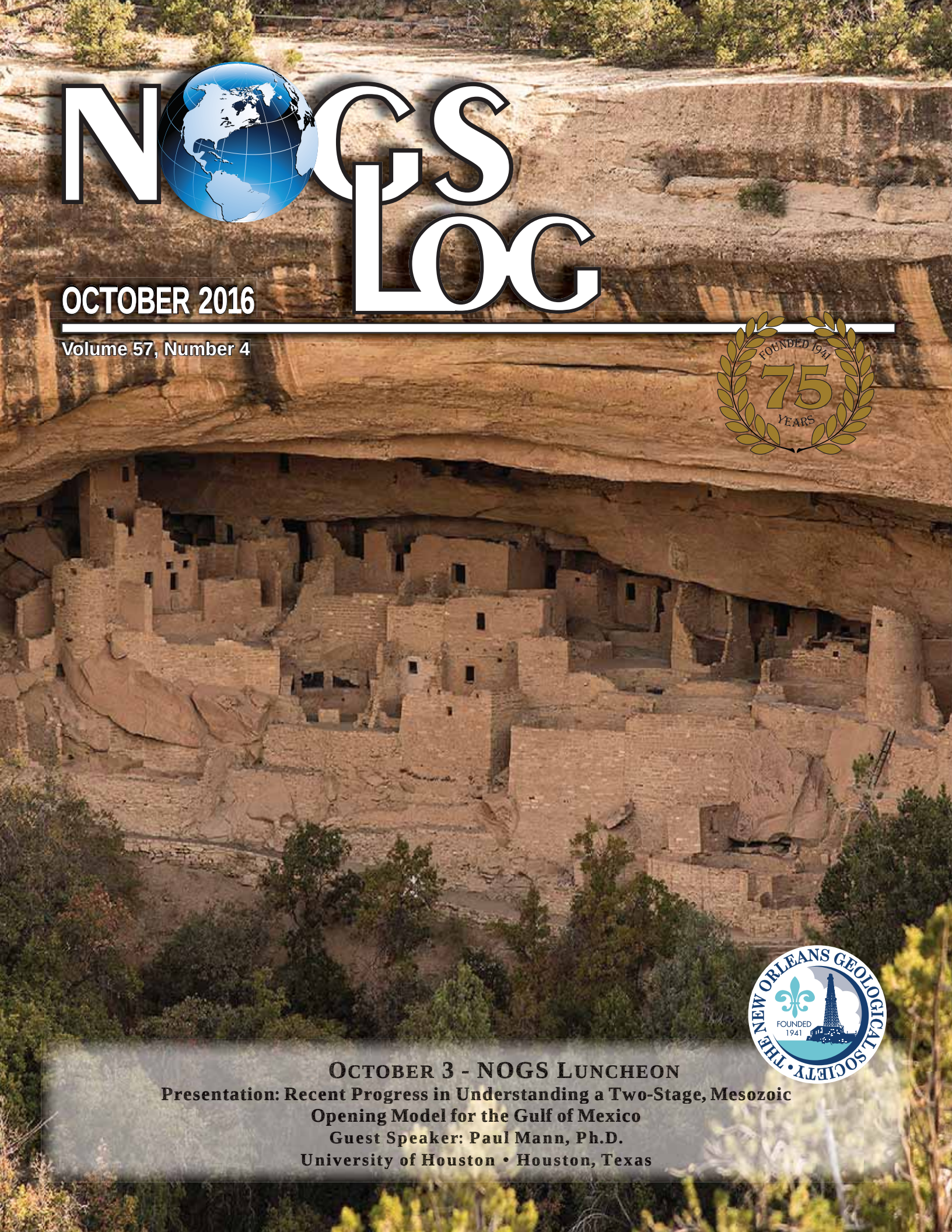

NOGS LOG

OCTOBER 2016

Volume 57, Number 4

FOUNDED 1941 75 YEARS

THE NEW ORLEANS GEOLOGICAL SOCIETY • FOUNDED 1941

OCTOBER 3 - NOGS LUNCHEON

Presentation: Recent Progress in Understanding a Two-Stage, Mesozoic Opening Model for the Gulf of Mexico

Guest Speaker: Paul Mann, Ph.D.

University of Houston • Houston, Texas



46th Annual New Orleans Gem and Mineral Show

Gem & Mineral Society of Louisiana, Inc.

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Published monthly by the New Orleans Geological Society. This issue was sent to press on September 20, 2016.

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IN THIS ISSUE

Regular Features:

Special Features:

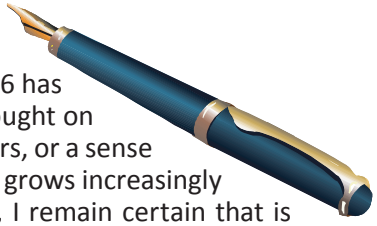
on the cover

Cover Photo from NASA Earth Observatory
Submitted by Tom Klekamp

Mesa Verde Cave Dwellings — Mesa Verde, Colorado

Carved into the aptly named Cliff House Sandstone, the Pueblo dwellings at Mesa Verde, CO represent one of the most famous examples of Native American archeology in the American West. This complex consists of nearly 150 rooms constructed out of the Cretaceous aged sandstone in the late 1190s by the Ancestral Pueblo transitioning from dwellings on top of the mesa into the sheltered rock alcove. The National Park Service notes that area is a mesa in name only as the southward dipping nature of the structure actually makes it a cuesta. The ancient Pueblo people took advantage of the shelter presented by the naturally forming recesses into the steeper flanks of the cuesta. With erosion driven primarily by dissolution action of seep springs within the sandstone, the alcoves took on a pronounced c-shape with the roof supported by the more resistant shale cap rock. Most of the sedimentary formations within the national park were deposited during the transgressive and regressive sequences of the Western Interior Seaway, an epeiric sea that opened during the subduction of the Farallon Plate and extended from the Gulf of Mexico to the Artic Ocean.

From the Editor



Though October hardly marks the close of the calendar year, it feels fair to say that 2016 has largely been a challenging year. Whether we're talking about professional uncertainty brought on by the oil downturn, personal anguish at the devastation wrought by the recent flood waters, or a sense of weariness bordering on cynicism at the vitriolic tone of public discourse in our nation, it grows increasingly easy the feel borne down by the full weight of the past few months. Despite all of this, I remain certain that is possible for a small number of dedicated people to enact real change. As many of our members reenter the job search after falling victim to industry layoffs, I've seen NOGS geologists reach out to them and ask, "How can I help?" When a longtime member of NOGS found her home inundated by the August floodwaters, NOGS geologists showed up and asked, "How can I help?" At a time when political divisions threaten to overwhelm longstanding bonds founded in common interest and mutual respect, NOGS geologists remain committed to public service for vital affairs like the SLFPA-W and other public works programs dedicated to flood control and coastal restoration. I recognize the challenging realities we face in an increasingly complex world, but the recent months have convinced me that our community is well equipped to face these challenges in whatever form they may come as long as we continue to support one another professionally, personally, and compassionately.

Laura

Laura Sorey, *Editor*

NOGS LOG

Contact:
Annette Hudson
info@nogs.org

2016 ADVERTISING RATES

The New Orleans Geological Society was formed in 1941, with an initial membership of only 55. It has always been an active professional society and presently has a membership of 500.

