The Bulletin
Houston Geological Society

Volume 46, Number 5 January 2004

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by Craig M. Dingler

President's Letter

Explore 2004.
Happy New Year, Everyone!

After a brief respite from dinner talks and other HGS functions over the holidays, we leap forward into 2004 with a full slate of meetings this month! The general monthly luncheon meeting is a joint meeting with the Geophysical Society of Houston (GSH), which is held at the Houston Engineering and Scientific Society (HESS) building on Westheimer (just west of the Galleria) on Tuesday, January 20. This means there is not a meeting at the Petroleum Club this month, so please take note!

On the other side of town, the NorthSiders group will be holding a luncheon meeting the same day (January 20) at the Hotel Sofitel in Greenspoint. I hope that the meetings will draw different crowds and no one will be trying to defy the laws of physics and be at both lunches. That sure would not be good for your New Year's resolution to lose mass!

If you are not a regular attendee at the dinner or luncheon talks, I urge you to resolve to try one or two this spring.

Speaking of New Year's resolutions, if you are not a regular attendee at the dinner or luncheon talks, I urge you to resolve to try one or two this spring. Vice-President Paul Babcock has done a fantastic job lining up quality talks focused on new fields and on geology, eschewing the business talks that we had from time to time in recent years. Steve Earle, chairman of the North American Explorationists Committee, has arranged for Kent A. Bowker to talk about the Burnett shale on January 26. This should be an excellent follow-up to Jeff Hall's eye-opening talk on Devon's operations in that field, which he gave at last October's luncheon. In case you missed it, the Burnett shale is now the largest gas field in Texas.

Need some predictions for 2004? The December 1, 2003 issue of the Houston Chronicle had an article on the Atlantic hurricane season stating that forecasters predict more major storms hitting the U.S. this year. Since 1995, about 10 percent of the hurricanes and tropical storms that have formed in the Atlantic and Caribbean have hit United States shores. That is statistically low, and a cause for concern in coastal communities that have been lulled into a false sense of strength and security. Given the extensive beach erosion along the mid-Texas coast last July from Hurricane Claudette, a weak Category 1 storm on the Safir-Simpson scale, we geologists can only ponder on how long some seashore towns like Surfside and Sargent Beach can continue to exist.

Undergraduate Scholarship Winners

January is the month we celebrate the awardees receiving HGS undergraduate scholarships. Each year at the January general dinner meeting, the HGS Foundation presents scholarships to upper-division undergraduate students who are majoring in the geosciences. Students are nominated by the geological departments at seven local universities: Houston, Rice, Stephen F. Austin, Sam Houston, Lamar, Texas A&M (College Station), and UT (Austin). Each school nominated two students, and the foundation's board reviewed the recommendations and selected one of them for a scholarship. By spreading the wealth to these seven schools, the HGS Foundation supports a diverse group of students with different backgrounds. It is also effective public outreach for the HGS as we are noticed by a larger, regional academic population.

For those of you who are unfamiliar with the HGS Foundation, it is a non-profit organization operated independently from the HGS. The foundation helps fulfill one of the main purposes of the HGS—to aid and encourage academic training in the geosciences. A volunteer Board

President's Letter *continued on page 7*

President's Letter continued from page 5

of Trustees manages the foundation. Current trustees are Chairman John Adamick, Dean Grafton, Don Scherer, David Fontaine, Paul Hoffman, Susan Black, and James Painter. Funding for the scholarships comes from the foundation's investment accounts, charitable donations from our members and from generous companies. Of course, your tax-deductible contribution is always welcome!

Awards will be given during the general dinner meeting on January 12 at the Westchase Hilton (9999 Westheimer just inside Sam Houston Parkway). Come meet some bright students and their mentor professors! From talking to a few of the winners in past years, I can tell you that the students are very intelligent, wide-eyed interested in the geosciences, and eager to pursue their careers – be it along academic lines or in industry. It's a real pleasure to see their youthful enthusiasm for the science.

Geologically, it certainly does!

Have you seen the recent tourism advertisements for New Mexico? There must be a geologist running the state's visitors' bureau, or someone who had the concept of uniformitarianism pounded into them during geology class! How else would you explain the tagline, "In New Mexico, the key to the present lies in the discovery of the past?!" ■

Editor's Letter

by ***Diane Yeager***
editor@hgs.org

Are You An HGS Know-It-All???
Take the Quiz

1. How many members does the HGS have?
a. Between 3,000 and 4,000
b. Between 2,000 and 3,000
c. Between 4,000 and 5,000

2. The HGS's sister society is:
a. GSH
b. AAPG
c. CIA

3. The HGS Office Manager is:
a. Annette Mather
b. Lilly Hargrave
c. Joan Henshaw

4. This person is the webmaster:
a. Dave Crane
b. Bill Osten
c. Diane Yeager

5. This year's president is:
a. Denise Stone
b. Craig Dingler
c. Steve Levine

6. The HGS was formally chartered in:
a. August 8, 1920
b. August 8, 1924
c. August 8, 1923

7. The 2003-2005 Directors are:
a. Janet Combes and Michael Barnes
b. Art Berman and Diane Yeager
c. Marsha Bourque and Andrea Reynolds

8. This committee became a group in 2003
a. NeoGeos
b. Website
c. Engineering and Environmental

9. This is the HGS's newest committee
a. NorthSiders
b. North American Explorationist
c. Houston Geological Auxiliary

10. She is the Third Vice President of the HGA
a. Jan Stevenson
b. Pat Hefner
c. Anne Rogers

11. The HGS typically sponsors ___ students for summer intern positions at the Houston Museum of Natural Science each year.
a. 4
b. 2
c. 6

12. To become an active member of the HGS you must have the following:
a. A degree in geology or an allied geoscience from an accredited college or university; or a degree in science or engineering from an accredited college or university and have been engaged in earth science interpretation for at least five years
b. A master's level degree in geology or an allied geoscience from an accredited college or university; or a degree in geology from an accredited college or university and have been engaged in interpretation for at least five years
c. A member of the AAPG

Editor's Letter *continued on page 11*

Editor's Letter continued from page 9

13. The Bulletin is issued for the months of:
a. October through July
b. September through June
c. August through May

14. The official insignia of the society was adopted in:
a. 1925
b. 1949
c. 1961

15. The HGS's first president was:
a. William J. Clinton
b. John R. Suman
c. David Donoghue

16. Guest night is held at the:
a. Houston Museum of Natural Science
b. Houston Art Museum
c. Reliant Stadium

17. To make reservations for an HGS lunch or dinner meeting you need to:
a. Call Joan the day of the meeting and tell her you plan to attend.
b. Go on-line and pay using your credit card.
c. Go on-line or call the HGS office with a credit card payment option.

18. The HGS Foundation is a non-profit organization operated _____
a. independently from the HGS.
b. by the HGS.
c. by seven academic institutions.

19. The 2002 – 2004 HGS Directors are:
a. Janet Combes and Michael Barnes
b. Marsha Bourque and Andrea Reynolds
c. Steve Levine and Paul Babcock

20. She manages the advertisement accounts for the Bulletin:
a. Lilly Hargrave
b. Diane Yeager
c. Joan Henshaw

Thanks for taking the quiz. Most answers can be found on the HGS web page or in the HGS Bulletin.

Answers: 1. a - web page post 4,300 members. 2. b - Geophysical Society of Houston. 3. c, 4. a, 5. b, 6. c, 7. c, 8. c, 9. a, 10. c, 11. b, 12. a, 13. b, 14. b, 15. b, 16.a, 17. c, 18. a - discussed in this month's Letter from the President, 19. a, 20. a.

From 18 to 20 – *You're are a HGS Know-It-All!!!* If you are not currently a chairperson or have not been on the board – you need to be nominated for a position – call Denise Stone.

From 16 to 18 – *You're an HGS Know-A-Lot.* With a little more work you can become an HGS Know-It-All.

From 14 to 16 – *You're Average.* You're almost there. Study the web page and go to the meetings.

Below 14 – *You either just joined or you didn't look up the answers on the web page and in the* Bulletin.

Monday, January 12, 2004

Westchase Hilton • 9999 Westheimer
Social 5:30 p.m., Dinner 6:30 p.m.

Cost: $25 Preregistered members; $30 Nonmembers & Walk-ups

Make your reservations now on-line through the HGS website at www.hgs.org; or, by calling 713-463-9476 or by e-mail to Joan@hgs.org (include your name, email address, meeting you are attending, phone number and membership ID#).

HGS General
Dinner Meeting

by ***Lane Sloan***
reprinted from World Energy Magazine, *Vol. 6, No. 1, 2003*

The Energy Image and Recruiting

The image of the energy industry is impacting its ability to attract top talent while the challenges the industry faces requires the best that universities can offer. Energy has nowhere near the popularity of other industries. This is partly due to its history of negative publicity. Current news events have added to the stigma. The image is equally impacted by the perception of it being a mature industry with cyclical layoffs and a far less lucrative upside than newer technologies. Yet, the need for energy is growing and the technology challenge to find it is considerably more demanding.

The energy industry needs to work itself back up the ladder of what is hot for aspiring talent. We need a renaissance in people aspiring for energy careers.

