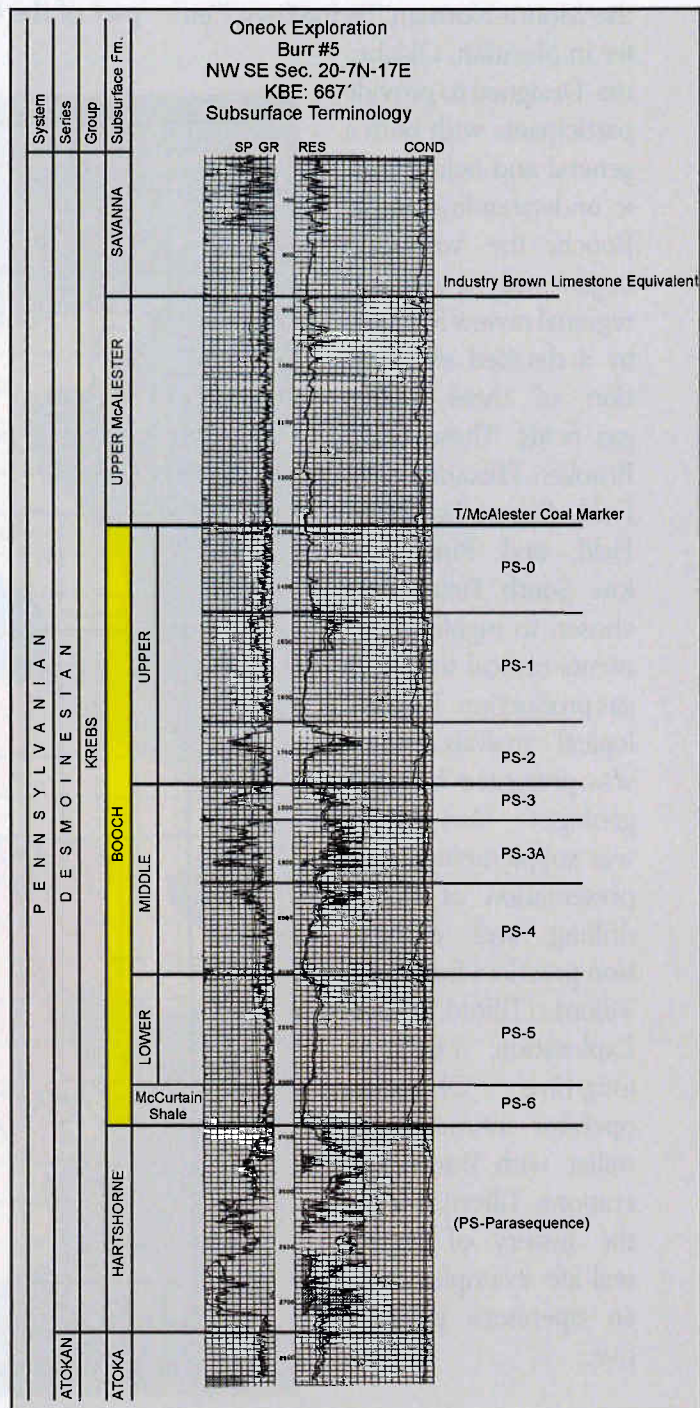


Figure 3. Regional Booch Type Log

and they continue to make a significant contribution to State production, especially gas production. Cumulative production amounts to 81 million barrels of oil and 530 billion cubic feet of gas from about 3,000 wells. Dominantly a gas producer today, the 1,250 active Booch gas wells produce about 21 million cubic feet of gas per day.

Workshop registrants received a copy of *The Booch Gas Play in Southeastern Oklahoma: Regional and Field-Specific Petroleum Geological Analysis*. This 91-page book includes a CD containing the files used in this study, including shape files for the regional maps and subsurface datasheets in Excel for the regional and field studies. Digital files were included to speed the evaluation process for those interested in pursuing the Booch, and provide a valuable resource for those already producing Booch reservoirs. General reference files include: 1) a listing of oil and gas related OGS publications, 2) an inventory of core and core analyses maintained by the OGS, 3) a document identifying public sources of Oklahoma oil and gas data, 4) and digital versions of State oil and gas production maps organized by field boundary (distinguishing coalbed methane production) and reservoir interval. Included with the regional production maps is a complete listing of field names, locations, production types and discovery dates.

The workshop was followed by a two-day field trip (Thursday, March 5, and Friday,

March 6, 2009) that was led by OGS geologists Neil Suneson, Dan Boyd and Rick Andrews. The field trip provided participants an opportunity to examine the best Booch outcrops and through the use of synthetic gamma-ray logs

made on the outcrop, to put a "face" on subsurface log signatures.