AD SIZE	2015 RATE	NEW 2016 RATE!
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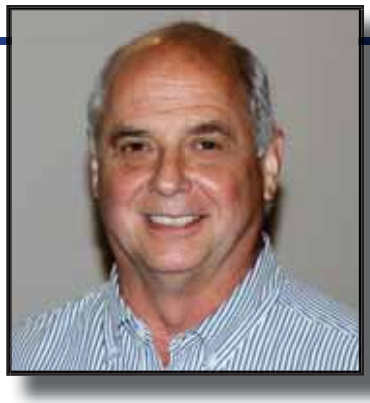

From the President

As if the effects of the prolonged downturn in the industry weren't enough, NOGS members in Baton Rouge and north of there had to deal with the effects of the Great Flood of 2016 that, according to NOAA, dumped up to thirty-one inches of rain in Watson and "only" nineteen inches in Baton Rouge. Several of us had heard that NOGS members Kathy and Kelly Haggar had two feet of water in their house and needed help cleaning up the resulting mess. We decided to see if any other NOGS members were in need of assistance and to ask for volunteers to help with the cleanup. The good news is that no one else responded to the email I sent out. Hopefully, that means no other members' homes were flooded. Additional good news is that eleven NOGS members and friends or family members stepped up to help out Kathy and Kelly.

I would like to thank all those who responded to the call for volunteers: Ken Huffman of LaBay Exploration who also worked on at least two other flooded homes that I know of, LSU Student member Rachel Thomason and her friend Miriam Toons whose house in Denham Springs was flooded up to the roof, UNO Student member Shara Gremillion and her mother Vickie Gremillion, Anna Strimas of Environmental Auditors and her fiancé Juan Carlos Rojas, Bill Haworth and his daughter Carolyn Haworth Lesieur, and my wife Genny and I also spent a day cleaning up the mess. There are pictures on pages 14 and 15 that show what it looked like.

NOGS will sponsor a field trip titled "Geological Facts of Life for Flood Protection" on Saturday, October 29 to examine part of the hurricane levee protection system designed and built following Hurricanes Katrina and Rita as a line of defense for the greater New Orleans area. The trip will focus on the stratigraphic and structural elements that make up the subsurface of southeastern Louisiana and how they affect the integrity of civil engineering projects. NOGS member Mike Merritt will lead the trip. Mike is an outgoing Commissioner of the Southeast Louisiana Flood Protection Authority-West and an extremely knowledgeable authority on the subject. We will meet no later than 8:30 a.m. to listen to Mike's introductory lecture, make three site stops and a lunch, and return by about 4:00 PM. SLFPA-W will provide travel vehicles and NOGS will provide guidebooks to all participants. The trip costs $35 to cover NOGS expenses. For more information, see page 12 of this issue.

By the time this goes to press, most of the arrangements for the field trip will have been completed. Nevertheless, we still need someone to chair the Field Trip Committee. By volunteering now, you can see what it takes to prepare for a successful field trip without getting swamped. This Chair would be providing a great service to NOGS members especially since field trips are an essential part of learning about geology. Also, we still are searching for members to chair the Membership and Publicity committees. These are also vitally important committees. Remember that numerous current and past volunteers will assist new volunteers to help share the load. You will only have to spend a few hours a month on this, but the impact to NOGS is great. Thanks.

Al Melillo

THE NEW ORLEANS GEOLOGICAL SOCIETY

NOGS Office

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Phone: 504-561-8980 • Email: info@nogs.org • Website: www.nogs.org
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UPCOMING

October 3 • NOGS Luncheon

Holiday Inn Downtown Superdome

$3.00 validated parking in hotel garage

Presentation:

Recent Progress in Understanding a Two-Stage, Mesozoic Opening Model for the Gulf of Mexico

Guest Speaker:

Paul Mann, Ph.D.

University of Houston • Houston, Texas

See pages 8 & 9 for Abstract and Biography

HOLIDAY INN DOWNTOWN SUPERDOME
Check with concierge or
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Lunch served at 11:30 am

ADMISSION:
With reservation..... $30.00
Without reservation $35.00
Student Member with reservations..... FREE

October 9-15

Earth Science Week 2016 - "Our Shared Geoheritage"

Since October 1998, the American Geosciences Institute has organized this national and international event to help the public gain a better understanding and appreciation for the Earth Sciences and to encourage stewardship of the Earth. This year's Earth Science Week will celebrate the theme "Our Shared Geoheritage." Geoheritage is the collection of natural wonders, landforms, and resources that have formed over eons and come to this generation to manage, use, and conserve effectively. Geoheritage locations are valued for many reasons, including scientific, economic, ecological, educational, cultural, aesthetic, artistic, and recreational purposes. Earth Science Week 2016 learning resources and activities engage young people and others in exploring geoheritage throughout the Earth systems, including the geosphere, hydrosphere, atmosphere, and biosphere. This theme promotes public understanding and stewardship in many areas, including Earth science, energy, paleontology, water quality, conservation, and climate science.

For more information, www.earthsciweek.org/geoscience-education

October 14-16

46th Annual New Orleans Gem and Mineral Show

Alario Center • 2000 Segnette Blvd. • Westwego, LA

For more information, www.facebook.com/GemAndMineralSocietyOfLouisiana/

Announcement on page 2 of this issue

October 29

NOGS Fall Field Trip

SLFPA-W Headquarters • 7001 River Rd. • Marrero, LA

For more information and registration, email info@nogs.org

Article on page 12 of this issue

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Continued from previous page

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Oct. 3 NOGS Luncheon Presentation

☆ ☆ ☆ at the Holiday Inn Superdome ☆ ☆ ☆

Recent Progress in Understanding a Two-Stage, Mesozoic Opening Model for the Gulf of Mexico

Presented by

Paul Mann, Ph.D.

Dept. of Earth and Atmospheric Science
University of Houston
Houston, Texas

ABSTRACT

I will review opening models for the Gulf of Mexico (GOM) in light of our own studies of integrated studies of gravity, magnetics, and interpretation of seismic reflection lines. Most previous workers agree that the first phase of syn-rift GOM opening is late Triassic-early Jurassic (235–174 Ma) in age, NW-to-SE in extension direction, and responsible for creating a broad zone of thinned, continental crust along the northern margin of the GOM and underlying the northern salt basins of Texas, Louisiana and Mississippi. This Late Triassic-early Jurassic rift zone is an along-strike continuation of Triassic rifts present along the eastern margin of North America, but in the northern GOM area these rifts failed to culminate in production of a parallel and contiguous zone of oceanic crust. Progress has been slow in understanding the early history and crustal structure of this area in the GOM due to the obscuring presence of an overlying sag basin of post-early Jurassic age filled by 3–4 km of depositional salt (now remobilized).

The second and much better understood phase of GOM opening is late Jurassic (156–145 Ma) and post-salt in age and formed a large expanse of salt-free, Jurassic oceanic crust underlying the deepwater GOM shared by the US, Mexico and Cuba. This second late Jurassic opening phase occurred along a highly arcuate slow spreading ridge system now precisely imaged on basin-wide, satellite gravity maps. We have georeferenced our grid of deep-penetration seismic and well data in the EGOM along with recent refraction studies to both ground-truth these satellite images and provide details of the early breakup and separation. The eastern and NE GOM continent-ocean boundary defined by deep seismic profiles is within 20 km of that inferred from satellite gravity. Gravity and magnetic models are used to constrain the location and shape of the deeply-buried, Jurassic age, and right-lateral Main Western transform fault that sharply defines the continental edge of eastern Mexico (Nguyen and Mann, 2016). We have used the shape of the satellite-imaged fracture zones in the central Mexican GOM along with the shape of the Main Western transform fault to improve the pole position for this second phase of GOM opening which is located in the Straits of Florida. This pole restores trends of Paleozoic crustal fabric in Florida and the Yucatan Peninsula imaged on gravity and magnetic maps to pre-rotation parallelism along with reuniting the now widely separate US Louann salt basin and Mexican Campeche salt basin. This pole position is used to create a kinematic plate model for the second phase of GOM opening that respects all available seismic reflection, refraction, well, and satellite imagery.

