

Looking Ahead – Information Studies in the Workplace Help Us Design For the Future

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Subject Discipline and Workplace Influence Patterns

- Medical faculty with research, teaching, and clinical responsibilities read more journal articles than any other faculty group
- Medical practitioners read more from personal print copies and spend the least amount of time per article reading
- Engineers in non-university workplaces read fewer journal articles than others, but spend more time per article

Another Lesson Learned

- Technologies will be adopted quickly by a majority of users within a discipline IF those technologies help them get their work done better or faster. Old ways (like reading from print) remain important if they are more convenient or quicker

IEEE Study of High Tech Engineers in Corporations

- Eight (8) companies in the U.S, India, and China
- Team at the University of Tennessee, Center for Information Studies including Suzie Allard of SIS and Ken Levine of Communication Studies
- Collaboration with the University of Mysore and Tsinghua University

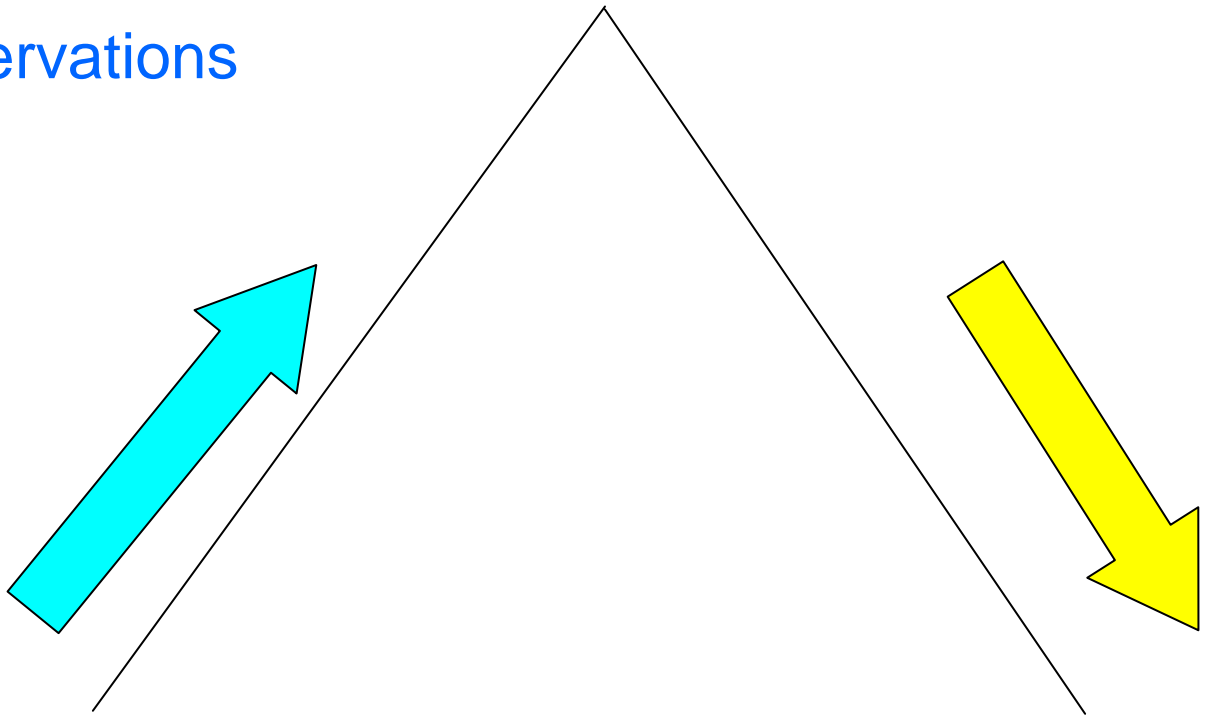


CSA field test of Tables & Figures Indexing Prototype

- Tables and figures indexing system that became CSA Illustrata: Natural Sciences
- Nine (9) organizations in Europe and the U.S.
- Sixty (60) natural scientist researchers
- A team at UT Center for Information Studies including Robert Sandusky of UT SIS and Margaret Casado, instructional librarian