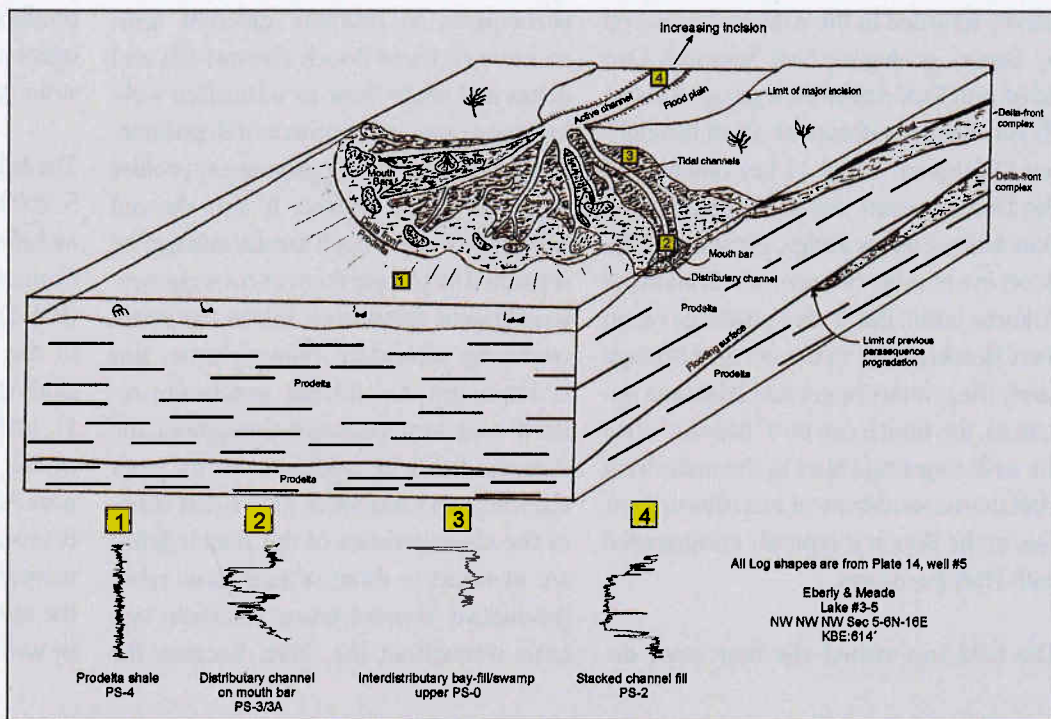


Figure 4. Schematic Booch Tidal Delta

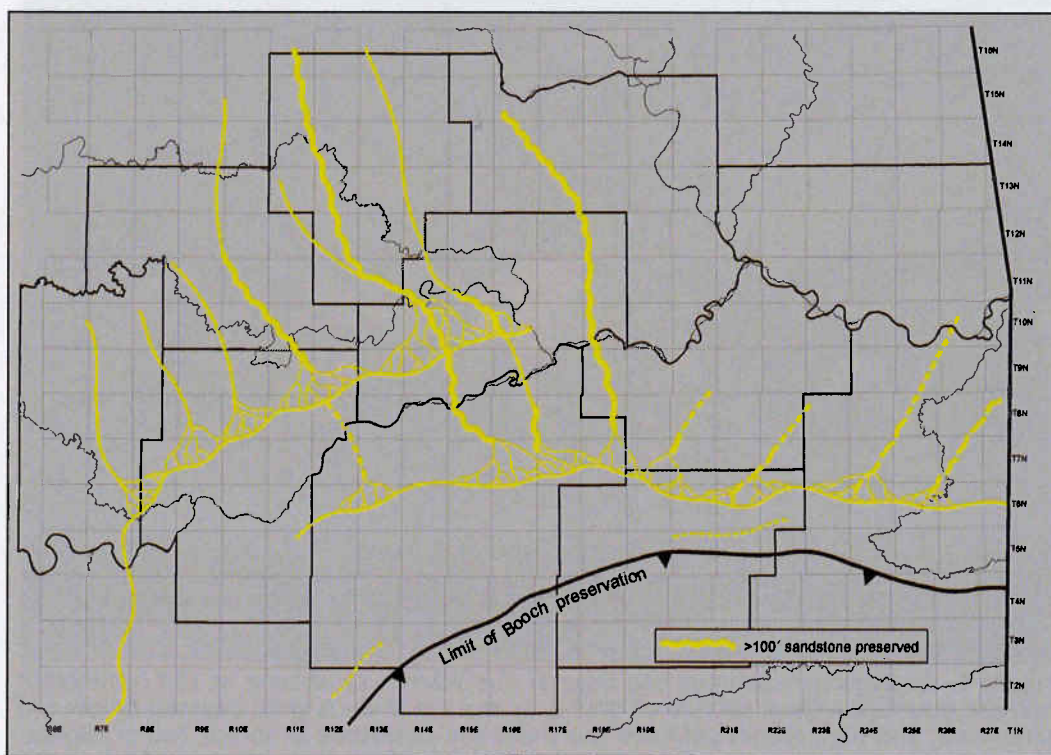


Figure 5. Schematic Middle Booch Depositional Systems

The OGS Booch Field Trip - Return to the Arkoma Basin

*Neil H. Suneson and Dan T. Boyd,
Oklahoma Geological Survey*

After several years away from southeastern Oklahoma, the Oklahoma Geological Survey returned to the Arkoma basin. Led by Survey geologists Neil Suneson, Dan Boyd, and Rick Andrews, a group of about 20 petroleum professionals from throughout Oklahoma visited 11 key outcrops of the Desmoinesian Booch sandstone. The Booch is not only a prolific natural gas producer in a number of important fields in the Arkoma basin, but it also produces oil on the Cherokee shelf to the north. Although rarely the primary target for Oklahoma operators, the Booch can be a "bail-out" zone for wells targeting either to the underlying Hartshorne sandstone or Hartshorne coal. Gas in the Booch is typically commingled with Hartshorne gas.

The field trip visited the best stops de-

scribed in *OGS Guidebook 35* written by Suneson and Boyd. The trip allowed participants to examine different sedimentary facies of Booch channel-fills and deltas and relate these to subsurface well-log signatures, environment of deposition, and productivity using gamma-ray profiles recorded at the surface. It also showed how the various Booch sandstones can be separated by placing them into a sequence-stratigraphic framework. Given the State's confusing subsurface nomenclature, this is important for tracing genetically related sandstone packages throughout the Arkoma basin. In addition, Boyd's work elsewhere in Oklahoma shows that many of the characteristics of the Booch deltas are identical to those of numerous other productive Pennsylvanian reservoir systems throughout the State. Because the

Booch crops out in the Arkoma basin (in many cases short distances from where it produces in the subsurface) it enables geologists to create a mental image of the sandstone reservoir that they are producing.

The field trip began the morning of March 5, 2009 in McAlester. The first three stops included a channel-fill sandstone in the Cameron Sandstone (Booch parasequence (PS) -1) near Blanco, a delta-plain sequence in the Warner Sandstone (PS-3/3A) including two coals near Haileyville (Figure 1), and a tidally influenced distributary-mouth bar (Cameron Sandstone (PS-1)) near Adamson. Discussions focused on the detailed measured sections, exposed sedimentary structures, gamma-ray profiles of the outcrops, and comparisons with nearby well-logs. These three stops served as an excellent introduction to the variety of depositional settings that we would see during the rest of the two-day field trip.

At midday we stopped to look at the underlying Hartshorne Formation between the towns of Panola and Red Oak. Here, the Hartshorne rapidly changes from a well-stratified, sandstone-poor marine-bar facies to a massive, cliff-forming incised-valley-fill sandstone 80 feet thick. After hiking through the woods, losing no one, some of us crawled down the cliff face to see the lower part of the sandstone, while others admired the view of the Ouachita frontal belt to the south from the top of the cliff.

After an all-you-can-bear-to-eat buffet lunch in Red Oak, we continued east, examining another



Figure 1. Geologists examining the base of the Warner sandstone at the Haileyville railroad outcrop. A thick section of dark-gray marine shale is well-exposed below the sandstone, and the contact between the shale and sandstone is abrupt and erosional. The geologists are looking at what appear to be channelform features at the base of the sandstone. Photo by Michelle J. Summers, OGS Staff.



Figure 2. Neil Suneson (pointing at map) and Dan Boyd (holding left side of map) locating Howe outcrop. The low ridge behind the vans is underlain by the Warner sandstone which here exposes a distributary channel overlying fine-grained marine bar strata. *Photo by Michelle J. Summers, OGS Staff.*

outcrop of marine-bar strata capped by a distributary-channel sandstone near the town of Howe (Figure 2). After driving through Poteau and past the AES Shady Point power plant, we examined a somewhat enigmatic outcrop of the Lequire Sandstone (PS-2) just south of the town of Spiro. Here, a thick section of dark-gray marine shale underlies well-stratified sandstone with distinct marine characteristics, including a variety of trace fossils. However, the contact between the shale and sandstone is abrupt and erosional, suggesting some channeling.

The last stop of the day was at another outcrop of the Warner Sandstone (PS-3/3A) at the dam below New Spiro Lake. Here, two coarsening-upward distributary-mouth-bar sequences show clear evidence for tidal reworking.

Dinner, overnight accommodations, and breakfast the next morning were graciously provided by the Robert S. Kerr Conference Center, located on a bluff of Savanna Sandstone looking south over a ridge-and-valley setting. Appropriately, this area is dominated by the McAlester Formation and its Booch sandstones – the focus of our attention.

Day two began with two outcrops along the same Warner Sandstone ridge that we visited at the last stop the previous day.

The first outcrop was a railroad cut near the town of Panama where a marine shale is overlain by two coarsening-upward sequences that are separated by an angular unconformity. The upper sequence shows repetitive, cyclic beds about 6 inches thick which are interpreted as evidence for tidal reworking. Shale drapes and flaser bedding support the interpretation that this outcrop (like many other Booch outcrops) is a tidally influenced distributary-mouth bar. The second stop was a few miles west at an outcrop near Carter Lake. Here, we observed a sequence of marine shales grad-

ing upward into marine-bar strata that are abruptly overlain by a distributary channel (Figure 3).

The next outcrop, identified as the Campground Spring Mountain stop by Suneson and Boyd (2008), shows a petroleum geologist's dream reservoir – an incised-valley sandstone. This Booch sandstone consists of more than 100 feet of medium-grained, unstratified, porous sandstone – undoubtedly a series of nested channel deposits filling an incised valley. Similar valley-fill deposits have created the most prolific



Figure 3. Booch field-trip participants at the Carter Lake outcrop. A thick section of well-exposed marine shale is at the base of the outcrop. The shale grades upward into interbedded shale and siltstone (near-vertical face forming most of cliff) which is capped by a thick-bedded sandstone with large-scale crossbeds. The sandstone is interpreted as a distributary channel. *Photo by Michelle J. Summers, OGS Staff.*



Figure 4. Lower part of the Lequire outcrop. A series of fining-upward sequences is exposed in this part of the Savanna Formation. Here, the basal sandstone of one of those sequences overlies with an abrupt contact interdistributary bay-fill shales. The base of the sandstone contains numerous large upright (in situ) carbonized tree trunks (probably lycopods). The sandstone grades up into interbedded siltstone and sandstone, which grades up into shale and minor siltstone and coal. *Photo by Michelle J. Summers, OGS Staff.*

petroleum reservoirs in the State not only in the Booch but throughout much of the Pennsylvanian-Permian stratigraphic interval. Although the environment of deposition of this sandstone is known, its precise placement within the Booch is not. The base of the sandstone is only 175 feet above the Hartshorne coal (easily identified by the strip mines), which, barring some sort of structural discontinuity, would place it within the lower Booch (PS-5 or 6). However, there are no lower Booch incised-valley-fill sandstones identified anywhere in the Arkoma basin. In environment and thickness, this outcrop closely resembles the middle Booch Warner (PS-3/3A) incised-valley sandstone that has been logged in the subsurface by nearby wells. However, the Warner appears to crop out as a continuous sandstone ledge that is stratigraphically above this outcrop. This is a problem that the authors are leaving to future geologists.

After a short drive on some back roads south of Keota and then west on Highway 9, we stopped at well-exposed channel se-

quence in what is mapped as Warner-Lequire. The coarse grain size of the sandstone and large-scale cross stratification identify this as a high-energy fluvial deposit.