Unfortunately, the demographics of the energy talent pool do not bode well for the industry retaining its intellectual capability over the coming decade. Couple the demographics with the poor image and the industry may be facing a crisis in energy careers. The energy industry needs to work itself back up the ladder of what is hot for aspiring talent. We need a renaissance in people aspiring for energy careers. Industry leaders, educators, and other relevant parties need to engage in focusing on the drivers that can re-energize energy careers. Houston is the only city with the critical mass of energy leadership to even begin to tackle this problem; no one company can change the image; it requires a community effort. One part of this solution is the University of Houston's Global Energy Management Institute that is focusing on energy education and providing a forum for the energy community to address this critical issue. ■

Biographical Sketch

Lane Sloan had a distinguished and diversified career with Shell Oil Company, retiring after 29 years of service at the turn of the millennium. He joined Shell in 1970 where his early career was spent in a variety of corporate roles in Houston, ranging from Information and Computer Services to Corporate Planning, Audit, and Treasury. In 1981, he became Production Administration Manager for Shell California Production Inc., followed by a position in the corporate organization as Manager Services Planning. Lane was appointed to Shell's senior management as General Manager of Products Finance in early 1985. He then undertook an assignment as Liaison Shell Oil in London, returning to Houston in 1987 as Vice President Corporate Planning. He became the Chief Financial Officer for Shell Oil Company in 1989 as Vice President of Finance and Business Services. In this period, Lane orchestrated the formation of the shared services concept that later became Shell Services Inc. He returned to London, first as the Regional Coordinator for the Far East and then as Director of the East Zone in Oil Products. In 1987, Lane was appointed the Chief Executive Officer of Shell Chemical Company, later becoming the Executive Vice President-Americas when Chemical became a global organization in Royal Dutch/Shell.

After leaving Shell, he joined SAIC in 2000 as an Executive Vice President responsible for its Energy Sector. At the end of that year, he became CEO of GrandBasin, a joint venture between Halliburton and SAIC. He left that role in 2001 when GrandBasin was absorbed into Landmark Graphics, a subsidiary of Halliburton.

Lane received a BS in business from the University of Colorado. In addition, he attained an MS in quantitative management science from the University of Colorado, an MS in accounting and an MBA in finance from the University of Houston.

He has served on the University of Houston's Bauer College of Business Dean's Advisory Board for over a decade and is currently on the Executive Committee and Chairman of the Energy Committee. He was awarded an honorary Master's of Business Experience as well as the Distinguished Alumnus Award from the Bauer College. Lane is a board member for the Sam Houston Area Boy Scouts Council, and was a former board member of the Houston Zoological Society. He also serves on the board of the Houston Technology Center. Recently, Lane became a member of the Silver Fox Advisors. He is teaching courses primarily focused on corporate strategy and strategic leadership at the Bauer College.

Monday, January 19, 2004

Westchase Hilton • 9999 Westheimer
Social 5:30 p.m., Dinner 6:30 p.m.

Cost: $25 Preregistered members; $30 Nonmembers & Walk-ups

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International Explorationists Dinner Meeting

by ***Scott E. Thornton,*** *Shell International E&P, Inc.,*
Peter Mullin, *Amerada Hess, and*
David D. J. Stewart, *Shell International E&P, Inc.*

Brazilian Deep Water Fold Belts: Tectonic Drivers and Structural Styles of Potential Traps

Deep water fold belts in the emerging and frontier basins in Brazil are structurally quite different than those more explored Santos, Campos, and Espirito Santo basins (the Southern Salt basin). One key difference is the nature of the mobile substrate. In the deep water fold belts of the Equatorial Margin and extreme northeast Brazil, little salt exists in the deep water continental margin, although shallow water salt is penetrated in the Potiguar and Sergipe-Alagoas basins. As a result, mobile shales, sometimes overpressured, provide the base of the décollement(s). Structural imprints from breakup of the North and South Atlantic provided strong contrasts in structural fabric of the continental margin separating fold belts into two generic sectors: 1) southern sector from Cumuruxitiba to Parnaiba-Pernambuco basins, where roughly east-west rifting occurred, and 2) northern sector along the Equatorial Margin from the Ceara to the Foz do Amazonas basin, where North Atlantic oblique rifting initiated Berriasian rifts and later drifting. Some limited parts of the Equatorial Margin also have Triassic rifts, akin to eastern North America. Fold belts and their contiguous listric-faulted nearshore structural zones will be dissected from the south to the north, from the Cumuruxitiba to the Foz do Amazonas basins.

Major tectonic drivers and structural controls for formation of these fold belts will be discussed relative to the general stratigraphic section in shallow and deep water. In addition to Campanian uplift, Middle Eocene and Late Middle Miocene Andean orogenies have triggered fold belt formation. The lack of significant exploration in these deep water fold belts points to potential in high-risk and potentially high-reward structural segments. ■

Biographical Sketches

Scott E. Thornton (speaker) has worked for Shell, Unocal, and Independents, generating exploration evaluations and regional studies of the South Atlantic continental margins. He has worked Brazil since 1992, including four bid rounds. In addition, he has conducted block/prospect evaluations, regional studies, and well operations in offshore North Alaska, offshore Southern California, South Asia, SE Asia, China, Australia, and the Subandean Zone in South America. He currently works as a contract consultant in Shell International E&P, Inc. on Brazil exploration. Scott's prior fold belt experience has been in onshore Pakistan, onshore and offshore western Burma, Ecuador, Peru, and offshore north Alaska.

Peter Mullin is currently Exploration Director for Amerada Hess's Brazil group, a part of Hess's South Atlantic Margin Team. Prior to joining Hess this year, Peter worked for some 24 years with Shell, primarily on exploration new ventures in South America and West Africa. He was Shell's exploration manager first for Angola and then Brazil (working all the Brazil bid rounds), and most recently was Shell's Head of Evaluation for Trinidad. In addition to South Atlantic margin basins, he has worked the Subandean fold belts in Bolivia, Peru, Columbia, Venezuela, and Trinidad and the Barbados accretionary prism in the Caribbean.

Dave Stewart is Team Leader, Brazil Team, Subsurface Evaluation, Shell International E&P, Inc. in Houston. Dave has worked Brazil since Bid Round 0 and, in addition to coordinating Bid Round Evaluation, has performed both regional and prospect analysis throughout the Brazilian marginal basins. Dave came to Shell from Robertson Research to join The Group's seismic stratigraphy effort in the Research Centre in Rijswijk, Holland. Dave has also had assignments at Shell on the Norwegian and British North Sea and the Gulf of Mexico.

Poster Sessions

1. Global Analogs and Prediction of Lacustrine Source Rocks: SE Asian and Brazilian Basins

By Scott E. Thornton and David D. J. Stewart, Shell International E&P, Inc.; Gilbert R. Stern, IGC; Joe Curial, Unocal Corporation; George E. Moore,

International Explorationists *continued on page 17*

International Explorationists continued from page 14

Consultant; Robert K Merrill, Samson Resources Company; Rex Cole, Mesa State College; Gregg Blake, Unocal Corporation

2. Syn-rift and Transpressional Plays along the Equatorial Margin: Brazil and Africa.

By Ian Davison, EARTHMOVES

3. Margin Basin Analysis (Brazil and West Africa) using a G3 Approach

By William Dickson, Dickson International Geosciences; Craig Schiefelbein, Geochemical Solutions International, Inc.; and Mark Odegard, GETECH USA, Houston

Abstract

The continental margin basins of Brazil and West Africa share similar tectono-stratigraphic units resulting from their proximity in Late Jurassic/Early Cretaceous time. Paleogeographic ties between the South American and African plates mean that oil habitats of the margin basins can often be correlated. Five stages of basin development are generally recognized: pre-rift intracratonic; continental rift; evaporite (the well-known Aptian salt); post-evaporite transgressive; and post-evaporite regressive. Historic production has largely been generated from lacustrine sediments deposited during Neocomian rifting. As spreading continued, Late Cretaceous post-evaporite sediments accumulated in shallow marine and fluvial-deltaic environments; these latter sources should dominate future production.

Our investigation of margin basins used geological, geophysical, and geochemical data, hence called our G3 approach. This combination greatly assists defining the controlling structural and tectonic features that influenced basin and source rock development, and reservoir emplacement. Geochemical data representing basins along both margins include oil chemistries based on an evaluation of about a thousand samples with supplementary data obtained from surface geochemical techniques and basin modeling.

Results identify correlations between sediment pathways and gravity signatures, redefining the depocenters or source subbasins. We demonstrate the long-lived influence of transfers or zones of weakness that segment the margins (basin framework) and separate oil types. Our talk illustrates the interpretation process with examples of clear and unclear correlations from the Greater Campos Basin (Santos/Campos/Espírito Santo) of Brazil in particular.

Vendor Corner-GETECH

GETECH offers the highest resolution gravity and magnetics data packages from both offshore and onshore Brazil. In addition, we have produced several integrated ArcView GIS studies for Brazil, which include a Greater Campos Basin Study, South Atlantic Margin Basin Analysis, and Tectonic Study of Brazil. The goal of these studies is to facilitate basin analysis and high-grade areas of exploration interest and to help in evaluation of the blocks in the upcoming 6th Licensing Round.

Tuesday, January 20, 2004

HESS • 5430 Westheimer
Social 11:30 a.m., Lunch 12:00 p.m.

Cost: $25 Preregistered members; $30 Nonmembers & Walk-ups

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Joint HGS/GSH General Luncheon Meeting

*by **John M. Jacques,** Tellus Division, Robertson Research International Limited, Llandudno, North Wales, United Kingdom*
*Presenter: **Antony D. Price,** Fugro-LCT Interpretation Services, Houston, TX*

A Composite Plate Tectonic and Basin Dynamic Model for the Gulf of Mexico, Using an Integration of Potential Fields and Geologic Data Sets

Understanding the tectonic history of the Gulf of Mexico Basin is essential in extending our knowledge of source rock and reservoir distribution into frontier areas. An advanced exploration program based on integrating tectonics, geophysics, geochemistry and sedimentology using Geographical Information System (GIS) technology has been developed to identify new play fairways and to extend existing play concepts.

