

March, 1981

BULLETIN

HOUSTON GEOLOGICAL SOCIETY

Volume 23

Number 7



HGS MARCH CALENDAR

March 9, 1981 (Dinner Meeting, Joint with GSH)

Galleria Plaza Hotel

Ray Holifield

Ray Holifield & Associates, Dallas

"Giddings—Austin Chalk Field, Upper Gulf Coast, Texas"

Social Period—5:30 PM, Dinner and Meeting—6:30 PM

Advance Ticket Sales Only—See Notice Inside

(No tickets sold after noon Friday, March 6.)

March 19—20, 1981 (Continuing Education)

Exxon Auditorium

"Atlantic Margin of North America Symposium"

March 25, 1981 (Luncheon Meeting)

Marriott West Loop (1750 West Loop South)

Vincent Matthews III

Amoco Production Company—Western Division, Denver

"The Wyoming-Utah Thrust Belt—A Major New Petroleum Province"

Social Period—11:30 AM, Luncheon and Meeting—12 Noon

Reservations (**telephone only, 771-8315**) must be made or cancelled by noon Monday, March 23, 1981.

HOUSTON GEOLOGICAL SOCIETY

6916 ASHCROFT
HOUSTON, TEXAS 77081
771-8315

EXECUTIVE BOARD

President	Chester A. Baird , Dow Chemical USA	978-3810
First Vice President	William F. Bishop , Tenneco Oil Company	757-3443
Second Vice President	Peggy J. Rice , Conoco Inc.	965-2923
Secretary	Matthew W. Daura , Transcontinental Gas Pipe Line Corp.	871-8000
Treasurer	Gerald A. Cooley , Phillips Petroleum Company	669-3650
Executive Committeeman	Robert W. Bybee , Exxon Company USA	656-5434
Executive Committeeman	Wendell L. Lewis , Independent Geologist	659-2476
Executive Committeeman	James A. Ragsdale , Blocker Exploration Company	977-2030
Executive Committeeman	Tommy M. Thompson , Highland Resources Inc.	223-4901
Past President	Jeffery V. Morris , Transcontinental Gas Pipe Line Corp.	871-2502

COMMITTEE CHAIRMEN

Academic Liaison	Louise Durham , Consultant	497-8790
Advertising	Fred Baker , Great Western Drilling Company	961-4162
Awards and Student Loan	Jerry A. Watson , W. L. Tidwell & Associates	977-8625
Ballot	Don P. Keith , Arco Oil & Gas Company	965-6165
Boy Scouts	Jerry Sides , Shannon Oil & Gas Company	939-9600
Bulletin	Gregory K. Burns , Cities Service Company	850-6193
Continuing Education	Kenneth D. Webb , Transco Exploration Company	871-8000
Entertainment	Robert S. Harvil , Exxon Company USA	680-5462
Environmental	Thomas Hessemann , Woodward-Clyde Engineering Consultants	688-9111
Environmental Publication	Evelyn M. Etter , Southland Royalty Company	629-8390
Exhibits	Jim McMurrey , Transco Exploration Company	871-8000
Field Studies	Arthur R. Troell , Franks Petroleum Company	464-8552
Field Trip	Andrew W. Hampf , Davis Brothers	224-8224
Finance	Robert J. Moses , First City National Bank	658-6654
Historical	O. Lyle Austin	681-2194
Library	Evelyn Wilie Moody , Consultant	654-0072
Membership	John H. Hefner , Exxon Company USA	965-7427
Nominating	Jeffery V. Morris , Transcontinental Gas Pipe Line Corp.	871-2502
Personnel Placement	Richard McLeod , Gulf Oil Exploration & Production Company	754-1247
Publications	William F. Bishop , Tenneco Oil Company	757-3443
Publication Sales	David Levin , Gulf Oil Exploration & Production Company	754-7915
Public Relations	Alicia Majkowski , Longhorn Oil and Gas Company	777-0777
Remembrances	Walter A. Boyd, Jr. , Columbia Gas Development Corp.	626-8090
Research Study Course	Phillip T. Fowler , Texas Gulf Oil & Gas Corp.	658-9811
Technical Program	Peggy J. Rice , Conoco Inc.	965-2923
Transportation	David M. Eggleston , Geomap Peppard-Souder	972-1018

SPECIAL REPRESENTATIVES

Adviser, Museum of Natural Science	Morgan J. Davis, Jr. , Pennzoil Producing Company	236-7405
GCAGS Representative	Jeffery V. Morris , Transcontinental Gas Pipe Line Corp.	871-2502
GCAGS Alternate	Chester A. Baird , Dow Chemical USA	978-3810
AAPG Delegate Chairman	Merton M. "Ozzie" Osborne , Trunkline Gas Company	523-1181
AAPG Group Insurance	John Bremsteller , Insurance Consultant	668-0610
Memorial Scholarship Board	Robert J. Schrock	497-4411

HOUSTON GEOLOGICAL AUXILIARY OFFICERS

President	Mrs. Andrew (Norman Jean) Bacho	494-9247
President-Elect	Mrs. Claude (Nancy) Rust	467-1693
First Vice-President	Mrs. John (Pat) Hefner	468-9495
Second Vice-President	Mrs. Mack (Jo Ann) Milner	782-1352
Third Vice-President	Mrs. Jim (Margery) Ambrose	497-3413
Secretary	Mrs. David (Glady) Sheridan	492-8638
Treasurer	Mrs. Ben (June) Buongiorno	494-1701
Historian	Mrs. Russell (Mary Lou) Seward	789-7596

A A P G A N N U A L M E E T I N G

SAN FRANCISCO, CALIFORNIA

MAY 31 - JUNE 3, 1981

Group Space has been reserved for HGS Members planning to fly from Houston to the 1981 AAPG Annual Meeting in San Francisco, California.

The Current Roundtrip Coach Airfare is \$594.00. The Current Group fare is \$416.00. Independent returns are permitted. These fares are quoted as of December 29, 1980 and are subject to change by the Airlines. It is important to note that your airfare will be guaranteed from the date you are ticketed as long as your originating flight does not change.

Additionally, a POST CONVENTION GEOLOGICAL FIELD TRIP is planned to the Islands of Kauai and Hawaii leaving San Francisco June 4 and returning June 11, 1981. Since flight schedules and airfares are not firm as of this date, the final cost will be published as soon as available. **THERE WILL BE A SUBSTANTIAL SAVINGS USING A HAWAIIAN AIRFARE THAT PERMITS A STOPOVER IN SAN FRANCISCO.**

If you are interested in Group Flights to San Francisco and/or the Post Convention Field Trip, please indicate on the attached coupons, and send them as soon as possible to:

CONNIE BURKE AAPG
TRAVEL UNLIMITED, INC.
P. O. BOX 25187
HOUSTON, TEXAS 77005

FOR FURTHER INFORMATION, CALL CONNIE AT (713) 526-3161

I am interested in your Group Flights to the AAPG ANNUAL MEETING IN SAN FRANCISCO.

Please indicate dates and approximate times desired below:

HOUSTON TO SAN FRANCISCO

May 29 _____ May 30 _____ May 31 _____ I prefer Morning _____ Noon _____ Evening _____ Departure

SAN FRANCISCO TO HOUSTON

June 3 _____ June 4 _____ Other _____ I prefer Morning _____ Noon _____ Evening _____ Departure

Name(s) _____

Address _____ City _____ State _____ Zip _____

Phone (with area code): Business _____ Home _____

I would like to be ticketed early to avoid fare increase _____ Please contact me with exact airfare _____

I am interested in the AAPG POST CONVENTION GEOLOGICAL FIELD TRIP. _____

Name(s) _____

Address _____ City _____ State _____ Zip _____

Phone (with area code): Business _____ Home _____

I would like to go to San Francisco

May 29 _____ May 30 _____ May 31 _____ I prefer Morning _____ Noon _____ Evening _____ Departure

Please send complete details as soon as they are available _____

Home City if other than Houston _____

*** * SEE NEXT PAGE * ***

A A P G POST CONVENTION GEOLOGICAL FIELD TRIP
JUNE 4 - 11, 1981 **HAWAII**

DEPART SAN FRANCISCO ON JUNE 4 TO HONOLULU WHERE A DIRECT CONNECTION WILL BE MADE TO THE "BIG ISLAND" OF HAWAII. TRANSFER TO THE KONA SURF HOTEL. REMAINDER OF THE DAY AT LEISURE. JUNE 5 DEPART KONA SURF HOTEL AT 8:30 AM. FULL DAY "CIRCLE ISLAND TOUR" OF HAWAII INCLUDING THE VOLCANOES, LUNCH NOT INCLUDED. JUNE 6 FULL DAY AT LEISURE. JUNE 7 DEPART FOR THE ISLAND OF KAUAI WHERE YOU WILL BE MET AND TRANSFERRED TO THE KAUAI SURF HOTEL. REMAINDER OF THE DAY IS FREE. JUNE 8 DEPART AT 8:30 AM FOR A TOUR OF WAIAMEA CANYON AND THE GARDENS, LUNCH NOT INCLUDED. RETURN TO THE HOTEL ABOUT 2:30 PM. REMAINDER OF THE DAY FREE. JUNE 9 DAY AT LEISURE UNTIL 7:00 PM WHEN YOU WILL HAVE A FAREWELL LUAU WITH A POLYNESIAN SHOW AND INCLUDING ONE MAI TAI PER PERSON. JUNE 10, DAY AT LEISURE UNTIL TIME TO DEPART FOR THE AIRPORT FOR YOUR FLIGHT TO HONOLULU CONNECTING TO YOUR RETURN FLIGHTS HOME.

LAND PACKAGE, EXCLUDING AIRFARE

DOUBLE	PER PERSON, INCLUDING INTERISLAND FLIGHTS (2)	\$380.00
SINGLE	PER PERSON, INCLUDING INTERISLAND FLIGHTS (2)	\$570.00
TRIPLE	PER PERSON, INCLUDING INTERISLAND FLIGHTS (2)	\$330.00

INCLUDES: KONA SURF, 3 NIGHTS * KAUAI SURF, 3 NIGHTS * ROUND TRIP TRANSFERS KONA AND KAUAI AIRPORT TO HOTELS AND RETURN * BAGGAGE HANDLING AT BOTH AIRPORTS * TIPS TO BELLMEN IN BOTH HOTELS * CIRCLE ISLAND TOUR OF HAWAII INCLUDING VOLCANO NATIONAL PARK * WAIAMEA CANYON AND GARDEN TOUR OF KAUAI * LEI GREETING ON ARRIVAL IN HONOLULU * FAREWELL LUAU ON KAUAI INCLUDING POLYNESIAN SHOW AND 1 MAI TAI PER PERSON * ALL TAXES AND GRATUITIES ON INCLUDED ITEMS * FLIGHT FROM HONOLULU TO KONA * FLIGHT FROM KONA TO LIHUE, KAUAI * THE CONNECTING FLIGHT TO HONOLULU FOR RETURN TO THE MAINLAND.

DOES NOT INCLUDE: AIRFARE FROM HOME CITY TO HAWAII. THIS WILL BE QUOTED SEPARATELY AS SOON AS JOINT AIRFARES HAVE BEEN APPROVED. THIS AIRFARE **WILL** INCLUDE THE STOPOVER IN SAN FRANCISCO FOR THE AAPG CONVENTION * GRATUITIES TO BUS DRIVERS ON TOURS. . . . THIS IS AT YOUR DISCRETION * LUNCHEES ON TOURS * MEALS OTHER THAN THOSE SPECIFIED IN THE PACKAGE * DRINKS OTHER THAN THE 1 MAI TAI AT THE LUAU * TOURS OTHER THAN THOSE INCLUDED * ITEMS OF A PERSONAL NATURE * PHONE CALLS * LAUNDRY * ADDITIONAL FLIGHTS IF ITINERARY IS ALTERED.

IMPORTANT: IF YOU WISH TO REMAIN LONGER, THIS CAN BE ARRANGED.

DEPOSITS: A DEPOSIT OF \$100.00 PER PERSON IS REQUIRED TO CONFIRM YOUR RESERVATION. THIS DEPOSIT IS NOT REFUNDABLE UNLESS CANCELLATION IS RECEIVED IN WRITING BEFORE MARCH 21, 1981.

FINAL PAYMENT: IS DUE NO LATER THAN APRIL 20, 1981. IF FINAL PAYMENT IS NOT RECEIVED, RESERVATIONS WILL BE CANCELLED AND \$100.00 DEPOSIT PER PERSON WILL BE RETAINED UNLESS SPACE CAN BE RESOLD.

PLEASE SEND DEPOSITS AND FINAL PAYMENTS TO:

**CONNIE BURKE - POST CONVENTION
 TRAVEL UNLIMITED, INC.
 P. O. BOX 25187
 HOUSTON, TEXAS 77005**

MAKE CHECKS PAYABLE TO: TRAVEL UNLIMITED

FLIGHT INFORMATION AND AIRFARE WILL BE PUBLISHED AS SOON AS IT IS AVAILABLE.

HOUSTON GEOLOGICAL SOCIETY CONTINUING EDUCATION

**Pre-registration Application
 ATLANTIC SYMPOSIUM**

March 19-20, 1981

Exxon Building Auditorium

1-5 pm/8:30-12 am

Name _____

Company _____ Phone _____

Address _____

Preregistration
 Students \$10.00
 Members \$25.00

Registration at door:
 Students \$15.00
 Members \$30.00

MAIL CHECK TO:
Houston Geological Society
6916 Ashcroft
Houston, Texas 77081

PRESIDENT'S COMMENTS

The Executive Board of the Houston Geological Society, at its January meeting, approved the establishment of two ad hoc committees. One committee is to research and write amendments to the Constitution and Bylaws of the Society which will:

1. Create the office of President-Elect
2. Redefine the qualifications for membership for "active" and "associate" members.
3. Give the Executive Board authority to increase dues up to "X" dollars without having to go to the membership for approval.