The final stop of the trip, which for many of us was our favorite, was an extremely well-exposed delta-plain sequence in the overlying Savanna Formation located just south of the town of Lequire. The roadcut here, which is one of the best outcrops in Oklahoma, exposes repeated fining-upward sequences of crevasse-splay sandstones overlain by interdistributary bay-fill shales (Figure 4). We spent a relaxing hour examining carbonized tree trunks, coal beds, soft-sediment deformation features, and collecting plant fossils. After this we headed back to McAlester for a rendezvous with our cars and home.

The field trip was an excellent complement to Boyd's study of the sequence stratigraphy of the Booch sandstones (Boyd, 2005). In addition, the guidebook is the latest in a series of OGS guidebooks on the structure and stratigraphy of the Ouachita Moun-

tains and the southern part of the Arkoma basin (e.g., Suneson and others, 2005). The weather was perfect and the camaraderie and discussions even better. All agreed that it was good to be back in the field looking at rocks and talking about how much better Oklahoma's fluvial-deltaic petroleum reservoirs can be understood after seeing the Booch.

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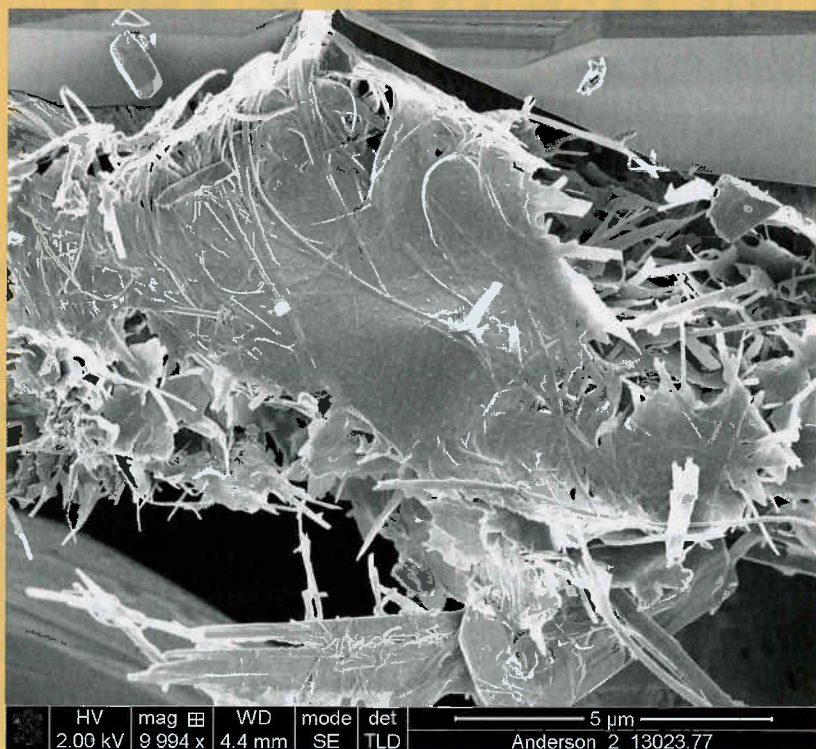
Unconventional Reservoirs Workshop

August 20, 2009

Moore Norman Technology Center; Norman, Oklahoma



Oklahoma Geological Survey
University of Oklahoma
Mewbourne College of Earth & Energy



Purpose and Scope of Meeting

This workshop, sponsored by the Oklahoma Geological Survey, will focus on exploitation of tight gas and shale gas reservoirs. Oklahoma possesses both in the Arkoma Basin and Woodford, Caney and Fayetteville shales. Geologic risk is of minimal concern in these plays. The challenges are to high grade the economically more attractive zones and to efficiently stimulate the productive intervals. Presentations will address these topics and cover local and Mid-Continent resource plays.

Of special interest are the quantitative characterization of petrophysical variability in these unconventional reservoirs and their relation to seismic attribute analysis to define sweet spots and the role of modern logging suites in helping to exploit these resources.

Contact Information

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A HUNDRED YEARS AGO IN OKLAHOMA OCTOBER — NOVEMBER 1907

Compiled by
Kenneth V. Luza
Oklahoma Geological Survey

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

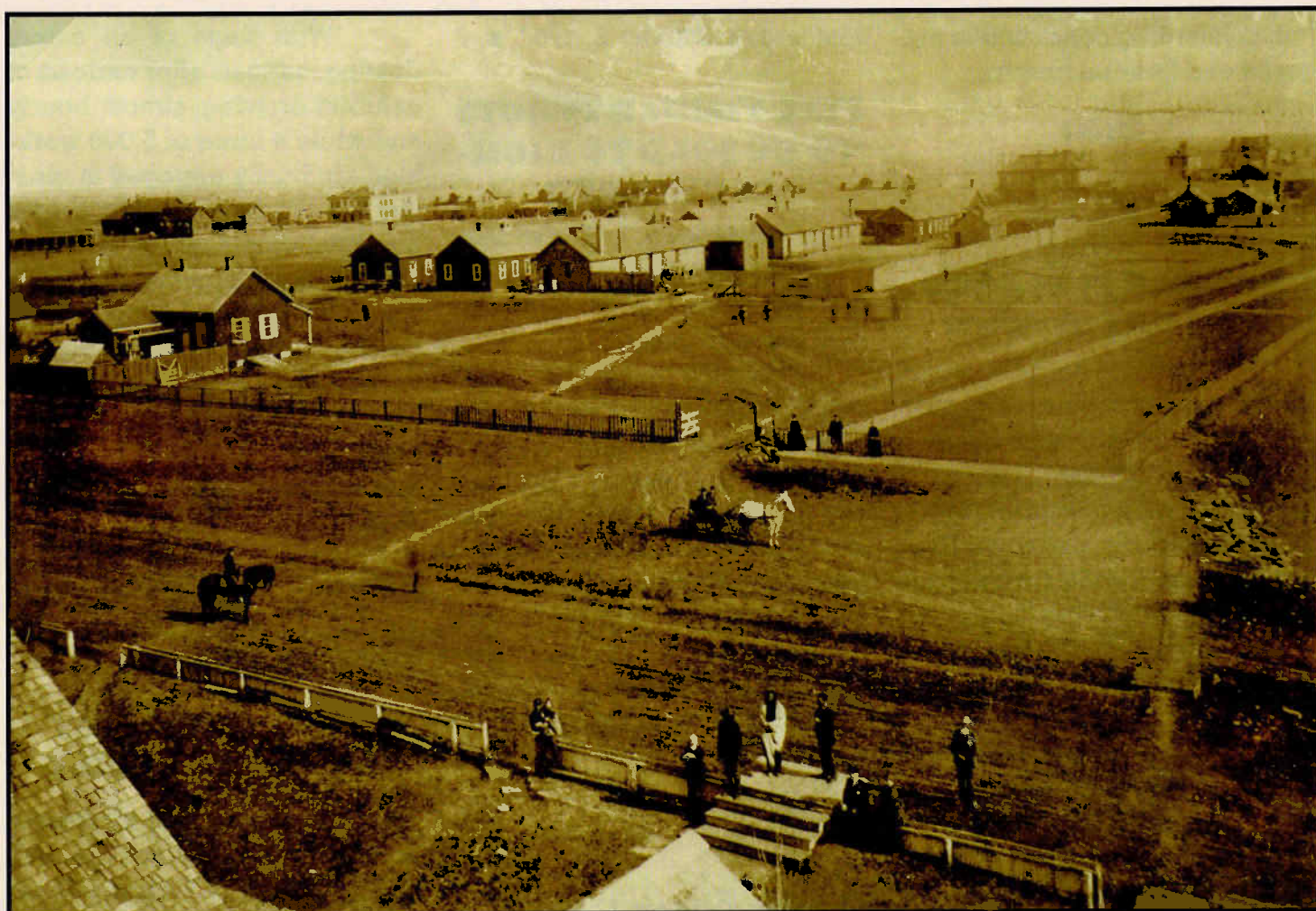
may have led to misinterpreting the reporter's meaning or intent.

The Daily Oklahoman had a daily average circulation of 21,040 in October 1907 and 21,381 in November 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.**

October — Saturday, October 5, the first State Fair opened at 10 o'clock. On October 12, the Chicago Cubs baseball team won the World Series. Thursday, October 17, 2,000 farmers from every state and territory in the Union gathered in Oklahoma City to attend the twenty-seventh annual session of the Farm-

ers' National Congress. Bennie Owens, University of Oklahoma football coach, was accidentally shot during a hunting trip on October 16. On October 17, the Trans-Atlantic Marconi system became operational. On October 21, a very large earthquake caused over 10,000 casualties in central Asia. The Knickerbocker Trust Company in New York City closed its doors at 12:30 p.m. on October 22. This started the bankers Panic of 1907 that soon spread across the nation. On October 24, an earthquake caused death and devastation throughout the Calabria area of Italy. The first boiler for the Belle Isle power house was placed on its foundation on October 31.