Initially this program creates a digital tectonostratigraphic database for the region. Integration of potential field data with geological data provides detailed structural and geological coverage. Enhancements of potential field data define salt geometry and distribution and distinguishes between structural features. In concert, these data create a "paleo-template," including tectonic elements and oceanic, continental crustal distribution. This "paleo-template" is further evaluated using 2-D mega-regional gravity, magnetic modelling along a suite of basin traverses.

This new interpretation will be used to assess the multitude of alternative evolutionary models and to produce palinspastic basemaps and paleotectonic reconstructions for tectonic and basin modeling.

Biographical Sketches

John M. Jacques received a Ph.D. from the University of Durham, United Kingdon in 1995. Mr. Jaques is currently a structural geologist at Robertson Research International Limited, North Wales, U.K., where he has undertaken numerous regional and global studies. Areas of expertise include: the digital compilation of structural, geological and isopach maps using ARC/VIEW‘ and ARC/INFO‘ GIS formats; construction of cross sections showing basin structure and megasequence distribution; the creation of regional geohistory charts from patterns of subsidence; regional and global time-slice maps illustrating plate reconstructions, palaeotectonics and palaeodepositional environments; and field based brittle and ductile deformational studies (e.g., SW Yemen, northern Pakistan).

Mr. Jacques worked on 10 regional, genetically-related basin units that create a global database of play fairways and petroleum systems that included: Circum-South Atlantic, Sub-Andean, Southern Caribbean, Gulf of Mexico, East Africa, Indo-China, East and West Indonesia, Arctic, and offshore Southeast China. Of these, Mr. Jacques took an interest in evaluating and developing regional tectonic evolutionary models for South America, Gulf of Mexico-Caribbean and South Atlantic, recently publishing several papers on this subject, which emphasise the importance of tectonics on petroleum system development.

Mr. Jacques was the project manager for a GIS-based digital product that has been designed to create a fully consistent, attributed structural and geological digital coverage for the entire globe, with the principal aim of defining all the world's sedimentary basins. ■

Antony D. Price holds a BSc. (Honors) in Physics and Geology from the University of Western Australia and is currently a Geophysical Interpreter specializing in integration of seismic, gravity, magnetic and geologic information from the regional to the prospect level with the Interpretation Services Group at Fugro-LCT. Prior to this Mr. Price worked with Airborne Gravity Exploration; Fugro-LCT, Marine Gravity Gradient Exploration; Bell Geospace and Airborne Electromagnetic and Magnetic Acquisition with World Geoscience. Current interests include tectonic evolution of the Gulf of Mexico and investigation of sedimentary section sourced magnetic anomalies. Areas of experience includes Gulf of Mexico, Brazilian, French Guiana, West African and West Australian margins.

Tuesday, January 20, 2004

Hotel Sofitel • 425 North Beltway 8 • Houston 77060
Social 11:30 a.m., Lunch 11:45 a.m.

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HGS NorthSiders Luncheon Meeting

by ***Kevin M. Bohacs***
ExxonMobil Upstream Research Company

Slime, Sand, and Shells: Lacustrine Hydrocarbon Play Elements Within a Continental-Environment Phase Stability Framework

Lake basin types have characteristic associations and distributions of hydrocarbon source, reservoir and seal strata. These differences arise mainly from distinct histories of lake hydrology, which control the evolution of lake water chemistry, the nature and stability of food webs and clastic sediment supply rates. Hydrocarbon sources are influenced strongly by these controls on the ecosystem and reservoir- and seal-prone strata are linked to these controls through the timing of clastic sediment supply relative to lake level and the influence of water chemistry on the dominant lithology (e.g., clastic, carbonate, evaporite).

The strong genetic association of play elements requires an integrated approach to prediction, which is facilitated by expanding the lake-basin-type diagram (Carroll and Bohacs, 1995, 1999) to a full continental-environment phase stability framework. This framework places fluvial, floodplain, coal, aeolian and the three lake-basin-type strata into relative stability fields, constrained by their inter-related controls: the rate of potential accommodation relative to supply rates of sediment and of water. The phase trajectory of basin evolution determines the proportion of each lake basin type in the resultant strata. This approach helps explain why all lake basins do not contain the full suite of lake basin types and how the fill of a chain of ancient lakes may be genetically related. One can predict phase trajectories in a forward sense from estimates of basin subsidence, paleoclimate and sediment yield, or one can reconstruct phase trajectories from relative thicknesses and areal extents of each continental environment stratal package: thick underfilled lake packages point to dominant control of potential accommodation rates whereas thin underfilled lake packages indicate dominant control of supply rates of sediment plus water.

Hydrocarbon sources are influenced strongly by these controls on the ecosystem.

Associated fluvial styles among the lake basin types appear to vary systematically, with perennial, high-sinuosity streams in overfilled, intermittent to perennial low-sinuosity streams in balanced fill and a wide range from ephemeral sheetflood/braided streams to perennial high-sinuosity streams in underfilled lake basins. Lateral distributions of reservoir-prone strata also vary significantly among lake basin types and lake shoreline shapes encompass a richer diversity than typically seen in marine settings: shorelines tend to be more highly constructive and dispersive in more persistently closed hydrologic basins. Fundamental changes in shoreline type and lake character between highstands and lowstands may even obviate the application of Walther's Law for predicting lateral distributions, especially in underfilled lake basins. Ultimate reservoir quality may be related to phase trajectory through the diagenetic effects of fluctuating groundwater tables. Each lake-basin type has a characteristic history of groundwater level changes, recorded in recurring associations of paleosol types and ichnofossil assemblages: histosols and shallow single-tier burrows, tracks and trails in overfilled, vertisols and multi-tier, moderate depth insect burrows in balanced fill, and aridisols and entisols with multi-tier, multiple-generation, relatively deep burrows in underfilled lake basins.

Observations indicate that these associations of hydrocarbon play elements occur in a wide variety of tectonic settings and ages, from continental rift to convergent foreland basins of Cambrian to recent age. Continued success in economic discovery and efficient recovery of hydrocarbons depend upon continued testing and elaboration of these concepts and a deeper understanding of the essential processes controlling deposition of lacustrine strata. ■

Northsiders *continued on page 23*

Northsiders continued from page 21

Biographical Sketch

KEVIN M. BOHACS (BSc Honors, Geology, University of Connecticut, 1976; ScD in experimental sedimentology, M.I.T., 1981) is a sedimentologist and stratigrapher with ExxonMobil Upstream Research Company. At URC, he leads investigations of organic-rich rocks from deep sea to lakes, in basins around the world. He tries to keep the "geo" in geochemistry by integrating field work, subsurface investigation, and laboratory analyses. He divides his time between geological research, collaborative studies with exploration companies, and teaching stratigraphy and hydrocarbon-system analysis in the classroom and field. His awards include AAPG's Jules Braunstein Memorial Award (1995), Best International Paper (1998), AAPG Distinguished Lecturer (1999–2000), and Petroleum Exploration Society of Australia Distinguished Lecturer (2001).

Monday, January 26, 2004

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Cost: $25 Preregistered members; $30 Nonmembers & Walk-ups

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North American
Dinner Meeting

by ***Kent A. Bowker***
Star of Texas Energy Services, Inc.
The Woodlands, Texas

The Barnett Shale Play, Fort Worth Basin

In terms of monthly production, the Newark East (Barnett Shale) field recently became the largest gas field in Texas. Production has grown from 80 MMCF/D in January 2000 to over 700 MMCF/D at present because of accelerated new-well drilling and old-well reworks/refracs. There are over 2.5 TCF of booked proven gas reserves in the field at present. Newark East field is located in the northern portion of the Fort Worth Basin, just north of the city of Fort Worth. The Mississippian Barnett rests on an extensive angular unconformity. The Barnett must be stimulated to achieve economic flow rates. Currently, wells are hydraulically fractured, but good frac barriers must be present directly above and below the Barnett for this stimulation technique to be successful. Hence, the stratigraphy above and below the Barnett is important to economic production from vertical wells. Recent horizontal drilling has shown great promise to expand the play outside the current economic limits. The thermal history of the basin is an important reason for the success of the Barnett. The thermal history of the Fort Worth basin is directly related to the emplacement of the Ouachita system. Sections of the Barnett bordering the Ouachita front (regardless of depth) have the highest thermal maturity and, hence, the lowest BTU content of produced gas. In the late 1990s, work by Mitchell Energy demonstrated the viability of water fracs in the Barnett play; this development has contributed to a huge acceleration in Barnett leasing and drilling activity during the past three years. Also in the late 1990s, Mitchell determined that the previous gas-in-place values for the Barnett were low by over a factor of three. There is approximately 150 BCF/mi^2 of in-place gas in Newark East field. The realization that the primary completion was only recovering 7% of the gas in place per well spurred the current (and very successful) rework/refrac program under way in the field.

The previous gas-in-place values for the Barnett were low by over a factor of three.

The history of the evolving geologic and engineering concepts that guided development of the Barnett is a tribute to rare perseverance in the oil patch. And the success of the Barnett play may provide a model for prospecting for other large shale-reservoirs. ■

Biographical Sketch

KENT A. BOWKER is currently exploration manager for Star of Texas Energy Services, Inc., a production company with activity centered in the Barnett Shale play of North Texas. Star of Texas Energy has primary offices in the Austin area with an exploration office in The Woodlands.