Learning About Users and Usage

Observations



Questionnaires
and Interviews

Diaries



IEEE Ultimate Goals

1. To identify ways high tech engineers use communication and information in their work;
2. To identify differences and similarities in the U.S., India, and China use and communicate information;
3. To gether information that will help in the design of future information products and services



CSA Study Key Research Questions for Tables & Figures (T&F)

1. What do scientists currently do with T&F?
2. How might they use a T&F index?
3. How effective is T&F searching?
4. How might T&F searching impact practice?
5. What features are most useful?



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1. Researchers and engineering practitioners use many sources of information and choose the source and format that works best for them. The categories of most trusted sources haven't changed much, but the formats have often changed





THE UNIVERSITY of TENNESSEE
School of Information Sciences



-
- How
 - Who
 - When



External Information Use

- Not much use of alerting services
- A few trusted trade journals or web site services
- Web sites found by search engines were perceived to be more up-to-date
- Not a lot of use of scholarly information
- In India more emphasis on the quality of the brand
- Science researchers still rely heavily on journals

-
2. Interactivity and intercommunication are a natural behaviour in many fields





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3. There are some differences in communication behaviour that are geographically based, but more differences based on discipline and task.



Similarities and Differences

- American high tech engineers in particular spend too much time on non-productive meetings
- Multitasking is commonplace
- European scientists and American scientists use information sources and rely on journals with similar patterns
- Satisfaction went up when the library has fully implemented links to a robust journal collection
- Task or purpose of information use is a bigger predictor of search, browse or other



4. Multiple levels of granularity are needed



1. Journal Issue

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ARTICLES

909 Newborn Screening for Lysosomal Storage Disorders
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2. Article Granularity

DISCUSSION AND REPLY

Mississippian Barnett Shale, Fort Worth basin, north-central Texas: Gas-shale play with multi-trillion cubic foot potential: Discussion

Thomas E. Ewing¹

Montgomery et al. (2005) have written a very useful

information-rich review article of the Barnett Shale play in an area of great current interest and importance. However, the Barnett Shale shows no uplift during the early and middle Permian and strong uplift after the Cretaceous. Logic would indicate that major pre-Cretaceous tectonic activity affects the basin history of the Barnett and the Fort Worth basins. I will also briefly discuss pre-Cretaceous tectonics and Barnett history in the deep basin.

SUBSIDENCE HISTORY OF EARLY AND THE LLANO ARCH

In Montgomery et al.'s (2005) basin-length lateral history diagram that is contrary to what is known.

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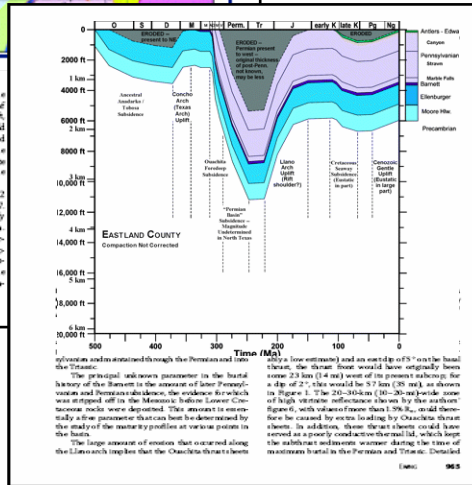
Figure 1 and in the text, they indicate that the Barnett was rapidly hydrated during the Permian and Early Permian, remained at depth with no uplift or subsidence except for minor subsidence in the Early Cretaceous, then was uplifted some 1.8 km (6000 ft) between the middle Cretaceous and the Eocene (with very slight subsidence in the present).
 The surface geology of Eastland County and surrounding areas (Barnes, 1972) shows that flat-lying Lower Cretaceous strata (Aurifer Sand and overlying Abilene Group matrix carbonates) lie unconformably above strata, ranging from the Strawn Group (Mississippian Formation, Devonian to regional age) in the southeast to the lower Clinch Group (Columbian Formation, Virgilian regional age) in the northwest. The west-northwest-dipping Pennsylvanian strata form part