Fort Reno 19th century structures, Oklahoma Territory. Photograph courtesy of the Oklahoma Historical Society.

Tuesday, October 1, 1907, p. 1

PRAIRIE FIRE STARTED BY INCENDIARY THREATENS TO BURN FT. RENO BARRACKS

OKLAHOMA'S GUARDSMEN FIGHT FIRE

MANY TENTS AND AMMUNITION SUPPLIES DESTROYED

El Reno, Okla., September 30.—An incendiary prairie fire broke out at three separate points on the Fort Reno Reservation near here this afternoon at 3

o'clock and until after midnight raged with unconquerable fury. The fire was driven to the northward by a strong wind straight for the barracks where government troops of the Oklahoma National Guard were encamped. The soldiers fought the flames valiantly, and succeeded in saving the buildings although about 100 tents, a large amount of ammunition, the commissaries of the National Guard, and other property estimated at \$15,000 was lost.

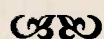
OR

October 1, 1907, p. 6

BIG LOCOMOTIVE MADE IN LOCAL SHOPS GOES INTO SERVICE SOON

Without delay in the construction and after having completed within one day of the earliest time limit set, the 250-horse power electric locomotive of the Oklahoma City Railway Company has been completed at the city car shops and will be placed in service Wednesday or Thursday. The engine will be used on the Belle Isle extension to Brit-

ton in handling construction material and general freight.



October 1, 1907, p. 8

DELMAR IS CLOSED FOR THE SEASON

Two enthusiastic audiences enjoyed the closing performances at Delmar and contributed to the brilliant windup of the fifth successful season of this popular summer institution. Delmar has been visited this season by thousands of local theatergoers and by many strangers who came to the city. During the 25 weeks that it has been open this season it has been conducted in model form and Manager Sinopoulo has made every provision possible for comfort, convenience, and decorum.

Delmar Park was located on the southwest corner of West Reno and South Western Avenues.

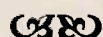


Wednesday, October 2, 1907, p. 2

FINE TIMBER TRACTS TO BE SOLD TO HIGHEST BIDDER

Muskogee, I. T., October 1.—The following important notice was posted in the Union Indian Agency today:

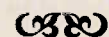
"Notice is hereby given that in accordance with the rules and regulations approved by the Secretary of Interior on September 19, 1907, I will receive bids at my office in Muskogee for the purchase of certain lands in the Choctaw Nation, and the timber thereon, until 2 o'clock Friday, November 15, 1907, and immediately after that hour said bids will be opened."



Thursday, October 3, 1907, p. 1

SPLENDID DISPLAYS ALREADY IN PLACE AT THE BIG FAIR GROUNDS

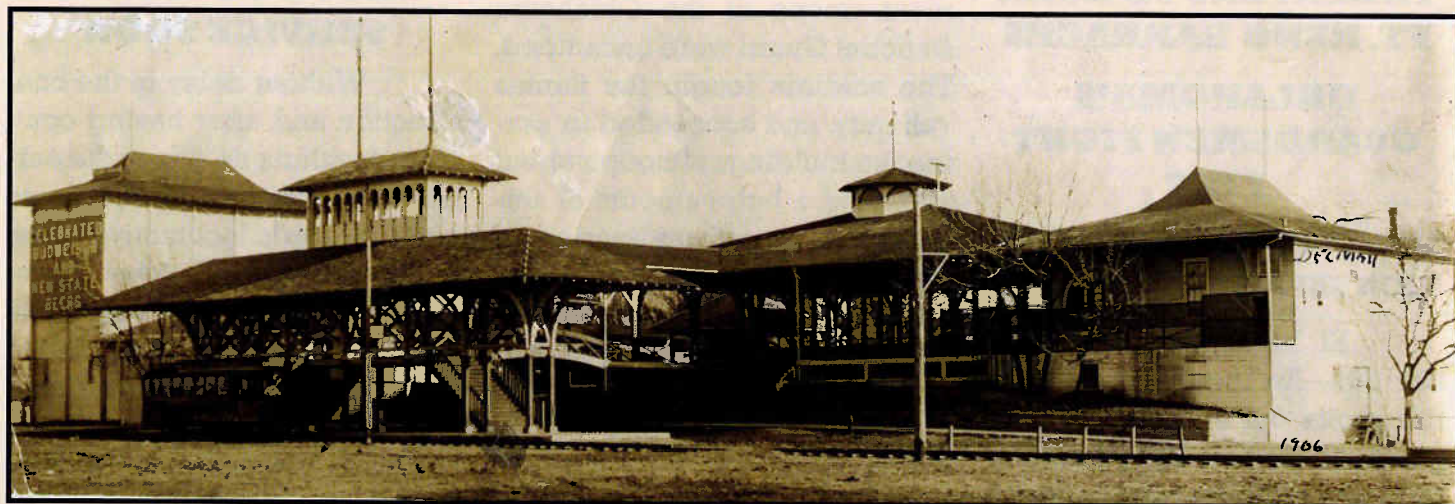
With flags of all colors floating, carload after carload of exhibits arriving almost hourly and while a force of 5,000 workmen are busily engaged in placing the big halls in ship shape, the Oklahoma State Fair Grounds are rapidly assuming form and when the entrance gates to the great exhibition are thrown open to the public on Saturday morning, it is predicted that the scene presented will be on such has never been rivaled in the Southwest.



October 3, 1907, p. 1

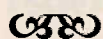
THIRTY MILES OF PAVING TO BEGIN

The paving of 30 blocks of streets in Oklahoma City will begin by the R. F. Conway Company of Chicago, as soon as material and machinery can be shipped to this city, according to James H. Bell, local agent for the Conway.



Delmar Garden Interurban Station, 1906 . Photograph courtesy of the Oklahoma Historical Society.

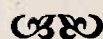
Operations have begun by three paving companies now working in Oklahoma City, on four miles of asphalt paving which must be completed by January 1, 1909, according to their contract.



October 3, 1907, p. 6

BIG OIL COMPANY FORMED; TO OPEN ITS OFFICES HERE

With a capital stock of \$300,000, the Bartlesville Oil Refining company has just received its charter. Of the capital stock, \$263,000 is paid up and only the remaining \$37,000 is to be placed on the market. The purpose of the company is to erect a large refining mill with a capacity of 1,000 barrels of oil a day, in Bartlesville, I. T., and to lay pipelines throughout the district.

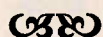


October 3, 1907, p. 6

NEW CAR LINE TO BE OPENED TODAY

A new street railway service, covering a distance of three quarters of a mile, giving accommodations to a portion of the city not hitherto traversed by car lines, and affording a shorter schedule than that heretofore maintained by the nearest car division to the district,

will be placed in operation at 8 o'clock this morning. The new line begins at the terminus of Englewood tracks and continues directly north for a distance of 2,000 feet to Pennsylvania Avenue.



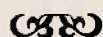
Saturday, October 5, 1907, p. 1

SCHOOL CHILDREN WILL BE GUESTS OF ASSOCIATION FIRST FAIR TO BE OPENED AT 10 O'CLOCK TODAY

Under skies that the weather man says will be fair in the presence of Governor-elect C. N. Haskell and Governor Frantz as well as thousands of enthusiastic citizens of the new state, the first annual state fair will be opened this morning at 10 o'clock and the first exhibition of the varied resources of Oklahoma, which is to last eleven days, will be begun.

Bands will play and the spectators will cheer. Speeches will be made by the distinguished visitors and by C. G. Jones, president of the Fair Association. Helen Renstrom, the "Oklahoma Nightingale," will sing and flags will wave.

This is the day for the school children of the entire state. There will be no charge to thereon 12 years. All persons over twelve priced at the gate.

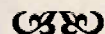


October 5, 1907, p. 1

BURNED COLLEGE WILL REBUILD

TRUSTEE OF HARGROVE COLLEGE, ARDMORE, UN- DISCOURAGED—SCHOOL OPENS

Ardmore, I. T., October 4.—At a meeting here today of the board of trustees of Hargrove College, which was destroyed by fire Wednesday morning, it was decided to rebuild on the present site. The plans and specifications of the new building have not been agreed upon, but it is expected that the plan of the old structure will be closely followed. The cost is estimated at \$50,000. School will reopen Monday with the same faculty in the Crescent Hotel building opposite the Democrat Office on B. Street.