Kent began his career with Gulf Oil in 1980, then moved on to Chevron with the merger. His last assignment with Chevron was in the Nonconventional Gas Business Team where he learned about various coal, shale, and tight-sandstone reservoirs, including the Barnett Shale. He began at Mitchell Energy in early 1998 where he assumed the geological duties on the Barnett Shale team. It was during the two-year period beginning in 1998 that two major events took place in the play: the perfecting of water fracs in the Barnett, and development of a true understanding of the gas in place (which is nearly four-times higher than thought previously). With the sale of Mitchell Energy to Devon, Kent moved on to Star of Texas Energy.

Kent is a licensed geologist in Texas and Wyoming and is a member of AAPG (where is currently an associate editor of the *AAPG Bulletin*), RMAG, and SPE. He has published numerous papers covering the history of geology, enhanced-recovery projects, and the geology of several conventional and nonconventional reservoirs.

A2D Technologies and TGS-NOPEC Presents a $3,000 Grant to the HGS Foundation

by ***Arthur E. Berman***

A2D Technologies and its parent—TGS-NOPEC Geophysical Company—donated $3,000 to the Houston Geological Society at the HGS General Dinner Meeting on November 10, 2003. Rod Starr, Executive Vice President Sales and Marketing for A2D Technologies, presented the grant. Dean Grafton accepted the check for the HGS Foundation.

The check was from proceeds from the A2D and TGS-NOPEC golf tournament and will be used by the foundation fo fund undergraduate scholarships fo students majoring in geology at regional universities. This is the sixth year that A2D has presented the HGS with grants for this purpose.

A2D Technologies provides integrated solutions for petroleum well log data acquisition, use, and management in addition to various geoscience workflow products. A2D offers well log data sets that include more than 1.7 million logs in the Gulf of Mexico, Gulf Coast, Permian Basin, and Rocky Mountains/ Mid-Continent areas. A2D Technologies is a wholly-owned subsidiary of TGS-NOPEC which has main offices in the U.S., U.K., Norway, and Australia.

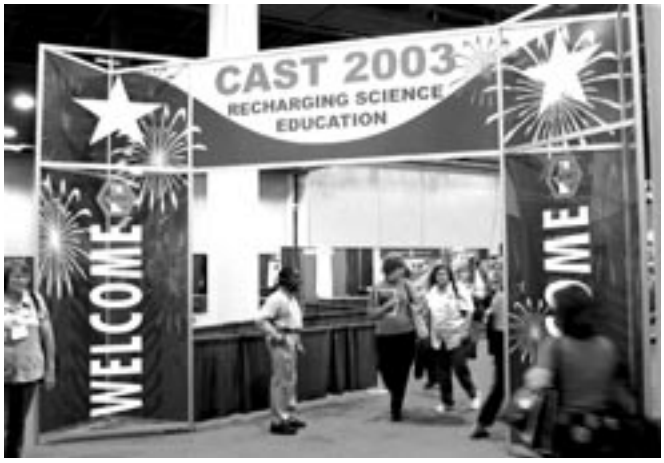
The HGS Foundation Board of Trustees and HGS membership sincerely thank A2D Technologies and TGS-NOPEC for their continuing and generous support. ■

HGS Foundation trustee Dean Grafton graciously accepts a donation from A2D Technologies' VP Rod Starr, noting "This will be put to good use!"

CAST 2003: Recharging Science Education

*Article by **Arthur E. Berman** and **Janet Combes;** photography by **Arthur E. Berman***

The Conference for the Advancement of Science Teaching (CAST) was held in Houston's Reliant Center October 30–November 1, 2003, and sponsored by the Science Teachers Association of Texas. Attendance at the conference was expected to exceed six thousand, one of the largest CASTs ever. Teachers and exhibitors came from all across Texas and the country to attend this important annual meeting. Featured were hundreds



of exhibits, classes, workshops, and technical presentations presented by teachers, industry providers to the science teaching community, and science professionals, including members of the Houston Geological Society. Special events featured "A Progressive Trick-or-Treat" held at the Houston Museum of Natural Science, the Houston Zoo, The J. McGovern Museum of Health and Medical Science, and The Children's Museum.

HGS Director Janet Combes (ExxonMobil) organized and coordinated the HGS's contributions to and participation in CAST. The HGS sponsored a series of Earth Science presentations given throughout the day on Saturday, November 1 that included talks by Craig Dingler, HGS President, Denise Stone, 2002-2003 HGS President along with other HGS members and volunteers Michael Dolan (ExxonMobil), Gary Coburn (Bell Geospace), Jim Coleman (USGS), Kristi Higginbotham (San Jacinto College), Bill Dupre (University of Houston) and Josh Rosenfeld (retired). Dennis McGraff (consultant) coordinated audio-visual services for the sessions and Stephanie Hrabar (I-Inc) assisted as session chair.

The HGS also hosted a series of ambitious field trips for CAST participants that included a High Island geology / birding tour, a Galveston Island-Brazos River geological field trip, a Texas City Dikes / Galveston Island hurricane erosion trip, as well as visits to the ChevronTexaco Drilling Center, the ExxonMobil Geochemistry Laboratory and the Kerr McGee Visualization Center. Trips to view downtown building stones, cores at the Houston Core Facility of the Bureau of Economic Geology, and growth fault evidence in West Houston were also sponsored. Several field trip participants came by the HGS exhibit hall booth to enthusiastically thank the trip organizers! One especially memorable comment: "That was the best field trip I've ever been on!"

Five of the eight HGS Speakers at CAST Earth Science Presentations (left to right): Craig Dingler, Jim Coleman, Bill Dupre, Kristi Higginbotham, Josh Rosenfield

CAST 2003 *continued on page 33*

January 2004

Sunday	Monday	Tuesday	Wednesday

Reservations:

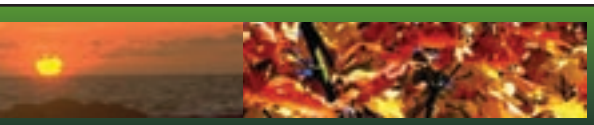
Reservations for technical meetings must be made or cancelled **by noon on the last business day before the event.** Voicemail is marked with the date and time it is made. If you make your reservation by email, a reply is sent confirming it. If you do not receive one, **assume it has not been** made and try again. Once name tags and lists are prepared, no more reservations can be added even if they are sent. **No shows will be billed.**

Make your reservations on-line through the HGS website at www.hgs.org; or, e-mail joan@hgs.org or call the office at 713-463-9476.

Members Pre-registered Prices:

General Dinner Meeting	$25
Env. & Eng.	$25
Luncheon Meeting	$28
International Explorationists	$25
North American Expl.	$25
Emerging Technology	$25
Nonmembers and walk-ups.	$30

4	**5**	**6** **HGS Executive Board Meeting**	**7**
11	**12** **HGS General Dinner Meeting** by Lane Sloan *"The Energy Image and Recruiting"* See page 13	**13**	**14**
18	**19** **International Exploratonists Dinner Meeting** by Scott E. Thorton, Peter Mullin, and David D.J. Stewart *"Brazilian Deep Water Fold Belts: Tectonic Drivers and Structural Styles of Potential Traps"* See page 14	**20** **Joint HGS/GSH General Luncheon Meeting** by John M. Jacques and Antony D. Price See page 19 **HGS NorthSiders Luncheon Meeting** by Kevin M. Bohacs See page 21	**21**
25 **NOW you can make your reservations on-line at www.hgs.org**	**26** **HGS North American Exploratonists Dinner Meeting** by Kent A. Bowker *"The Barnett Shale Play, Fort Worth Basin"* See page 25	**27**	**28**



GeoEvents

Thursday	Friday	Saturday
1 *Holiday HGS Office Closed*	2	3
8	9	10
15	16	17
22	23	24
29	30	31

Upcoming GeoEvents

January 20
AWG Houston Area Geoscientist Meeting
"Guatamalam Jade: Rediscovery and Geology" by Dr. Virginia Sisson
See page 7

Upcoming HGS Meetings

February 3
HGS Executive Board Meeting

February 9
HGS General Dinner Meeting

February 16
HGS International Explorationists Dinner Meeting

February 17
Northside Technical Dinner Meeting:
"Predicting the Stratigraphic Architecture of Carbonate Reservoirs" by Charles Kerans

February 23
North American Explorationists Dinner Meeting
"Helium Exploration - A 21st Century Challenge" by Steven Maione

February 25
HGS General Luncheon Meeting

CAST 2003 continued from page 31

Field trip organizers and leaders included: Adrian Eunson and Craig Gardner (ChevronTexaco), Marsha Bourque (HGS Director), Mark Richardson, Cara Davis, and Katrina Burroughs (ExxonMobil), Howard White, Tom Schultz, and Paul Schlirf (KerrMcGee), Michael Jones (Lee College), Alison Henning, Patrick Taha, and Alex Simms (Rice University), Dr. Carl Norman (professor emeritus University of Houston), Richard Howe (Terrain Solutions, Inc.), Terri Ficker, Teri MacArthur, and Wayne McWhirter (Texas Master Naturalists), Doug Smith (Harris County Extension Agent), Bob Scheidemann (Shell), Ginny Adamski (Texas Agricultural Extension Center), Kristine Brown (US Army Corps of Engineers), Neal Immega (Shell-retired), Nancy Engelhardt-Moore (GeoFixIt), Ed Rozenburg (ExxonMobil, Texas Ornithology Society), and Laura Zahm and Beverly DeJarnett (Texas Bureau of Economic Geology Houston Research Facility).

Marilyn Smith and Aram Derewetzky, ExxonMobil, presented a Saturday morning workshop Fossil, Mineral and Rock Identification. In addition, an earth science short course Discovering Plate Boundaries was given on Saturday afternoon by Dale Sawyer and Alison Henning, Rice University.