The Committee was also asked to give the Executive Board its thoughts on the advisability of establishing "student" and "emeritus" membership categories.

Dr. Anthony Reso, a Past President of the Society, agreed to chair this Committee and Jack O. Colle and W. Dean Grafton, also Past Presidents of the Society, agreed to serve on the Committee. Their thoughts on the subjects are to be presented to the Executive Board of the Society at its February meeting with the final results being presented to the membership for your approval in April.

As presently set up, the Society votes in April, the ballots are counted about the middle of May and the new administration takes over July 1. This gives the incoming President about one and one-half months to get his/her act together. The Houston Geological Society has become, for some time now, a Society whose members' professional interests encompass far more than Texas Railroad Commission Districts 2 and 3. This, plus the increasing size of the Society, makes it imperative that the incoming President have more than one and one-half months to think about what he/she would like to accomplish and the methods by which to do so. It is not fair to the incoming President and certainly is not to the benefit of the Society and its members.

It has become apparent in recent Executive Board meetings that our qualifications for membership need further definition. My experience on screening boards for various organizations shows that the biggest problem always seems to be with the qualifications for "associate" members, and this Society is no different. We are hopeful we can clarify the issue.

With Item 3, we are trying to give future administrations more control over their own destinies. The membership voted last year to raise dues. This year's administration is still projected to have a budget surplus at year-end. Just as surely as the sun rises in the east, we can already project less of a surplus, if any, for next year's administration and the administration following that may need another dues increase. If we felt this year that next year's administration needed a dues increase to cover the Society's business, we would have to have made our decision to ask the membership for it by the middle of February, some 4½ months before the next administration takes office with that much time left on the present administration's charge. If approved, the incoming administration could decide in June if a dues increase was needed and still have time to get the new amount included for the new dues notices that go out in August and early September. The present roller coaster budget effect would be eliminated and the chances of leaving an incoming administration in a monetary situation in which they could not accomplish what they felt necessary would be diminished.

A number of the larger local geological societies (RMAG, WTGS, Lafayette) have already established the office of President Elect. The membership of the RMAG, several years ago, gave its Executive Board approval to raise dues an incremental amount without having to ask their approval.

If you can recall way back to the first paragraph, I told you we had created two ad hoc committees. The second one, equally important, is to study an area in which the Executive Board believes the Society has the beginnings of a problem. The result of the Committee's work should tell us if we, indeed, do have a problem and hopefully, how to approach solving it.

For the past several years the membership of the Houston Geological Society has been growing by several hundred each year so that membership by year's end will approach 3800. Attendance at our meetings is holding steady at levels established several years ago. Since the level of speakers and the subjects of their talks have remained generally high, the Board feels that the stagnant nature of the attendance (really a decline in percentage of members attending) probably reflects the dispersal of members throughout the metropolitan area, the time involved in getting around the metropolitan area, and the few places that can adequately handle a large crowd. For whatever reason, the Board feels that possibly the Society is not meeting its goals as stated in the Constitution, i.e., (1) to disseminate and facilitate discussion of geological information, and (2) to enhance professional interrelationships between geologists in the area.

Satellite groups of geologists are already established west of West Belt and in the Greenspoint-Woodlands area. We have asked this Committee, chaired by Ben Sorrell, a Past President, to try to determine how many geologists are out there and how the Society can help meet their professional needs. The Committee has been requested to present their recommendations to the Executive Board by June 1. It was the opinion of the Board that this Committee should be large, with representatives from all sections of the area and of all age groups. If you feel you have ideas on this, please contact Ben.

Chet Baird
President

SOCIETY CALENDAR FOR APRIL

- April 13, 1981
Location to be announced
HGS Evening Meeting
John H. Oehler
Conoco Exploration - Research & Development "Carbonate Source Rocks in the Jurassic Smackover Trend of Mississippi, Alabama and Florida"
- April 29, 1981
Location to be announced
HGS Luncheon Meeting
Christopher Kendall
Gulf Research & Development
"Tepee Structures"

PRICE SCHEDULE—HGS MEETINGS

- Galleria Plaza Hotel
Dinner \$20.00
Marriott West Loop (1750 West Loop South)
Luncheon \$13.00
RESERVATIONS (771-8315)

NOTICE: Advance tickets are required for the March 9 evening meeting. Tickets for this joint meeting with the Geophysical Society of Houston are \$20.00. **Deadline for purchasing tickets is noon Friday, March 6.**

You may purchase tickets at the February 25 HGS meeting or by sending your order with a check and a stamped, self-addressed envelope to:

Houston Geological Society
6916 Ashcroft
Houston, TX 77081

Please make reservations for the Wednesday noon meeting by noon Monday, March 23.

NOON MEETING—MARCH 25, 1981

VINCENT MATTHEWS III—Biographical Sketch



Vince Matthews is Exploration Manager of Amoco Production Company's Western Division—an area including 16½ western States—with headquarters in Denver.

Matthews first joined Amoco Production in 1967 in New Orleans as a geologist following the awarding of BS and MS degrees in geology from the University of Georgia. Two years later, in 1969, he resigned to pursue graduate

studies at the University of California, where he was a Danforth Fellow and Lecturer. His PhD-dissertation research was on the movement history of the San Andreas fault.

For 5½ years he taught geology at the University of Northern Colorado, where he was an Associate Professor of Geology and Environmental Studies and was also President of the Faculty Senate.

Matthews rejoined Amoco Production in Denver in 1977 as a staff geologist working in the Overthrust Belt. In 1979 he was transferred to the Production Company's General Office in Chicago. Just prior to his present assignment, he was in charge of Amoco's preparation for the Beaufort Sea OCS sale north of Prudhoe Bay, Alaska.

Dr. Matthews is the author of 17 professional papers in geology. He is editor of the Memoir on *Laramide Folding Associated with Basement Block Faulting in the Western U.S.*, which was published by the Geological Society of America. He has been a geological consultant to the Bureau of Land Management and the Governor's Task Force on the Rocky Flats Nuclear Weapons Plant in Colorado. He is also a Fellow in the GSA and a member of AAPG.

THE WYOMING-UTAH THRUST BELT—A MAJOR NEW PETROLEUM PROVINCE (Abstract)

Prior to 1976, most companies did not consider the Utah-Wyoming thrust belt to be a promising area for exploration. Much of this pessimism was the result of a misconception about the time of migration of hydrocarbons and concerns about the ability to decipher the complex structures. However, within the past 5 years, the Wyoming-Utah thrust belt has developed into a major petroleum province. Advances in seismic technology have led to the discovery of 9.5 trillion cu ft of gas and over 900 million bbl of oil thus far. The opportunities for expanding this play into other parts of the thrust belt are extremely exciting—yet may not necessarily be fruitful.

PROFESSIONAL AND ORGANIZATIONAL NEWS:

PROFESSIONAL AND ORGANIZATIONAL NEWS may be sent to Mrs. Virginia Lee Bick, 2534 Yorktown, Suite 156, Houston, 77056 for publication in the HGS Bulletin. All news to be published in the May issue should be sent to Virginia by March 25th. These items may also be phoned to her at 840-0406.

Ken Cox joins Home Petroleum Corp., 2600 N. Loop W., Ste. 400, Houston, 77092, (686-7444) as SR. Exploration Specialist for South Louisiana. Mr. Cox has previously been employed by Tenneco Coal Co.

Bobby Evers; formerly District Geophysicist, S.E. Region for Texas Oil and Gas Corp., has opened his own geophysical consulting firm at 11060 Timberline, Houston, 77043, (465-7586).

M. E. "Gene" Mathis, Jr. has left Fairfield Industries to join Petty-Ray where he is currently working with High Resolution 3-D Marine Data and Finegrain Velocity Analysis.

Worldwide Energy Corporation is opening a regional exploration office in Midland, Texas. The Southwest Regional Office is located at 3415 West Illinois, Suite One, Midland, Texas 79703. Telephone: 915/686-0233. Manager of the new office is **Dennis L. Bell**.

CPC Exploration, Inc. of Corpus Christi, Texas, announces the opening of exploration offices in the Ben Franklin Savings Building at 5444 Westheimer and the appointment of **George T. Karabatsos** as Vice-President of Exploration. Mr. Karabatsos was formerly with Sanchez-O'Brien Minerals Corporation.

UNIVERSITY OF NEW ORLEANS / GEOPHYSICIST

Applications are invited for a permanent faculty position commencing August, 1981, in exploration geophysics. The Ph.D. or equivalent experience is required.

Appointee will be expected to teach graduate and undergraduate courses in geophysics and general geology, conduct a program of research, supervise theses and oversee a program in geophysics. The position will be at the assistant professor level or higher depending on background. Applications are encouraged from individuals with industrial experience, including recent retirees.

Applicants should send a letter outlining interest in position, complete resume, and three letters of recommendation to Dr. Gordon Frey, Department of Earth Sciences, Lake Front, University of New Orleans, New Orleans, LA 70122.

UNO is an equal-opportunity/affirmative action employer. Applications from minority groups are specifically invited.

1981 AAPG SOUTHWEST SECTION MEETING

From April 5-7 the San Angelo Geological Society will host the 1981 AAPG Southwest Section meeting. Headquartered at the San Angelo Convention Center and the nearby Holiday Inn and Holidome, this early spring meeting will explore "Trapping Mechanisms In West Texas Basins".

CONFERENCE: APRIL 28-29, 1981

GEOLOGY OF ALABAMA

The Alabama Geological Society, The Geological Survey of Alabama and State Oil and Gas Board of Alabama, and the School of Mines and Energy Development of the University of Alabama will host the conference.

The program includes a general session, Coastal Plains session, Black Warrior Basin session, Appalachian Thrust Belt session and core workshop. In addition two pre-conference one-day field trips on April 27 will be given to the Appalachian Thrust Belt and to the Alabama Coastal Plain. A post-conference one-day field trip will be conducted April 30 to the Black Warrior Basin. Registration deadline is March 31, 1981. Registration fee is \$60 (student \$20) with the field trips an additional \$50 each. Write Ernest A. Mancini, Geology and Geography Department, University of Alabama, University, Alabama 35486 for additional information.

EVENING MEETING—MARCH 9, 1981

RAY HOLIFIELD—Biographical Sketch

Ray Holifield is President of Ray Holifield & Associates, Dallas, Texas, a geological consulting firm. Mr. Holifield received B.S. and M.A. degrees from the University of Missouri. From 1964 to 1970, he was employed by Tenneco Gulf Coast. From 1970 to 1975 he worked for D. R. McCord, primarily in the Middle East, and from 1975 to 1979 he worked on domestic projects for LaRue Moore & Schafer. Mr. Holifield established his own firm in 1979.

GIDDINGS—AUSTIN CHALK FIELD, UPPER GULF COAST, TEXAS (Abstract)

Ray Holifield & Associates is providing geological consulting services for drilling programs of approximately \$250 million during 1981 in the Austin Chalk trend.

Application of seismic techniques coupled with innovations in well completions and price increases for oil and gas create the opportunity for profitable, yet low-risk, drilling programs.

Discussion will focus on the origin of gas and oil in the Austin Chalk, reserves, exploration, and drilling and completion techniques.

LOWER TERTIARY OF THE BRAZOS VALLEY, GUIDEBOOK

DAVID G. KERSEY, Editor

Published by the Houston Geological Society, 1979, 126 p. \$10 postpaid

The guidebook was prepared by the faculty and graduate students of the Center for Sedimentology at Texas A&M University. The publication is divided into two sections.

The first section is a collection of eight papers. The first five discuss the regional structure, stratigraphy, depositional environments and micropaleontological biostratigraphy of the Claiborne Group. Two papers deal with lignite deposits in the Manning Formation and Middle Yegua Formation. The eighth paper is entitled "Uranium in Lignites of Texas Gulf Coast Plain".

The second part of the guidebook contains four road logs, discussions of field trip stops and field trip localities. An appendix includes a description of geologic units seen at the various stops. A bibliography containing over 175 references is also included. Figures in the text range from regional sand maps to well log correlation sections, and from graphs showing distribution and amount of uranium in lignites to measured sections and petrographic composition diagrams.

The discussion of each stop and locality includes a general description of the outcrop and supporting evidence for the interpretation of depositional environment. A measured section accompanies the discussions.

The guidebook is a useful reference book that will help geologists have a better regional understanding of the sediments of the Claiborne Group, as well as remind us of the relationship between those SP log deflections and the rocks at the outcrops. The extensive bibliography itself should be a useful reference, especially for those involved in compiling company reports.

Walter S. Light, Jr.

* * * * *

In addition to earthquakes due to natural causes, earthquakes can be triggered by a variety of man's activities, including reservoir impoundment, fluid injection, fluid withdrawal, quarrying, and the detonation of large underground explosions.

HGS SYMPOSIUM

The Continuing Education Committee of the HGS will sponsor a symposium on the Atlantic Margin of North America from 1 P.M. to 5 P.M. on Thursday, March 19 and 8:30 A.M. to Noon on Friday, March 20 in the Exxon Building Auditorium. Speakers from government and industry will provide an overview of current studies and activity along the margin.