Implications for deepwater exploration from this work include: 1) more precise locations of the continent-ocean boundaries in the US, Mexican and Cuban maritime zones; 2) the locations of passive margins overlying rifting margins versus those passive margins overlying "transform passive margins" and their consequent effects on heat flow and passive margin subsidence; and 3) the question of whether or not late Jurassic source rocks and petroleum systems can exist on the extensive, deepwater area of oceanic crust formed during the second stage of GOM opening.

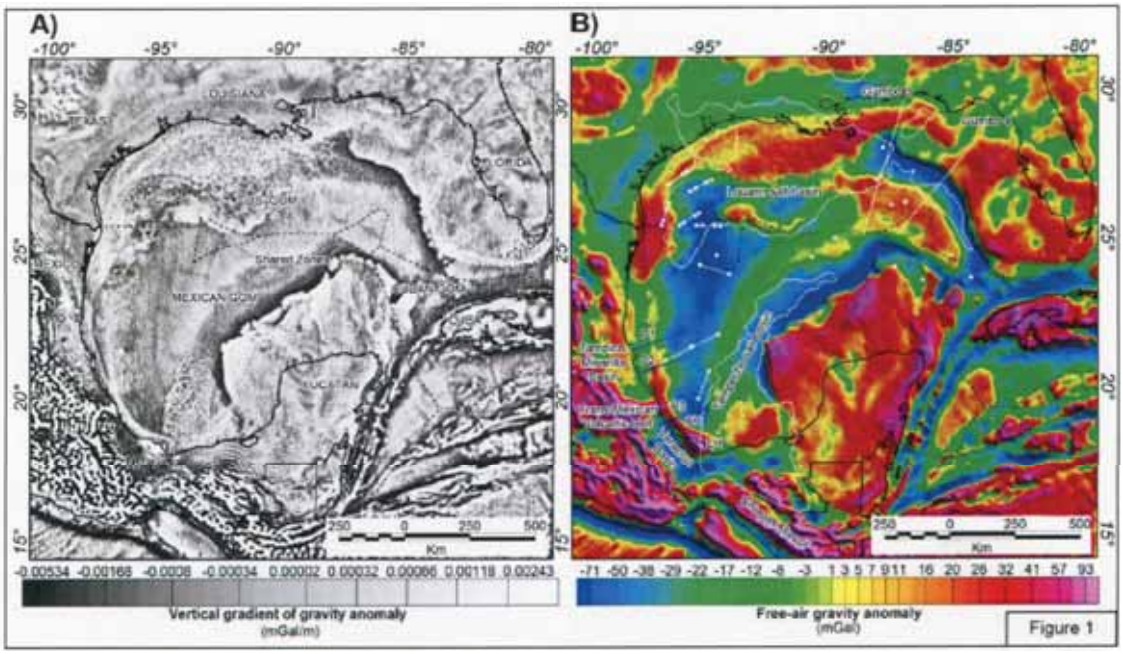

Figure 1. (a) Geographic setting of the GOM with an overlay of the vertical gradient of gravity anomaly from Sandwell et al. (2014) showing a slightly darker, linear expression of the extinct, deeply buried, Jurassic ridge-fracture zone system occupying the center of the deepwater GOM. (b) Overlay of the same area showing the free-air gravity anomaly, also from Sandwell et al. (2014). Onshore data are derived from the EGM2008 geoid model (Pavlis et al., 2012). The dashed white outline represents now-separated areas of the northern Louann salt basin in the U.S. GOM and the southern Campeche salt basin in the Mexican GOM. The white dots are seismic refraction stations from Ibrahim et al. (1981) and Nakamura et al. (1988). Gumbo 1, 3, and 4 are refraction profiles fromVan Avendonk et al. (2015), Eddy et al. (2014), and Christeson et al. (2014), respectively. AH is Anegada high volcanic field, and LH is Los Tuxtlas high volcanic field. Profiles 1, 2, and 3 are modeled gravity profiles shown in Figure 6a–6c.

BIOGRAPHY

Paul Mann is a professor of geology and Robert E. Sheriff Endowed Chair at the Department of Earth and Atmospheric Sciences of the University of Houston. He was previously a senior research scientist and lecturer at the University of Texas at Austin. He received his Bachelor of Arts in geology from Oberlin College and his Ph.D. in geology from the State University of New York at Albany. His main interests are tectonics, basin analysis, and petroleum geology. He is the principal investigator of an oil industry-funded consortium at the University of Houston called CBTH that conducts basin-scale mapping and modeling in the Gulf of Mexico, Caribbean, northern South America, conjugate margins of the South and Central Atlantic, and East African margin. The project currently employs 18 University of Houston geology and geophysics students at the graduate and undergraduate level who work on a variety of research projects along with maintaining a GIS surface and subsurface database for the CBTH study area.

THE LUNCHEON RESERVATION DEADLINE IS SEPT. 30 - CONTACT THE NOGS OFFICE

"And Looking Ahead . . ."

The next luncheon will be held on November 7. Our guest speaker, Jon Rotzien of Houston's Basin Dynamics, LLC, will present "Application of Global Outcrop Belts to Exploration and Field Extension in the Deepwater Gulf of Mexico." Contact the NOGS office at 504-561-8980 or use the PayPal link at www.nogs.org to make your reservation.

CALENDAR OF EVENTS: OCTOBER — NOVEMBER 2016

***Editor's Note on Calendar Events**: In the spirit of the NOGS mission to engage with students, the NOGS LOG calendar will begin featuring guest lectures and seminars of note hosted by local universities and schools. Just as we want students to attend NOGS luncheons, I encourage NOGS members to take advantage of these opportunities for continuing education and support south Louisiana schools with your attendance and participation. If you know of upcoming seminars or academic events that may be of interest to our members, please email the event details to Laura Sorey at nogseditor@gmail.com to be included in the monthly calendar.*

2016	EVENT	LOCATION	CONTACT / INFO
3 Oct	**NOGS Luncheon Paul Mann, Ph.D. University of Houston "Recent Progress in Understanding a Two-Stage, Mesozoic Opening Model for the Gulf of Mexico"**	Holiday Inn Superdome	annette@nogs.org or 504-561-8980
8-19 Oct	Earth Science Week		www.earthsciweek.org/geoscience-education
10 Oct	Columbus Day		
14 Oct	BRGS Luncheon	Baton Rouge Mike Anderson's Seafood	lisapultz@cox.net
14-16 Oct	46th Annual New Orleans Gem and Mineral Show Gem & Mineral Society of Louisiana, Inc. Doors open at 10:00 a.m.	Alario Center 2000 Segnette Blvd. Westwego, LA	www.facebook.com/GemAndMineralSocietyOfLouisiana
21 Oct	Tulane Seminar Series Dr. Scott Tyler "It Used to be Like Watching Paint Dry: Measuring the Rate of Antarctic Shelf Glacier Melting" University of Nevada	Noon Room 108 - Jones Hall	www2.tulane.edu/sse/eens/events-and-seminars/seminars/index.cfm
21 Oct	LSU Wilbert Lecture Dr. Hank Frankel Topic TBA University of Missouri	LSU Baton Rouge E137 Howe-Russell-Kniffen	www.lsu.edu/science/geology/seminars/item72050.php
28 Oct	Tulane Seminar Series Dr. Chris Hayes "Deriving Dust Deposition to the Ocean Using Thorium Isotopes from Season to Millennia" USM	Noon Room 108 - Jones Hall	www2.tulane.edu/sse/eens/events-and-seminars/seminars/index.cfm
28 Oct	LSU Wilbert Lecture Dr. Rob DeConto Topic: TBA Umass-Amherst	LSU Baton Rouge E137 Howe-Russell-Kniffen	www.lsu.edu/science/geology/seminars/item72050.php
29 Oct	NOGS Fall Field Trip Trip Leader: Honorable Michael L. Merritt, LPG Southeast Louisiana Flood Protection Authority-West	SLFPA-W Headquarters 7001 River Road Marrero, LA 8:30 a.m.	info@nogs.org
31 Oct	Halloween		
7 Nov	**NOGS Luncheon Jon Rotzien Basin Dynamics, LLC "Application of Global Outcrop Belts to Exploration and Field Extension in the Deepwater Gulf of Mexico"**	Holiday Inn Superdome	annette@nogs.org or 504-561-8980
8 Nov	Election Day		
11 Nov	BRGS Luncheon	Baton Rouge Mike Anderson's Seafood	lisapultz@cox.net
24 Nov	Thanksgiving Day		

NOGS FALL FIELD TRIP

Photo credit Dr. Mathewson, ASBOG Field Trip Coordinator. Field Trip Stop 2 on April 9, 2016.