Figure 1. Pre-Cretaceous tectonic map of north and central Texas showing the westward and northward-sloping the rocks that was generated by probable early Mesozoic uplift and erosion of the Llano arch. The map of present-day Cretaceous is shown from Barnes, 1972; map patterns between the outcrop edges are marked by post-Cretaceous erosion showing the major subsidence to be due to the sub-Cretaceous unconformity. Locations of Eastland and Fort Worth basins are also shown, as well as a possible original western limit of Ouachita thrust belt in late Permian and Triassic.



Pre-Cretaceous rocks of the Llano area (Ewing, 2005). The maximum uplift appears to be centered southeast of Tarrant County toward the east end of the Llano uplift near the edge of the Ouachita thrust belt. I would speculate that the uplift represents a rift shoulder caused by rifting and extension in the East Texas basin and the Gulf of Mexico. If this is true, uplift was probably Late Triassic and Jurassic in age because this is the age of the extensional episode.

In support of these facts and inferences, Figure 2 shows a corrected version of Montgomery et al.'s Figure 7. Subsidence occurred during the Permian and Early Permian, possibly continuing into the Late Permian. Subsidence rates in nearby Palo Pinto County, as corrected for compaction and sediment loading (i.e., tectonic subsidence), exceeded 50 m/my. In the Devonian, some of the highest rates found in the west Texas area (Ewing, 1993). Peak burial and tem-



3. Objects granularity: Extract and index figures

DISCUSSION AND REPLY

Mississippian Barnett Shale, Fort Worth basin, north-central Texas: Gas-shale play with multi-trillion cubic foot potential: Discussion

Thomas E. EWING¹

Montgomery et al. (2005) have written a very useful, information-rich review article on the state of knowledge of the Barnett shale play in north Texas, a topic of great current interest and importance. One error exists, however, the fault, lower than they present shows no uplift during the early and middle Mississippian and rising again after the Carboniferous, whereas the geologic record indicates major pre-Carboniferous uplift. This error substantially affects the discussion of the tectonic history of the Barnett and should be corrected in the literature. I will also briefly discuss the implications of pre-Carboniferous erosion and Ouachita thrusting to Barnett country in the deep Fort Worth basin.

SUBSIDENCE HISTORY OF EASTLAND COUNTY AND THE LLANO ARCH

In Montgomery et al.'s (2005) figure 7, they show a time-depth burial history diagram for Eastland County that is contrary to what is known about the area. In that

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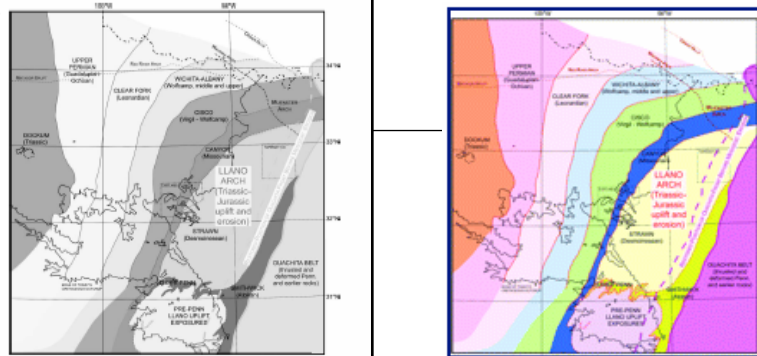
AAPG Bulletin, v. 80, no. 6 (June 2006), pp. 962–966