Speakers and their topics will include:

W. P. Dillon of the USGS on the continental margin south of Cape Hatteras.

C. W. Poag of the USGS on the stratigraphy and depositional history of sedimentary basins of the U.S. Atlantic margin.

K. D. Klitgord of the USGS on the tectonic structure of the U.S. Atlantic margin.

L. F. Jansa of the Geological Survey of Canada on the Mesozoic carbonate platforms of the eastern North American margin.

A. S. Kinder of Cities Service Co. on the current and future industry activity on the U.S. Atlantic margin.

PASSAGES

James D. Glynn died September 17, 1980 in Onalaska, Texas. Mr. Glynn was an independent petroleum geologist.

Richard H. Schweers died September 16, 1980, he was retired from Texaco.

John F. Weinzierl, 80 died September 29, 1980. Mr. Weinzierl was a consulting geologist and geophysicist.

Don W. Bishop, 66, died October 1, 1980. Mr. Bishop was retired from Dresser Atlas.

James M. Bridges, 60, died October 20, 1980. Mr. Bridges was a geologist with Southern Natural Gas Co.

Dr. J. Brian Eby, 83, died December 1, 1980. Dr. Eby was a consulting geologist.

HGS MEMORIAL SCHOLARSHIP FUND

The Society's Memorial Scholarship Fund recently received contributions in the following categories:

Mr. G. C. Hardin, Jr. PATRON

204 Arborway
Houston, Texas 77057

Mr. James I. Riddle DONOR

Southern National Bank Bldg.
Suite 1708

Houston, Texas 77002

Mr. R. R. Rieke DONOR

5634 Meadow Lake
Houston, Texas 77056

Mr. James W. Roach DONOR

10039 Del Monte Dr.
Houston, Texas 77042

Mrs. Carleton D. Speed, Jr. DONOR

606 River Oaks Bank & Trust Tower
2001 Kirby Drive

Houston, Texas 77019

Houston Geological Auxiliary DONOR

c/o Mrs. A. Bacho, President
38 Charleston North

Sugarland, Texas 77478

Mr. & Mrs. W. Dean Grafton CONTRIBUTOR

12531 Shepherd's Ridge
Houston, Texas 77077

Carl E. Norman

TOWARD A PHILOSOPHY OF OIL-FINDING

Wallace E. Pratt

As a geologist long engaged in the search for oil, I have witnessed the development over the last 40 years of an amazingly effective art of prospecting based on the science of geology, vastly aided since the middle 1920's by geophysics. I share the satisfaction of the geological profession in this splendid achievement. We have gone far beyond the utmost that seemed possible to me at the beginning of my work in petroleum geology.

Nevertheless, my experience has forced me to the conclusion that even the most finished art of prospecting by itself, is not adequate to the task of finding the earth's oil. There are other factors which constitute barriers to success in oil-finding of such a nature that no perfection of methods and techniques of search can remove or surmount them. These factors are fundamental; they are innate in our very habits of thought. They are greatly re-enforced by the existing social order in many countries. Their nature and the way in which they operate to defeat the oil-finder are revealed in two incidents - familiar to all of us - which are typical of the activities of the oil-producing industry. These incidents may be briefly recited.

In May, 1920, when the total past production of this country amounted to only 5 billion barrels, David White, the competent and highly respected chief geologist of the United States Geological Survey, predicted that "the production of natural petroleum in the United States must pass its peak at an early date, probably within five years and possibly within three years, due to the exhaustion of our reserves." "Our domestic production," he continued, "is not likely ever to exceed 450 million barrels" annually. If we did produce so much we would "exhaust the estimated 7 billion barrels of natural petroleum remaining available in the ground in the United States in 18 years."

Today, 30 years after this prediction was made, we are producing at roughly five times the rate David White set as the maximum we could ever attain, and over the intervening years we have produced five times as much as the total he estimated as remaining available in the ground. Yet we still have a proved reserve four times larger than David White's estimate of total remaining resource in 1920, to say nothing of an additional undiscovered resource of unknown volume.

It is clear in retrospect, therefore, that David White's prediction was absurdly pessimistic. He was firmly convinced that there was very little oil in the United States. His opinion was based on his knowledge of the occurrence of oil and he was unusually well informed on this subject. Most of us agreed with him at the time. In 1921, this society, the American Association of Petroleum Geologists, joined with him and his colleagues in the United States Geological Survey in the preparation of a similarly pessimistic estimate of the remaining petroleum resources of the United States.

There are many instances where our knowledge, supported in some cases by elaborate and detailed studies, directed specifically to the question at issue, has convinced us that no petroleum resources were present in areas which subsequently became sites of important oil fields. The second incident here to be recited, is a case in point.

Over a period of 15 years preceding its discovery in 1937, the largest known oil field in the world-Kuwait, in the Middle East-was offered for a nominal consideration to a number of the larger units in the petroleum industry, including the three

leading oil companies-British, Dutch, and American-in the world; and all these companies, in turn, declined the offer. Not one of them thought it worthwhile even to undertake to explore an area which, once it was explored, proved to be the site of an oil field larger-far larger-than any previous known. In other words, at the end of 90 years of virgorous search for oil over the earth and of intensive study of the occurrence of oil in the crust of the earth, the best minds in the oil-finding industry failed to recognize the earth's greatest oil field (to date) before it was proved by drilling: worse than that, they were convinced that it was no oil field at all!

Why do we so completely misjudge the potentialities of oil-bearing rocks? It is not that this incredible error arose out of unfamiliarity with the occurrence of oil in the region in question. The Middle East has been famous for its seeps of oil and gas for hundreds of years. Kuwait itself boasts profile oil seeps. In adjacent Iran, great oil fields had already been producing for more than 20 years. Moreover, these adjacent Iranian oil fields had been developed and were currently administered by one of the very companies which insisted that Kuwait was not worth exploring. Two of the other leading companies had for years been participants in large oil-producing operations in Iraq, on the other side of Kuwait.

These companies knew more than anybody else about oil in the Middle East. They commanded the services of the best geologists in the world. They had carried out special investigations-long and painstaking geologic research on the occurrence of oil in the Middle East. They were not deterred from exploiting Kuwait by any feeling that they knew too little about the occurrence of oil there to justify the risk of loss the venture would involve. On the contrary, they were deterred by their conviction, based on long experience and extensive surveys in the Middle East, that there was no chance of success in Kuwait. They knew, in short, that "there is no oil in Arabia."

Before I leave this incident, I should complete the record by recalling to you that the company which finally had the courage to take up the concession on Kuwait, ten years after it had first been offered to the leading oil producers of the world, was Gulf Oil Corporation. At the same time Gulf Oil Corporation acquired also a concession on the neighboring island of Bahrein, in the Persian Gulf, which it later sold to Standard Oil of California. The California company promptly initiated drilling operations on Bahrein Island and, in 1932, discovered a major oil field. This discovery made it abundantly clear to everyone that there is oil in Arabia, after all, and one of the three great companies which had spurned the Kuwait concession a few years earlier, now re-entered the field and finally (1934) secured a half interest with Gulf Oil Corporation in the Kuwait concession.

It would be consoling to us as geologists and oil-finders if we could convince ourselves that our experience at Kuwait constitutes merely an isolated mistake in judgment, out of keeping with our general and normal performance. But this solace is denied us. If we examine the record, we find that Kuwait is only one more instance in a long series of similar misjudgments. And these errors are frequently the errors of our best informed authorities.

Each of the incidents just recited illustrates a mental attitude which becomes a formidable barrier to oil-finding. The first is an example of the natural conservatism of the trained scientific mind-a trait which, it has been said, has grievously impeded the quest for truth, everywhere. It has impeded the search for oil. David White was conservative. He dealt with

facts-so far as they were known; and he would not venture beyond the known. Because so much was unknown to him, and therefore ignored by him, David White erred. We all erred with him. Consistently, from the birth of the industry to the inception of the Second World War, the scientist has grossly underestimated the petroleum resources of the United States. This conviction of our best minds that little or no oil remained to be found has continuously handicapped the search for oil. Unless men can believe that there is more oil to be discovered, they will not drill for oil.

The second incident illustrates an even more pernicious habit of mind. Joseph Pogue has emphasized this singular trait in a recent unpublished discussion of estimates of petroleum reserves. That which becomes known to us in a particular field, he says, however small our knowledge may be, tends often, not only to color, but actually to obscure what remains unknown to us in the same field. A "little learning" about our proved reserves, for example, makes it impossible for us to measure our total resources by any other yardstick. If the part we know is small the unknown extension of it must also be small. What we learn, instead of illuminating what we have still to learn, sometimes casts a mental shadow over it, rendering it less discernible and impelling us to ignore it.

Those who are trained and experienced in the art of oil-finding appear to be particularly susceptible to this blindness which comes with the acquisition of a little knowledge. Oil-finders, of necessity, are guided by their observation of the facts-their knowledge of the occurrence of oil in the area they have to explore. But the oil-finder can almost never know all the factors with which he has to deal-the actual conditions at depth beneath the surface of an unexplored, or incompletely explored, segment of the earth's crust. For him, the disparity between the known and the unknown is unusually large. For him, the need to be always alert to the potentialities of what he does not know is paramount. He must maintain a constant awareness that he does not know everything that may enter into his problem. To assume that our knowledge of an area is complete when it is not, may be to conclude that there is no oil where there is oil. So it is that we conclude from an inadequate knowledge of the facts that "there is no oil in Arabia".

The record demonstrates that, as oil-finders, we have persistently underestimated the amount of oil and gas that have been stored up in the earth's crust. We have been too conservative always. Despite all our mistakes, however, we have already found in the United States far more oil than our knowledge of the occurrence of oil permitted us to anticipate. Our discoveries since 1920 are already almost 9 times greater than David White's estimate of the total remaining resource; and we know there are still new oil fields to be discovered.

We have produced in the United States nearly two-thirds of all the oil the world has consumed in the past. This means a past production in this country nearly 10 times as great per unit of area of earth's crust favorable for the occurrence of oil, as the rest of the world.

It was long held that our ability to find and produce oil more rapidly and more abundantly than the rest of the world arose from an exceptionally rich endowment of natural resources in oil. But it is clear today that oil resources far richer and larger than ours exist elsewhere over the earth.

How, then, does it come about that we have been able to produce so much more oil in the past than the rest of the world? And how have we surmounted or circumvented the mental barrier which, as we have noted, stand in the way of mankind's search for oil?

Since the very inception of the industry, the finding and producing of oil in the United States have been carried on by literally thousands of independent enterprises; thousands of individuals, each an oil-finder in his own right; each free to put to the practical test of the drill his own ideas and theories of where oil might be found; and each spurred on to the drilling of exploratory wells by the assurance that if he made a discovery, he would reap a reward commensurate with its value to society.

Under these circumstances, hundreds of thousands-more than a million-wells have been drilled in the United States in search for oil. And many thousands of them have been drilled at places which were believed by everyone except the driller, to be unfavorable for the occurrence of oil. Yet, time after time, these wells at unfavorable locations discovered major oil fields. This is the way we have found oil in the United States-the drilling of many exploratory wells all over the land. By this procedure more oil fields have been discovered than anybody had dreamed were possible.

Under these circumstances, also, the mental barriers that normally stand in the way of the oil-finder were dissipated. The conservatism of the trained scientist was nullified by the action of the untrained oil-finder, unhampered by "a little learning." If one man said there is no oil in Arabia (or West Texas) another man promptly drilled a well there to see-and often he found oil.

The freedom of every citizen to explore by drilling wells for oil and the assurance to every citizen of a generous reward for success in finding oil have accrued to us out of our social and political environment. These are advantages which have contributed more to our achievement in oil-finding than the perfection of the art of prospecting. The citizens of few other countries possess these advantages. To their lack is due, in large part, the relatively poor showing in the search for oil over much of the earth. Oil-finding is at once the task of the individual and of the community at large. If the action of either is inappropriate, the search languishes.

One indispensable attribute of the successful oil-finder is vision. Levorsen has said "until a discovery well has been drilled the undiscovered oil or gas field exists at best only as an idea in the mind of the geologist." If it is in the mind of geologist, or the oil-finder, that new fields first take form, then discovery must wait on our mental visualization-our imagination.

Where oil is first found, in the final analysis, is in the minds of men. The undiscovered oil field exists only as an idea in the mind of some oil-finder. When no man any longer believes more oil is left to be found, no more oil fields will be discovered, but so long as a single oil-finder remains with a mental vision of a new oil field to cherish, along with freedom and incentive to explore, just so long new oil fields may continue to be discovered.

Editor's Note:

The preceding article was published in the *Bulletin* of the AAPG, Volume 36, November 12, December 1952, pages 2231-2236. It appears here with the permission of the Editor of the AAPG *Bulletin* and with the permission of the author. Mr. Pratt, 95, lives in Tucson, Arizona.

SEMINAR SERIES - UNIVERSITY OF HOUSTON SPRING 1981

- 10th March "Dike intrusion at Mid Ocean Spreading Centers: Evidence from Ophiolites"
E. Rosenkrantz, Univ. of Texas Marine Science Institute, Galveston.
- 24th March "Review of Leg 73, D.S.D.P.: Southeast Atlantic Ocean"
M. Carman, Geol. Dept., Univ. of Houston, Houston.
- 31st March "Geological mapping of the Oceanographer Transform using Submersible "ALVIN" and deep towed camera system "ANGUS"
J. Casey, Geol. Dept., Univ. of Houston, Houston.