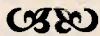
Sunday, October 6, 1907, p. 1

CREDIT TO TEDDY FOR CONFERENCE

THE HAGUE MEETING WILL MENTION ROOSEVELT AS ORIGINAL PEACEMAKER

The Hague, October 4.—In the final act of the peace conference, it was decided today that President Roosevelt shall be mentioned first in the introduction as the summoner of the conference, with the names of Emperor Nicholas as its convok-

er, and Queen Wilhelmina as its hostess.



October 6, 1907, p. 9

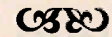
**640-MILE FENCE
AGAINST RABBITS
GOVERNMENT AFTERWARD
FOUND ANIMALS SUCCEED
IN CROSSING RIVER**

San Francisco, October 5.—Arthur W. Paget, a former member of the Queensland government, who has been a guest

at the Hotel Jefferson and Del Monte, said last evening that from 1886 to 1898, the Queensland government spent over a quarter of million sterling in fighting rabbits, which had gone far to ruin the farmers in the neighboring state, New South Wales.

A 640-mile long fence was completed by 1889 at a cost of 125,000 pounds. Two years later it was reported that rabbits were dying in thousands on the New South Wales side of the fence, where they reduced the country to a desert. The triumph

of Queensland was short lived. It was discovered that the rabbits had taken to swimming the rivers crossed by the fences and had already established themselves in Queensland Territory.



October 6, 1907, p. 10

**CAPITOL HILL WILL
BECOME PART OF
THIS CITY**

With the coming of statehood, the voters of Oklahoma



Entrance to State Fair grounds, 1909. Photograph courtesy of the Oklahoma Historical Society.

City will have before them the proposition of whether the municipality of Capitol Hill shall be taken as part of the corporation of Oklahoma City. Several months ago a petition signed by about 75 percent of the legal electors of Capitol Hill was presented to the city council of Oklahoma City asking that they be taken as a part of this city and the matter was then tabled on account of the unsettled condition of affairs during the transitory period with a territorial form of government to statehood.

Now that President Roosevelt has declared his intention of ratifying the constitution the citizens of Capitol Hill are again asking for admission to Oklahoma City. Capitol Hill has a 1,300 population and has been incorporated for several years.



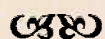
October 6, 1907, p. 12

INSTITUTION IS DEDICATED TO THE NEW STATE BY C. G. JONES—ADDRESS MADE BY HASKELL— FRANTZ ABSENT

Ten thousand persons were assembled at the State Fair Grounds at 10 o'clock yesterday morning when Master Luther Jones, eleven years old, son of C. G. Jones, president of the State Fair Association, touched a button that gave the signal for the

formal opening of the gates.

Ticket No. 1001, the first admission ticket sold to a patron of the fair, was purchased by E. L. Gore of Oklahoma City, a traveling man. This ticket was secured by President Jones and will be kept as a souvenir of Oklahoma's first state fair. Early incoming trains were crowded and street cars, public hacks, and private conveyances were crowded all day with passengers bound for the fair grounds and at least reaching nearly 4,000.

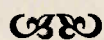


October 6, 1907, p. 19

NEWS AND GOSSIP FROM THE STATE UNIVERSITY

The enrollment at The University of Oklahoma, in October, was something over 550. Many students will come in yet all through the month. Taking this number with those who come in for the second semester, the total for the year should go over 750.

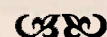
Chas. N. Gould, head of the Department of Geology, and one of the most prominent paleontologists in the western states, left Friday for Ponca City for the purpose of investigating some oil wells.



October 8, 1907, p. 13

PIONEER COMPANY REMOVING SWITCHES TO NEW BUILDING

Present conditions indicate that the Pioneer Telephone and Telegraph Company will have completely removed and installed their switch-board and connections from the several offices now occupied by them in various parts of the city, to the new Pioneer Building now in course of construction at Broadway and Third.

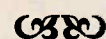


Thursday, October 10, 1907, p. 10

WHEN CAN SALOONS LEGALLY BE SHUT UP IN NEW STATE?

Will Oklahoma's saloons close as soon as the statehood proclamation is issued.

Much discussion has arisen among the saloon keepers of the city as to when the prohibition clause of the constitution becomes effective. That no saloons will be forced to close until after the president has signed the constitution and the legislature has met and passed a law in keeping with the prohibition clause of the constitution and provided for the manner in which prosecution shall be made, is the opinion of Judge Charles B. Redick.

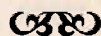


October 10, 1907, p. 10

AIR TIDES BAFFLE GERMANS

Berlin, October 9.—The science of aerial navigation, at least in Germany, has reached a point where many of the most prominent investigators are asking themselves in which direction they shall pursue their experiments. The problem of steering is satisfactorily solved, but there remains the important question

of the conquest of the contrary currents of air, and this raised the issue between the advocates of "lighter than air" and "heavier than air." All three systems the rigid, the semi-rigid, and flexible, represented respectively by the steerable balloons of Count Zeppelin, the German aeronaut, and Major von Parsevai, have been and still are being tested.



October 11, 1907, p. 6

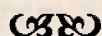
OKLAHOMA CITY MAY SECURE BRICK MAN- UFACTURING PLANT

Oklahoma City is competing with Dallas, Texas, for the location of a mammoth concrete brick manufacturing plant, to be erected at one of these points in the near future, by Charles W. Jones of Charlotte, N. C. The factory will manufacture enough brick to supply Missouri, Kansas, Texas, Arkansas, and Oklahoma, and will employ a small army of



Oklahoma Geological Survey's booth at the State Fair, ca. 1910. Photograph courtesy of the Western History Collections, University of Oklahoma.

laborers.



October 11, 1907, p. 7

SOLVE OIL PROBLEM BY BARGE SHIPPING RIVER NAVIGATION IS ONE GREAT NEED IN INDIAN TERRITORY FIELD

Muskogee, I. T., October 10.—“Navigation is the only way to solve the oil question in this territory,” said Homer Needles, a prominent oil man who draws \$5,000 per month income from his oil wells and knows the difficulty of marketing oil. “The Muskogee Field,” continued Mr. Needles, “is apparently one of the biggest in the territory, but all of the pipelines are carrying their capacity now and if a new field is opened, it simply means that the general run of wells must be ‘pinched in’ just a little more. What we need is a system of putting oil in big barges and floating them down the river to tide water.”

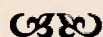


Sunday, October 13, 1907 p. 9

15 BUFFALOES TO ARRIVE HERE SOON FROM N.Y. ZOO BISON TRAVELING IN TWO SPECIAL CARS

The buffalo herd which was presented to the national government by the New York Zo-

ological Society last year, to form the nucleus of a great southwestern herd, is now on its way to the new range of 7,680 acres that has been prepared for it in the best portion of the Wichita Forest and Game Reserve, southwestern Oklahoma. On October 10, fifteen fine animals, the pick of the splendid herd of 45 head in the New York Zoological Park, were crated for shipment, each in roomy and comfortable crates, and shipped to Cache, Oklahoma. The buffaloes will arrive in Oklahoma City tomorrow or Tuesday.



October 13, 1907, p. 9

COAL FAMINE THREATENS PEOPLE OF THE NEW STATE

The people of Oklahoma and Oklahoma City are threatened with a coal famine and the conditions during the winter months will even be worse, in the opinion of all local coal dealers of the city. With the coal operators refusing to accept orders only on condition of delayed shipment and delivery at the price of coal on the date of shipment, the greatest difficulty is experienced by the dealers in securing enough coal to supply the present demand. The scarcity of labor, the irregularity of the output, and the inadequate supply of cars are all held to be responsible for the situation.

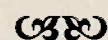


October 15, 1907, p. 1

BIG POWWOW OF IN- DIANS BEGINS

GERONIMO, HIS BRAVES, AND PRETTY GIRLS COL- LINSVILLE'S ATTRACTION

Collinsville, I. T., October 14.—The Indian powwow opened today with a grand reception to Geronimo and 35 of his braves from the military reservation at Fort Sill, Oklahoma. Geronimo rode a white pony and was accompanied by Chief Spy Buck and many other noted chieftains in the parade. Indians from all parts of the new state are coming in great numbers, and the spectators will number well into the thousands.



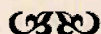
October 16, 1907, p. 1

PRODUCERS OF OIL GOING ON THE WAR- PATH

Tulsa, I. T., October 15.—The executive board of the Mid-Continent Oil Producers' Association, which numbers among its members the prominent oil producers of Oklahoma Indian Territory and Kansas, in a special meeting today decided to call an early meeting of all oil men in Indian Territory for Tulsa in a few days to make protest against the last two rulings of the Department of the Interior, governing the development of the oil fields in Indian Territory.

