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What's New with the CBTH Project in Houston, Texas and Stavanger, Norway

CBTH Mid-Year Meeting with updates on new Geopost data visualization

The CBTH Project will host a mid-year meeting for sponsors and prospective sponsors on March 22, 2019 beginning at 7:30 a.m. in Cemo Hall, Room 105. A continental breakfast will be provided and the meeting will take place from 8 a.m. until 12 noon. At the meeting, we will present the latest project news, upcoming invoices, recent publications, and updates on the Geopost portal, which will provide a new, web-based mapping and data visualization interface for sponsors to view and access CBTH Project data. For more information on the meeting, please visit our website at http://cbth.uh.edu

CBTH Project featured in GEO Ex Pro article

The CBTH Project was featured in the December 2018 issue of GEO Ex Pro in an article on the conjugate margins of the Gulf of Mexico. The work highlighted was the CBTH-supported master's research of Andrew Steier, who is now an explorationist with the GOM group at Total in Houston. Other CBTH work that this study was based on includes Luan Nguyen (Nguyen and Mann, 2015) and the 2018 PhD study by Pin Lin (now at Chinese National Offshore Oil Company (CNOOC) in China). Current students working on various aspects of GOM conjugate margins include Jack Kenning (PhD), Nawaz Bugti (PhD), Mei Liu (PhD) and Marcus Zinecker (PhD). **Click here** to read the article in the latest issue. **Click here** to read more on the UH EAS website.



Cover of the December 2018 issue of GEO Ex Pro



What's New

PhD student Jack Kenning wins award at 20th Annual Robert E. Sheriff Lecture

CBTH PhD student Jack Kenning won the first place student poster award at the 20th Annual Robert E. Sheriff Lecture hosted by the Houston Geological Society and the UH Department of Earth and Atmospheric Sciences on November 12, 2018.

CBTH 2018 Annual Sponsors Meeting

Thanks to everyone who attended the CBTH Annual Sponsors Meeting on Friday, September 21, 2018! This year, we had a total of 57 attendees (34 from industry, 23 from UH/UiS). For more information, including a copy of the presentation schedule, **click here**. For a write-up on the meeting on the UH website, **click here**.



CBTH students, staff, and sponsors at the 2018 CBTH Annual Sponsors Meeting

Upcoming CBTH publications in AAPG Memoir

Students, former students, and researchers at the UH and UiS parts of CBTH have completed a total of 14 publications that are now in press for the upcoming volume of AAPG Memoir on the tectonics and petroleum potential of the southeastern Caribbean titled "Eastern Caribbean-NE South American Boundary: Tectonic Evolution, Basin Architecture and Petroleum Systems (edited by Dr. Claudio Bartolini (Repsol)). These papers were recently accepted for publication and the memoir is currently in production. For a full list of CBTH-supported publications in the upcoming volume, visit the "Recent & Upcoming Publications" section.



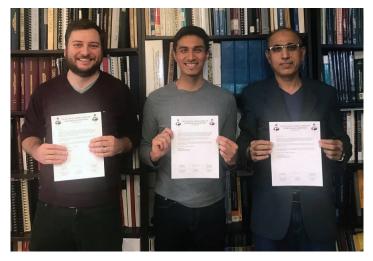
What's New

CBTH-supported students place first, second, and third at the HGS-PESGB Africa Conference

CBTH students won all three poster awards at the Houston Geological Society and the Petroleum Exploration Society of Great Britain's 2018 Africa Conference held on September 12-13, 2018 in Houston. The conference is held in Houston and London in alternating years. Marcus Zinecker won first place with a poster comparing the conjugate margins of northwest Africa and the Blake-Bahama plateau; Omar Zavala placed second for his poster comparing the thermochronology of the South Atlantic Ocean; and Geraldine Tijerina placed third for her poster comparing the thermochronology of the conjugate margins of the Central Atlantic. Geraldine is an undergrad from the geology department at UH-Downtown who is working with the CBTH group. **Click here** to read more.

CBTH-supported students place first, second, and third at the GCAGS poster session in Shreveport

Congrats to Omar Zavala (1st), Jack Kenning (2nd) and Nawaz Bugti (3rd) on their recent wins at the Gulf Coast Association of Geological Societies meeting covering South Atlantic and GOM margins. **Click here** to read more.