There were over three hundred exhibitors with booths showing current science texts, technology, science teaching modules and aids, and workshop materials. The HGS sponsored a booth in the general exhibition staffed by HGS members Jim Grubb (Huber Corp), Dennis McGraff, Craig Dingler, Marsha Bourque, and Janet Combes; ExxonMobil Science Ambassador Susan Brockley also assisted at the booth. The new K-12 exhibit panels, prepared by Jennifer Burton, Andrea Reynolds, Amy Sullivan, and Andrea Brown, with the support of their companies, Anadarko and Shell, had an overwhelming reception. Teachers wanted copies of the posters NOW, but had to settle for a response that the displays would be posted on the HGS website soon. Back issues of HGS *Bulletin* and copies of the Anadarko comic, EnerGenie, were rapidly distributed.

Keynote talks at CAST by science experts in non-geology fields included a Nobel Prize winner, an astronaut, the Director of Astronomy and Education Programs for the HMNS, the Deputy Director of Educational Programs at Johnson Space Center, and the Texas Education Agency's Director of Science and Assistant Director of Science Assessment Division. ■

2003 Shrimp Peel Attendance Up 30 Percent

Article and photography by ***Arthur E. Berman***

The 2003 HGS/GSH Shrimp Peel was a major success with attendance up by 30 percent from last year: 545 people attended compared with 420 in 2002. As before, the Shrimp Peel was held at Sam Houston Race Park in the Pavilion Centre on Friday, November 7. The Pavilion Centre has proved to be an ideal venue for the Shrimp Peel because it is a large indoor facility with a great view of and easy access to the race track's home stretch.

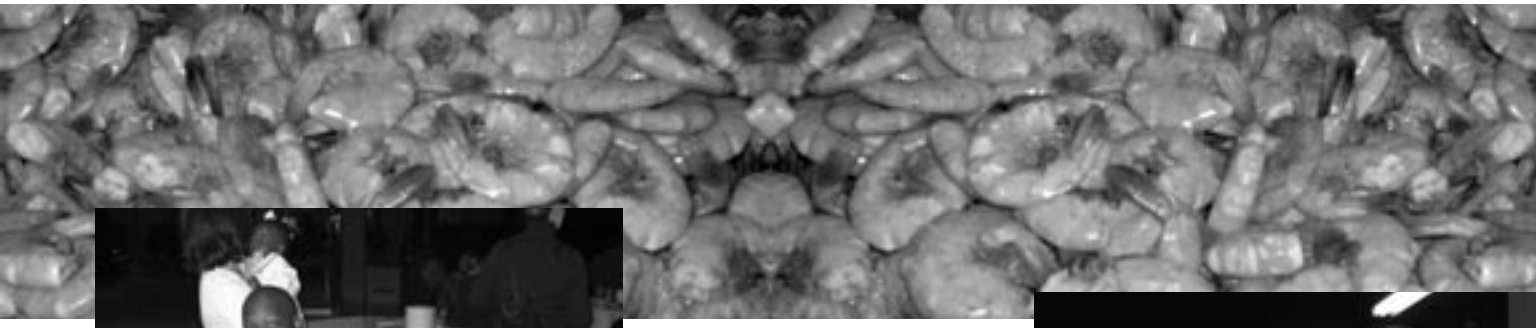
There were abundant boiled shrimp and other Cajun delights along with beer, soft drinks, and live music. The food was outstanding and live music was provided by "Nigel Edison and the Gulf Coast Outlaws," a Houston-area band that is making a big impression on the Texas country music scene. Everyone had a great time and some people even won money on the horse races. Other winners included our 25 door prize recipients, who were awarded prizes varying from gift baskets and gift cards to golf shirts and Rockets tickets.

The Shrimp Peel Committee, HGS and GSH thank all the sponsors of this event and encourage support for them from our members. Gold contributor sponsors are Dominion E&P, Ovation Data Services, Seismic Micro-Technology, Subsurface Computer Modeling (SCM), and VeritasDGC, Inc.. Silver contributors are Baker Atlas, Fairfield Industries, Hampson-Russell, NuTech Energy Alliance and PGS. *¡Muchas Gracias, folks!*

Also many thanks to the Shrimp Peel committee of Lee Shelton, Veritas, who served as chairman for the fifth year, and committee members Terry Neffendorf and Mac Olson, SCM, Kent Horstmann, SMT, and to our HGS/GSH office staff including Joan Henshaw, Lilly Hargrave and Nancy Frye for helping make this year's event a success. ■

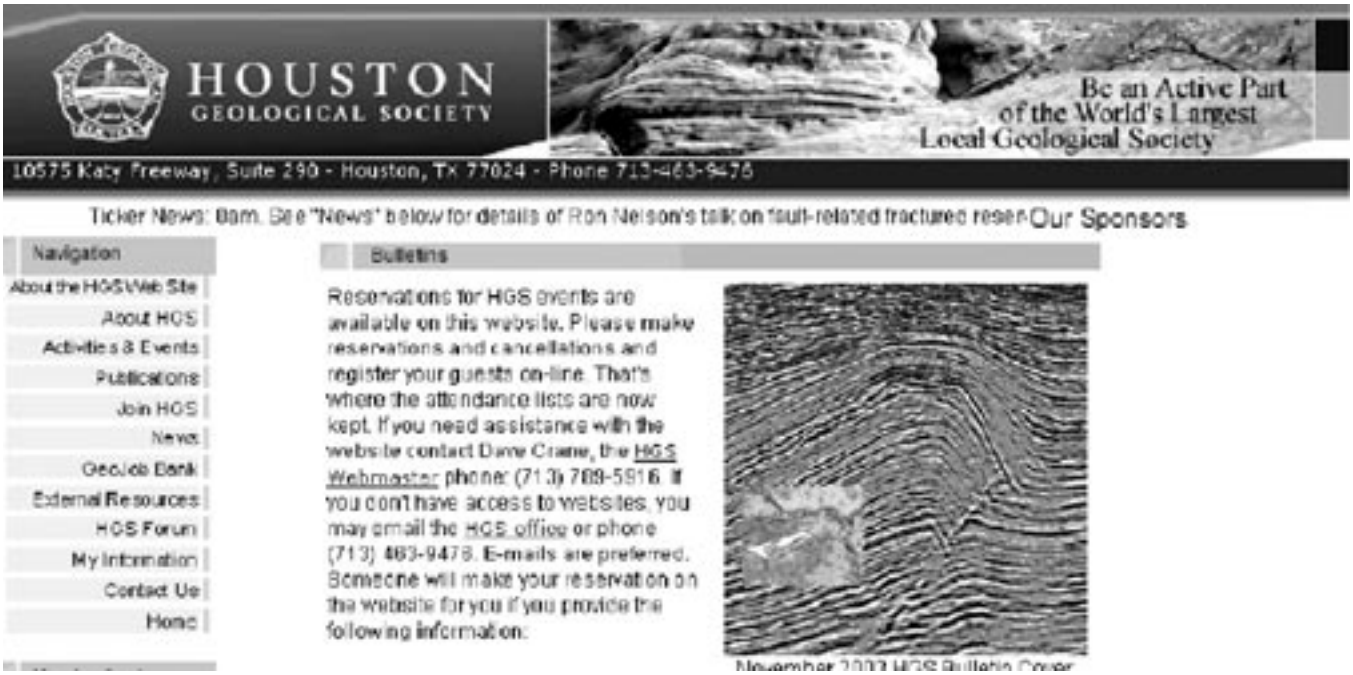
Make a note on your calendars that the *2004 Shrimp Peel* will be held in mid-October.

Left: Lee Shelton, Veritas, Shrimp Peel Chairman
Below: Terry Neffendorf, SCM, Shrimp Peel Committee Member



The HGS Website: A Closer Look

Article and photography by ***Arthur E. Berman***



http://www.hgs.org/, enter. I log onto the HGS Website and enter a virtual world where geology rules. Let's take a closer look at the Website and how to use it.

A visually arresting green headline banner with Society logo proclaims, "Be an Active Part of the World's Largest Local Geological Society." With 3611 active members that's a fact. Ticker news characters dance across the page: Deadline for pre-registration for the Northsiders' Technical Dinner Tuesday has been extended until Tuesday morning at 6:00 am. Great! It's not too late to register for Ron Nelson's talk on fault-related fractured reservoirs.