Providing for an increase

in the royalty of the Indian lessor and from one-tenth to sixteen and two-thirds per cent of the production, and that the Indian lessor of land must share in the profits acquired from the transfer of a valuable lease, though there be no clause in the original lease to this effect, are the objectionable rulings.

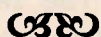


October 16, 1907, p. 2

SIX CENT GAS IS EXPECTED SOON

C. F. COLCORD THINKS PIPELINE WILL BE COMPLETED WITHIN FEW MONTHS

"It is probable that manufacturing gas will be selling in Oklahoma City for from 5 to 6 cents a thousand feet within a few months," said C. F. Colcord last night. "Gas at this price will make Oklahoma City the greatest manufacturing center in the Southwest."



Thursday, October 17, 1907, p. 1

NATIONAL GATHERING WILL BE BIGGEST IN HISTORY OF THE ORGANIZATION

2,000 FARMERS WILL HOLD CONVENTION HERE TODAY

Farmers from every state and territory in the Union are gathered in Oklahoma City to attend the twenty seventh-annual session of the Farmers' National Congress, which will open today. More than 1,000 delegates had



University of Oklahoma football team, 1907. Photograph courtesy of the Western History Collections, University of Oklahoma.

arrived in the city last night, it is estimated, and 1,000 more are expected on the incoming trains today. Five hundred visitors, in addition to the delegates, also will be present. The Farmer's National Congress is maintained to afford agriculturalists an opportunity to discuss questions of agriculture in a broad, national sense.



October 17, 1907, p. 1

BENNIE OWEN ACCIDENTALLY SHOT; MAY DIE

FOOTBALL COACH AT OKLAHOMA UNIVERSITY WOUNDED WHILE HUNTING

Norman, Okla., October 16.—While attempting to catch a shotgun as it fell from a buggy, in which he and John Barbour, a local druggist, were hunting. Bennie Owens, football coach for Oklahoma University, was shot under the left arm and in the extreme left of his body, this afternoon, and seriously, possibly fatally injured. He was driven to town immediately after the accident and three doctors were summoned to attend to his injuries. All hopes of saving the arm have been given up by the doctors and it is now feared that the shot may prove fatal.

Bennie Owen recovered from his injuries and went on to coach football at the University of

Oklahoma until 1926. He died in Houston, Texas, at the age of 94.



October 17, 1907, p. 8

BEAVER COUNTY CATTLEMAN TALKS OF PASSING OF HIS VOCATION

Guthrie, Okla., October, 16.—George W. Hubbard, a pioneer Beaver County cattleman, who was appointed clerk of the new county of Cimarron by the constitutional convention, is one of the interesting figures in Guthrie during the canvass of the election returns on the constitution. Mr. Hubbard located at Kenton, the temporary county seat of Cimarron, in 1885 and has lived there ever since.

"The cattlemen in that portion of Oklahoma are fast selling out and the old-ranches are disappearing," he says. "One of the oldest time cowmen sold out during the last week and two others have placed their stock on the market. Where there used to be thousands of cattle a few years ago, there are now but hundreds and it is only a matter of a brief time until the cowman disappears in Oklahoma forever."



Friday, October 18, 1907, p. 1

CANVASS OF RETURNS

IS COMPLETED

CLAYTON AND FRANTZ TO TAKE CERTIFICATE TO WASHINGTON

Guthrie, Okla., October 17.—Announcing at the completion today of the canvass of the 73 counties whose poll books and tally sheets had been submitted to the board that he and Governor Frantz expect to convey the certificate of the result to Washington in person. Judge W. H. H. Clayton expressed the belief that he and the governor will reach the national capital by the time the president has returned from his hunting trip in the southern cane brakes.

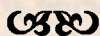


Saturday, October 19, 1907, p. 7

OIL OPERATORS WILL HAVE STRONG LOBBY

Muskogee, I. T., October 18.—Oil operators in Indian Territory will maintain a lobby at Guthrie during the entire session of the first state legislature to see that no legislation is placed that will injure their interest. No event or attraction ever held in Oklahoma, it is expected, will so interest the farmer, stock raiser, the fruit grower, and the public in general as the State Fair of Oklahoma, which will be held October 5 to 16 at Oklahoma City. Here will be on exhibition all of the products of Oklahoma

soil, proving by illustration what can be done with the Oklahoma farm, together with the ways and means of realizing the possibilities of profitable agriculture and stock raising.



Wednesday, October 23, 1907, p. 1

**BIG TRUST CO.
CLOSES ITS DOORS
DEPOSITORS SCRAM-
BLE TO WITHDRAW
SAVINGS**

New York, October 22.—The

Knickerbocker Trust Company, the second largest trust company in New York City, with deposits amounting to about \$60,000,000, closed its doors at 12:30 this afternoon, following a steady run of persons who called to withdraw their deposits. The company officials declared that the suspension of payment was only temporary.

This started the Panic of 1907, which began in New York and soon spread across the nation and led to bank and business closings.



October 23, 1907, p. 1

**LOCAL BANKS HAVE
MUCH MONEY
FAILURE IN NEW YORK WILL
HAVE NO LOCAL
INFLUENCE**

The failure of the Knickerbocker Trust Company of New York will have no effect on banking and financial circles of Oklahoma City. On the contrary, all banks in the West and South have an unusual amount of money on hand, owing to the fact that



Picking cotton, ca. 1897. Photograph courtesy of the Western History Collections, University of Oklahoma.

they no longer use New York as a depository and on account of the prosperous conditions existing through this section of the country according to D. A. Duncan, president of the Oklahoma City National Bank.



Thursday, October 24, 1907, p. 1

WALL STREET WOE NEARLY ENDED

OIL KING TO LEND BIG SUMS TO FINANCIAL INSTITUTIONS

New York, October 23.—John D. Rockefeller has taken an active interest in the present financial situation and he has arranged to loan very large sums to a number of New York financial institutions.

A distinctly more favorable tone was evident in Wall Street today, following the announcement that Secretary Cortelyou of the Treasury Department had made deposits of government funds in New York banks.



October 24, 1907, p. 9

HOLDUP IS CAUGHT AFTER BATTLE IN OIL FIELDS

Sapulpa, I. T., October 23.—After a desperate encounter with a posse of oilmen near Redfork, a small station north

of this city, a stranger who had robbed Richard Purdy, a foreman, and relieved him of \$800 in money and two diamonds valued at \$500, was captured and brought to the federal jail in this city. He refused to tell his name.



Sunday, October 27, 1907, p. 1

DO NOT WITHDRAW COIN FROM BANKS MORGAN SAYS CAPITAL IS NEEDED

FINANCIAL INSTITUTIONS SHOWN EQUAL TO THE STRAIN

New York, October 26.—In response to a request of the Associated Press as to his view of the present financial situation, J. P. Morgan said today:

"As I have already said, I can not too strongly emphasize the importance of people realizing the greatest injury that can be done in the present situation is the thoughtless withdrawal of funds from the banks and trust companies and hoarding the cash in safe deposit vaults or elsewhere thus withdrawing the supply of capital always needed in such emergencies as that which has been confronted during the past week."



Tuesday, October 29, 1907, p. 1

STATEHOOD TO AR-

RIVE NOV. 16

PRESIDENT ROOSEVELT RECEIVES THE CONSTI- TUTION AND FIXED DAY FOR ISSUING PROCLA- MATION

Washington, October 28.—President Roosevelt will issue the proclamation admitting the new state of Oklahoma on Saturday, November 16, next. The constitution was formally placed in his hands by Governor Frantz and a delegation from Oklahoma at 11 o'clock this morning.

The constitution is typewritten on parchment and does not contain the election ordinances. While not enthusiastic over its terms, President Roosevelt regards it as within the terms of the enabling act and holds that he has no further discretion and will sign the constitution.



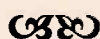
October 29, 1907, p. 1

BELIEVED THAT FAITH OF PEOPLE IS SUCH NO FLURRY IS TO BE FEARED

MORE THAN \$35,000,000 IS TOTAL DEPOSITS OF THE TWO TERRITORIES BANKS—RESERVE FUND LARGE

In the midst of the greatest prosperity the country has known in its history, with the Southwest leading all other sec-

tions of the country in the relative volume of business transacted, with more than \$35,000,000 deposited in the banks of the two territories, Oklahoma City and the new state at large finds itself without enough currency to conduct business along long established lines. The action of the Kansas City banks Sunday night in deciding to refuse to make shipments of cash to country banks until the financial situation in the east became more settled came without warning to many of the banks in Oklahoma.