- 7th April "Rock Water Reactions and Geochemical Cycling"
F. Dickson, Oakridge National Laboratory, Tenn.
- 16th April "Geophysical Studies in Eastern Egypt: delineation of the Red Sea Continental Margin"
P. Morgan, Lunar and Planetary Institute, Houston.
- 21st April "Early Land Plant Evolution - the Palynological Evidence"
G. Wood, Amoco Production, Houston.
- 28th April "Tectonics and Evolution of Venus"
R. Phillips, Lunar and Planetary Institute, Houston.

SEMINARS ARE HELD AT NOON IN ROOM 315, SCIENCE & RESEARCH BLDG. I, UNIVERSITY OF HOUSTON. FOR FURTHER INFORMATION PLEASE CONTACT STUART HALL 749-4523.

NEW MEMBERS

ALLEN, ROBERT G. H.
Mgr. Uranium Exploration
G C O Minerals Co.
P. O. Box 4258
Houston, Tx. 77210
651-9261

BENTLEY, BARBARA P.
Geologist
Amoco Production Co.
P. O. Box 3092
Houston, Tx. 77001
652-8480

BRAND, KARL E.
Sr. Geologist
Brown & Root Inc.
Box 3, 91-2NE-22
Houston, Tx. 77001
679-2445

BROAD, RICHARD
Technical Rep.
Exploration Surveys Inc.
8616 Daffodil
Houston, Tx. 77063
977-1042

COOK, CHARLES S.
Chief Geologist
Jones - O'Brien Inc.
P. O. Box 5928
Shreveport, La. 71105
869-2551

COSTER, JOHN R.
Geologist
Cabot Corp.
2190 N. Loop W.
Houston, Tx. 77018
680-1915

CRATSLEY, DENNIS W.
Staff Geologist
Texas Eastern Expl. Co.
P. O. Box 2521
Houston, Tx. 77001
759-3131

DONAIS, PATRICK A.
Staff Geophysicist
Phillips Petroleum Co.
P. O. Box 1967
Houston, Tx. 77001
669-3569

ELLIS, LOWELL C.
Technical Director
Gulf Oil
P. O. Box 2100
Houston, Tx. 77001
754-1287

FREEMAN, CLINTON A.
Geologist
Gulf Science & Technology
P. O. Box 36506
Houston, Tx. 77036
754-5141

GARBER, RAYMOND A.
Assoc. Production Geologist
Sun Production Co.
P. O. Box 3327
Houston, Tx. 77001
680-4600

GARTNER, RICHARD H.
Geologist
Pan Canadian Petroleum Co.
One Houston Center #1500
Houston, Tx. 77010
658-8787

GILMORE, JR., HERMAN L.
Development Geologist I
Getty Oil Co.
6750 W. Loop S.
Bellaire, Tx. 77401
668-8400

GROOMS, DAVID G.
Geologist
Cities Service
P. O. Box 642
Houston, Tx. 77001
683-2304

GRUBITZ, GARY E.
Geophysicist
Cities Service Co.
P. O. Box 27570
Houston, Tx. 77027
850-6168

HALE, RICHARD A.
Consulting Geophysicist
Phillips Petroleum Co.
P. O. Box 1967 - #635
Houston, Tx. 77001
669-3434

HEPPARD, PHILIP D.
Geologist
Amoco Production Co.
P. O. Box 3092
Houston, Tx. 77001
652-2316

HILL, BRUCE E.
Geologist
Amoco Production Co.
P. O. Box 3092
Houston, Tx. 77001
652-4604

HINELINE, T. LAWRENCE
Geologist
Texaco Inc.
P. O. Box 430
Bellaire, Tx. 77401
666-8000

HUERTA, RAUL
Geophysicist
Exxon Company USA
P. O. Box 2180-4550 Dacoma
Houston, Tx. 77001
680-5257

INDIK, ISAAC Y.
Geophysicist
Phillips Petroleum Co.
P. O. Box 1967
Houston, Tx. 77001
669-3747

JOHNSON, BRUCE A.
Geologist
Phoenix Resources Co.
914 Main St. #1550
Houston, Tx. 77002
658-0784

KENNETT, BONNI J.
Geologist
G C O Minerals Co.
P. O. Box 4258
Houston, Tx. 77210
651-9261

KINSMAN, ROBERT W.
Comp. Sci. Manager
Cities Service Co.
P. O. Box 22082
Houston, Tx. 77027
520-4625

KOWALCZYK, GARY R.
Exploration Geologist
Columbia Gas Developmt. Corp.,
P. O. Box 1350
Houston, Tx. 77001
626-8090

KROHN, STEVEN R.
Geologist
Exxon Company USA
P. O. Box 4279
Houston, Tx. 77001
999-9463

LANDRUM, RICHARD S.
District Geologist
Union Oil Co. of California
4151 Southwest Frwy. #760
Houston, Tx. 77027
621-1917

LEONARD, JAY E.
Research Scientist
Getty Oil Co. (EPRC)
P. O. Box 42214
Houston, Tx. 77042
975-8099

MATHIS, MARK E.
Geologist
G C O Minerals Co.
P. O. Box 4258
Houston, Tx. 77210
651-9261

NEFE, ERICK C.
Geophysicist
Exxon Co. USA
P. O. Box 4279
Houston, Tx. 77001
999-9229

NOLAN, THOMAS J.
Sr. Geologist
Marathon Oil Co.
P. O. Box 3128
Houston, Tx. 77001
629-6600

O'LEARY, JOHN C.
President
Intercoastal Operating Co.
600 Jefferson #616
Houston, Tx. 77002
659-8772

OLSON, CHRISTOPHER J.
Geologist
Amoco Production Co.
P. O. Box 3092
Houston, Tx. 77001
652-2392

PENNELL, RAY
Exploration Manager
Gulf Oil Expl. & Prod. Intl.
P. O. Box 2100
Houston, Tx. 77001
754-1312

PIERCE, STEPHEN E.
Explorationist
Superior Oil Co.
P. O. Box 1521
Houston, Tx. 77001
751-4110

SCHMIDT, BENNETTA L.
Geologist
Cities Service Co.
P. O. Box 27570
Houston, Tx. 77027
850-6190

SCHOEN, WILLIAM R.
Divn Reservoir Engineer
Mesa Petroleum Co.
1700 Dresser Tower
Houston, Tx. 77002
658-4421

SEATON, WILLIAM J.
Geologist
Phillips Petroleum Co.
P. O. Box 1967
Houston, Tx. 77001
669-3471

SINCOCK, BRADFORD W.
E. S. Engineer
Core Laboratories Inc.
5295 Hollister Rd.
Houston, Tx. 77040
460-9600

SPROLL, WALTER P.
Geophysicist
Cities Service Co.
P. O. Box 27570
Houston, Tx. 77027
850-6166

WALTERS, GERARD M.
Geologist
Amoco Production Co.
P. O. Box 3092
Houston, Tx. 77001
652-5222

WERREN, WALTON K.
Geologist
Phillips Petroleum Co.
P. O. Box 1967
Houston, Tx. 77001
669-3734

WHITLEY, DONALD L.
Geologist
Amoco Production Co.
P. O. Box 3092
Houston, Tx. 77001
652-5222

WICKS, JOHN L.
Geologist I
Cities Service Co.
P. O. Box 27570
Houston, Tx. 77027
850-6228

WILSON, HEATHER G.
Exploration Geologist
Gulf Oil Corp.
P. O. Box 1635
Houston, Tx. 77001
754-7645

WOLTERS, WM. DOUGLAS
Geologist
Eaton Operating Co.
3100 Edloe #205
Houston, Tx. 77027
627-9764

YATES, PATTI A.
Geophysical Technician
Western Geophysical Co.
P. O. Box 2469
Houston, Tx. 77001
789-6900

NEW ASSOCIATE MEMBERS

NAGEL, SHIRLEY M.
Geological Technician
Souders & Co.
P. O. Box 94126
Houston, Tx. 77018
681-6330

POOLE, RICHARD A.
Geological Assistant
Sonat Exploration Co.
P. O. Box 1513
Houston, Tx. 77001
940-4060

THE PETROLEUM GEOLOGIST'S ROLE: 2000-2025 A.D.

ALEX H. MASSAD, President Exploration & Producing Division, Mobil Oil Corporation

I believe areas currently in the early stages of development of their oil and gas reserves such as the OPEC countries, Alaska, and the People's Republic of China will have the greatest need for petroleum geologists in the early part of the twenty-first century. However, the role the petroleum geologist will play during this period will depend upon the way the energy industry develops.

In making predictions on this subject, I will assume the continuation of current industry trends and discount unforeseen political events which may in fact radically change the orderly progress of events. Keeping this in mind I would like first to call your attention to the current state of the geological profession and the manner in which it reflects the current state of the oil and gas industries.

The most recent figures available from the U.S. Department of Labor, for 1978, state there were 17,653 professional geologists in the U.S. The Department of Labor predicts by 1990 this number will increase to about 25,000; an increase of about 42%.

Meanwhile, last year the U.S. active rig rate rose about 40%. It is now at an all time high.

Although the active rig rate is not the sole factor determining employment opportunities for geologists, and although it may not continue to increase at this rate, the fact remains it has increased in *one year* about as fast as the number of geologists is expected to increase over the next *ten years*. This at least partly explains the current shortages of experienced petroleum geologists and indicates this shortage will probably grow more acute if the active rig rate continues to climb. How did this situation develop?

The Natural Gas Policy Act of 1978 eased or lifted price controls from certain categories of natural gas which flow in interstate commerce. This has resulted in a higher price for producers who discover gas at 15,000 feet or below. Also, as predicted, President Carter's decision to decontrol oil prices has spurred drilling activity, although the growth rate might have been even higher if the 30% windfall tax hadn't been levied on new discoveries. Nevertheless the *Oil and Gas Journal* predicted a record of 59,000 or more U.S. oil and gas wells would be completed in 1980. Also, in some areas, like the Anadarko Basin, there has been a surge in deep drilling.

The current increase in price as well as drilling activity is a result of the shortage of oil in the U.S. which, given the current evidence, should increase well into the twenty-first century. In the U.S. 1979 was the best year for addition to our proven reserves since 1970, when the large Prudhoe Bay discovery was made in Alaska. And except for the year Prudhoe Bay was discovered, 1979 was the best year in this regard in twenty-five years. Nevertheless, even in 1979 the U.S. replaced, through exploration and development, only 75 percent of the oil produced during the year. The decline in reserves has slowed considerably from 1976, when new reserves added were only 38 percent of the total oil produced, however, we are still falling behind.

We find ourselves moving as fast as we can, drilling more and more, yet falling behind, and our reserves continue to shrink. The chain of events we are observing stems initially from a shortage of supply. This, in turn has led to an increase in the price of energy, which has given us incentive to drill more. The increase in the drilling rate has resulted in a tightness in

the rig-rental market, with some fees doubling almost overnight.

The increases in drilling activity and costs have resulted in a greater demand by exploration companies for experienced petroleum geologists. Expert geological advice is essential to success, since correct location of oil and gas prospects prevents unnecessary drilling.

Because oil and gas are non-renewable resources, the more oil and gas we locate and produce, the fewer areas available for exploration remain, and thus, the more difficult it becomes to locate undiscovered reserves. Even in proven areas we are drilling deeper and conducting more reservoir studies to produce the last possible economical bbl or MCF.

In the onshore U.S., which is the most extensively explored area of comparable size in the world, this means we will have to work harder to find less. Certainly, technological improvements have facilitated our ability to interpret geological data. Improvements in seismic and computer mapping techniques have made the explorationist's job easier in some ways and changed ways of doing things. Seismic surveys are being used to probe the deeper horizons of oil areas, and improved mapping techniques have made stratigraphic traps more attractive as prospects.

Nevertheless, in the U.S. our unexplored onshore reserves base continues to decline. Yet, because of increasing prices it has become more profitable for U.S. exploration companies to focus more attention on smaller accumulations in older exploration areas. The increase in price has made marginal stripper wells profitable and is helping pay for the added expenses of secondary and tertiary recovery.

If the economics of the current situation remain the same, the more intense geological work that these areas require will continue to be attractive as long as sufficient amounts of hydrocarbons can be produced. The political stability of the U.S. makes it an attractive source of oil and gas; nevertheless as our production continues to decline during the next twenty or more years or so, we will have to look at other areas, as well as other forms of energy such as coal and nuclear.

By the beginning of the twenty-first century, oil and gas will still account for 50% of the world's energy supplies. Because of this, as supplies of oil and gas from newer — largely foreign — producing areas begin to decline, the oil and gas companies will have to apply more concentrated geological efforts. We will have to apply the same technological methods of reworking older prospects and concentrating more attention on smaller prospects which we are now doing domestically. Thus, during the first twenty-five years of the twenty-first century, geologists will be in greatest demand outside of the continental U.S. (Lower 48 states).

During this period it is likely the newer geological horizons will be in areas we are just now beginning to look at, such as Alaska, West Africa, and North and South Atlantic American Coastal areas and the People's Republic of China. Also, offshore, we will be drilling in deeper waters and in even more hostile climates.

The importance of astute geological work is pointed up by recent statistics on reserves added per well drilled. Among the 15 companies surveyed, the most successful added five times more reserves per well drilled than the least successful. Since Mobil was one of the top-rated companies in the survey, I can tell you our decisions are based on the most modern and sophisticated interpretation of geophysical and geological data. The successful companies will continue to strive to use the most advanced methods and tools in the search for oil and gas.