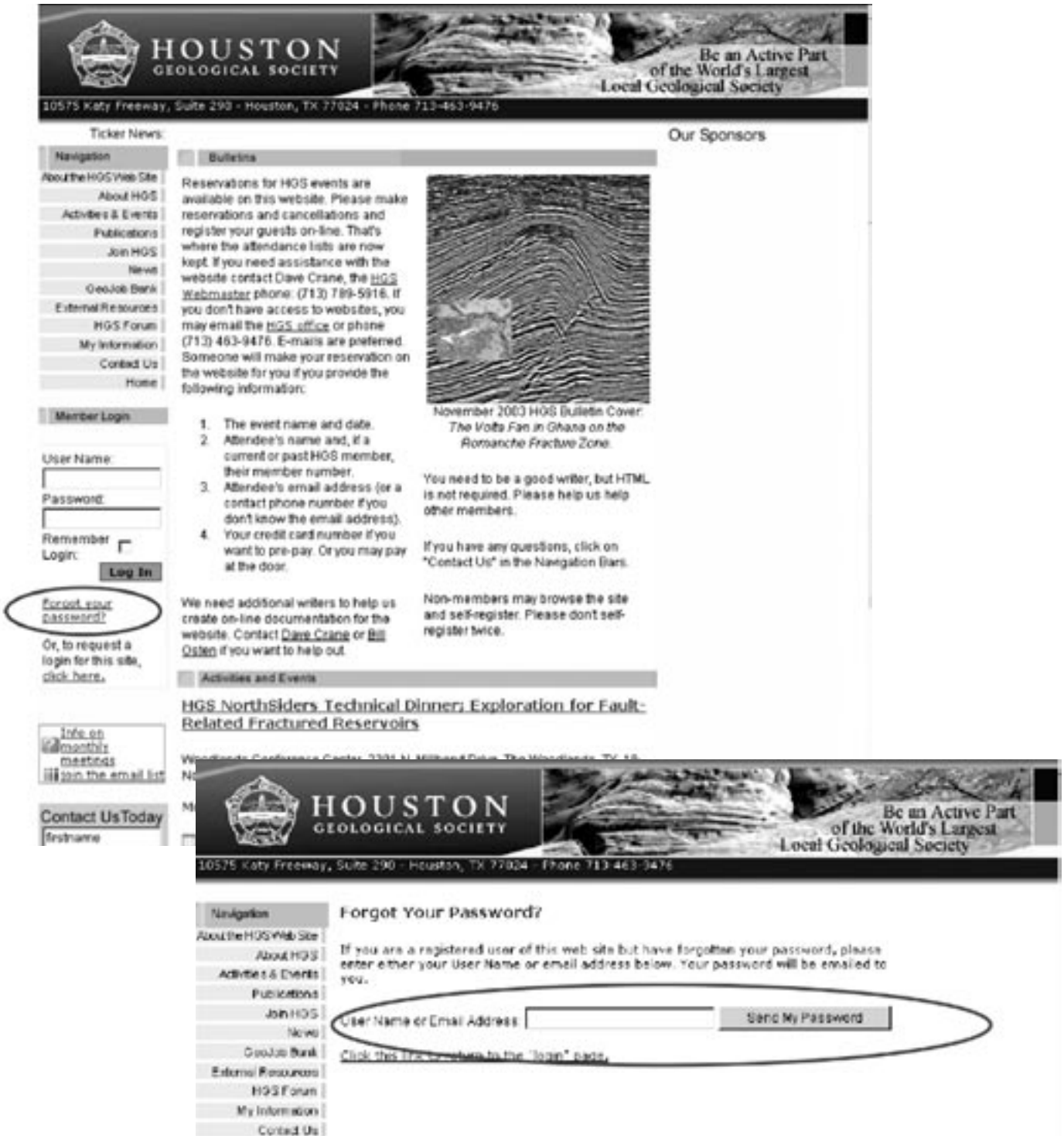
What I want to do is to register for Frank Peel's upcoming talk at the Joint North Amercan/International Explorationists Meeting, "Styles, Mechanisms and Hydrocarbon Implications of Syndepositional Folds in Deep Water Fold Belts: Examples from Angola and the Gulf of Mexico."

But first, let's walk through how you would go about activating your HGS member account and then sign up for an event, in this case the talk on deep water fold belts.

If you are an HGS member and have not activated your account, now is the time to do that. Every member has a Website account waiting to be activated. If you are an active or past member of the HGS there is no need to enter your member record information: this has already been done for you.

The HGS Website *continued on page 38*

The HGS Website continued from page 37



As a pre-registered user (current and former HGS members) click "Forgot Your Password" and submit your e-mail address when prompted.

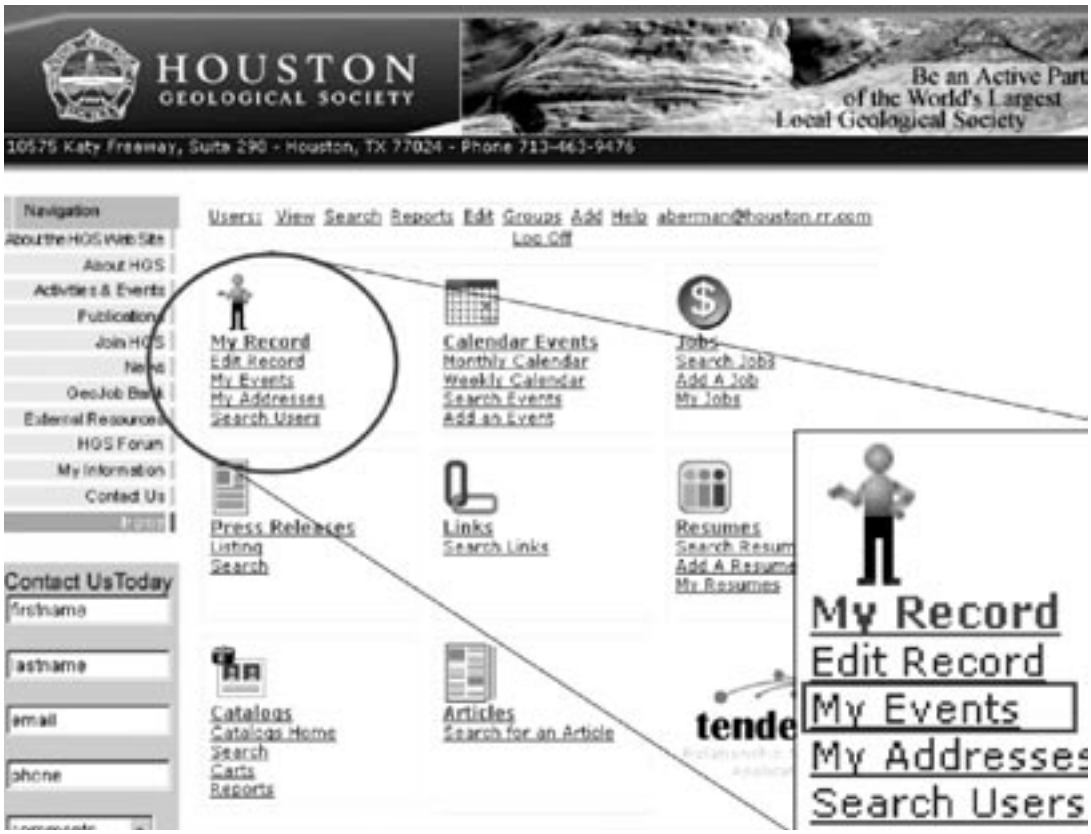
Your User ID and password will be sent to that e-mail address if the system finds a match.

Once you have received your user ID and password by e-mail, log on and enter your ID and password in the area indicated on the left.

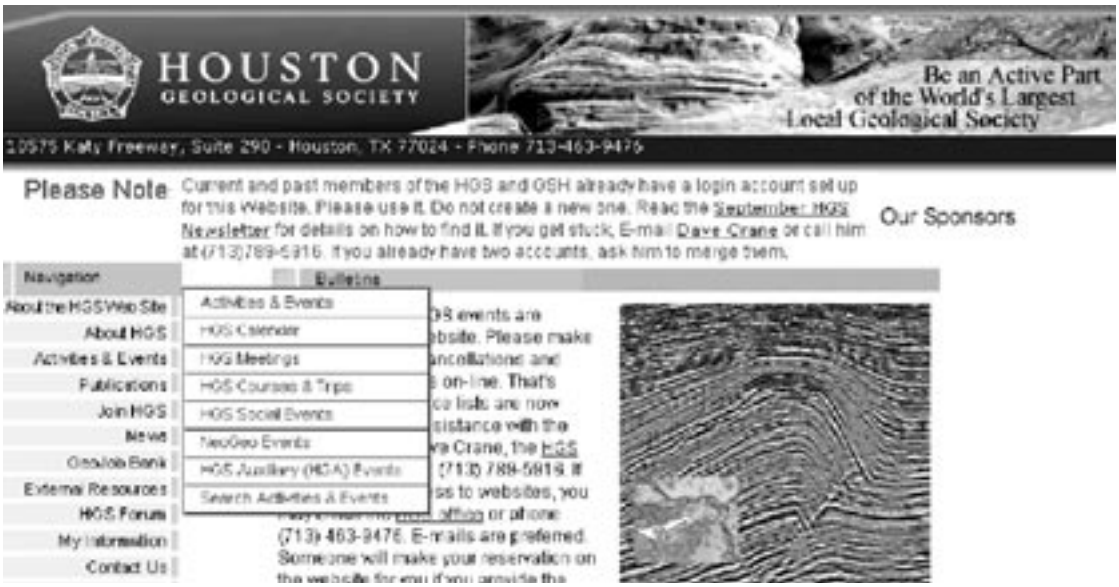
Check the "Remember Login" box and click "Log In" and you are taken to the User Screen.

Select from the "My Records" menu "My Events" and you will see all events, past and present, for which you have registered (but have not cancelled).