figure and in the text, they indicate that the Barnett was rapidly hydrated during the Pennsylvanian and Early Permian, remained at depth with no uplift or subsidence except for minor subsidence in the Early Carboniferous, then was uplifted some 1.8 km (6000 ft) between the middle Carboniferous and the Boone (with very slight subsidence to the present).
 The surface geology of Eastland County and surrounding areas (Barnes, 1927) shows that flat-lying Lower Carboniferous strata (Ardmore Sand and overlying Edecola Group matrix carbonates) lie unconformably above units, ranging from the Strawn Group (Mississippian Formation, Devonian regional age) in the southeast to the lower Clinch Group (Clinch Formation, Virginia regional age) in the northwest. The west-northwest-dipping Pennsylvanian strata form part of a large, west-dipping homocline with dips of 7–12 m/m (40–60 ft/m), about 0.8°N, in which areas as old as Strawn or even Shawnee (Ardmore) in the east and as young as Upper Permian in the west were tilted and eroded before Early Carboniferous deposition. The subsurface map of Figure 1 clearly shows that this homocline trends north-northwest from the area of the Llano uplift until it bends to the east near the Oklahoma state line (see Ewing, 2005 for more information). The subsurface map implies that the Pennsylvanian section, after an indefinite amount of burial in the later Pennsylvanian and Permian, was tilted, uplifted, and eroded before Carboniferous fluvial sediments were deposited. Afterward, limited Early Carboniferous subsidence and an unknown amount of Late Carboniferous (and early Tertiary) subsidence occurred, before final exposure.

The timing of tilting and uplift is not definitely known. No signs of eastward tectonic rotation or flexure changes are present in the Pennsylvanian or Wolfcampian that could suggest tilting and uplift at that time. Uplift may have begun to the east as early as the Lower Permian, although the key relationships remain to be established in northern Oklahoma. Rocks as young as Carboniferous (the west) dip beneath the Carboniferous river, and even the Dockum Group (Upper Triassic) may be affected by subtle homocline tilting.

The amount of uplift increases to the east and southeast (that is, older rocks subside beneath the Carboniferous). I have elsewhere called this uplift the “Llano Arch” because it was the major factor in exposing the

Figure 1. Pre-Carboniferous subsurface map of north and central Texas showing the westward- and northward-trending homocline that was generated by probable early Mississippian uplift and erosion of the Llano Arch. The dip of presently preserved Carboniferous is shown from Barnes, 1927, map pattern between the outcrop edges are omitted for post-Carboniferous erosion, assuming the major subsidence to be due to the sub-Carboniferous unconformable. Location of Ardmore and Tarrant can also be shown, as well as possible original western limit of Ouachita thrust belt before the end of uplift and erosion.



Permian rocks of the Llano area (Ewing, 2005). The main thrust uplift appears to be centered southwest of Tarrant County toward the east end of the Llano Arch, near the edge of the Ouachita thrust belt. I would speculate that the uplift represents a rift shoulder caused by tilting and erosion in the East Texas basin and the Gulf of Mexico. If this is true, uplift was probably Late Triassic and Jurassic in age because this is the age of the so-called rifting.

Interpreting these facts and inferences, Figure 2 shows a corrected version of Montgomery et al.'s figure 7. Subsidence occurred during the Pennsylvanian and Early Permian, possibly continuing into the Late Permian. Subsidence rates in nearby Palo Pinto County, as corrected for compaction and sediment loading (i.e., tectonic subsidence), exceeded 50 m/my. in the Devonian, some of the highest rates found in the west Texas area (Ewing, 1993). Peak burial and temperature occurred during the Permian and Early and Middle Triassic. The entire section was then uplifted and eroded during the Late Triassic and Jurassic deposition of the Ardmore Sand.

EXTENSION TO THE DEEP BASIN: ROLE OF OVERTHRUSTING

A similar diagram can be drawn for Tarrant County in the deep part of the Fort Worth basin (Fig. 3). Although the Paleozoic is entirely covered about 2000 m, several subsurface trends show Lower Carboniferous (Twin Mountain and Travis Peak beds resting on Strawn (Devonian) strata. Tectonic subsidence rates in this area were extremely high: the Anka deposition (89 m/my.) had high tectonic Strawn deposition (>21 m/my.; Ewing, 1993).