Led by Mike Merritt of the SLFPA-W, this year's NOGS Field trip will examine West Bank flood control structures. Part of this expedition will point out landform areas likely to lose elevation and encourage the sea to advance upon the coast. Rapid geologic reviews investment in the projected lifetime of flood protection public works projects currently projected to last until the 2050s. With new geological information about the stability of levee foundations and the location of previously unrecognized geo-hazards, we are able to strengthen the system, while encouraging more effective system operation and focusing maintenance to avoid costly waste.

The mission of the Southeast Louisiana Flood Protection Authority-West (SLFPA-W) is to protect the citizens and businesses of the West Bank from hurricanes and riverine flooding by inspecting, operating, and maintaining the integrity of our levees, floodwalls and floodgates. SLFPA-W is composed of the West Jefferson Levee and the Algiers Levee districts, with jurisdiction over eighty miles of levees, forty-seven of which are part of the Hurricane Protection System and thirty of which are Mississippi River levees. Since 2006, all of the Authority's levees and floodwalls have been improved for the protection of residents in south Louisiana. For more information, visit www.slfpaw.org.

- Date: Saturday, October 29, 2016
- Location: SELFPA-W Headquarters; 7001 River Rd, Marrero, LA.
  Directions: Take Westbank Expy (US 90), Exit Barataria Blvd (La 50), head north to River Rd (La 541), turn left and proceed 1.5 miles to SLFPA-W HQ Bldg.
- Time: Coffee and donuts at 8:30.
  Presentation begins 9:00 am with transportation afterwards provided by SLFPA-W.
- No extended hiking or walking is necessary. People with handicaps can be accommodated. Please inquire beforehand.
- Three stops showing geological effects on critical engineering structures
- Trip leader: Mike Merritt, SLFPA-W Commissioner and licensed professional geologist
- Includes: Field Trip Guidebook for participants and 6 CEU credits for PG requirements
- Cost per person: $35 which covers the printing of the Field Trip Guidebook
- Attendees buy their own lunch at Captain Larry's Seafood in Belle Chasse
- Return to SLFPA-W headquarters no later than 4:00 pm
- Space is available for 32 participants. Register early at info@nogs.org

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NOGS Flood Recovery

NOGS President-Elect Kathy Haggar and her husband Kelly were one of the nearly 110,000 households to suffer damage in the August floods that devastated broad swathes of south Louisiana. When the flood waters receded from their Baton Rouge home, a group of NOGS members and friends were there to help with those first steps of recovery. Whether carrying debris out to the curbside, tearing up sodden floor boards, or cutting out soaked wall insulation, these individuals helped any way they lighten the heavy burden of recovery after a flood.


20th Annual Gulf of Mexico
Deepwater
Technical Symposium
August 17-18, 2016
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20th Annual Gulf of Mexico
Deepwater
Technical Symposium

South Louisiana and Offshore Gulf of Mexico Exploration and Production Activities

LAFAYETTE DISTRICT, ONSHORE AREA

By Kevin Trosclair and Carlo C. Christina

The Baker-Hughes United States rig count for the week of August 29 was 472, rigs, down from 847 rigs a year ago, however this is an increase of 9 rigs from last month. The US rig count has increased over the past three months from a low of 380 rigs in May. The rig count for Louisiana (not including the OCS) was 26 rigs, down 2 rigs from last month and down from 42 rigs one year ago.

	August 26	July 29
North Louisiana Rigs:	16	15
South Louisiana Rigs:	10	13
Land	6	9
Inland Waters	4	4

The Office of Conservation, Lafayette District, Onshore Area, issued 7 permits to drill during the month of August compared to 9 permits last month and 8 permits one year ago. There are four new locations of interest to report this month:

SPECIAL REPORT *by Carlo C. Christina*

Helis Oil & Gas Tuscaloosa Marine Shale Well

Nearly two years ago Helis Oil & Gas Company applied for a permit to drill a Tuscaloosa well in St. Tammany Parish, listed in Lacombe Bayou Field. The proposed location is approximately 7 miles northeast of the Townsite of Mandeville and is also located 1.3 miles southwest of Lakeshore High School.

This well has become the most controversial and highly publicized well in many years. Helis permitted the well to a proposed depth of 13,374 feet as a Tuscaloosa Sand well. But Helis planned to evaluate the Marine Shale section with logs, cores and conduct pressure sampling in the Marine Shale, which is found immediately above the Tuscaloosa Sand. If the results were positive, Helis planned to sidetrack and drill a horizontal hole and to FRACK the Marine Shale section.

Concerned citizens held meetings to discuss the pros and cons of having a FRACKED well in their area. Many individuals and scientists presented evidence to support or condemn the proposal. A line was drawn in the sand-a deep line in fact-which separated old friends, co-workers, business owners from customers, and even members of families into "anti-frackers" from "pro frackers." After many objections by citizens and business leaders 3 lawsuits were filed, including one by the town of Abita Springs. The 19th Judicial District Court reversed the issuance of the permit to drill and it was canceled.