BULLETIN COMMITTEE

EDITOR

GREGORY K. BURNS, Cities Service Co., P.O. Box 27570, Houston, Texas 77027, Ph. (713) 850-6193

ASSOCIATE EDITOR

JOAN E. CARLSON, Home Petroleum Corp., 2600 N. Loop West, Suite 400, Houston, Texas 77092, Ph. (713) 686-7444

ASSISTANT EDITOR

KIM A. DOUD, Mesa Petroleum Co., 601 Jefferson Ave., Houston, Texas 77002, Ph. (713) 658-4496

SUSAN CONGER, Gulf Oil Exploration and Production Co., P. O. Box 1635, Houston, Texas 77001, Ph. (713) 754-7695

ADVERTISING

FRED BAKER, Great Western Drilling Co., Suite 1273, Galleria Tower West, 5075 Westheimer, Houston, Texas 77056, Ph. (713) 961-4162.

HOUSTON GEOLOGICAL SOCIETY

The Houston Geological Society, was founded in 1923 and incorporated in 1975. Its objectives are to stimulate interest and promote advancement in geology for this area, to disseminate and facilitate discussion of geological information, to enhance professional interrelationships among geologists in the area, and to aid and encourage academic training in the science of geology.

The *Bulletin* is published monthly except July and August. Subscription price for nonmembers is \$15 per year. Single copy price is \$1.50. Claims for nonreceipt in the contiguous U.S. should be made within 2 months of the date of issue; claims from elsewhere within 4 months.

Communication about manuscripts and editorial matters should be directed to the Editor. Inquiries concerning advertising rates should be directed to the Advertising Chairman. Applications for membership in the Houston Geological Society may be obtained from the Society office, 6916 Ashcroft, Houston, Texas 77081.

COVER PHOTO

The White Mine, Uvalde County, Texas, world's largest Rock Asphalt Mine, approximately 12 miles west of Uvalde, Texas. This was the scene of the first part of the October 1980 HGS Field Trip led by Feather Wilson. You're looking at an Upper Cretaceous (Taylor) carbonate beach deposit (Anacacho Lime). An unconformable surface provided the trap. Subtle differences in porosity and permeability are visible within the walls of the mine. On hot days, asphalt seeps out of the walls of the mine. *Photo courtesy of Chet Baird.*

The increasing sophistication of petroleum geological science has had its affect both on success and manpower requirements. For example, 20 years ago few geologists were engaged in thermal maturation studies of source beds or in plate tectonic work. Today no frontier exploration effort of magnitude can ignore the implications of one or both of these disciplines. Compared to 20 years ago additional hundreds of geologists are engaged today in computer geology, seismic stratigraphic studies and sophisticated well logging analysis. As hydrocarbon-finding becomes more difficult and petroleum geology expands, the requirements for ever more complex and detailed geological studies will increase. I see the numbers of geologists increasing well into the 21st century.

This is why I believe geologists will still be at the forefront of the industry's exploration efforts in the year 2025. As our resource base continues to shrink and drilling costs rise sound geological advice will become more and more valuable.

BIOGRAPHY

Alex H. Massad is a Director of Mobil Corporation, and a Director and Executive Vice President of Mobil Oil Corporation. He is also President of the Exploration and Producing Division.

Mr. Massad was born on July 10, 1923, in Drumright, Oklahoma, and received a B.S. degree in Petroleum Engineering from Oklahoma University in 1944. During World War II, Mr. Massad served as an engineering officer in the United States Navy.

He joined Mobil in 1946, as a Rotary Floorman in a drilling crew in the Southwest. Subsequently, he worked in various field activities and held numerous engineering and managerial positions.





In 1964, he joined the Middle East Affairs Department on a special assignment related to the Persian Gulf. Returning in 1965, he was assigned to the Midland, Texas, Exploration and



Producing Division, and later became General Manager of the division. Following other assignments in the Southwest, he became Executive Vice President for Exploration and Producing of the North American Division in 1968, moving to a similar position in the International Division two years later.



He was elected Senior Vice President of Mobil Oil and Executive Vice President of the newly-formed Exploration and Producing Division in October, 1975. In August, 1976, he was named a Director of Mobil Oil Corporation. He was elected to the Board of Mobil Corporation effective May 5, 1977.


CONTRIBUTORS FOR THE 1980-1981 HGS ENTERTAINMENT FUND

Baroid	Petroscience
Big "6" Drilling Co.	Richardson Seismic Service Inc.
John D. Bremsteller	Schlumberger Well Services
R. Brewer & Co. Inc.	Seiscom Delta Inc.
Jack Colle	Seis Pros Inc.
Core Labs Inc.	Service Photocopy Inc.
Core Service Inc.	Sidney Schaffer & Assoc. Inc.
Dibler Seismic Service	Teledyne Exploration
Dresser Industries	Western Geophysical
Erco-Petroleum Consultants	
GDI Inc.	
Geodata Service Inc.	
Geomap/Peppard-Souders & Assoc.	
Geophysical Trend Corp.	
Georex Data Inc.	
Geosource Inc.	
Indexgeo & Associates, Inc.	
Nico Supply	
NL Industries Foundation, Inc.	
Pennington Seis Exchange Inc.	
Petroleum Information Corp.	

<p>R. P. AKKERMAN Geologist EXPLORATION Engineer CONSULTANT Review of Subsurface Data 3425 Bradford Place 668-4327 Houston, Texas 77025</p>	<p>T. WAYNE CAMPBELL PALEO-DATA, INC. CONSULTING PALEONTOLOGIST AND GEOLOGIST 6619 FLEUR De LIS DRIVE NEW ORLEANS, LOUISIANA 70124 (504) 488-3711</p>	<p>CHAPMAN CRONQUIST OIL & GAS CONSULTANT 5815 PORTAL DRIVE HOUSTON, TEXAS 77096 (713) 723-8022 (713) 723-3819 RESERVOIR STUDIES • PROPERTY EVALUATION • IMPROVED RECOVERY</p>
<p>PAUL H. ALLEN, JR. CONSULTING GEOLOGIST 12625 MEMORIAL DRIVE #51 HOUSTON, TEXAS 77024 (713) 467-3069</p>	<p>PETE W. CAWTHON, JR. PETROLEUM CONSULTANT SUITE 130 10575 KATY FREEWAY (713) 932-1913 HOUSTON, TEXAS 77024</p>	<p>DONALD P. DEGEN Petroleum Geologist 6200 Savoy, Suite 450 Houston, Texas 77036 Area Code 713 Office 977-8828 Residence 774-9833</p>
<p>GUS B. BAKER Energetics, Inc. Gulf Coast Exploration 614 SOUTHWEST TOWER At 707 McKinney Houston, Texas 77002 Ph. (713) 759-0306</p>	<p>(713) 743-4386 (Office) (713) 581-8743 (Home) 505 Lyons P. O. Drawer J SCHULENBURG, TEXAS 78056 STEWART CHUBER CONSULTING GEOLOGIST 214 Southwest Tower 707 McKinney Houston, Texas 77002 (713) 658-8395</p>	<p>Oil, Gas, Uranium, Lignite John S. Dudar Consulting Geologist 10719 VALLEY FORGE HOUSTON, TEXAS 77042 Res: 713/780-8555</p>
<p> BALLARD ENTERPRISES JACK W. BALLARD Geophysical Consultant 6440 Hillcroft Suite 108 Houston, Texas 77081 Bus. (713) 771-3045 Res. (713) 771-0919</p>	<p>GEORGE CLARK Petroleum Geologist 201 Gordon Dr. Crockett, Texas 75835 Ph. 544-8257</p>	<p>LOUISE S. DURHAM GEOLOGIST 918 DARIA DR HOUSTON TEXAS 77079 (713) 487-8790</p>
<p>President  VIRGINIA LEE BICK Member of American Association Petroleum Geologists Progressive Energy Consulting 2534 Yorktown Houston, Texas 77056 (713) 840-9562 (Bus) (713) 961-0406 (Res)</p>	<p>TELEPHONE BEAUMONT, TX, U.S.A. (713) 832-0368 835-4501 TELEPHONE ATHENS, GREECE 646-0917 GENEOS PETE COKINOS PETROLEUM AND GEOLOGICAL ENGINEERING CONSULTANT HOME OFFICE: 947 HAZEL ST. BEAUMONT, TX. 77701 U. S. A. OVERSEAS OFFICE: SARANTAPICHOU 57 (LIKOBETTOS) ATHENS, GREECE TELEX 779-478</p>	<p>Domestic Foreign DAVID L. DUNN Consulting Geologist and Paleontologist Biostratigraphy, Paleocology 6103 Old Oak Circle Sugar Land, Texas 77478 Tel (713) 498-3866</p>
<p>ADMINISTRATOR AAPG GROUP INSURANCE PROGRAM SEG GROUP INSURANCE PROGRAM JOHN D. BREMSTELLER REPRESENTATIVE 1218 C. & I BLDG. HOUSTON, TX. 77002 TELEPHONES OFFICE 751-0259 OFFICE 668-0610</p>	<p>JACK COLLE JACK COLLE & ASSOC. Consulting Geologists & Paleontologists 708 C&I Building—Houston, Texas 77002 (713) 652-4997 Jack Colle (622-9555) J. G. Ward (497-7298)</p>	<p>EVARD P. ELLISON GEOLOGIST TELEPHONE 652-3816 556 THE MAIN BUILDING 1212 MAIN STREET HOUSTON, TEXAS 77002</p>
<p>WAYNE Z. BURKHEAD Consulting Geologist 713 Rocky River Houston, Texas 77056 Ph. 713/621-3077</p>	<p> W. F. COOKE, JR. PRESIDENT Acco OIL & Gas Co. One Briar Dale Ct. Houston, Texas 77027 (713) 622-7070</p>	<p>PAUL FARREN Geophysical Consultant Geodata Building Houston, Texas 77081 667-3317 5603 S. Rice Ave. (77081)</p>
<p> W. W. (Bill) BURR Geophysical Consultant Adair Center, South 6440 Hillcroft, Suite 108 Houston, Texas 77081 Bus. (713) 771-3045 Res. (713) 771-5243</p>	<p>JACK W. CRAIG Consulting Geologist 1412 C & I Building Houston, Texas 77002 713/652-4960</p>	<p>INTERPRETATION PROGRAM MANAGEMENT DOMESTIC - FOREIGN ROBERT D. (BOB) FISH GEOLOGICAL CONSULTANT MAILING ADDRESS: 6420 HILLCROFT SUITE 309 HOUSTON, TEXAS 77036 (713) 774-4882 P. O. BOX 38142 HOUSTON, TEXAS 77038 RES. PHONE: (713) 723-2688</p>

<p align="center">STEWART H. FOLK STEWART FOLK & COMPANY, INC.</p> <p><i>Geologists, Geophysicists, and Engineers</i> Alaska and other Frontier Areas Worldwide 2200 South Post Oak Road - Suite 700 Houston, Texas 77056 Office (713) 622-9700 Home (713) 781-2336</p>	<p align="center">Clyde E. Harrison O'Donohoe & Harrison Exploration Company</p> <p align="center">1212 MAIN STREET SUITE 850 - THE MAIN BLDG HOUSTON, TEXAS 77002</p> <p align="center">(713) 658-8115</p>	<p align="center">GEORGE N. MAY GEORGE N. MAY and ASSOCIATES Consulting Geologists and Paleontologists P. O. Box 51858 Oil Center Station Lafayette, Louisiana 70505 (318) 234-3379</p>
<p align="center">FORNEY & COMPANY Oil & Gas Properties Exploration Consulting CHARLES M. FORNEY Petroleum Geologist</p> <p align="center">P. O. Box 2602 Corpus Christi, Texas 78403</p> <p>10th Floor - The 600 Building 512/884-7721</p>	<p align="center"><i>Lane E. Horstmann, Sr., P.E.</i> <i>Geological Consultant</i></p> <p align="center">9039 KATY FREEWAY BUILDING 200, SUITE 219 HOUSTON, TEXAS 77024</p> <p align="center">(713) 488-4134</p>	<p align="center">ROBERT H. MAYSE Houston Pipe Line Company Vice President - Energy Resources</p> <p align="center">1121 Americana Building Houston, Texas 77002 713/654-6684</p>
<p align="center">PAMALE PETROLEUM COMPANY Oil & Gas Producers</p> <p align="center"> WILLIAM M. FREW EXPLORATION MANAGER</p> <p>BUS 713 961-7706 RES 713 774-3525</p> <p align="center">SUITE 600 GALLERIA TOWERS WEST HOUSTON TEXAS 77056</p>	<p align="center">WILLIAM E. HUMPHREY Petroleum Exploration Consultant</p> <p>Suite 700 2200 South Post Oak Road Houston, Texas 77056</p> <p>Office 713/622-9700 Home 713/444-8180</p>	<p align="center">W. B. McCARTER C. E. McCARTER Independents</p> <p align="center">2522 Hazard Houston, Texas 77019</p> <p>523-5733 529-1881</p>
<p align="center">JOSEPH N. GRAGNON PRESIDENT</p> <p>GRAGNON CONSULTING INC 713-652-3837</p> <p align="center">1410 Americana Bldg Houston Texas 77002</p>	<p align="center"></p> <p align="center">LARRY L. JONES PRESIDENT</p> <p align="center">SPARTAN PETROLEUM CORPORATION</p> <p align="center">8552 KATY FRWY SUITE 154 HOUSTON TEXAS 77024 713/464-0709</p>	<p align="center">A. N. McDOWELL EXPLORATION CONSULTANT</p> <p align="center">OFFICE: (713) 467-7436 RESIDENCE: 10633 SHADOW WOOD DRIVE HOUSTON, TEXAS 77043 (713) 468-6521</p>
<p align="center">ERWIN E. GRIMES OIL/GAS EXPLORATION Phone 1-512-896-5998</p> <p>Grimes Resources, Inc. Discovery Oil Corporation</p> <p align="center">P. O. Box 403 Kerrville, TX 78028</p>	<p align="center">BOBBY G. KERR CONSULTING GEOPHYSICIST</p> <p>Bus 977-9664 Res 499-4803</p> <p align="center">2600 S. GESSNER SUITE 230 HOUSTON TX 77065</p>	<p align="center">FRANK S. MILLARD CONSULTANT Well Log Interpretations—Seminars</p> <p align="center">10211 Holly Springs, Houston, Texas 77042 Tele (713) 782-8033</p>
<p align="center">Steven R. Gustison PETROLEUM GEOLOGIST P. O. Box 923 PRYOR, OKLAHOMA 74361 (918) 825-2691</p>	<p align="center">HOWARD W. KIATTA PETROLEUM GEOLOGIST</p> <p align="center">1220 SOUTHWEST TOWER 707 MCKINNEY STREET HOUSTON, TEXAS 77002</p> <p>Res. (713) 680-0179 Bus. (713) 650-0680</p>	<p align="center">R. B. MITCHELL Geologist</p> <p align="center">2301 First City National Bank Bldg. Houston, Texas 77002 652-2192</p>
<p align="center">KARL F. HAGEMEIER PETROLEUM EXPLORATION CONSULTANT</p> <p>1706 C & I BUILDING 1006 MAIN STREET HOUSTON, TEXAS 77002</p> <p align="center">TELEPHONE OFF. 713/787-0959 RES. 713/494-7344</p>	<p align="center">PETROMARK MINERALS, INC.</p> <p align="center">DANIEL F. LINDOW Houston Manager</p> <p>Bus 654-8093 Res 462-8215</p> <p align="center">1020 SOUTHWEST TOWER 707 McKinney Houston Texas 77002</p>	<p align="center">ROBERT O. MITCHELL Petroleum Exploration Geology</p> <p>EL CALVARIO 17 SAN LORENZO LAS PALMAS GRAN CANARIA TES 28 97 03 97 SPAIN</p> <p align="center">1956 WINROCK APT 408 HOUSTON, TEXAS 77057 TEL 713-977-6498</p>
<p align="center">MICHEL T. HALBOUTY Consulting Geologist and Petroleum Engineer Independent Producer and Operator</p> <p>TELEPHONE (713) 622-1130 TWX (910) 881-4599</p> <p align="center">THE HALBOUTY CENTER 5100 WESTHEIMER HOUSTON, TEXAS 77056</p>	<p>OFFICE: 889 HOUSTON CLUB BUILDING HOUSTON, TEXAS 77002 227-2552</p> <p align="center">O. G. LUNDSTROM GEOLOGIST</p> <p>RES: 3614 ABERDEEN WAY HOUSTON, TEXAS 77025 664-4397</p>	<p align="center">EVELYN WILIE MOODY CONSULTING GEOLOGIST OIL AND GAS EXPLORATION SUBSURFACE STUDIES TECHNICAL PAPERS</p> <p>856 THE MAIN BLDG 1212 MAIN ST HOUSTON, TEXAS 77002</p> <p>OFF 713-654-0072 RES 713-528-0917 CERTIFIED # 3540</p>