CBTH student poster competition winners at GCAGS 2018

Upcoming UiS sampling event in Belize and Guatemala

UiS researchers have signed a cooperation agreement with the Belize oil ministry/department and the Guatemalan government, and they will travel to both countries in April to collect samples. Expected analy -sis include gas chromatography/mass spectometry (GC, GC-MS, GC-MSMS) and isotopes. This research wi II be presented at the CBTH Annual Sponsors Meeting in Fall 2019.

UiS IBA Team places 2nd

The UiS IBA teams under the supervision of Alejandro Escalona placed second in the European section of the IBA competition in April of 2018. With over 20 teams, the Europe section is one of the largest and most competitive sections in the global IBA competition.



Graduating Students at UH

ERIC LUNN graduated with his BS degree in geology from the Commonwealth Honors College at the University of Massachusetts Amherst in 2015. After graduation he worked for one year as an environmental geologist in Massachusetts. In fall 2016, he began his MS project to make a 3D gravity model of the deep crustal structure between the Barreirinhas and Ceara basins and intervening Romanche fracture zone in northern equatorial Brazil. Eric was the team captain of the 2017 University of Houston Imperial Barrel Award team that placed 1st in the international AAPG IBA competition. He was a 2018 summer intern with the Shell group working on theNeuquen basin, Argentina. He has completed his thesis, will officially graduate in May 2019, and will start at Shell in March 2019. Houston.





LUCIA TORRADO completed her MS study with CBTH at UH in 2012 on: "Non-Marine Sequence Stratigraphy and Changing Fluvial Style in the Northern Llanos Foreland Basin of Colombia" In December 2018, she completed her PhD with the CBTH group, which consisted of subsurface, seismic stratigraphic studies of the Nicaraguan Rise of the Caribbean Sea and the Amazon cone of offshore Brazil. She has completed two first-authored papers and three co-authored papers on the Llanos basin and the Nicaraguan Rise.



New Undergraduate Students at UH



BRYAN MOORE is a post-baccalaureate from Texas A&M University with a BS in Plant and Environmental Soil Science. He is now a Geology major at the University of Houston. He joined the CBTH project as a research assistant in January 2019 and has assisted in managing the reference database as well as the stratigraphy, wells, and outcrops parts of the GIS database.

TREVOR RUSSELL is an undergraduate geology major interested in seeking a career in the oil and gas industry. He assists in managing the reference database as well as the stratigraphy, wells, and outcrops parts of the GIS database.





EMILY STIBBE is an undergraduate returning to CBTH as she completes her second BS in Geophysics at UH. She is preparing to apply to a slate of graduate schools and will assist with managing the reference database as well as the stratigraphy, wells, and outcrops parts of the GIS database.



Recent Meetings

American Geophysical Union 2018 Annual Meeting

The American Geophysical Union (AGU) held its annual meeting in Washington, D.C. on December 10-14, 2018.

o Nikola Bjelica – Comparison of thickness and geochemistry of Cretaceous Oceanic Anoxic Event 2 black shale horizons in the Gulf of Mexico, Caribbean, and Atlantic passive margins

68th Annual Convention of the Gulf Coast Association of Geological Societies (GCAGS) and the Gulf Coast Section of the Society of Economic Paleontologists and Mineralogists (GCSSEPM)

The 2018 GCAGS meeting was held on September 30 – October 2, 2018 at the Shreveport Convention Center in Shreveport, Louisiana. A full list of CBTH presentations can be found below. **Click here** for more information.

o Nawaz Bugti – Extracting fault and regional salt flow information from a high-resolution, bathymetric map of the shelf, slope and abyssal plain of the US Gulf of Mexico

o Paul Mann - Hydrocarbon prospectivity of rifted, conjugate margins of the Gulf of Mexico, Central Atlantic, and South Atlantic