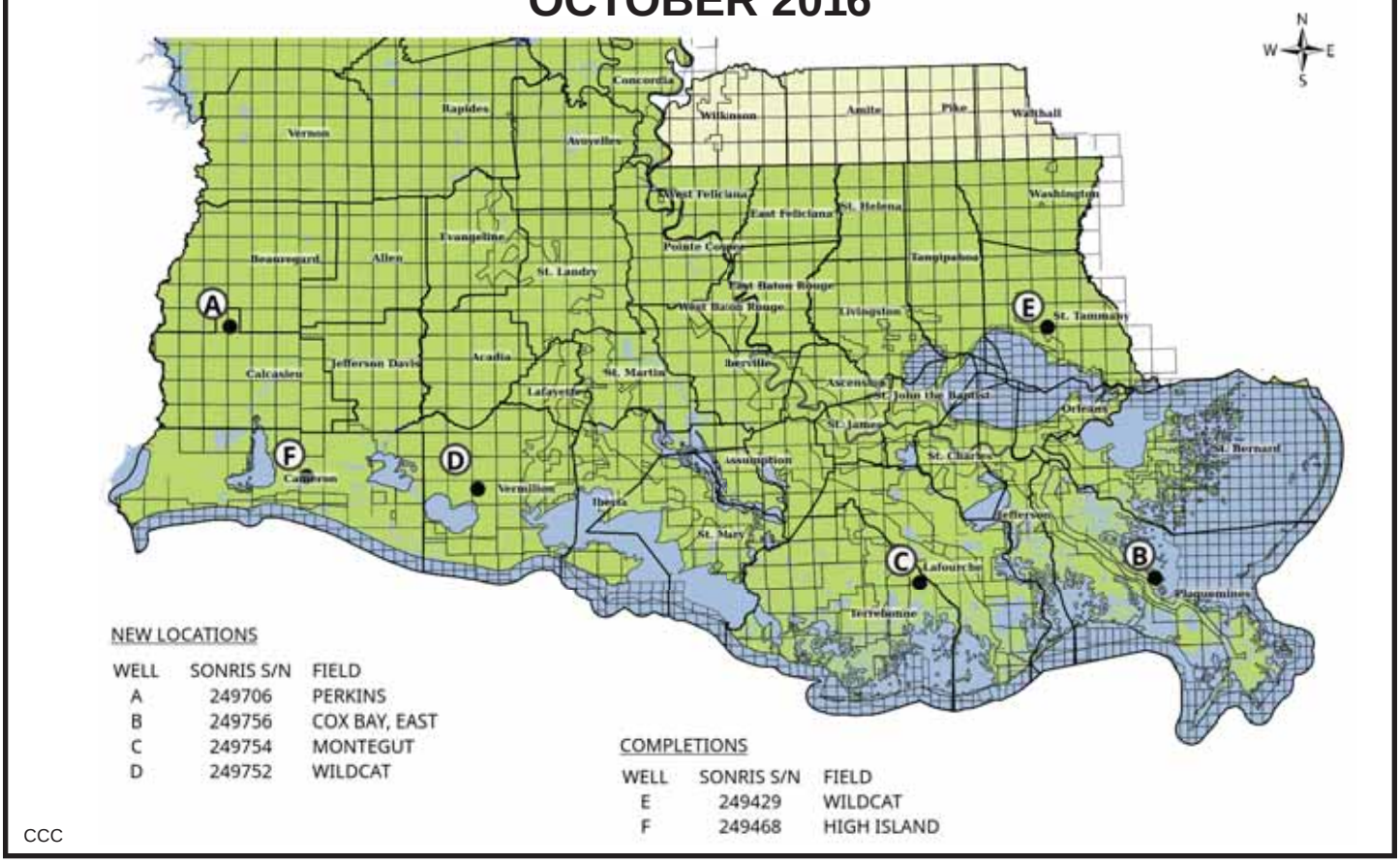
Drilling in St. Tammany Parish is not new or novel. More than 100 wells have been drilled in the Parish with early drilling beginning in the 1920's and 1930's. In fact, more than 17 deep Tuscaloosa wells have been drilled in the Parish. A very deep well, deeper than 21,000 feet, was drilled less than 4 miles from the Helis proposal. More than 20 Marine Shale wells have been drilled and fracked in nearby Florida Parishes to the west and more than 30 wells have been drilled in the adjoining counties in Mississippi. The nearest Marine Shale production is in Little Silver Creek, located approximately 40 miles to the northwest of the proposed Helis well. The field has produced more than 700,000 barrels of oil from the Marine Shale in the past 3 years.

Helis re-permitted the well and it was spudded on June 29, 2016, and drilled to a total depth of 13,450 feet, after setting 9 5/8 inch casing at 12,435 feet. The Marine Shale section was cored in the interval 12,960 to 13,022 feet. Electrical logs were run at total depth and 3 cement plugs were set, 1 across the Marine Shale section and 2 in and out of casing. A dry hole tree was installed and the rig was released on August 16, 2016.

Helis is awaiting the results of the cores and log information prior to deciding if the well will be plugged back, sidetracked, horizontally drilled and fracked. If the results are negative the well will be plugged and abandoned as an expensive dry hole.

HELIS #1 EADS POINTEVENT..... TD 13,374
Serial Number 249429..... STATUS 31
St. Tammany Parish. LA .....SHUT-IN DRY HOLE-FUTURE UTILITY

SOUTH LOUISIANA ACTIVITY MAP
OCTOBER 2016



***EDITOR'S NOTE*: On Tuesday, September 20, Helis announced that it was abandoning its project after exploratory drilling and opting not to pursue a second phase involving fracking. The well will be plugged and abandoned.**

NEW LOCATIONS

In Calcasieu Parish, **Perkins Field, (A)**, Tri-C Resources will drill its #1 Forestar Min, (SN 249706), in Sec. 30, 7S-10 W to test Yegua sands at a depth of 9957 feet. The well is located 1 mile north of production in the field.

Upstream Exploration will drill the #1 OLB, (SN 249756), in **East Cox Bay Field, (B)**, Sec. 26, 18S-16E, in Plaquemines Parish. The well will be drilled to a proposed total depth of 12,800 feet to confirm production in the Uvigerina Sand. The well will be drilled offsetting the discovery well for East Cox Bay Field, which was drilled by Century Exploration N. O. as a rank wildcat located midway between Quarantine Bay and Cox Bay fields. It was completed as an oil well in December 2014 flowing 422 BOPD and 795 MCFD through perforations 13,300 to 13,328 feet. It has produced more than 150,000 barrels of oil in the past 17 months.

In Terrebonne Parish, Tellus Operating Group will drilled an interesting well in **Montegut Field, (C)**, located in Sec. 50, 18S-19E. The #1 Cris I; McMoRan, (SN 249754), will be drilled to a depth of 15,575 feet to test a Cris I 3D seismic anomaly. It is offsetting a well drilled in 2005 which stuck drill pipe prior to reaching the objective zone at 14,422 feet. Montegut Field was discovered in 1956 and has produced from multiple sands from 10,600 feet to 13,000 feet, principally from Tex W sands. A successful completion in the Cris I Sand will open the area for new drilling.

Hilcorp Energy has permitted a **wildcat (D)**, in Vermilion Parish, 2 miles south of production in

Outside Island Field. The #1 Exxon Mobil (SN 249752), will be drilled in Sec. 17, 14S-1E, to a proposed depth of 14,445 feet, in a directional hole 7,561 feet southwest of the surface location. The objective section, the MA-6 Sand, will be encountered at a depth of 11,700 feet.

COMPLETIONS

Helis Oil & Gas has drilled its #1 Eads Poitevent (SN 249429), a **Tuscaloosa wildcat, (E)**, the Lacombe Bayou Prospect, located in Sec. 34, 7S-12E in St. Tammany Parish. The well was spudded on June 29 and drilled to a depth of 12,425 feet where 9 5/8 inch casing was set. Cores were taken in the Marine Shale in the interval 12,960 to 13,022 feet. The well was drilled to a total depth of 13,374 feet where electrical logs were run. Three cement plugs were set, one across the Marine shale interval and two in and out of casing. A dry hole tree was installed and the rig was released on August 6, 2016.

Walter Oil & Gas has completed the #32 Miami Corp (SN 249468), in **High Island Field, (F)**, in Cameron Parish. The well was drilled in Sec. 32, 13S-7W to a total depth of 16,545. It was completed as a gas well flowing 2500 MCFD and 13 BCPD through perforations 16,155 to 16,210 feet.

OFFSHORE GULF OF MEXICO

SHELF AND DEEPWATER ACTIVITIES

by Al Baker

During **August 2016**, the **BOEM** approved **48** Gulf of Mexico drilling permits. Of these, **3** were for shelf wells and **45** were for deepwater wells. Of the total number of permits, there were **3 new well permits**, all issued in deepwater.

Two of the new deepwater well permits were for exploration wells. One was issued to **Anadarko Petroleum** for their **Green Canyon 563 #1** well. The other permit was granted to **LLOG Exploration Offshore** for their **Mississippi Canyon 565 #1** well. The third new well permit was for a development well that was awarded to **Hess Corporation** for their **Green Canyon 511 #WI-3** well.

On August 26th, **IHS-Petrodata** reported that the Gulf of Mexico mobile offshore rig supply stood at **104**, which are **5** less than reported last month. The marketed rig supply consisted of **50** rigs, of which **37** were under contract. The marketed contracted versus total rig supply utilization rate is **35.6%**, while the marketed contracted versus marketed supply utilization rate stands at **74%**. The marketed rig supply number is **3** less than reported last month, and the contracted rig supply number is also **3** less than reported last month. In contrast, the August 2015 fleet utilization rate stood at 62.9% (versus 48.1% today) with 76 out of the 116 rigs under contract.