<p>I. K. NICHOLS Petroleum Geologist 41 Still Forest Drive Houston, Texas 77024 Phone: 782-4970</p>	<p>713 - 757-0274 <i>Cecil R. Rives</i> PETROLEUM GEOLOGIST SUITE 1313 THE MAIN BUILDING 1212 MAIN STREET HOUSTON, TEXAS 77002</p>	<p>SOUDERS AND COMPANY ENERGY EXPLORATION SERVICES BARKLEY SOUDERS 9800 Northwest Frwy., Suite 110 Houston, Texas 77092 713/681-6330</p>
<p>C. E. NICHOLS Geophysicist 41 Still Forest Drive Houston, Texas 77024 Phone: 782-4970</p>	<p>JAMES W. ROACH PETROLEUM GEOLOGIST JWR EXPLORATION, INC. 3603 WESTCENTER, SUITE 110 HOUSTON, TEXAS 77042 OFF 713-784-4080 HOME 782-9704</p>	<p>CRAMON STANTON Oil & Gas Consultant 5906 Bermuda Dunes Drive Houston, Texas 77069 444-0965</p>
<p>ELWIN M. PEACOCK INCORPORATED CONSULTING GEOPHYSICIST 713-852-5014 910 C & I BUILDING HOUSTON, TEXAS 77002</p>	<p>Off. 461-3060 Res. 468-5695 JOHN A. RUGGLES Geological Consultant Town & Country Professional Building #100 10405 Town & Country Way Houston, Texas 77024 MEMBER AAPG, SIPES AIPG, GSA</p>	<p>S. BROOKS STEWART INCORPORATED Consulting Geophysicist 910 C&I Building 1006 Main Houston, Texas 77002 (713) 652-5016</p>
<p>RICHARD L. PORTER Petroleum Geologist & Exploration Consultant J & E Petroleum, Inc. 911 Walker, Suite 501 Houston, Texas 77002 BUS. (713) 227-7003 RES. (713) 774-7682</p>	<p> HERSHEL E. SALE CERTIFIED PETROLEUM GEOLOGIST 9720 TOWN PARK, SUITE 101 HOUSTON, TEXAS 77036 BUS 713-771-0459 RES. 713-774-3494</p>	<p>E. H. STORK, JR. E. H. STORK, JR. & ASSOCIATES, INC. Consulting Paleontologist and Geologist Biostratigraphy—Paleo ecology Geologic Interpretations 1811 C&I Building Houston, Texas 77002 Off: (713) 652-5026 Res (713) 466-9064</p>
<p>LEO PUGH Gulf Coast Geo Data Corp. Seismic — Gravity Data 1109 AMERICANA BLDG. Houston, Texas 77002 (713) 652-3879</p>	<p>MARTIN M. SHEETS Consultant Energy Environment Petroleum Geothermal Active Surface Faults Subsidence 1973 W. Gray, Suite 4 Houston, Texas 77019 713-523-1975</p>	<p>W. L. TIDWELL CERTIFIED PETROLEUM GEOLOGIST SUITE 450 • 6200 SAVOY • 713-977-8625 HOUSTON, TEXAS 77036</p>
<p>JOSEPH G. PUTMAN III Oil & Gas Interests 1514 Pine Gap 444-3546 Houston, Texas 77090 658-0601</p>	<p>OFF. 713-832-0122 RES. 713-783-9439 HARRY H. SISSON CONSULTING GEOPHYSICIST MEMBER AAPG SEG IAMG 10405 TOWN & COUNTRY WAY SUITE 100 HOUSTON, TEXAS 77024</p>	<p>M. P. TIXIER TIXIER TECHNICAL CORPORATION P. O. BOX 25247 HOUSTON, TEXAS 77005 — Well Log Studies — (713) 523-1066</p>
<p>GEOLOGY GEOPHYSICS EXPLORATION DEVELOPMENT O. J. RAUSCHENBACH OIL AND GAS CONSULTANT 7255 Clarewood, Suite 343 Houston, Texas 77036 Office 713 988-1775 Residence 713 774-3999</p>	<p>FRED L. SMITH, JR. Consulting Geologist Paleontologist Office: 659-5757 Res. 468-7300 1014 C & I Building Houston, Texas 77002</p>	<p>CHARLES E. TROWBRIDGE CONSULTING GEOLOGIST 1714 C & I BUILDING HOUSTON, TEXAS 77002 Office (713) 652-5038 Residence 468-3161</p>
<p>RAYMOND D. REYNOLDS Geologist P. O. Drawer 2256 Lufkin, Tx. 75901 Phone: 713-634-4752</p>	<p>ROY O. SMITH & ASSOCIATES, INC EXPLORATION CONSULTANTS ROY O. SMITH (713) 661-7468 4680 BEECHNUT, SUITE 222 HOUSTON, TEXAS 77096</p>	<p> GENE VAN DYKE President Van Dyke Company (713) 877-8544 One Greenway Plaza Houston, Texas 77046 Telex 762200</p>

<p align="center">MERLIN J. VERRET <i>President</i></p> <p><i>Delta Energy Resources, Inc.</i> 3002 Country Club Road Lake Charles, Louisiana 70601 (318) 477-1477</p>	<p align="center">A. D. WARREN <i>Consulting Paleontologist and Geologist</i></p> <p align="center">8686 Nottingham Place La Jolla, California 92037 (714) 453-4416</p>	<p align="center">BEN WICKER <i>Petroleum Geologist</i></p> <p>Telephone, 24 Hours Office: 713/227-4214 Res.: 713/493-0968</p> <p align="right">San Jacinto Building 911 Walker, Suite 345 Houston, Texas 77002</p>										
<p align="center">J. C. WALTER, JR.</p> <p align="center"><i>Geologist and Petroleum Engineer</i></p> <p>1100 Louisiana Houston, Texas 77002 658-3002</p>	<p align="center">  PRAIRIE PRODUCING COMPANY <hr/> George F. Watford Chief Executive Officer </p> <p align="center">2200 HOUSTON NATURAL GAS BUILDING HOUSTON, TEXAS 77002 713-658-8413</p>	<p align="center">JAMES M. WILSON <i>Geophysical Consultant</i></p> <p>Office 713-658-8346 Home 713-658-2375 Willis Texas</p> <p align="center">808 The Main Bldg Houston Texas</p>										
	<p align="center">JAMES A. WHEELER <i>Petroleum Geologist</i></p> <p align="center">Suite 821 C & I Building Houston Texas 77002 (713) 651-9595</p>	<p align="center">INTEGRATED EXPLORATION SERVICES, INC. Nelson B. Yoder President</p> <table border="0"> <tr> <td>Bio Lithostratigraphy</td> <td>Working with</td> </tr> <tr> <td>1. Lithologic Analysis</td> <td>1. Well cuttings</td> </tr> <tr> <td>2. Depositional Environments</td> <td>2. Cores</td> </tr> <tr> <td>3. Reservoir Potential</td> <td>3. Field Samples</td> </tr> <tr> <td>4. Stratigraphic Modeling</td> <td>4. Logs</td> </tr> </table> <p>3903 Spur 501 (713) 471-8406 (Old Hwy 146) La Porte, Texas 77571</p>	Bio Lithostratigraphy	Working with	1. Lithologic Analysis	1. Well cuttings	2. Depositional Environments	2. Cores	3. Reservoir Potential	3. Field Samples	4. Stratigraphic Modeling	4. Logs
Bio Lithostratigraphy	Working with											
1. Lithologic Analysis	1. Well cuttings											
2. Depositional Environments	2. Cores											
3. Reservoir Potential	3. Field Samples											
4. Stratigraphic Modeling	4. Logs											

CAVALLA ENERGY EXPLORATION CO.



JAMES A. McCARTHY
President

HERMAN L. SMITH
Vice President

600 Jefferson Bldg. Suite 508
Houston, Texas 77002
713/652-0907

PETER R. FRORER
Vice President

BILL FORNEY
President

BILL FORNEY JR.
Vice President



BILL FORNEY, INC.

5599 SAN FELIPE, SUITE 1200
HOUSTON, TEXAS 77056
(713) 621-0033

petrophysics, inc.

exploration computing service

Joe H. Smith
President

7880 San Felipe / 210 / Houston, Tx. 77063 / 713/977-2059



Seismograph Service Corporation
A SUBSIDIARY OF RAYTHEON COMPANY

Box 1590 • Tulsa, Okla. 74102 • (918) 627-3330

DISTRICT OFFICES AND DATA PROCESSING CENTERS
HOUSTON • MIDLAND • DENVER • BAKERSFIELD • CALGARY



DOROTHY RODDY, President

DO YOU NEED CAREER COUNSELING?

WHAT ARE YOUR CHOICES IN TODAY'S MARKET?

- What opportunities for growth are there?
- What locations are available to choose from?
- What are the current salary and compensation packages available?
- What companies are offering participation?
- Who is searching for your "special" qualifications?

DO YOU KNOW HOW TO BEST PRESENT YOURSELF?

- How do **you** prepare a resume for presentation?
- Who do **you** need to see and talk to in order to get hired?
- Are you adept in the art of negotiating for your best interests?
- How often do you want to have to interview before **you** find the right position?

Roddy and Associates are experts in our field and have assisted professionals in their career planning for over ten years. We have maintained an excellent reputation within the energy industry for consistently providing top technical personnel whenever and wherever they are needed. Constantly in contact with top firms, both majors and independents, we fill many positions from the excellent clients in our files without ever advertising the opportunity. Call on us today to assist **you** in our strictly confidential and highly professional manner.

Let us answer "your" questions about "your" career. We are sure we can give you the right answers!!!!!!

5075 Westheimer, Suite 899
Houston, Texas 77056
713 / 961-1188

Fees Paid by Companies

Roddy
AND
Associates
PERSONNEL SERVICES, INC.

Suite 1150, 410 17th Street Bldg.
Denver, Colorado 80202
303 / 893-8948

Equal Opportunity Employer



OMNI EXPLORATION, INC.

Oil & Gas Exploration

GULF COAST DIVISION
Suite 950, The Main Building
1212 Main Street,
Houston, Texas 77002
(713) 650-0016

E. B. "Bud" McDaniel, Division Manager

Schlumberger

Schlumberger Well Services

1300 Main, Suite 1209
Houston, Texas 77002

Texas Coast Division
658-8300

WGM INC.