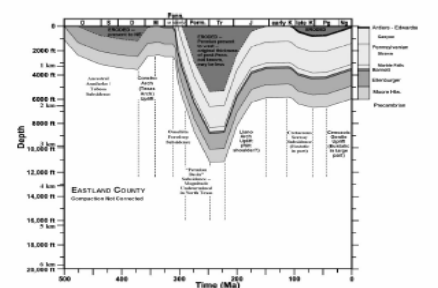


Figure 2. Corrected time-depth burial history diagram for Eastland County. Tectonic subsidence affects the Strawn and perhaps even the amount of tectonic subsidence is poorly known. The entire uplift of the area between the Llano basin and the Early Carboniferous probably took place in Middle Jurassic. Box, most hydrocarbon generation in the Barnett occurred during the Permian and Triassic. Thickness values are from Montgomery et al. (2005), with additional data indicated from Ewing (1992).

amount of subsequent subsidence is unknown. Again, peak maturity is reached perhaps in the latest Permian and maintained through the Permian and into the Triassic.
 The principal unknown parameter in the burial history of the Barnett is the amount of late Pennsylvanian and Permian subsidence; the evidence for tectonic subsidence is not clear. This amount is currently a poorly constrained parameter in the study of the maturity profiles at various points in the basin.
 The large amount of erosion that occurred along the Llano Arch implies that the Ouachita thrust belt

once extended some distance west of their present position. For 2 km (6000 ft) of erosion (which is probably a low estimate) and an average 0.5° over the basal thrust, the thrust zone would have originally been some 2.5 km (1.6 mi) west of its present location. The dip of 2° (this would be 57 km (35 mi), as shown in Figure 1). The 20–30-km (10–20-mi) wide zone of high vitrinite reflectance shown by the authors (Figure 6), with values of more than 1.5%, could therefore be caused by extra loading by Ouachita strata sheets. In addition, these thrust sheets could have served as a poorly conductive thermal lid, which kept the subsurface and hence warmer during the time of maximum burial in the Permian and Triassic. Detailed

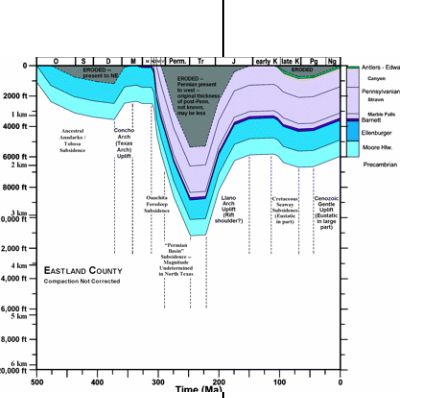


Figure 3. Similar diagram to Figure 2, showing a time-depth burial history diagram for Tarrant County. Tectonic subsidence affects the Strawn and perhaps even the amount of tectonic subsidence is poorly known. The entire uplift of the area between the Llano basin and the Early Carboniferous probably took place in Middle Jurassic. Box, most hydrocarbon generation in the Barnett occurred during the Permian and Triassic. Thickness values are from Montgomery et al. (2005), with additional data indicated from Ewing (1992).



Potential Uses and Purposes

1. To find relevant articles they would not otherwise find
2. To retrieve and use images
3. To compare their work with others'
4. To support analysis

Potential Use: To retrieve and use images

- It would be useful “when looking for information difficult to retrieve in written form”
- Specific instances noted:
 - “looking for geologic maps of a specific area”
 - “for a quick assessment of photographic quality in cytogenetics research”
 - “when I need a specific graph, map, photograph, or figure that would be for presentations or teaching”



Potential Use: Engineers

- Engineers often just need to check a fact in a table or a stock quote for their company or their competitors
- Engineers' work is focused on task
- Efficiency may improve if only they get what they need

What do these findings mean for future information products and services?

1. Incorporate internal knowledge and shared communication with external sources and search
2. Provide tools that allow granular identification and extraction of information
3. Provide immediate distribution of selected information, but older important too
4. Provide discipline based tools
5. Quality filters are important