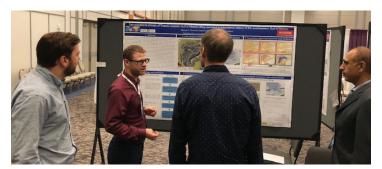
o Nawaz Bugti - Structural modeling and kinematic restoration of Corsair normal fault trend, northwest Gulf of Mexico

o Jack Kenning – Role of Eocene-Oligocene mass transport deposits for controlling along-strike variations in thickness, structural geometry, and hydrocarbon sealing, in the Mexican Ridges fold-thrust belt, western Gulf of Mexico

o Omar Zavala - Comparison of multi-stage cooling histories on conjugate rift margins of the South Atlantic Ocean

o Marcus Zinecker - Mega-regional scale, decision-tree analysis for hydrocarbon prospecting on passive, conjugate margins of the circum-Atlantic and Gulf of Mexico

o Marcus Zinecker - Two successive phases of Triassic-Jurassic Gulf of Mexico rifting recorded in the subsidence history of the southeastern Gulf of Mexico



CBTH PhD student Marcus Zinecker presents at GCAGS 2018



Recent Meetings

CBTH 2018 Annual Sponsors Meeting

The CBTH Project hosted its annual sponsors meeting on Friday, September 21, 2018. **Click here** to visit our website for more details, including the meeting schedule, directions, and more.

HGS-PESGB Africa Meeting 2018

The Houston Geological Society and the Petroleum Exploration Society of Great Britain hosted their annual Africa meeting on September 12-13, 2018 at the Norris Conference Center. Below, you'll find a full list of CBTH presentations:

o Malik Muhammad Alam - Comparing controls on the formation of 27 passive margin fold-belts from the margins of the Gulf of Mexico, South Atlantic and Africa

o Nikola Bjelica - Compilation of widespread, Cretaceous OAE1, OAE2, and OAE3 black shale horizons documented in wells from the Gulf of Mexico, Caribbean, and Atlantic passive margins

o Marie Kouassi - New insights into the assembly and breakup of Pangea from a mega-regional compilation of 8,672 detrital zircon ages from the circum-Gulf of Mexico, Northern South America, and West Africa

o Geraldine Tijerina - Constraints on central Atlantic rifting based on a compilation of low-temperature thermochronology ages from rifted, conjugate margins of the east coast of the USA and northwestern Africa

o Omar Zavala - Rift history of the South Atlantic Ocean from subsidence histories of offshore wells and low-temperature thermochronology (AFT) cooling ages from the South American and west African conjugate margins

o Marcus Zinecker – Plate tectonic framework for petroleum systems of Atlantic conjugate margins: northwest Africa-Eastern USA and northeast South America-Equatorial West Africa

Upcoming Meetings

AAPG Hedberg Conference: The evolution of petroleum systems analysis: Changing of the guard from late mature experts to peak generating staff

CBTH researchers Dr. Paul Mann and Dr. Lei Sun will present at the AAPG Hedberg Conference on March 4-6, 2019 in Houston, Texas. To register or view more information, **click here**.

o Lei Sun, Paul Mann, and Charles Sternbach – Emerging trends from 114 giant oil and gas fields discovered from the decade 2008-2017.



Upcoming Meetings

AAPG Geoscience Technology Workshop (GTW): Unlocking Mexico's offshore potential

Dr. Paul Mann and CBTH PhD Candidate Jack Kenning will present at the AAPG Geoscience Technology Workshop on March 6-7, 2019 in Mexico City. To register or view more information, **click here.**

o Paul Mann – Restoring the conjugate margins of the Gulf of Mexico: Implications for expansion of pre- and syn-rift play fairways

o Jack Kenning – Tectonic influence on the distribution of shale-rich, mass-transport deposits: Implications for hydrocarbon trapping, sealing, and migration in the Mexico Ridges fold belt

AAPG Annual Conference and Exhibition 2019

AAPG Annual Conference and Exhibition 2019 – The American Association of Petroleum Geologists will host its annual meeting in San Antonio, Texas on May 19-22, 2019. Below, you'll find a list of CBTH presentations at this year's meeting. For more information, visit https://ace.aapg.org/2019

o Jack Kenning and Paul Mann - Controls of Cenozoic Mass Transport Deposits on Hydrocarbon Prospectivity of the Mexican Ridges Fold-Belt, Western Gulf of Mexico (Student Research Poster Session I)

o Paul Mann, Andrew Steier, and Pin Lin - Restoring the Late Jurassic, Conjugate Margins of the Gulf of Mexico: Recent Progress and Remaining Problems (Session 120 - Theme 4: Global Studies of Extensional and Passive Margins)

o Hualing Zhang and Paul Mann - Timing of Paleozoic-Cenozoic Tectonic Events in the Permian Basin, West Texas, From Integrated Subsidence and Structural Studies (Student Research Poster Session II) o Marcus Zinecker and Paul Mann - Testing the Two-Stage Triassic-Jurassic Opening Model for the Gulf of Mexico From Faults Bounding Shallowly Buried Rifts in the Southeastern Gulf of Mexico (Student Research Poster Session II)