MINING AND GEOLOGICAL CONSULTANTS
Metallics / Nonmetallics / Solid Fuels

- Minerals Reconnaissance
- Property Evaluations
- Geophysics
- Feasibility Studies
- Preproduction and Mine Management
- Logistics

1300 Main, Suite 539
Houston, Texas 77002
(713) 658-0754
Telex 77-5754

P. O. Box 59
Anchorage, Alaska 99510
(907) 276-5004
Telex 090-25263



mapco
INC.

EXPLORATION OIL & GAS

Suite 2680 • Two Allen Center • Houston, Texas 77002
(713) 659-6000



ROBERTSON
RESEARCH (U.S.) INC.

ANALYTICAL AND CONSULTING SERVICES
SOURCE BED GEOCHEMISTRY • PETROLEUM GEOCHEMISTRY
STRATIGRAPHY • BIOSTRATIGRAPHY
SEDIMENTOLOGY • RESERVOIR GEOLOGY
GEOLOGICAL CORE EVALUATION
BASIN APPRAISAL
REGIONAL GEOLOGY

16730 Hedgcroft • Suite 306 • Houston, Texas 77060 • Tel: (713) 445-4587



Pogo Producing Company

P.O. Box 2504
900 Southwest Tower
Houston, Texas 77001
651-4300

Rocky Mountain Division
P. O. Box 2211
First of Denver Plaza
Denver, Colorado 80201
(303) 572-3739

Mid-Continent Division
204 N. Robinson Avenue
Suite 900
Oklahoma City, Oklahoma 73102
(405) 236-4192

Western Division
P. O. Box 10340
615 Blanks Building
Midland, Texas 79701
(915) 682-6822

1500

MUD LOGGING

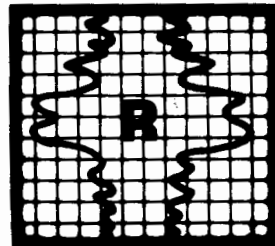
2000

**Still the oil man's
best bet.**

2500

Mud logging has benefited from improved procedures and is still the oil man's best bet. Ragsdale Well Logging is taking advantage of innovations and providing them to customers without extra costs. Ragsdale uses the finest conventional mud logging equipment and a team of experienced loggers to insure economy and accuracy in direct measurement at the well site. Geologists and drilling superintendents from the Gulf Coast to the Rocky Mountains depend on Ragsdale to help them make the big decisions.

3000



RAGSDALE

WELL LOGGING COMPANY

3801 Kirby, Suite 536
Houston, Texas 77098
(713) 526-7060

3500



**International
Biostratigraphers
Incorporated**

PALEONTOLOGY
PALYNOLOGY
NANNOFOSSILS

PALEOECOLOGY
SOURCE ROCKS
THIN SECTIONS

W. W. FAIRCHILD

C. R. PICKETT

5933 BELLAIRE BOULEVARD • HOUSTON, TEXAS 77081 • (713) 665-8686



South Texas Div. Office
9301 Southwest Freeway - Suite 465
AC-713/270-1201

KEPLINGER and Associates, Inc.

INTERNATIONAL ENERGY CONSULTANTS



K&A, INC. Oil and Gas Management Services
A KEPLINGER COMPANY

TULSA

320 So. Boston, Suite 320
Tulsa, Oklahoma 74103
(918) 587-5591

HOUSTON

3200 Entex Building
1200 Milam
Houston, Texas 77002
(713) 651-3127

DENVER

Anaconda Tower Suite 2360
555 17th Street
Denver, Colorado 80202
(303) 825-8202

CORPUS CHRISTI

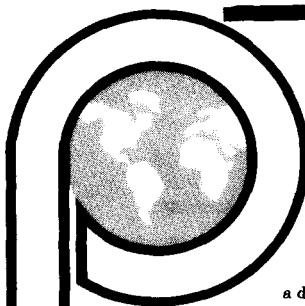
751 Petroleum Tower
Corpus Christi, Texas 78474
(512) 884-8579

DALLAS

1265 Campbell Centre
8150 N. Central Expressway
Dallas, Texas 75206
(214) 691-3820

CASPER

Energy II Building, Suite 250
951 West Werner Court
Casper, Wyoming 82601
(307) 265-4960



Worldwide experience
in gravity, magnetics,
and photogeology

PhotoGravity Company
a division of berry industries corporation

7000 Regency Square Blvd., Suite 130
Houston, Texas 77036
(713) 780-4911 • Telex: 76-2059

THE GRUY COMPANIES G

H. J. Gruy and Associates, Inc.

RESERVOIR ENGINEERING STUDIES · GEOTHERMAL ENERGY STUDIES ·
SECONDARY and TERTIARY RECOVERY STUDIES · GEOLOGIC STUDIES ·
MARKET and ECONOMIC ANALYSES · PRESSURE TRANSIENT ANALYSES ·
RESERVOIR SIMULATION · COMPUTER PROGRAMMING and APPLICATION ·
EXPERT WITNESS and REPRESENTATION · AUTOMATION STUDIES ·
TECHNICAL ASSISTANCE and TRAINING · INVESTMENT ANALYSES ·
INDUSTRIAL WASTE SUBSURFACE STORAGE STUDIES · EVALUATION REPORTS

Gruy Management Service Co.

PROPERTY MANAGEMENT · DRILLING and COMPLETION · ACCOUNTING ·
WORKOVER OPERATIONS · PRODUCTION OPERATIONS · PIPELINE SYSTEMS ·
SECONDARY RECOVERY · DISPOSAL SYSTEMS · GAS COMPRESSION · CONSULTATION

Gruy Federal, Inc.

OIL-GAS RECOVERY STUDIES · ENVIRONMENTAL STUDIES · FORECASTING ·
COMPUTER MODELING · ECONOMIC ANALYSES · RISK ANALYSES · POLICY ANALYSES

DALLAS OFFICE

150 W. John W. Carpenter Freeway
(214) 659-3200 Irving, Texas 75062
Telex: 730833 Answer Back: Gruy Dal

HOUSTON OFFICE

2500 Tanglewilde Suite 150
(713) 785-9200 Houston, Texas 77063

Develop Your Potential!



**“We specialize
in finding the
people who
find oil
and gas.”**

**Let us show
you the difference
quality service makes!**

Our professional Exploration and Production Division can offer a total of 25 years experience in the Oil and Gas industry . . . we know the oil business, and we know the job market! Let us use our experience to help you take your next step upwards in your career. Or, if you are a manager in need of hiring a staff member, we can assist you in finding a qualified candidate for your present company's needs.

We employ an on-line, in-house computer to speed up our selection process. If a candidate prefers, we will discuss an opportunity with him/her prior to our presentation to an employer. We are not a resume mail-out service. We pride ourselves in providing quality, not quantity, and in maintaining discreet confidentiality.

Additional areas served by Burnett Personnel Consultants are:

Legal (our consultants are all attorneys), Financial, Data Processing (scientific and business applications), Construction, Clerical, Temporaries, Contract, and Payrolling Personnel for Houston.

So if you need to add to your present staff, or wish to seek some upward mobility in your own career, or just want to stay current with today's rapidly changing job market and compensation packages. . . Call us!

ALL POSITIONS ARE FEE PAID.

Burnett

Personnel Consultants

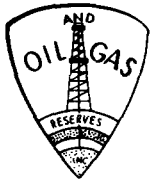
**3300 S. Gessner at Richmond
Suite 250
977-4777**

THE ANALYSTS
Schlumberger

**TECHNICAL SERVICES
FOR
DRILLING
AND
FORMATION EVALUATION**

- TOTAL CONCEPT WELL LOGGING
- MEASUREMENTS WHILE DRILLING (MWD)
- PHYSICAL FORMATION EVALUATION
- CORE ANALYSIS

HEADQUARTERS:
THE ANALYSTS, INC., 200 MACCO BLVD., SUGAR LAND, TEXAS 77478
TELEPHONE: 713-491-4949 TELEX: 79-4615
WORLDWIDE SERVICE CENTERS



Oil and Gas Reserves, Inc.

Corpus Christi
820 Bank & Trust-123
Corpus Christi, Texas
78477

Houston
305 San Jacinto Bldg.
Houston, Texas
77002

H. T. Nolen

Terry Richardson
Steve Hill

Oil & Gas Exploration

RALPH E. DAVIS ASSOCIATES, INC.
Consultants
Petroleum and Natural Gas
3050 South Post Oak Road — Suite 600
Houston, Texas 77056 713-626-7741

SIDNEY SCHAFER & ASSOCIATES

Geophysical Consulting

Offshore Gravity Data



THE GEOPHYSICAL DIRECTORY
THE OIL AND GAS DIRECTORY

HOUSTON, TEXAS 77019
PHONE 713 529-8789 2200 WELCH AVENUE

R. BREWER & CO., INC.
Houston

ATWATER CONSULTANTS, LTD.
GEOLOGISTS & PETROLEUM ENGINEERS
318 CAMP STREET
NEW ORLEANS, LA. 70130
(504) 581-6527



DOW CHEMICAL U.S.A.
OIL & GAS DIVISION
HOUSTON, TEXAS

400 WEST BELT SOUTH
P O BOX 4322
(713) 978-2971

Midland, Texas - Walnut Creek, California
Lafayette, Louisiana - Denver, Colorado

LYONS PETROLEUM, INC.

SHREVEPORT, LOUISIANA

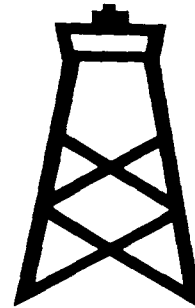
GENE HILLIARD	DICK DAVENPORT
G. F. ABENDROTH	BILL WATSON
GENE HILLIARD, III	TIM ABENDROTH
	GEORGE MORGAN

LAFAYETTE, LOUISIANA

JIM FAMBROUGH	MIKE RADFORD
DUANE DUNGAN	SCOTT DANIEL

Brown and McKenzie

Oil & Gas Exploration



Five Greenway Plaza East Suite 1704
Houston, Texas 77046
713/626-3300

C. F. Brown, Jr.
Michael McKenzie

Billy J. Neal
Jerry Webb
Joel Paseman



Drilling and Production Data
Logs and Maps
Computerized Data Bases
Engineering and Exploration Consultation
Data in Microform
Special Energy Publications

Need current or historical exploration and production data or any of the above services? Turn to Petroleum Information — your full service information source.

When the bottom line is to get the job done, PI is the name to remember.

Petroleum Information Corporation

A Subsidiary of A.C. Nielsen Company

HOUSTON, TEXAS
4150 Westheimer
P.O. Box 1702 (77001)
713/ 961-5660

DENVER, COLORADO
1375 Delaware
P.O. Box 2612 (80201)
303/ 825-2181



PAR[®] AIR GUN
systems
for land & marine
seismic surveys

BOLT ASSOCIATES INC.
 205 WILSON AVE., NORWALK, CONN 06854 (203) 853-0700
 TELEX 94-0310



DAHL DRAFTING & DESIGN
 Geological Geophysical
 Land Drafting Presentations
AIR BRUSH SLIDES BROCHURES GRAPHICS
 One Allen Center Suite 2505 500 Dallas
 Houston, Texas 77002 (713) 228-6138



PERSONNEL CONSULTANTS

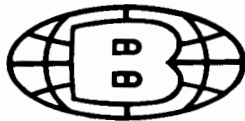
Exclusively For
GEOLOGISTS and GEOPHYSICISTS

Strictly Confidential
 Independents and Majors
 Knowledgeable Career Guidance
 High Professional Ethics
 Never A Cost To You

We know the Oil Patch and specialize in your profession. We can help you make the most of your education and experience.

Send Your Resume or Call
Larry Powell
 PRESIDENT

L.H. POWELL & ASSOCIATES
 10122 Long Point at Gessner, Suite 117
 Houston, Texas 77043
713/467-4186



J. R. Butler and Company
 OIL AND GAS CONSULTANTS
 RESERVE EVALUATIONS

4605 Post Oak Place, Suite 130, Houston, Texas 77027
 Telephone 713/627-7180 Telex: 910 881 4408

*Affiliated with GeoQuest International, Inc.
 and GeoQuest Exploration, Inc.*

BIG "6" DRILLING COMPANY

7500 San Felipe, Suite 666
 Houston, Texas 77063

W. H. Smith, Chairman of Board 783-2300
 C. B. Bengel, Jr., President-General Manager

NORTH AMERICAN ROYALTIES, INC.



OIL AND GAS EXPLORATION

HOUSTON DISTRICT, Suite 2630 Two Allen Center, Houston, Texas 77002, (713) 751-0034



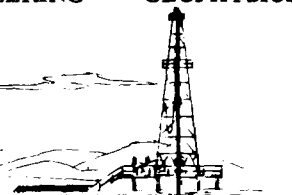
WESTERN GEOPHYSICAL

10.001 Richmond Avenue, P.O. Box 2469, Houston, Texas 77001
Telephone: 713 789-9600 Cable WESGECO Telex 762406

PEPPARD-SOUDERS & ASSOCIATES *Petroleum Consultants*

GEOLOGY • ENGINEERING • GEOPHYSICS

G
E
O
M
A
P



Dallas Denver Houston Midland

Dresser Atlas Wireline Services

601 Jefferson
Suite 3038
Houston, Texas 77002
(713) 972-2232



Geodata SERVICE INC.

5603 South Rice Avenue
Houston, Texas 77081

Custom Storage of Confidential
Exploration Materials

G. J. Long
Paul Farren

Telephone 666-1741

Telex 79-2777

Exclusively

Geologists, Geophysists

Bill Sonne

493-9770



14760 Memorial Suite 301

Houston, Tx. 77079

Also Colorado Springs (303) 573-6398 Dick Troth

Resumes sent with consent



MITCHELL ENERGY & DEVELOPMENT CORP.