The HGS Website *continued on page 40*

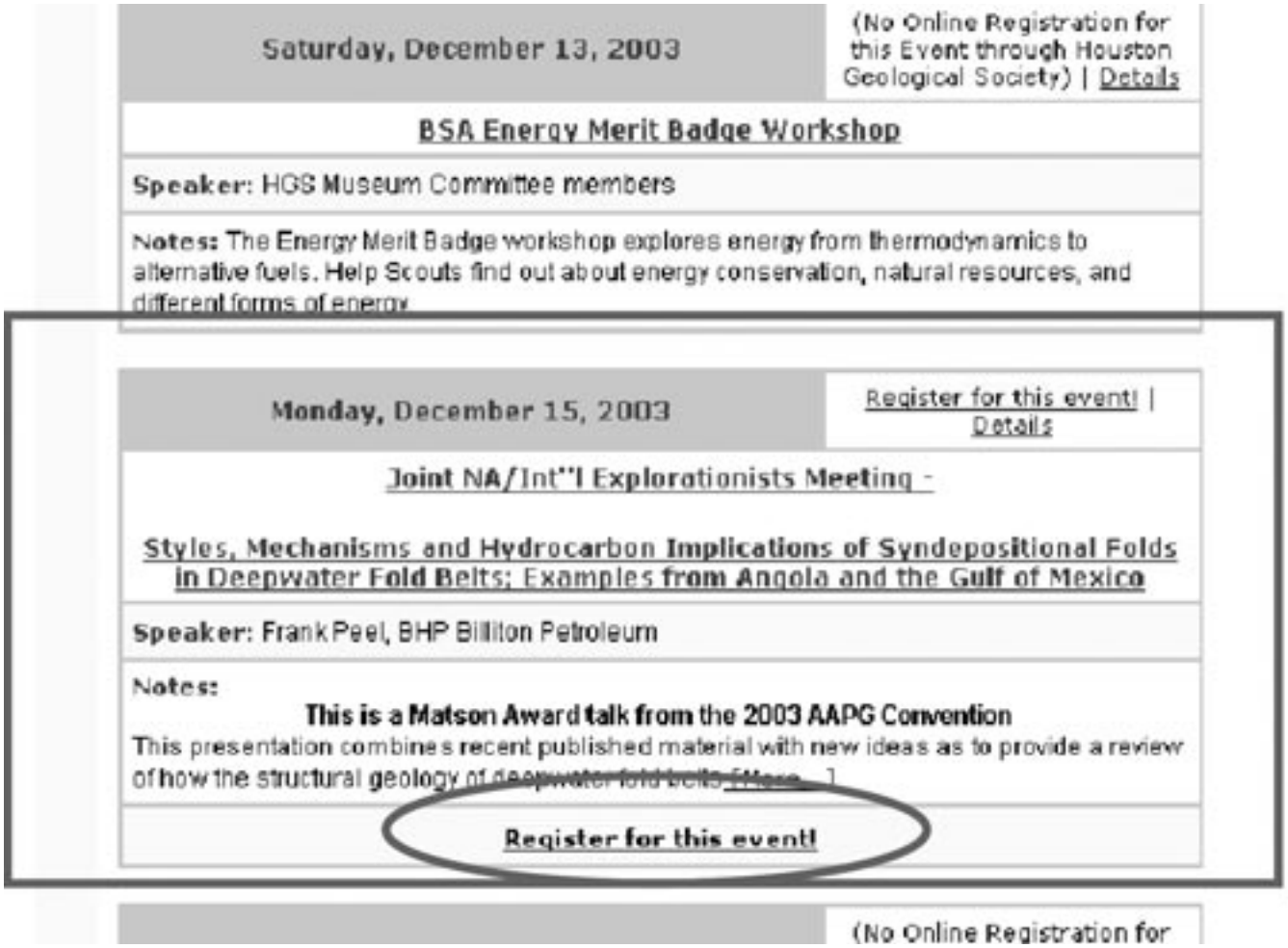


The HGS Website continued from page 39



Now to register for that talk on deep water fold belts: From any page, including the home page/logon page, I select "Activities & Events."

This takes me to the "Events List."



I scroll down until I see the event I am looking for and select "Register for this event":

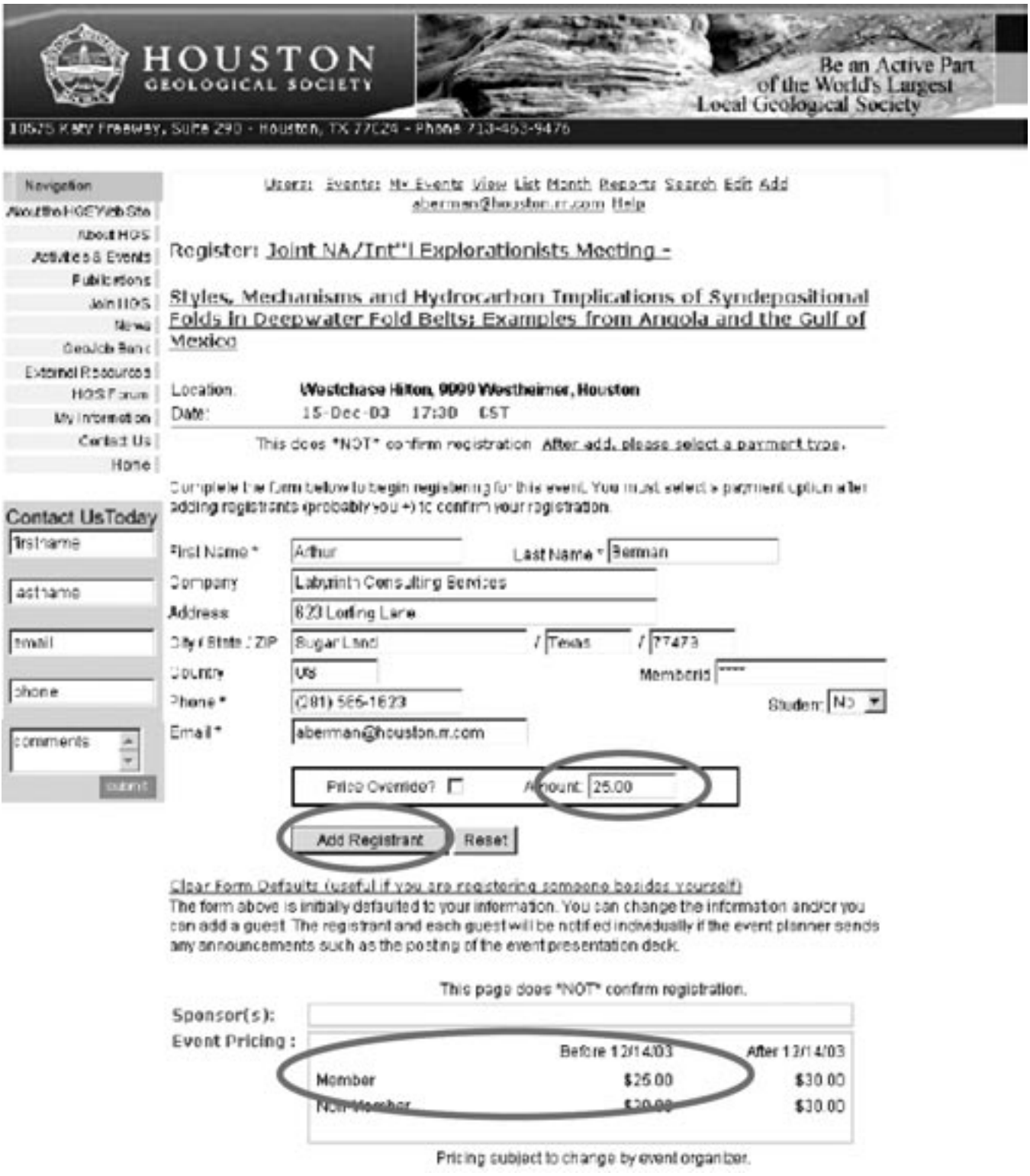
I re-enter my login information for access to the secure section of the site, check "Remember Login" if it is not checked, and then click "Log In."

The HGS Website *continued on page 43*

The HGS Website continued from page 41

Now I am ready to register. I check my member information and type $25.00 in the "Amount" box, which is my member price before 12/14/2003, and then click "Add Registrant."