Geological Society of London Conference on Petroleum Geology of Mexico and the Northern Caribbean

On May 14-16, 2019, the Geological Society of London will host the "Petroleum Geology of Mexico and the Northern Caribbean" conference at the Burlington House in London. Below is a list of CBTH students presenting at the meeting. To register or view more information, **click here**.

o Jack Kenning – Tectonic, structural, and stratigraphic controls on hydrocarbon prospectivity in the Mexican Ridges deepwater fold belt, western Gulf of Mexico

o Sean Romito – Determining basement terrane boundaries in the modern Caribbean plate and their impact on regional hydrocarbon systems



Recent Publications

2018-2019 completed student thesis studies supported by the CBTH project at UH and their current employment (5)

- Shenelle Gomez, 2018, Tectonostratigraphic evolution of the Barbados accretionary prism and surrounding sedimentary basins within the Southeastern Caribbean-South plate boundary zone, PhD dissertation, University of Houston, 247 p. (Gomez now at: Perdido GOM development team, Shell, Houston)
- Pin Lin, 2018, Crustal structure and tectonostratigraphic evolution of the eastern Gulf of Mexico basin, PhD dissertation, University of Houston, 154 p. (Lin now at: Western hemisphere exploration team, CNOOC Research Lab, Beijing)
- Eric Lunn, 2019, 3D gravity modeling of the Barreirinhas and Ceara basins of northeastern Brazil, MS thesis, University of Houston, 49 p. (thesis completed Feb, 2019; official graduation date is May, 2019). (Lunn to start at: Permian basin unconventional exploration team, Shell, Houston)
- Andrew Steier, 2018, Jurassic-Cretaceous stratigraphic and structural evolution of the northern Yucatan margin, Gulf of Mexico basin, MS thesis, University of Houston, 91 p. (Steier now at: US GOM exploration team, Total Exploration, Houston)
- Lucia Torrado, 2018, Tectono-stratigraphic controls on petroleum system elements in passive margin settings: Studies of the western Nicaraguan Rise and Foz do Amazonas basin, Brazil, PhD dissertation, University of Houston, 264 p.(Torrado now seeking employment)

2018 student thesis studies supported by the CBTH project at UiS (2)

- Navas, R., 2018, Tectonostratigraphic evolution of the Gulf of Venezuela., MS thesis, University of Stavanger, MS thesis, 108 p.
- Skarstein, G., 2018, Geochemical characterization of oils and sediments from Cuba and Jamaica; Implications for the northern Caribbean petroleum system, MS thesis, University of Stavanger, 129 p.

Upcoming Publications (Previously-supported CBTH students are marked by an asterisk*) Alvarez, T.*, Mann, P., Vargas, C.A., and Wood, L.J., 2018, Gravity, seismic reflection and tomographic constraints on the subduction to strike-slip transition; southeastern Caribbean Plate boundary zone: Tectonic Evolution, Basin Architecture and Petroleum Systems (C. Bartolini, editor), in press.

- Alvarez, T.*, Mann, P., and Wood, L.J., 2019, Tectonics and evolution of sedimentary basins along the arcuate, southeastern margin of the Caribbean plate, Eastern Caribbean-NE South American Bound-ary: Tectonic Evolution, Basin Architecture and Petroleum Systems (C. Bartolini, editor), in press.
- Carvajal-Arenas, L.C. and Mann, P., 2018, Western Caribbean intraplate deformation, 2: Defining a continuous and active microplate boundary along the San Andres rift and Hess escarpment, Colombian Caribbean Sea, AAPG Bulletin, v. 102, n. 8, p. 1523-1563.



Upcoming Publications (cont.)