As of August 26th, **BakerHughes** indicated that there were **17** active mobile offshore rigs in the Gulf of Mexico, which is **45.9%** of the rigs under contract mentioned above. This active rigs number is **2** less than reported last month. Of the 17 rigs, **2** are located on the **shelf** and **15** are situated in **deepwater**. The current active rigs count compares to 29 active rigs during the same period last year, representing a **44.5%** drop (minus 12 rigs) in yearly rig activity.

As of August 26th, the **BakerHughes** total U.S. rig count stood at **468** rigs **down 75.8%** from the **September 26, 2014, high** of **1931** rigs. At this time a year ago, the rig count stood at 843 rigs. Of the current 468 rigs, **406** are **oil rigs** and **81** are **gas rigs**.

A year ago in this column, I wrote that "the **BOEM** held the most lackluster Gulf of Mexico lease sale since area-wide Gulf sale were first conducted in 1983," which at that time was western GOM OCS Sale 246." Sad to say, I was wrong. On August 24, 2016, record lows were set at western GOM **OCS Sale 248**. Only **3 companies** submitted bids on just **24 tracts, all** of which are situated in deepwater. The 3 companies included **BHP Billiton Petroleum Inc., BP Exploration and Production Inc.** and **ExxonMobil Corp.** Together they exposed a paltry **$18,067,020 in high bids.** The BOEM's Regional Director, Michael Celata, summed it up the best by succinctly stating that "it represents the least revenue offered by the smallest number of companies making the fewest bids yet on leases in the central and western Gulf of Mexico. Obviously, it was the industry's concerns over low commodity prices and newly imposed BSEE regulatory burdens that caused severe dampening effects on interest in the sale.

Another startling article caught my attention this month, this time in the August news at World Oil magazine. According to World Oil's latest mid-year forecast, only 14,430 wells are expected to be drilled in the U.S. in 2016. This will be the lowest total since 11,700 wells were drilled in 1933, which was during the Great Depression. To read the entire article, visit http://worldoil.com/news/2016/8/22/2016-on-pace-for-worst-ep-yeqar-since-great-depression-bu-improvement-seen. If you can believe what you read, things are looking up.

Louisiana State University
NOGS Memorial Foundation Scholarships

LOUISIANA STATE UNIVERSITY

LEE H. MELTZER GRADUATE SCHOLARSHIP

Mr. Don Hood - *$3,000 Cash Award*

My interest in geology started very young but did not shine until the end of my undergraduate education. As a kid, I was interested in all science, the first of which to take my attention were geology and paleontology. This of course transitioned into many other interests, chemistry meteorology, physics, basically whatever was being taught in my science class at the time. Once in college, I had settled on physics and got my BS in physics with a focus in condensed matter. Towards my senior year, I didn't feel drawn to any particular field of physics, so I asked the question, "What else can I do with this degree?". This brought me back to those early childhood fascinations in geology, and when I found that many physicists had transitioned into geology, I started really investigating my opportunities in geology. This brought me to LSU to work with Dr. Suniti Karunatillake on planetary geology, a field that brings together geology, physics, and engineering to investigate the history of our fascinating solar system. Since starting at LSU, I have had the opportunity to contribute to several exciting projects exploring the surface of Mars, and I look forward to what I am able to do in the coming years.

GEORGE W. SCHNEIDER, SR. SPECIAL AWARD

Mr. Austin McGlannan - *$2,500 Cash Award*

Austin McGlannan graduated from Purdue University with a bachelor's of science in geology receiving departmental honors. During the summer of 2011, he worked for EarthScope siting locations for EarthScope's Transportable Array, a nationwide 70 km grid of broad band seismic stations, throughout Indiana and parts of Kentucky. Following this summer internship, he worked under the guidance of Dr. Hersh Gilbert to investigate the crustal structure and tectonic evolution of the North American midcontinent utilizing data from the Transportable Array. Currently, Austin is pursuing a master's degree in geology at LSU studying the retreat of the West Antarctic Ice Sheet through the lens of sedimentological and geomorphological observations under the guidance of Dr. Philip Bart. He is the President of LSU's AAPG student Chapter and an LSU Co-representative for SEPM Gulf Coast. Austin grew up in Miami, Florida and enjoys sailing, fishing, and hiking in the Everglades.

JULES & OLGA BRAUNSTEIN MEMORIAL SCHOLARSHIPS

Mr. Ryan Riggs - *$2,500 Senior Cash Award*

Ryan Riggs was born and raised in Pasadena, Texas. He explored the many natural beauties of Texas traveling during the summers to visit different family members. Having always loved the outdoors, and science, he decided to enroll in a physical geology class. Since then he has been in love with the subject, and is now majoring in it. He has taken many geology courses at LSU, and truly loves the ones which give him the opportunity to do field work, such as sedimentology, and structural geology. He plans to pursue a master's degree in geology upon graduation.

Ms. Brianna Crenshaw - *$2,000 Junior Cash Award*

Brianna Crenshaw is an undergraduate geology student at Louisiana State University. She is originally from Katy, Texas and graduated from Cinco Ranch High School in 2014. Soon after her freshman year at LSU, she accepted a position working in a sedimentology lab under Dr. Samuel Bentley and since then has been heavily involved with research. Her research experience includes sedimentological studies, geophysical surveying, and geochemical analysis based in the Gulf of Mexico. Now ending her sophomore year, she has exciting plans to begin writing an undergraduate thesis this summer on a project funded by USGS about the impact hurricanes have on the deposition of sediments in southern Louisiana. After graduation in 2018, she is planning to go onto graduate school to obtain her master's degree and then proceed into the oil industry. The organizations she is involved in include LSU's AAPG student chapter, the Geology Club of LSU, and the Coasts Oceans Ports and Rivers Institute (COPRI). Aside from research and school, her hobbies include hog hunting with her father, traveling, and spending time with her one-year-old niece Emma.

Tulane University
NOGS Memorial Foundation Scholarships

JAMES ALLEN GILREATH GRADUATE SCHOLARSHIP

Mr. Tushar Bishnoi - *$3,000 Cash Award*

I was born in Roorkee, a town close to the foothills of the Himalayas in Uttarakhand State, India and completed my high school in 2007 from St. Montfort School, Roorkee. Since childhood, I was exposed to the fascinating geology of the Himalayas and hence decided to pursue and successfully complete a baccalaureate degree (Honors) in geology from University of Delhi in 2010. I secured an All India Rank of 30 in the Joint Admission Test for M.Sc. (2010) and successfully pursued masters of technology degree in geological technology from the prestigious Indian Institute of Technology Roorkee in 2013. Currently, I am a second year Ph.D. student in department of earth and environmental sciences at Tulane under Dr. Kyle Straub. My research work is focused on understanding and quantifying the conditions necessary for linkages of shelf-edge deltas and self-channelized submarine fans through physical experiments.

NOGS MEMORIAL FOUNDATION SCHOLARSHIP

Ms. Molly Keogh – *$2,500 Cash Award*

Molly's interest in geology began as a kid growing up in Oregon, where she collected river rocks until her pockets overflowed. In college, she took rock collecting to the next level, pursuing a bachelor's degree in Geological Sciences at the University of Oregon. Now a second-year Ph.D. student at Tulane University, Molly works with Dr. Alex Kolker studying patterns of wetland sedimentation and crevasse splay development. Her research focuses in particular on lower Mississippi River freshwater and sediment diversions. Outside of school, Molly enjoys birdwatching, bicycling, and adding to her ever-expanding rock collection.