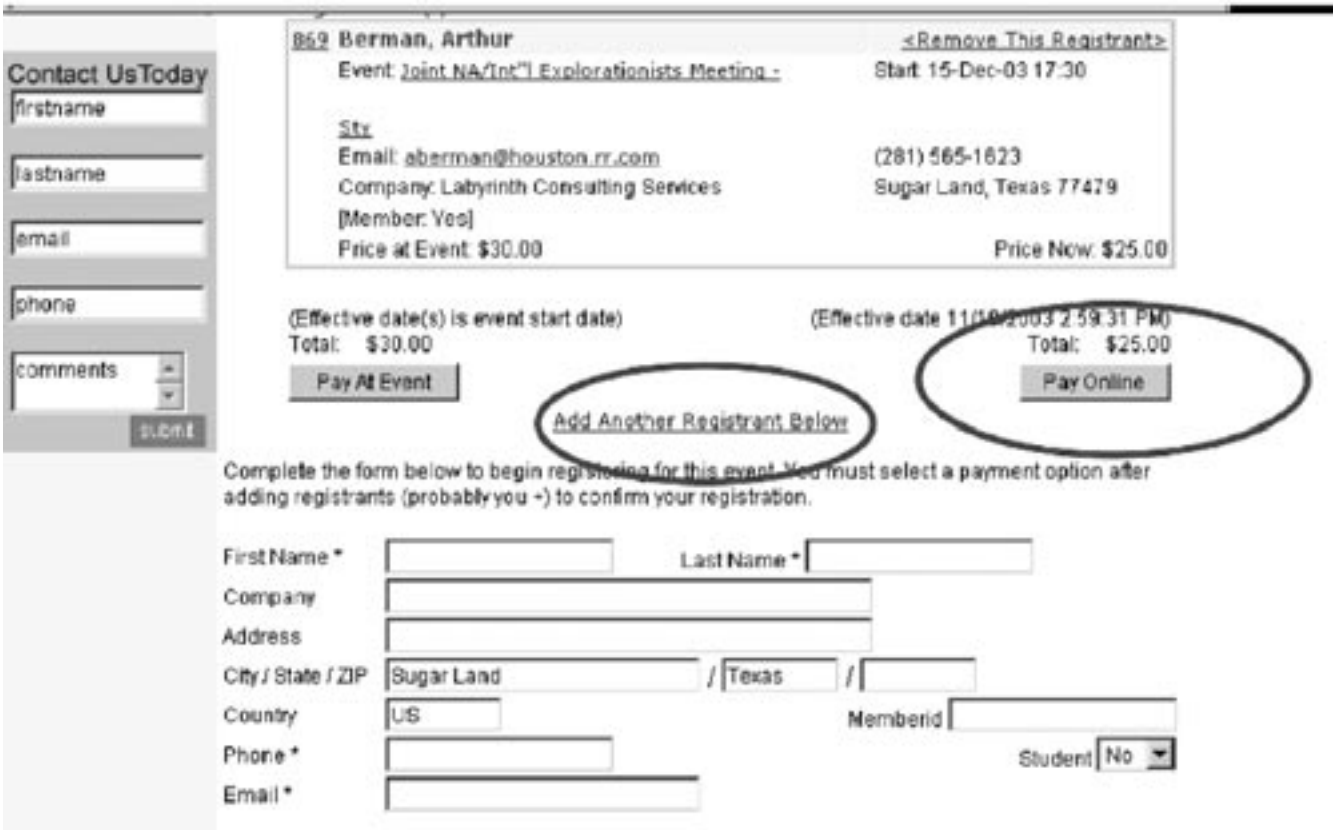
The HGS Website *continued on page 45*



The HGS Website *continued from page 43*

Next, I see my registration information. If I want to add another registrant, I can do so below. Otherwise I click "Pay Online."

The HGS Website *continued on page 47*



The HGS Website *continued from page 45*

Now I fill in my credit card information, click "continue" and view my confirmation.

An e-mail confirmation will automatically be sent to me along with a reference number. When I arrive at the talk everything should be ready for me to pick up my nametag and receipt and walk in with no further transaction at all! How cool is that?

Finding out about and signing up for HGS technical talks is now so easy and fast! It sure beats the "old" way of calling in to the office and making a reservation, then having to write a check or get cash to pay at the meeting itself. And it saves the HGS office staff an unbelievable amount of time and administrative work.

Now I can either choose from the list under "What would you like to do now?" or navigate from the Navigation area on the left and continue to explore and learn from the HGS Website.

The most active part of the HGS's Website is, not surprisingly, the GeoJob Bank. Let's see what's going on there.

I select "GeoJob Bank" from the Navigation area.

The HGS Website *continued on page 49*

The HGS Website *continued from page 47*

And I am taken to the GeoJob Bank. (Or I could simply type hgs.org/jobs in the address area).

There are many positions advertised here including data loaders, Manager Consulting Business Development, Seismic Processing Geophysicist, Exploration Development Geologist and many more. You can scroll down on your own and see them all.

The Job Bank averages almost 14,000 visits per month! This is one function of the Website that clearly fills a very important need for both job seekers and employers. People who post jobs on the Website can see how many people have looked at their job posting. The new on-line Business Card advertising format (Directory) and Member Resume feature have the same feature. Mike Cline, an HGS Website Committee member and HGS Employment Committee Chairman, has been instrumental in maintaining our outstanding jobs pages for several years.

The HGS Website is truly its window to the world. It is my window to the HGS world and beyond. It is also a window for the world to look in on the HGS. And lots of people all over the world are navigating the HGS Website every day to learn about technical talks and other events or looking for jobs and employees. From the middle of September to the end of that month, the Website had visits from over 23,500 people. Per day visits range from 1,150 on "slow" weekend days to over 2,500 visits on "heavy" weekdays. In October there were 56,500 visits. Visitors to the HGS Website come from all over the world. Most visits—over 7,000 per week—come from North America. European visitors account for about 1,500 visits per week. Asia and South America account for the third and fourth most common visits to the site with about 1,000 and 500 visits apiece, respectively.

Like much of what the HGS does the Website is a bellwether for the geoscience world and industry. The Website is the leader among other geoscience societies for both innovation and resources. It is also a commercial center where companies and vendors show their products and services, though the people behind the Website have consciously kept the commercial side of the site somewhat in the background for professional reasons.

What we see today as the HGS Website premiered this Fall when a major redesign was finished to give us the colorful and dynamic face. Working behind the scenes are the members of the Website Committee, many of whom have been building the Website since its beginning in 1997. Back then it was largely a collection of virtual brochures built and maintained mostly by Bill Osten and Dave Crane along with various members of The Computer Committee including Ken Aitken, Peter Fender, Inda Immega and Craig Moore.

Those who remember those bygone days logged onto the site at http://www.hougeo.org because a UK-based group owned the hgs.org URL (uniform resource locator). Luckily for the HGS, that other group forgot to renew its site name and we grabbed it! HGS member and Website Committee Chariman Bill Osten has been the driving force and chairman of the Computer and Website Committees for the better part of the last ten years.

The HGS Website *continued on page 51*

The HGS Website continued from page 49

Webmaster Dave Crane

Website Chairman Bill Osten

Deborah Sacrey

Mike Cline

Ed Schipul, Schipul Technologies, Inc.

Andrea Reynolds

Joan Henshaw

During Denise Stone's tenure as HGS President (2002–2003) the HGS Executive Board decided that the existing Website needed to be updated and given the interactivity that characterized other leading-edge sites. The Website was seen as an important link between job seekers and employers looking for skilled geoscientists. Dave Crane was hired as HGS Webmaster in April 2003 and, along with the Website Committee, was charged with giving the Website a sharper, more professional look and making it easier to navigate.

In addition the Board wanted to reduce the paperwork in the HGS organization. Now people can register and pay for technical talks and other HGS events electronically. Dave and the committee were asked to create means for companies to advertise products and services in a database-driven and interactive fashion. We can look forward to the time when members and officers will share ideas on HGS business and other important issues by using the forums capability that we now have. Soon we will all utilize the current Website resources to fill out membership applications and pay dues online. Someday we may even be able to vote for officers and board members online.

Website Committee members include: Dave Crane, Webmaster, HGS past president Denise Stone, Inda Immega, Bill Osten, Committee Chair, Andrea Reynolds, Deborah Sacrey, Mike Cline and Joan Henshaw. Also Ken Nemeth, Finance Committee Chair, and Scott Sechrist are on the Website Committee. Members Jim Ragsdale and Don Scherer have also helped. Ed Schipul of Schipul Technologies, Inc. has contracted much of the Website maintenance and mechanics along with committee members.

The new Website allows committee chairs and members to communicate with HGS members and visitors by submitting information to the Website that they want to share. Members and non-members can publish articles to the Website and post events to the calendar. Committee chairs can keep the public informed about their activities and members can post their resumes. Additionally, if the location or speaker changes at the last minute, the information on the Website can be quickly and easily changed and information follow-up can be accomplished.

What the Website needs now comes from you, the Society's members. First, start using the Website along with the *Bulletin* as your primary sources of HGS information. By making your event reservations and updating your personal information online frees the HGS office staff to do their many other important tasks. Second, volunteer to help the Website Committee by participating in the ongoing improvement of the site. The Committee needs good writers whether or not they know anything about Website mechanics and construction.

There is so much more to the HGS Website than has been mentioned in this article. The best way to see it is to log on, activate your member account (or join) and cruise! The Website still has many areas that can be improved, updated or otherwise changed in response to member and user feedback. In short, it is and will ideally always be a work-in-progress, constantly changing and expanding to meet the needs of the organization. It is our organization's window to the world and right now, thanks to a lot of people's hard work and vision, it's waiting for you to take a closer look! ■

HGA *and* GeoWives **News**

*by **Anne Rogers,** Third Vice President*

Happy New Year, everybody. How fast the fall went by with so many activities for us. As always, when we visit the Great Caruso, we were quickly put into the Holiday spirit, enjoying the show and the luncheon. A special thank you to Ginger Oil Company, TEXON LP and Spartan Petroleum Corporation for helping to underwrite this event for us. Suzanne Howell and Dorothy Cooke and their committee did a great job.

Now we are ready to move into 2004 and look forward to the spring, which comes early in Houston. Our first event of the year is our Bridge/Game luncheon at the Junior League, on Monday, February 16, 2004, at 10 a.m. As usual, Daisy Wood and her committee will be organizing it so we can be sure of having lots of fun and a really enjoyable day. Feel free to make up a group to play your favorite board or card game. For those of you who would like to come but have no game expertise, the chicken-foot domino group is the place for you! Spouses and guests are welcome. Contact Daisy at 713-977-7319 for reservations.

We have been happy to welcome new members to HGA this fall and encourage spouses of any HGS members to join us at any time of the year. We meet in September, December, March and May with the Bridge/Game Day in February.

GeoWives

We had a very busy and happy Holiday Season with carol singing and a delightful evening at the lovely home of Jim and Daisy Wood.

Looking forward to the New Year, we will have a review of humorous books by Margaretta Bolding on January 21, 2004. For details of time and location please call Debra Munsell at 832-249-9442.

February 11 we will visit the Museum of Fine Arts to enjoy the work of Matthew Richie and Anne Wilson, followed by lunch at the Café Express.

March 11 will be our annual day trip with Martha Lou Broussard and Linnie Edwards, returning to Brenham to continue the history of Sam Houston.

GeoWives meets monthly from September to May. This smaller group is designed to make newcomers feel welcome and introduce them to a few members at one time. GeoWives accepts new members at any time of the year. This is a good way to make friends if you are new to the city. Only members of HGA are eligible to join,

Geowives *continued on page 51*