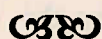


October 29, 1907, p. 4

FIND ZINC ORE ON PRYOR CREEK FARM

Muskogee, I. T., October 28.—Mining men are excited over a rich strike of zinc ore on the farm of W. L. Mayes, near Pryor Creek. Mr. Mayes had some laborers digging a well on his farm and at a depth of 21 feet they struck zinc ore. The laborers did not know what it was and as there was considerable quantity of pyrites of iron, known as "fools gold," they believed they had struck a gold mine.

The vein of zinc is four feet thick and is very rich. In the well it has a pitch of nearly 45 degrees. The well is on section 20-21-20. The ore is what is known in Joplin District as peacock jack.



October 31, p. 3

BOILER WILL BE PUT IN POSITION

STREET RAILWAY COMPANY RAPIDLY PUSHING WORK ON POWER HOUSE

The first of the six boilers of \$175,000 powerhouse which is being erected at Belle Isle by the Street Railway Company, will be placed on the foundation today, if nothing happens to change the plans of the engineering force. The remainder of the work will be rushed to completion and the plant is expected to have been completed and in operation by March 1.



November — *In early November, millions of dollars arrived in New York City from the Treasury to ease the financial crisis in the banking industry. November 6, two dynamiters were killed in a coal mine near Wilburton. On November 11, the American Mining Congress opened their eleventh annual meeting in Joplin. Saturday, November 16, 1907, statehood proclamation was issued by President Theodore Roosevelt. On November 16, 11:50 p.m., Oklahoma City saloons were ordered closed due to the new prohibition law. The Trans-Mississippi Congress opened its eighteenth annual session in Muskogee on November 19. The world's best dresser, Cecile Sorel, said it is impossible for a woman to be well dressed*

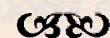
on less than \$30,000 a year.



Friday, November 1, 1907, p. 1

110-FOOT CANAL

Washington, October 31.—One hundred and ten feet is the width which the Navy Department has finally fixed upon as desirable for the locks for the projected Panama Canal. This is an increase of ten feet in width over the plans on which the commission is working.



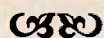
Saturday, November 2, 1907, p. 12

PRAIRIE COMPANY BUYS TANK FARM

Tulsa, I. T., November 1.—That the Prairie Oil & Gas Company intends to install an immense tank farm at Tulsa is the general belief here. Today this company purchased of Dr. Fred S. Clinton 115 acres of land just southeast of the city limits and adjoining the pumping station and tank farm of the Texas Company, which has just built a pipeline from Tulsa to the Gulf. Officials of the Prairie Oil & Gas Company are reticent as to what purpose to a large tract of land will be applied, but it is admitted that a large price was paid for it and that it was wanted for some particular purpose.

At Jenks, twelve miles south of Tulsa, the Prairie Oil and Gas Company is installing a tank

farm which will have a capacity of 10,000,000 barrels when completed, which will not be about a year yet. At Ramona, 35 miles north of Tulsa, the Prairie Oil & Gas Company has yet another large tank farm with similar storage arrangements at Red Fork and in the Morris Oil Field.



Sunday, November 3, 1907, p. 1; 3

**QUARTER OF A MIL-
LION DOLLARS SUM
DEPOSITED WITH
BANKS DURING DAY
LITTLE IS TAKEN OUT
OF VAULTS**

A quarter of a million dollars represents the deposits in Oklahoma City's banks on the first day of their opening. They having remained closed from a week ago yesterday until 9

o'clock yesterday morning, the result of the refusal of Kansas City and the East to ship currency to the Southwest. Not more than ten per cent of that was withdrawn.

In many of the banks, clerks worked all night, the volume of the day's business having been so large that they were unable to catch up with their work during the regular banking hours.

The bankers joined in a



Inauguration of Governor Haskell, November 16, 1907, in front of the Carnegie Library, Guthrie, Oklahoma. *Photograph courtesy of the Western History Collections, University of Oklahoma.*

statement to the public last night, in which they say:

"The real crisis has been passed and the people of the country have stopped all semblance of a panicky condition. Confidence, patience, foresight, and appreciation of the meaning of community of interests have bridged the chasm."



November 3, 1907, p. 1

URGED TO ASSEMBLE CONGRESS

LEADERS IN FINANCIAL WORLD SAID TO DESIRE ACTION

Washington, November 2.—It was learned there today from undoubtedly reliable sources that President Roosevelt is now being urged to call an extra session of Congress to deal with the financial situation. The

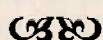
request comes from and represents the judgment of the conservative leaders in the financial world who have represented the present situation as one compelling action of a character that will eradicate all grounds for suspicion of American industrial methods.

The president has been assured from most reliable sources that there will be no opposition on the part of the great industries of the country to the enactment of the necessary laws to carry out his ideas of federal



Guthrie "State House," Logan County Courthouse at Guthrie, served as Oklahoma's first Capitol from 1907-1910. Photograph courtesy of the Oklahoma Historical Society.

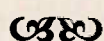
control to the extent to which he has expounded 'them' in his recent public utterances. These assurances are made at this time to avert what has been reported as the most dangerous situation which has confronted the country. That is the growing lack of confidence based on irregularities in business methods in some quarters and no sure and speedy means of separating the good from the unsound.



Friday, November 8, 1907, p. 1

LUSITANIA COMES WITH \$10,000,000 GREAT VESSEL BREAKS RECORD AND ARRIVAL RELIEVES FINANCIAL MARKET

New York, November 7.—With ten millions of gold in her strong box and a new trans-Atlantic record written in her log, the *Lusitania* passed Sandy Hook lightship at 1:40 o'clock this morning. The *Lusitania* brought to the relief of the money market here \$10,000,000 in gold in unprecedented time. The west-bound trip was made approximately in four days, nineteen hours and ten minutes. The exact time can only be known from the official recording. Her hourly average was little better than 24 knots an hour, and she probably has beaten the record about 40 minutes.



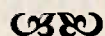
Wednesday, November 13, 1907, p. 1

SECRETARY OF THE INTERIOR PROMISES NO RELIEF TO OIL MEN IN MID-CONTI- NENT FIELD

GARFIELD RESERVES ARBI- TRARY RIGHT TO REGULATE

Washington, November 12.—Secretary Garfield today listened to the protests of a committee of twenty representing the Mid-Continent Oil Producers Association against a recent amendment to regulations of the Interior Department governing oil leases in Indian Territory. Secretary Garfield stated that the regulations had only been made after mature deliberation and he intimated that they probably would not be changed.

The amendment authorizes the secretary to increase the royalty to be paid to the Indian allottees to the extent of sixteen and two-thirds per cent of the gross proceeds amounting from any leases, and three hours of time were spent in trying to convince the secretary that the regulation is unbusinesslike and may be used to work great hardships.



Thursday, November 14, 1907, p. 1

WILL START DEPOT WORK CONTRACT MADE FOR

REMOVAL OF STRUC- TURES NOW ON THE SITE

Built of pressed brick and stone, with massive arches and spacious waiting rooms, elegantly furnished offices, electric lights, with dimensions to accommodate the business of the companies where Oklahoma City a city of 100,000 population, and costing approximately \$300,000, the new union station proposed by the Rock Island and Frisco Railroads is now a certainty.



November 14, 1907, p. 6

FLYING MACHINE READY TO LAUNCH AFTER MANY YEARS OF EXPERIMENTING, IS AERIAL PROBLEM SOLVED?

Baddeck, Nova Scotia, November 13.—After many years of experimental work, the machine with which Alexander Graham Bell hopes to solve the problem of aerial navigation, was successfully launched today in the presence of a large number of close friends of the inventor.

The launching took place at Professor Bell's workshop. Mrs. Bell, in breaking a bottle of champagne over the bow of the ship, declared its name to be the "Cygnet." The great doors of the workshop were thrown open and the kite was conveyed to a float on which it was lowered to the waters of Bras d'Or Lake.

Owing to adverse weather, however, a flight was not attempted. The ship, or kite, is a tetrahedron thirteen meters along on top, ten meters along the bottom by three feet in depth.



Saturday, November 16, 1907, p. 1

STATEHOOD PROCLAMATION WILL BE ISSUED TODAY

OKLAHOMA PASSES FROM CARPET BAG RULE INTO SISTERHOOD OF STATES

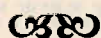
PRESIDENT SIGNS AT 9 O'CLOCK: CEREMONIES AT 11

With the scratch of a pen today the dividing line between Oklahoma and Indian Territory will be obliterated. The territorial form of government will be annulled. Those who have held office by virtue of federal favoritism will retire. They will be succeeded by officials chosen by the whole people. Oklahoma's battle for recognition as a true sister of the other 45 commonwealths will be at an end.

At 9 o'clock this morning, central time, 10 o'clock eastern time, Theodore Roosevelt, president of the United States, will affix his official signature to the statehood proclamation and the news will be flashed over the wires that there is a new star in America's constellation.