JULES & OLGA BRAUNSTEIN MEMORIAL SCHOLARSHIPS

Ms. Amanda Cuesta - *$2,500 Senior Cash Award*

Amanda Cuesta was born and raised in New Jersey and has always shown a love of learning. Her first introduction to geology was in a sixth grade science class, during a lesson on the basic rock types. Though she developed her love of science in that class, it wasn't until her sophomore year at Tulane that she even considered revisiting geology, much less making a career of it. Looking to fill another course's prerequisite, she decided to give physical geology a try. It was love at first lecture, and she quickly declared geology as a major. She is currently an intern with the Water Institute of the Gulf. Upon graduating from Tulane, she intends to continue her education in grad school.

Ms. Audrey Brown - *$2,000 Junior Cash Award*

Audrey grew up in Colorado with the Rocky Mountains acting as a natural source of inspiration and wonder. From a young age, she would go on hikes with her family and friends, collecting rocks and minerals as she went. She is currently working towards a dual degree in both geology and anthropology at Tulane University, where she uses her knowledge of earth science to aid in her understanding of archaeology. Audrey is currently a resident advisor and a member of Alpha Lambda Delta Honor Society. She looks forward to studying abroad in Ireland in the fall, where she plans to conduct research on Dublin's unique coastal geology.

NOGS Memorial Foundation Scholarships

The NOGS Memorial Foundation Scholarships are granted each year to those students who have demonstrated exceptional talent in or commitment to their geologic studies and projects. It is the policy of the Memorial Foundation to posthumously name these scholarships after those members whose own extensive contributions to the profession have been particularly praiseworthy.

Lee Hilliard Meltzer *for expertise in oil and gas appraisal and exploration, as well as manifold and unstinting support of and service to - from AAPG to NOGS - the region's professional geologic organizations.*

James Allen "Al" Gilreath *for his work as chief tool developer of down-hole instrumentation and 'pattern' interpretation, earning him, world-wide, the title, 'Mr. Dipmeter'.*

Richard W. "Dick" Boebel *for his outstanding abilities as an oil and gas finder and in being a unique individual who was most generous of his time and talent to the industry, his peers, and in his support of many professional organizations.*

George W. Schneider, Sr. *for exceptional leadership in exploration activities and for being a positive force in establishing the New Orleans Geological Society and serving as its first president in 1941-42.*

Jules Braunstein *gained wide recognition in the oil and gas industry not only for exceptional technical expertise but also as an exacting editor. His long career was conspicuous for selfless devotion and is carried on by his surviving wife,* ***Olga,*** *in her bequeathal of the residue of their estate to NOGS Memorial Foundation Scholarship Fund.*

The University of New Orleans
NOGS Memorial Foundation Scholarships

RICHARD W. BOEBEL GRADUATE SCHOLARSHIP

Ms. Celeste Woock - *$3,000 Cash Award*

Celeste Woock was born in Cypress, TX, on January 27, 1993. She grew up in between Lafayette, LA, and Houston, TX. Celeste attended the Academy of the Sacred Heart, Grand Coteau where she was involved in volleyball, honors society, and graduated class valedictorian. She then began her college career at the University of Alabama in the fall of 2011, majoring in aerospace engineering. She had a change of heart and switched to mechanical engineering before finally finding a home in geology in the fall of 2013. Along with remaining a full time student, Celeste worked with Dr. Kim Genareau as an undergraduate researcher for a time, studying igneous samples to learn more about the conditions inside Mt. Taranaki (New Zealand) prior to eruption. Celeste graduated with a bachelor of science in geology in May 2015, and now is working on her master's of earth and environmental science at the University of New Orleans. Her thesis work involves studying regional subsidence rates and causes in Barataria and Terrebonne bays. She is using benchmark, tide gauge, water level, LIDAR, and possibly CORS data to analyze methods of wetland loss and rates of land subsidence. She will use ArcGIS, ERDAS Imagine, and Adobe Illustrator in this analysis. She participated in AAPG's Imperial Barrel Award Competition in Spring 2016, where the UNO team won first in the Gulf Coast Region. In this process, the team used IHS Kingdom software, OpenDtect and BasinMod software. The dataset the team received included 2D and 3D seismic, well logs, cores, geochemical and pressure data. Some of Celeste's main interests are 3D seismic interpretation, prospect generation, and environmental geology. Some of her hobbies include travelling, camping, hiking, and running. She plans to complete her master's degree in the spring of 2017.

NOGS MEMORIAL FOUNDATION SCHOLARSHIP

Mr. William Morrison - *$2,500 Cash Award*

William Morrison was born in New Roads, LA, and has been a resident of New Orleans, LA, since 2006. William graduated with honors from West Feliciana High School in 2006. William attended Tulane University the following fall. In 2010 he graduated cum laude with a bachelors degree in geology. While attending college, William was involved in several student organizations and was actively involved with planning department field trips and assisting with field work.

After graduation, William worked as a field geologist for SDII Global Corp. in Tampa, FL. The work involved supervising standard penetration test boring to identify sinkhole activity under commercial and residential properties. After one year, he returned to New Orleans for an internship with an independent petroleum geologist. This work involved log correlation and depth registering log images. William was also involved in seismic mapping and management of large quantities of well data. In 2012 William began work as an offshore health, safety, and environmental (HSE) technician for Safety Management Systems. While a contractor for Shell Offshore (GOM) he traveled to many offshore platforms for well intervention operations. William was tasked with overseeing onsite HSE concerns such as safety and environmental training, incident investigation, and supervision of contract workers. His position also included BSEE regulatory compliance and DOT waste management.

In 2015 William enrolled as a full time graduate student at the University of New Orleans to acquire his master's degree in geology. Aside from being a teaching assistant he is also involved in many student organizations such as the AAPG student chapter, where he is the Vice President. William is a member of the 2016 UNO Imperial Barrel Award (IBA) team. This team won first place in the Gulf Coast Division of the IBA competition. They will compete in the international competition in the summer of 2016. William's academic interests include Paleontology, salt tectonics, seismic interpretation, and geophysics. His hobbies include cooking, fishing, bird watching, and woodworking.

JULES & OLGA BRAUNSTEIN MEMORIAL SCHOLARSHIPS

Ms. Shara Clark - *$2,500 Senior Cash Award*

Shara Clark was born in Gulfport, MS, and grew up in LaPlace, LA. In August 2000, Shara joined the United States Air Force as a computer systems operator. She spent five years on active duty then joined the Air National Guard for the next eight

years. During this time, she held jobs such as communications-security specialist, software tester, network engineer, and satellite terminal operator. She was deployed to Qatar in support of Operation Iraqi Freedom and Operation Enduring Freedom. Shara also worked humanitarian relief efforts such as the Haiti earthquake in 2010 and Hurricane Isaac in 2012 in Braithwaite, La. Shara obtained a bachelor's degree in computer systems management from Park University in Missouri, and a master's degree in information technology from Capella University in Minnesota.

Following a thirteen-year military career, Shara realized her passion was in the field of Earth Sciences. She separated from the Air Force in September of 2013 and began taking courses at the University of New Orleans the following January. Shara is currently working on her undergraduate degree at UNO in Earth and Environmental Sciences, then plans to obtain her Ph.D. in marine geology from the University of Southern Mississippi at Stennis Space Center.

Ms. Britanny George - *$2,000 Junior Cash Award*

Brittany George was born in New Orleans, Louisiana on May 30, 1987. Brittany grew up in St. Bernard Parish, Louisiana, primarily in Chalmette. She attended Andrew Jackson High School in Chalmette before being accepted to the Louisiana School for Math, Science and Arts in Natchitoches, Louisiana. Her focus at LSMSA was in humanities, with emphasis on foreign languages. Throughout her high school career, she studied German and for the last two years at LSMSA, she studied Russian as well. After graduating in 2005, Hurricane Katrina hit New Orleans and she evacuated to Buffalo, New York. She began her college career at Erie Community College in 2006, majoring in business administration. Eventually she moved to New York City for a year and then back to New Orleans. Brittany enrolled at Delgado Community College in 2013, where she changed her major to physical science. She transferred to the University of New Orleans in the fall of 2015, where she originally enrolled in the Naval Architecture and Marine Engineering Program, but found her passion with geology during her first year at the University. She is now a junior, with three semesters left before graduation. Throughout her college career, she has worked full-time. This summer, she will be attending summer school in Innsbruck, Austria, where she will be studying Alpine geology and European politics. Once she graduates from the University of New Orleans, she hopes to return to Europe to get her master's degree. She plans on studying permafrost processes as they relate to global warming.