2001 Timerloch Place The Woodlands, Texas 77380
(713) 363-5500

An Equal Opportunity Employer

*Listed on the American
Stock Exchange*

Ticker Symbol: MND

THE STONE OIL CORP.
GULF COAST OIL & GAS EXPLORATION

*3801 KIRBY DRIVE, SUITE 544
HOUSTON, TEXAS 77098*

**KARL H. ARLETH B. W. KIMMEY
SAM G. OBOURN
(713) 526-8734**

NL Baroid Logging Systems reduce drilling costs.

Baroid offers a wide range of logging services that reduce drilling costs, increase drilling efficiency and minimize drilling hazards. Baroid Logging Systems include Mud Logging Service (MLS), Applied Drilling Technology (ADT), and Computerized Applied Drilling Technology (CADT).

MUD LOGGING SERVICE includes all the instruments and facilities needed to provide the following information:
• Baroid ppm LOG • direct determination of methane and total gas in mud • total combustible gas and methane in drill cuttings • liquid hydrocarbons (C₆+) in cuttings • oil fluorescence in mud and cuttings
• drilling rate • lithology • record of mud pit level • drilling mud properties • record of other data pertinent to drilling operations • daily log of all data • composite log of data on completion of well • all equipment housed either in a skid-mounted doghouse or trailer.

APPLIED DRILLING TECHNOLOGY provides all of the information obtained in Baroid's Mud Logging Service and adds the equipment and experienced personnel to make pore pressure and drilling efficiency recommendations including: pore pressure, frac gradients, running speeds, and hydraulics factors. Baroid's ADT, utilizing the latest instrumentation and automatic recording devices, detects and plots: "d" exponent (normalized drilling rate) • connection gas • casing fill-up during trips • pump pressure • casing pressure • mud weight and viscosity • shale density • shale factor • intercom with driller.

COMPUTERIZED APPLIED DRILLING TECHNOLOGY provides all of the information obtained in Baroid's MLS and ADT Services and utilizes an on board computer to monitor drilling and mud system parameters, analyze and provide alarms on abnormal conditions, record data on tape for historical records, display data on CRT and print complete reports, perform complex calculations to derive pore pressures, ECD, delta chlorides, cuttings slip velocity, "what if" hydraulics, surge and swab pressures, and many other on line parameters and off line user programs.

Your Baroid Logging Systems representative can help you select the service best suited to your needs. **NL Baroid/NL Industries, Inc.**, P.O. Box 1675, Houston, Texas 77001. (713) 527-1100.



SIERRA PRODUCTION COMPANY

1400 Capital National Bank Bldg.
Houston, Texas 77002

Byron F. Dyer

James P. Blackstone



GeoQuest International, Inc.
EXPLORATION CONSULTANTS
SEISMIC DATA PROCESSING

4605 Post Oak Place, Suite 130, Houston, Texas 77027
Telephone 713/627-7180 Telex: 910 881 4408

*Affiliated with J. R Butler and Company
and GeoQuest Exploration, Inc.*



**TELEDYNE
EXPLORATION**

5825 Chimney Rock Road • P.O. Box 36269
Houston, Texas 77036 • 713/666-2561
Offices: Midland/New Orleans/Denver/Calgary/Caracas

QUALITY THIN SECTIONS SINCE 1962

**NATIONAL
PETROGRAPHIC SERVICE**

7001-H MULLINS (713) 661-1884
HOUSTON, TEXAS 77081

**CORE
SERVICE
INC.**

CORPUS CHRISTI	884-0683
VICTORIA	573-4202
HEBBRONVILLE	527-4051
COTULLA	879-2411
CARRIZO SPRINGS	876-5217
SAN ANTONIO	824-6081

"Core Analysis"
"Water Analysis"

THANKS TO ALL OUR MANY CUSTOMERS AND FRIENDS, WE HAVE WORKED MORE THAN 28,000 JOBS SINCE 1955, MAKING US NUMERO UNO IN THE SOUTH TEXAS AREA.

IF IT HAS ANYTHING TO DO WITH "CORE OR WATER ANALYSIS", CORE SERVICE, INC., AND IT'S EMPLOYEES WILL CONTINUE TO STRIVE TO FURNISH UNEXCELLED SERVICE, EXPERIENCE AND DEPENDABILITY TO THE ENERGY INDUSTRY AT LESS COST.



GraviMetrics, inc.

Craig Ferris, PRES.

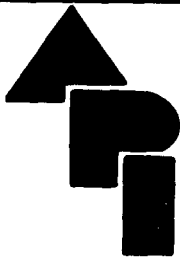
1437 South Main St. Tulsa, Okla. 74119
918 / 585-3333



**HOUSTON OIL & MINERALS
CORPORATION**

a diversified natural resource company

1100 Louisiana Street, Houston, Texas 77002



AMERICAN PROSPECTORS, INC.

1220 SOUTHWEST TOWER
HOUSTON, TEXAS 77002
(713) 650-0451

Gary E. Morrison, Chairman
Tom E. Purcell, President
Raymond C. Blakely
Robert C. Pace

David A. Pustka
Jerry D. Sloane
Linda L. Smith

OIL & GAS INDUSTRY PROFESSIONALS

There Are No "Shortages" of Career Opportunities!

Why choose Joseph Chris to find the right career choice? Our Professional Consultants suggest you consider these unmatched options!

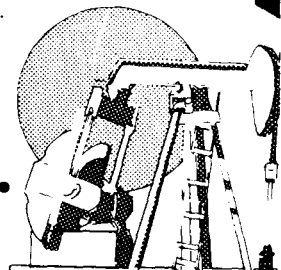
- CONTACTS**with key executives and hiring managers avoiding the corporate personnel paper shuffle.
- CONVENIENCE**no need to waste your valuable time in an often fruitless effort. Our professional approach allows you to concentrate on your current duties, and still enjoy your leisure time.
- CAREER OPTIONS**with our specialized approach, we are able to respond on a quantitative basis without sacrificing the most demanding parameters.
- CONFIDENTIALITY**we fully appreciate this requirement! We exercise a discreet approach by qualifying your interest prior to presentations to companies.

Contact Jasper Jeter
or Nick Brugan,
Oil & Gas Industry
Specialists at
(713) 961-4051.



Joseph Chris Personnel Services Inc.

5251 Westheimer, Suite 380
Houston, Texas 77056



EXPLORING THE GULF COAST

PEL-TEX OIL CO., INC.

SUITE 5000
FIRST INTERNATIONAL PLAZA
1100 LOUISIANA

HOUSTON, TEXAS 77002
713-658-8284



GeoQuest Exploration, Inc.

SEISMIC DATA ACQUISITION
4605 Post Oak Place, Suite 130, Houston, Texas 77027
Telephone 713/627-7180 Telex: 910 881 4408

*Affiliated with J. R. Butler and Company
and GeoQuest International, Inc.*

To be eligible for active membership, an applicant shall: (1) have a degree in geology or an allied science from a recognized college or university and shall be directly engaged in the application of geology, or shall (2) have been engaged in geological work during at least the preceding five years.

PLEASE PRINT

DATE _____

LAST NAME FIRST INITIAL

To the EXECUTIVE BOARD:

I hereby apply for ACTIVE ASSOCIATE membership in the HOUSTON GEOLOGICAL SOCIETY and pledge myself to abide by its Constitution and Bylaws.

Signature: _____

This application must be endorsed by two active members.

Name (print): _____ Signature: _____

Name (print): _____ Signature: _____

HGS DIRECTORY & MEMBERSHIP FILE

APPLICANT: PLEASE TYPE OR PRINT

LAST NAME	FIRST	INITIAL	NICKNAME			
COMPANY		POSITION OR TITLE				
COMPANY MAILING ADDRESS	CITY	STATE	ZIP CODE	COMPANY PHONE		
HOME ADDRESS	CITY	STATE	ZIP CODE	HOME PHONE		
SCHOOL	DEGREE	MAJOR	YEAR			
PROFESSIONAL AFFILIATIONS	AAPG <input type="checkbox"/> APGS <input type="checkbox"/>	GSA <input type="checkbox"/> PS <input type="checkbox"/>	SEG <input type="checkbox"/> AGU <input type="checkbox"/>	SEPM <input type="checkbox"/> SIPES <input type="checkbox"/>	AIME <input type="checkbox"/> SPE <input type="checkbox"/>	SPWLA <input type="checkbox"/> OTHER _____
LOCAL AFFILIATIONS	GSH ACTIVE <input type="checkbox"/>	GSH HON <input checked="" type="checkbox"/>	SEPM G. C. SEC. <input type="checkbox"/>			
SPOUSE'S NAME:	PREFERRED MAILING ADDRESS		HOME <input type="checkbox"/> BUS <input type="checkbox"/>			

Annual dues, \$15.00 must accompany application. HGS operates on a fiscal year: July 1 - June 30.

Upon completing this application, please return entire form along with your Dues to:

Houston Geological Society
6916 Ashcroft
Houston, Texas 77081
771-8315

OUTLINE OF EXPERIENCE: _____

SPACE BELOW TO BE USED FOR PROCESSING ONLY

Action of Membership Committee:

Received _____ Approved for ACTIVE ASSOCIATE membership

Membership Chairman: _____ Date: _____

Action of Executive Board:

Approved: _____ (Secretary) Date: _____

Analysis and Evaluation Services

Conventional Core Analysis
Sidewall Core Analysis
Special Core Analysis
Reservoir Fluid Analysis
Gas Analysis
Hydrocarbon Source-Bed and
Geochemical Evaluation

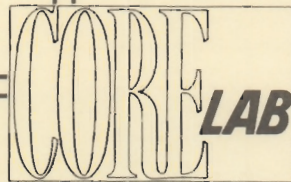
Contact: Milton Craft

Engineering and Geological Consulting

Reservoir Engineering Studies
Reservoir Simulation Studies
Enhanced Recovery Processes
Geological Services
Reserve and Evaluation Studies
Drilling and Production Services
Computing and Software Services

Logistic and Product
Utilization Studies

Contact: ROLLIE HARGRAVES

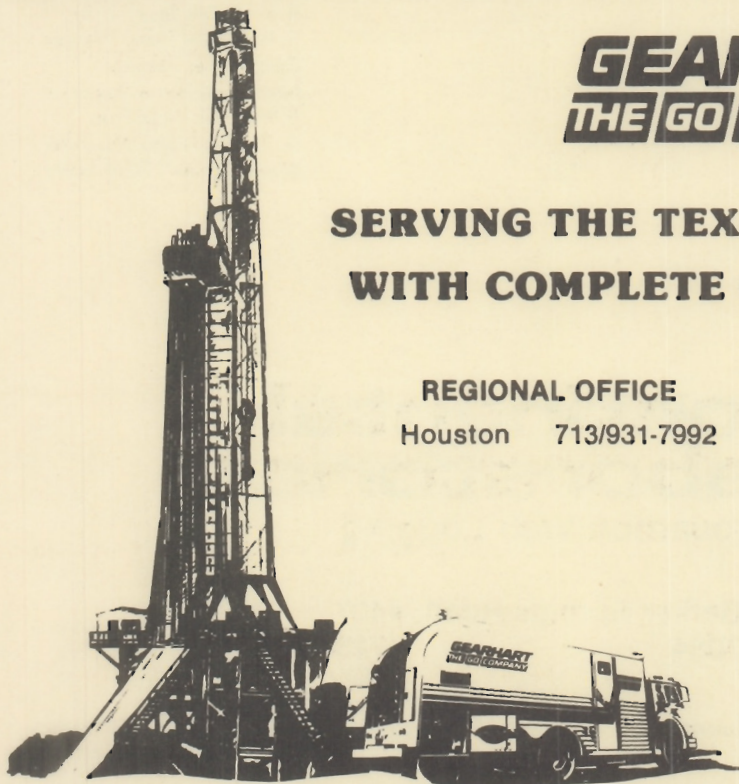


Computerized and Conventional Hydrocarbon Well Logging

Contact: Peter Rutledge

CORE LABORATORIES, INC.

5295 Hollister Road, Houston, TX 77040 • (713) 460-9600



GEARHART THE GO COMPANY

**SERVING THE TEXAS GULF COAST
WITH COMPLETE OPEN HOLE SERVICES**

REGIONAL OFFICE

Houston 713/931-7992

DISTRICT OFFICES:

Conroe	713/539-3151
Bryan	713/775-0728
Victoria	512/578-9024
Corpus Christi	512/883-2884

Houston Geological Society

6916 ASHCROFT
HOUSTON, TEXAS 77081

BULK RATE
U. S. POSTAGE
PAID
Houston, Texas
Permit No. 8254

J DENNY BARTELL
PARTNER
HEMINGWAY-BARTELL & ASSOC
ESPERSON BLDG #1612
HOUSTON TX 77002

Matagorda
Brazos
Galveston
High Island
West Cameron
East Cameron
Grand Isle
South Timbalier
Breton Sound

South Texas Frio
Central Texas Chalk
S. E. Texas Deep Frio
S. E. Texas Deep Wilcox
East Texas Jurassic
North Louisiana Jurassic
S. W. Louisiana Frio
S. E. Louisiana Miocene
West Texas Ellenberger



**Continental
Laboratories**

Hydrocarbon Well Logging

16830 Barker Springs Road, #407
Houston, Texas 77084 (713) 492-6330

Lawrence C. Metzler, Operations Manager

John N. Grissett, Regional Manager