

March, 1984

BULLETIN

HOUSTON GEOLOGICAL SOCIETY

Volume 26

Number 7



HGS MARCH CALENDAR

MARCH 12 (Joint Dinner Meeting with Geophysical Society of Houston)

Westin Galleria, 5060 W. Alabama

Eugene R. Brumbaugh, Geophysical Consultant - Past President SEG

"A COORDINATED GEOPHYSICAL - GEOLOGICAL APPROACH TO FINDING STRATIGRAPHIC TRAPS"

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

RESERVATIONS by advance ticket only. Must be made or canceled by **noon, Friday, March 9, 1984.**

MARCH 28, 1984 (Luncheon Meeting)

Meridien Hotel, 400 Dallas

Edward A. Duncan, Sohio Petroleum

"DELINEATION OF DELTA TYPES: NORIAS DELTA SYSTEM, FRIO FORMATION, SOUTH TEXAS."

Social Period - 11:30 AM, Luncheon and Meeting - 12:00 Noon

RESERVATION by name (telephone only **771-8315**) must be made or cancelled by **noon Monday, March 26, 1984.**

MARCH 14, 1984 (Dinner Meeting)

HGS International Group

Westin Galleria Hotel, 5060 W. Alabama

Tom C. Connally, Amoco

"CRETACEOUS CARBONATES OF FATEH FIELD, DUBAI, UNITED ARAB EMIRATES"

Social Hour - 5:30 PM, Dinner and Meeting 6:30 PM

*Ticket must be purchased by **Monday, March 12, 1984.***

MARCH 3, 1984

HGA Couples Party

Petroleum Club, 800 Bell

MARCH 10, 1984

HGS Racquetball Tournament

Courts, Etc., 2620 Tanglewilde

*Reservations must be made by **March 2, 1984.** Call **Stu Stouffer (681-9742).***

MARCH 26, 1984

HGS Golf Tournament

Kingwood Country Club (See page 1)

HOUSTON GEOLOGICAL SOCIETY

6916 Ashcroft

Houston, Texas 77081

771-8315

(Alternate phone: 771-5421)

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BULLETIN

Editor	Jerry A. Watson , Consulting Geologist	783-2828
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PRESIDENT'S COMMENTS

Ballots for election of 1984-85 HGS officers will be sent to Society members next month. Along with the selection of officers the membership will be asked to approve or disapprove some changes in the Bylaws.

An ad hoc committee was appointed and asked to take a close look at Article V of the HGS Bylaws. Chester A. Baird, Chairman, and his committee, Martha Lou Broussard, Wendell L. Lewis, Sabin W. Marshall and Charles E. Trowbridge, did so and made a recommendation to the HGS Executive Board. The Board accepted most of their recommendation and now presents the changes for general membership approval.

For one thing, we propose the standing committees be named in alphabetical order. In the present Bylaws they are jumbled.

Sections two through twenty-two list each committee, describe its functions and state the number of members of which the committee shall consist. We now find that some committees are requiring more members than the Bylaws allow and other committees are functioning well with fewer members than the Bylaws allow. Our proposal is to simply delete any reference to number.

We also recognize that in some years some committees will be more active than they are in other years. For instance, the function of the Field Trip Committee is to plan and arrange for "an annual geological field trip". In the 1983-84 year, Chairman Tridib Guha has already conducted two field trips. More are coming up before the year is out. We propose removing the reference to "an annual" in the Bylaws and make "field trips" plural.

According to Article VI, "Amendment to the Bylaws shall be made by mail ballot in which approval is given by at least two-thirds of the total number of members voting." Your affirmative vote to restructure Article V will be appreciated.

MATTHEW W. DAURA
President

NEWS FROM HGA

Don't forget the couples party, March 3rd! It will be at the Petroleum Club at 800 Bell. The hostesses are Evelyn Carroll, Sharon Boone and Fran Hennington. Let's reward their efforts with a good turnout! Jules' combo will play music for dancing from the 40's.

You'd better get your reservations in San Antonio for the convention, May 20-23. The grapevine says there is going to be a big crowd for all the festivities! It should be interesting and fun in "Ole San Antone"!

"Some minds are like concrete; thoroughly mixed and permanently set."