Saints, Steno, and Stratigraphy

By Laura Sorey

October 9 marks the beginning of national Earth Science Week when geoscientists across the nation will celebrate this year's theme of "Our Shared Geoheritage." The theme refers to our collective stewardship of earth's beauties and natural resources as well as the historical narrative of our understanding of these wonders. In this article we bring attention to one of the great authors of this heritage, Nicolas Steno. With the arc of his professional and personal history ranging from anatomist to geologist to a venerated and beatified Catholic bishop, Nicolas Steno is, at the very least, an interesting person to study. Though "interesting" remains insufficient to describe a man to whom we credit the development of the principles governing stratigraphy as well as breakthroughs regarding the nature of fossils and crystal systems.

Born in Copenhagen, Denmark in 1638 as Niels Steensen, Steno first studied as a medical doctor at the University of Copenhagen. This foundation served him well as he went on to serve as a professor of anatomy at the esteemed University of Padua and as personal physician to one of the ducal Medici's. The former biology majors among us will recognize his handiwork stemming from this period when we recall the Stensen duct, discovered by and named for Steno. But his most important contributions to the field of science lie in the principles of stratigraphy that also bear his name.

Steno first communicated these famed principles in his 1669 publication *De solido intra solidum naturaliter contento dissertationis prodromus*. Operating under the then popular assumption that all rocks and minerals were initially derived from a fluid state, Steno postulated that layers of rock must form horizontally as the rock and mineral particles fall to the bottom of the rock-bearing fluid unless they are distorted by external forces after the fact. This basic premise of deposition served as the impetus for the development of four fundamental ideas that continue to guide modern our geologic investigations:

The Law of Superposition
The Principle of Original Horizontality
The Principle of Lateral Continuity
The Principle of Cross-Cutting Relationships

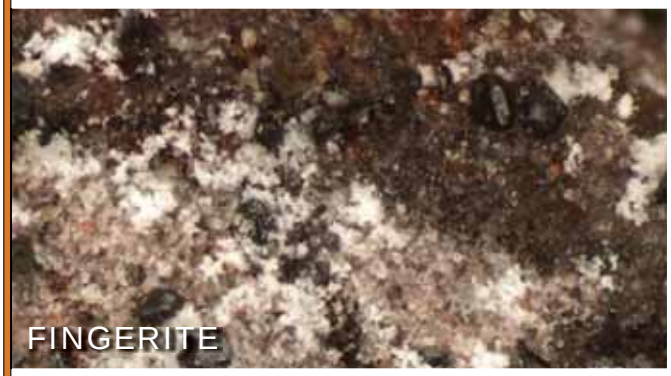
These principles served as the bedrock for more advanced analysis of stratigraphic controls and sequences to come from such famed scientists as James Hutton, Charles Lyell, and William Smith. Steno is also hailed an innovator in mineralogy for his original observation that the angles between corresponding crystal faces remain constant regardless of crystal size. Known as Steno's Law, the recognition of this phenomena enabled René Just Haüy the develop the breakthroughs in mineralogy that would earn him the name of "Father of Modern Crystallography."

Mere recitation of scientific and historical facts, interesting though they may be, comprise only part of the narrative of Steno's influence and legacy. His work and its influence on the way we assess geology embodies Aristotle's postulation that "The whole is greater than the sum of its parts." So too does our work during events like Earth Science week. The cost of promoting geoheritage may be that of a few hours of your personal time or a small donation of your money, but the payout has the potential to be so much more.

Photo of Nicolas Steno's tomb in Basilica di San Lorenzo in Florence, Italy by Ed Picou.
Scan of Steno prayer card provided by Ed Picou.

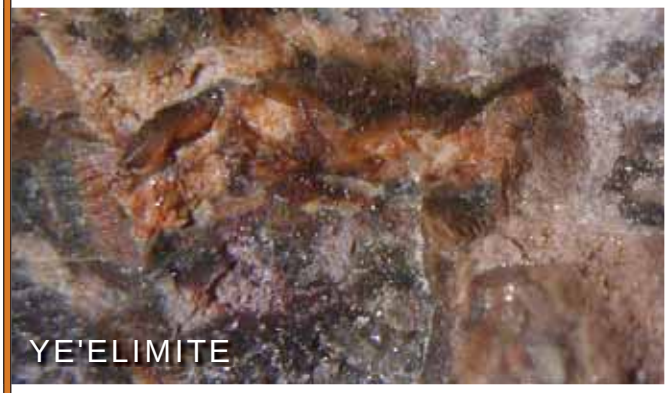
Submitted by Sassan Mouri

The Rarest Mineral



Pokémon Go is not the only game in the world where you can search to find the rarest beast. In fact, geologists have also been attempting to catch 'em all, and Robert M. Hazen, a research scientist at the Carnegie Institution of Washington's Geophysical Laboratory and Clarence Robinson Professor has been on the hunt.

So you say "rare" is a relative term, well in a paper published by Hazen and Ausubel (June 2016) they define rare minerals as those recorded from five or few localities. Take a guess here. How many minerals do you think meet that criterion? Are you out of guesses because you are still contemplating the last "On the Rocks," and deciding which cryptic code name to use for your next project? Well focus. 2,550 species meet the criteria and another interesting fact is that many of these minerals have a total known volume of <1 cc (Hazen and Ausubell, 2016). It is noted in this study that this definition of rare differs from our standard definition of rare which means diamonds, rubies, emeralds, and other precious gems fall off the list.



So your next question should be why do we care about these "rare" minerals? Rare minerals have been found to correlate to other larger events (Hystad et al., 2015). And it is thought that understanding these rare minerals would help in understanding Earth's complex system and other fluid-rock interactions. It has also been suggested that maybe understanding these rare minerals could help understand the origins of life.

Ok, now that I have provided you with intriguing information about the rarest minerals, I will list a few and highlight my favorite for you to contemplate until the next "On the Rocks" segment: fingerite, senaite, nitromagnesite, hazenite, rorisite, gregoryite, ye'elimite, markcooperite, andychristyite, swedenborgite, clearcreekite, mroseite, and schwertmannite.

Now that you think I made all of those names up, please go read, *"On the Nature and Significance of Rarity in Mineralogy"* by Hazen and Ausubel (2016) to verify if those names truly exist.

So back to my favorite rare mineral as I promised, drum roll please…hazenite.

Because who doesn't like a scientist that can make people laugh at their own expense. What is hazenite? Well to put it bluntly, microbial poop.

In fact, you can find hazenite only in one location, Mono Lake, California. It is formed when the phosphorous levels in the lake get too high causing the microbes in the water to excrete from their cells. This results in tiny colorless crystals.

A direct quote to BBC from Dr. Hazen, "Yes, it's true – hazenite happens."

REFERENCES

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On Halloween, pop some popcorn and watch one of these classic horror movies, but check the locks on the doors and windows first!

Frankenstein (1931)
House of Wax (1953)
Godzilla (1954)
Dracula (1958)
The Birds (1963)
The Mummy (1932)
The Tingler (1959)
The Blob (1958)
Creature from the Black Lagoon (1954)
Curse of the Mummy's Tomb (1958)

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