- Castillo, K.*, and Mann, P., 2019, Structure, stratigraphy and petroleum potential of the easternmost part of the Eastern Venezuelan foreland basin, Eastern Caribbean-NE South American Boundary: Tectonic Evolution, Basin Architecture and Petroleum Systems (C. Bartolini, editor), in press.
- Cedeno, A.*, Ahmed, M.*, Escalona, A., and Abrahamson, P., 2019, Tectonostratigraphic evolution of the western Barbados accretionary prism and the eastern Tobago forearc basin: Implications for petroleum systems, Eastern Caribbean-NE South American Boundary: Tectonic Evolution, Basin Architecture and Petroleum Systems (C. Bartolini, editor), in press.
- Cedeno, A.*, Ohm, S., and Escalona, A., 2019, Barbados petroleum and its role in understanding distribution of Cretaceous source rocks in the southeastern Caribbean margin: Insights from an organic geochemistry study, Eastern Caribbean-NE South American Boundary: Tectonic Evolution, Basin Architecture and Petroleum Systems (C. Bartolini, editor), in press.
- Escalona, A., Norton, I., Lawver, L., and Gahagan, L., 2019, Quantitative plate tectonic reconstructions of the Caribbean region from Jurassic to present, Eastern Caribbean-NE South American Boundary: Tectonic Evolution, Basin Architecture and Petroleum Systems (C. Bartolini, editor), in press.
- Escalona, A., Watson, L., and Ahmad, M.*, 2019, Late Cretaceous-Pliocene paleogeography of the circum-Caribbean region based on quantitative plate reconstruction and georeferenced databases, Eastern Caribbean-NE South American Boundary: Tectonic Evolution, Basin Architecture and Petro-leum Systems (C. Bartolini, editor), in press.
- Figueira, B.*, and Escalona, A., 2019, Overview of the Petroleum System of the Gulf of Paria, Eastern Venezuela Basin, Trinidad-Venezuela - implications from Plate to Province scale, Eastern Caribbean-NE South American Boundary: Tectonic Evolution, Basin Architecture and Petroleum Systems (C. Bartolini, editor), in press..
- Gomez, S., Bird, D., and Mann, P., 2018, Deep crustal structure and tectonic origin of the Tobago-Barbados ridge, Interpretation, v. 6, n. 2, p. T471-T484, DOI dx.doi.org/10.1190/INT-2016-0176.1
- Gomez, S.*, Mann, P., Alvarez, T.*, and Krueger, A., 2019, Tectonostratigraphic evolution of the Barbados accretionary prism and surrounding sedimentary basins within the southeastern Caribbean- northeastern South America arcuate, strike-slip to subduction transition zone, Eastern Caribbean-NE South American Boundary: Tectonic Evolution, Basin Architecture and Petroleum Systems (C. Bartolini, editor), in press.
- Lin*, P., Bird, D., and Mann, P., 2019, Crustal structure of an extinct, late Jurassic-to-earliest Cretaceous spreading center and its adjacent oceanic crust in the eastern Gulf of Mexico: Marine Geophysical Research, DOI: 10.1007/s1100101909379-5, published online February 9, 2019
- Liu, M.*, Filina, I., and Mann, P., 2019, Delineation of seaward-dipping reflector provinces and the pre-salt basin of the NE Gulf of Mexico, Interpretation, in revision.



Upcoming Publications (cont.)