Happy St. Patrick's Day

DUSTY MARSHALL

TRADER'S COLUMN

The "Traders Column" makes free advertising space available to HGS members who have items available for *one time transactions*. So, if you are trying to find a good home for a rare set of books, or want to sell or buy some unusual business equipment, send your ad to the *Bulletin*. Items must be submitted six weeks in advance of publication.

PRICE SCHEDULES—HGS MARCH MEETINGS

Westin Galleria Hotel, March 12
Dinner..... \$18.00

Meridien Hotel, March 28
Luncheon..... \$14.00*
*Includes Hotel Parking

RESERVATIONS (771-8315)

Advance Tickets are required for the March meeting with the Geophysical Society. Deadline for purchasing tickets for the March 12 meeting is **noon Friday, March 9, 1984**. You may purchase tickets by sending your order with a check and a **stamped, self-addressed envelope to:**

Houston Geological Society
6916 Ashcroft
Houston, Texas 77081

Telephone reservations are required for the March 28 luncheon meeting. Deadline for making reservations is **noon Monday, March 26, 1984**.

HGS INTERNATIONAL GROUP

Westin Galleria Hotel, March 14, 1984
Dinner..... \$21.00

Admission to all International meetings is by **advance ticket purchase only**. Tickets may be purchased from representatives in the International departments of most companies or by sending a **check for \$21 and a stamped, self-addressed envelope to:**

Houston Geological Society
6916 Ashcroft
Houston, Texas 77081

Ticket distribution and receipts are handled by **Moin Hussain** and all inquiries should be directed to him at **960-6705**.

* * * FLASH * * *

FREE BAR at the joint HGS/GEOPHYSICAL SOCIETY OF HOUSTON meeting on Monday, March 12 (5:30 PM) at the Westin Galleria.

The Joint Meeting Bar Sponsors are:

Sercel - John L. DeVault

Data Inc. - C. B. Smith, Jr.

Sidney Schafer and Company - Sidney Schafer

Let's be sure to let those people know how much we appreciate their patronage.

MAC McKINNEY

SOCIETY CALENDAR FOR APRIL

Monday, April 9 Dinner Meeting
Westin Oaks Hotel, 5011 Westheimer
Speaker - Arnold Bouma Gulf Research
"Deep Sea Drilling Project Leg 96, Mississippi Fan"

Wednesday, April 25 Luncheon Meeting
Hotel To be announced
Speaker - Scott Hamlin .. Bureau of Economic Geology
"Fluvial Depositional Systems of the Carrizo-Upper
Wilcox in South Texas"

DINNER MEETING—MARCH 12, 1984

EUGENE R. BRUMBAUGH—Biographical Sketch



E. R. Brumbaugh has been an Active Member of SEG for 33 years. He served the Society as First Vice-President in 1981, as Technical Program Chairman of the 40th Annual International SEG Meeting in New Orleans, and as General Chairman of the 49th Annual SEG Meeting. He has been a member of the Casper, Denver and Oklahoma City Geophysical Societies and is currently a member of the South-

eastern Geophysical Society where he has served as President, First Vice-President, and Membership Chairman.

He received his B.S. degree in physics and mathematics from Juniata College in 1946 after Naval aviation training during World War II. He also has done graduate work in geology at the University of Colorado.

Brumbaugh joined Shell Oil Co. on a seismic crew operating in the Sacramento and San Joaquin basins in California and the Williston basin in Montana. He supervised crew operations and interpretation in the Powder River, Big Horn, Wind River, and Green River basins and western folded belt in Wyoming, the Uinta basin in Utah, and the Denver basin in Colorado. He was division geophysicist in both the Casper and Denver Divisions, and later held staff interpretive assignments in the Anadarko, Ardmore, and Arkoma basins in Oklahoma and Arkansas. Since 1968, he has been in New Orleans working the offshore Gulf of Mexico, Atlantic offshore, and the Gulf Coast onshore. Brumbaugh retired from Shell in 1981 to be regional geophysical manager for Tomlinson Interests, Inc., concentrating on exploration in South Louisiana. He is now a Geophysical Consultant.

He is a member of EAEG, AAPG, SGS, New Orleans Geological Society, and is a registered geophysicist in California.

A COORDINATED GEOLOGICAL-GEOPHYSICAL APPROACH TO FINDING STRATIGRAPHIC TRAPS

Many stratigraphic traps have been found on the gently dipping flanks of the stable sedimentary basins in the United States. Many more remain to be found. The sedimentary environment is becoming well known in most of these basins. This information combined with detailed studies of the already discovered and developed stratigraphic traps allows one to anticipate the type of trap and the tools needed to detect these traps in most areas being explored.