The announcement in

Oklahoma will be greeted by the booming of cannon, the ringing of bells, and the blowing of whistles.



November 16, 1907, p. 3

SALOONS WILL BE CLOSED AT 11:50

OFFICERS SAY THAT THE PROHIBITION LAW MUST BE ADHERED TO

"Saloons must be closed at 11:50 o'clock Saturday night and they must stay closed," said Sheriff George W. Garrison. "Every policeman has been instructed to see that no liquor is sold after the hour announced for the closing the saloons," says Charles Post, Chief of Police. County Attorney-elect said: "I will prosecute all violators of the prohibition laws."



November 16, 1907, p. 10

WATER CONTRACT LET BY LAWTON CITY ARRANGES FOR \$175,000 LINE—SELLS BONDS AT PAR

Lawton, Okla., November 15.—Late last night, after an all-day session, the city council granted the contract for laying the water pipeline from Mount Scott to Lawton to the McQuarters Plumbing and Machine

Company of Dallas at a cost of \$175,000. The water bonds were sold to the American Light and Water Company of Kansas City, Mo., at par. These bonds run for 30 years, bearing 6 per cent.

The construction of the pipeline must be started within 45 days and be completed by August 1 of next year. This line leads to the large reservoir in the mountains twelve miles from the city, fed by numerous mountain springs, the force of this new water system will come from the high gravity pressure and the supply will be sufficient for a city of 100,000 population.



Sunday, November 17, 1907, p. 1

FIRST INAUGURAL BALL PRESENTS SCENE DAZZLING IN ITS SPLENDOR

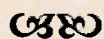
HANDSOME WOMEN, BEAUTIFULLY GOWNED AND CHIVALROUS OKLAHOMANS ENJOY AUSPICIOUS EVENT

Guthrie, Okla., November 16.—The city hall at Guthrie was the scene this evening of a brilliant and auspicious event, the first inaugural ball of the State of Oklahoma. The perfumed air was radiant with happiness. Every face was expressive of joy, and softened laughter filled the big ball room. Brilliantly lighted by myriads of electric globes half hidden in encircling vines, and filled with gaily gowned women



Pioneer Telephone Company's building, 401 North Broadway. Photograph courtesy of the Oklahoma Historical Society.

and conventionally garbed men, the hall scene was one of movement and beauty.



November 17, 1907, p. 1

BLOCKS RUSE OF BIG OIL COMPANY

Guthrie, Okla., November 16.—Learning that the Standard Oil Company had all preparations made to construct a gas pipeline across the state line in Washington County in the interregnum occurring between the

signing of the proclamation and the inauguration of state government, Governor Haskell privately qualified two hours before the public ceremony in order that his first official act might be to direct the county officials of Washington County to prevent the violation of the constitution if it were necessary to put every Standard Oil officer in the county jail. Late last night Governor Haskell was advised that the oil company had the material on the ground and a large party of workmen camped near the state line north of Bartlesville, and that their intention was undoubtedly

to take advantage of a lapse in government to push a pipe across into Kansas.



November 19, 1907, p. 8

WEST HAS SHARP MEAT AX OUT FOR THE COAL TRUST

McAlester, Okla., November 18.—The illegal restraint of trade and a combination for maintaining exorbitant prices for the output of the mines are alleged by Attorney General Charles West in the ac-

tion in district court here against 48 coal companies.

Attorney West alleges in proof of his accusation of the restraint of trade that the coal companies have refused to sell upon the same terms to all purchasers; that they have refused to supply the production of the mines adequately to the demands of the public; and that the various railroad companies have been made special customers.



Friday, November 22, 1907, p. 1

CUT RAIROAD CHARGES ON HAUL- ING COAL

RAILWAY COMMIS- SIONERS HOLD CON- FERENCE REGARDING COMING REFORMS

Guthrie, Okla., November 21.—The Corporation Commission tonight issued an order notifying all Oklahoma railroads that a 60 per cent reduction in coal rates would go into effect in January. The notice was issued after a lengthy conference with Attorney General West. It specifies that the rate to be established shall be similar to the one maintained in Arkansas. The Oklahoma railroads have the highest schedule on coal shipments in the Southwest. The action taken tonight is the result of an investigation made by the attorney general.



Thursday, November 28, 1907, p. 1

STANDARD MAY STOP PURCHASE OF CRUDE MUSKOGEE RUMOR SAYS IT TAKES OWN PRODUCTION ONLY AFTER DEC. 15

Muskogee, Okla., November 27.—It was reported on what is believed to be good authority tonight that the Standard Oil Company will discontinue buying crude oil in the Mid-Continent Field. It is understood that Standard after December 15 will not take more than 12,000 barrels per day, which is about its own production. The Standard is now taking from producers about 60,000 barrels per day.



—Upcoming Meetings

2009

JUNE

7-10 American Association of Petroleum Geologists (AAPG) Annual Meeting, Denver, Colorado. Contact: 800/364-2274; website: <http://www.aapg.org>.

21-24 American Association of State Geologists (AASG) Meeting, Park City, Utah. Website: <http://www.stategeologists.org>.

23-24 33rd Forum of Coal Geologists of the Western Interior Coal Region Meeting, Poteau, Okla. Sponsored by Oklahoma Geological Survey; contact: Brian Cardott at 405/325-3031 or 800/330-3996; e-mail: bcardott@ou.edu. Additional contact: Michelle Summers at 405/325-3031 or 800/330-3996; e-mail: mjsummers@ou.edu. Website: <http://www.ogs.ou.edu>.

AUGUST

20 Unconventional Reservoirs Workshop, Moore Norman Technology Center, Norman, Okla.

This workshop, sponsored by the Oklahoma Geological Survey, will focus on exploitation of tight gas and shale gas reservoirs. Oklahoma possesses both in the Arkoma Basin and Woodford, Caney and Fayetteville shales. Geologic risk is of minimal concern in these plays. The challenges are to high grade the economically more attractive zones and to efficiently stimulate the productive intervals. Presentations will address these topics and cover local and Mid-Continent resource plays.

Of special interest are the quantitative characterization of petrophysical variability in these unconventional reservoirs and their relation to seismic attribute analysis to define sweet

spots and the role of modern logging suites in helping to exploit these resources.

Technical Questions: Carl Sondergeld, Mewbourne College of Earth & Energy, 405/325-3180, csondergeld@ou.edu. Registration and other information: Oklahoma Geological Survey 405/325-3031 or 800/330-3996; Michelle Summers 405/325-7313, mjsummers@ou.edu; Tammie Creel 405/325-3034, tcreel@ou.edu. Website: <http://www.ogs.ou.edu>.

23-24 Summer North American Prospect Expo (NAPE), Houston, Texas. Contact: <http://www.napeonline.com>.

SEPTEMBER

19-26 The Society for Organic Petrology, Gramado, Brazil. Website: <http://www.aipg.org>.

30 2nd Annual Real Deal Mid-Continent Prospect Expo, Clarion Meridian Hotel & Convention Center, Oklahoma City, Okla. Sponsored by Oklahoma Geological Survey (OGS) & Oklahoma City Geological Society (OCGS). Contact: Michelle Hone (OCGS) at 405/235-3648; e-mail: ocgs.mhone@logixonline.com. Website: <http://www.ocgs.org>.

See pages 70 - 71 of this issue for information regarding the 1st annual Expo!

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 given by Dan Boyd, (Oklahoma Geological Survey) and Jim Puckette, (Oklahoma State University).

OCTOBER

3-7 American Institute of Professional Geologists (AIPG) Annual Meeting, Grand Junction, Colorado. Website: <http://www.aipg.org>.

4-6 Interstate Oil and Gas Compact Commission (IOGCC) 2009 Annual Meeting, Biloxi, Mississippi. Contact: 405/525-3556; website: <http://www.iogcc.state.ok.us>.

4-7 Society of Petroleum Engineers (SPE), New Orleans, Louisiana. Website: <http://www.spe.org>.

8 2009 Oklahoma Oil & Gas Trade Expo, Oklahoma City, Oklahoma. Contact: Oklahoma Commission on Marginally Producing Oil and Gas Wells (MWC); 405/604-0460 or 800/390-0460. Website: www.marginalwells.com.

11-13 AAPG Mid-Continent Section Meeting, Tulsa, Oklahoma. Website: <http://www.aapg.org>.

18-21 Geological Society of America (GSA) Annual Meeting, Portland, Oregon. Contact: 800/472-1099; website: www.geosociety.org.

25-30 Society of Exploration Geophysicists (SEG) Annual Meeting, Houston, Texas. Website: <http://www.seg.org>.