- Punnette, S.* and Mann, P., 2019, Subsurface structure of the Hinge Line fault zone and its control on the distribution of gas fields of the North Coast Marine Area (NCMA) of offshore, northern Trinidad, Eastern Caribbean-NE South American Boundary: Tectonic Evolution, Basin Architecture and Petroleum Systems (C. Bartolini, editor), in press.
- Punnette, S.*, Wood, L., and Mann, P., 2019, Late Quaternary sedimentary evolution of the North Coast Marine Area (NCMA) of northern, offshore Trinidad, Eastern Caribbean-NE South American Boundary: Tectonic Evolution, Basin Architecture and Petroleum Systems (C. Bartolini, editor), in press.
- Reuber, K.*, and Mann, P., Control of Paleozoic, orogenic trends on along-strike variations in Cretaceous, continental rifts of the South Atlantic Ocean, in revision for Interpretation.
- Rodriguez, L.*, Mann, P., and Hall, S., 2019, Crustal structure and geologic history of the Espino rift, Venezuela, based on integration of potential fields, seismic reflection, and well data, Eastern Caribbean-NE South American Boundary: Tectonic Evolution, Basin Architecture and Petroleum Systems (C. Bartolini, editor), in press.
- Sanchez, J.*, Mann, P., Carvajal-Arenas, L. C.*, and Bernal-Olaya, R.*, 2019. Regional transect across the western Caribbean Sea based on integration of geologic, seismic reflection, and magnetic data. AAPG Bulletin, v. 103, p. 303-343: DOI: 10.1306/05111816516.
- Steier, A.* and Mann, P., 2019, Late Mesozoic gravity sliding and Oxfordian hydrocarbon reservoir potential of the northern Yucatan margin, Marine and Petroleum Geology, in press.
- Torrado, L.*, Carvajal, L.C.*, Sanchez, J.*, Mann, P., and Silva-Tamayo, J.C., 2019, Late Cretaceous-Cenozoic sequence stratigraphic and paleogeographic controls on petroleum system elements of the Nicaraguan platform, western Caribbean Sea, AAPG Bulletin, accepted August 31, 2018.
- Wang*, J., Mann, P., and Stewart, R. H., 2018. Late Holocene structural style and seismicity of highly transpressional faults in southern Haiti. Tectonics, 37(10), 3834-3852. DOI: 10.1029/2017TC004920.
- Watson, L. and Escalona, A., 2019, Creating Spatial-based Paleogeography from Plate Reconstructions: A Methodology, Eastern Caribbean-NE South American Boundary: Tectonic Evolution, Basin Architecture and Petroleum Systems (C. Bartolini, editor), in press.
- Zimmerman, U., Dieset, J.*, Watson, L., and Lapen, T., 2019, Sedimentological constraints and provenance of Eocene and Miocene successions from Barbados, Eastern Caribbean-NE South American Boundary: Tectonic Evolution, Basin Architecture and Petroleum Systems (C. Bartolini, editor), in press.



Awards

- 2018 Omar Zavala, Undergraduate, 1st place Gordon I. Atwater poster award, Annual Gulf Coast Assoc. Geological Societies
- 2018 Jack Kenning, PhD candidate, 2nd place Gordon I. Atwater poster award, Annual Gulf Coast Assoc. Geological Societies
- 2018 Nawaz Bugti, PhD candidate, 3rd place Gordon I. Atwater poster award, Annual Gulf Coast Assoc. Geological Societies
- 2018 Jack Kenning, PhD candidate, 1st place, Sheriff student poster competition (Advanced PhD category)
- 2018 Marcus Zinecker, PhD student, 1st place student poster competition, 15th Houston Geological Society/Petroleum Exploration Society of Great Britain, Africa 2018 Conference
- 2018 Omar Zavala, undergraduate, 2nd place student poster competition, 15th Houston Geological Society/Petroleum Exploration Society of Great Britain, Africa 2018 Conference
- 2018 Geraldine Tijerina, undergraduate, 3rd place student poster competition, 15th Houston Geological Society/Petroleum Exploration Society of Great Britain, Africa 2018 Conference
- 2018 Sean Romito, PhD candidate, Houston Presidential Fellowship (2018-2020)
- 2018 UH EAS AAPG Wildcatters, Top AAPG Student Chapter, AAPG 2018 Annual Meeting
- 2018 UiS IBA team led by A. Escalona places second in European section
- 2018 Jack Kenning, PhD Candidate: 4th Place, AAPG 2018 Annual Meeting Student Poster Competition
- 2018 Lucia Torrado, Scholarship for Outstanding Graduate Work in Geology, UH Student Research Day
- 2018 Jack Kenning, Scholarship for Outstanding Graduate Work in Geology, UH Student Research Day
- 2018 Jack Kenning, 1st Place Oral Presentation, MS/PhD First Year Category (Session 1), UH Student Research Day
- 2018 Omar Zavala, 3rd Place Poster Presentation, Undergraduate category, UH Research Day
- 2018 University of Stavanger Imperial Barrel Award Team (team advisor: Alejandro Escalona): 2nd Place; European Imperial Barrel Award Regional Competition



Thanks to our sponsors!

As we continue with Phase V of the CBTH project, we would like to thank our active and inactive company sponsors for their support in providing data, software, funding, and knowledge to further student research in Caribbean geology. Your support has provided many opportunities for CBTH students to pursue research projects in the region and your efforts are truly appreciated.

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