Studies of clastic, erosional and carbonate stratigraphic traps indicate that most have a detectable anomaly associated with them. Some have a minor structural anomaly that is near the level of seismic structural resolution. These and others often have interval thinning in the sediments overlying the trap that is detectable using well data isopach and/or seismic isochron techniques. Most have a high impedance contrast reservoir unit that is thick enough to be detected using seismic wave form and reflection amplitude techniques. A coordinated use of these geological and geophysical tools is discussed briefly in this paper.

GOLF TOURNAMENT REMINDER

The Annual HGS Golf Tournament will be held on Monday, March 26, 1984 at the Kingwood Country Club. All details and entry forms were in the January 1984 Bulletin. Entries will be limited to 360 golfers. Contact Gary Wirey at 469-1874 for information.

EAST TEXAS EXPLORATION SYMPOSIUM

The East Texas Geological Society is sponsoring a symposium on the Jurassic of East Texas. The conference will be held in Tyler, March 27-28, 1984. For registration materials write: E.T.G.S., P.O. Box 216, Tyler, Texas 75710, or call (214) 561-1794 or (214) 581-1068.

"REMOTE SENSING FOR EXPLORATION GEOLOGY"

April 16-19, 1984

Colorado Springs, Colorado

This conference is an industry-oriented meeting focusing on the operational use of remote sensing in exploration programs as well as future directions for research and development in geologic remote sensing. The technical program will include plenary sessions, poster presentations and panel discussions. The program will address the following topics:

- Commercialization of Remote Sensing Satellites
- Remote Sensing for Hydrocarbon Exploration
- Remote Sensing for Mineral Exploration
- Data Integration
- Geobotanical Remote Sensing
- Image Processing Techniques and Applications
- State-of-the-Art of Remote Sensing and Future Systems
- Regional Exploration Models and Remote Sensing

For additional information or the reservation of space for commercial or non-commercial displays, interested persons are urged to contact:

Dr. Robert H. Rogers
Environmental Research Institute of Michigan
P.O. Box 8618
An Arbor, Michigan, 48107, USA
Telephone: (313) 994-1200
TWX: 810-223-7019

HGS PIPELINE

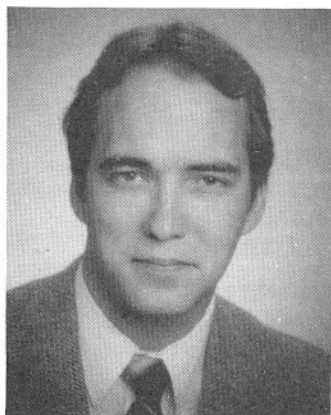
The HGS *Bulletin* publishes letters to the editor in an opinion column called the **HGS Pipeline**. Send your letter to:

Editorial Staff
Houston Geological Society
6916 Ashcroft
Houston, Texas 77081

S.I.P.E.S. SPRING JOINT CHAPTER FUNCTION APRIL 7-8, 1984

The Corpus Christi, San Antonio and Houston chapters of the Society of Independent Professional Earth Scientists announce a Spring social function to be held at Columbia Lakes resort the weekend of April 7th. Planned activities include fishing, golf and leisure. Unplanned activities include fish stories, golf score adjustments and shop talk.

LUNCHEON MEETING—MARCH 28, 1984
EDWARD A. DUNCAN—Biographical Sketch



Edward A. Duncan is an exploration geologist in Sohio Petroleum Company's Western Region Exploration - Appraisal Group in San Francisco. He is presently working north Alaska's Beaufort Sea Basin, utilizing seismic stratigraphy and depositional framework studies and preparing for O.C.S. lease sale #87. He was raised in Houston, Texas and attended the University of Texas at Austin from

1974 to 1982. While working on his Bachelor of Science and Master of Arts degrees, Ed assisted on various geological projects at the Bureau of Economic Geology including East Texas and Palo Duro Basin waste isolation studies. His initial studies of depositional systems and processes centered on master's research of the Frio - Norias delta system of South Texas. Continued work on the Frio - Norias delta system as well as studies concerning the application of genetic stratigraphy to hydrocarbon exploration are his present goals. Ed is a member of A.A.P.G.

DELINEATION OF DELTA TYPES: NORIAS DELTA SYSTEM, FRIO FORMATION, SOUTH TEXAS

The Norias delta system was the major depositional component of the Frio Formation, South Texas. The Norias was an expansive, sandy, predominantly progradational complex fed by the updip Gueydan fluvial system. This depositional complex effectively filled the Rio Grande Embayment of South Texas by the end of Frio deposition. Norias deltaic sedimentation was probably initiated during the early rise in sea level following a lowstand. The delta system was flanked by time equivalent depositional systems including a northerly strandplain and to the south possibly a delta system in northern Mexico. Incorporated within the complex body of the generally progradational sequence, a well defined evolution of Norias delta types can be documented through the time of Frio deposition. Early Norias deltas developed a strongly dip-oriented lobate geometry interpreted as reflecting a high constructive fluvially dominated regime. Middle Norias deltas continued to be generally high constructive lobate in style, but evidence for significant strike reworking of deltaic sediments can be inferred based on development of a north flanking strandplain system. Late Norias deltas were high destructive wave dominated features. Essentially the Norias delta system had evolved into a broad alluvial plain feeding a strandplain with little physiographic expression of a delta lobe.

GSA MEETINGS—1984

Northeastern Section	March 15-17
South-Central Section	March 26-27
North-Central Section	
Southeastern Section (Joint)	April 4-6
Rocky Mountain Section	May 11-12
Cordilleran Section	May 30-June 1
GSA Annual Meeting	November 5-8

HGS FIELD TRIP
"GEOLOGY AROUND LLANO AREA"
INSTRUCTOR: DR. STEVE CLABAUGH
Date: May 5, 1984

Participants will see classic outcrops of Precambrian and Paleozoic rocks of the Llano area near Burnet, Marble Falls and Johnson City. Igneous, metamorphic and sedimentary rocks are included.

Cost not determined yet but it will be inexpensive. Please complete the pre-registration form with questionnaire and mail as soon as possible. Any inquires call: **Phil Salvador 492-8151, Kari Rekoske 531-2361, Terry Sheehy 621-7606 or Tridib Guha 965-2995.**

Pre-Registration
"Geology Around Llano Area"

Name: _____

Company: _____

Phone: _____

1. Get to Austin & return using own transportation _____ (check)
2. Ride to Austin Friday evening and return to Houston Saturday night _____ (check)

MAIL TO: Phil Salvador
 Conoco Inc.
 P.O. Box 218850
 Houston, Texas 77218

ERRATA

James M. Murphy, who wrote a book review for the February issue of the *Bulletin*, was erroneously listed as being a career employee of Conoco. Actually, Jim has spent 31 years with Phillips Petroleum Company.

Also in the February issue, the 4th Annual GCS/SEPM Research Conference date should have read 27-30 November, 1983.

BULLETIN ADVERTISING SPACE AVAILABLE

Contact

Claudia Ludwig 723-1436

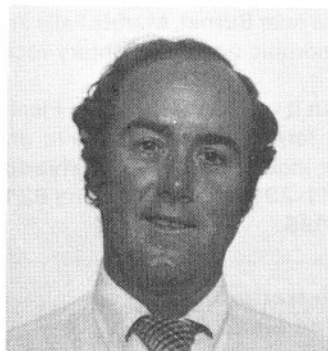
NEW 1984 HGS MEMBERSHIP DIRECTORY

The latest HGS Membership Directory came out in January. All HGS members should have received a copy through the mail. Any member that has not received a copy may obtain one by calling the HGS office at 771-8315.

To date there have been several errors noted in the membership directory. Sohio Petroleum Company's Houston office number is 981-1150 rather than the 988-1150 listed. Moore-McCormack Energy employees Brock, Chahin, Eliassen and Woodward are still in the Houston office instead of the Dallas office. LaVerne B. Cobb listed as manager of Geology for H. J. Gruy and Associates was manager of geology for Gruy Petroleum Technology, Inc.; however, she now has opened her own consulting office, L. B. Cobb & Associates, phone 780-0132.

**HGS INTERNATIONAL EXPLORATIONISTS
GROUP—EVENING MEETING, March 14, 1984**

TOM C. CONNALLY—Biographical Sketch



Tom Connally is a staff geologist with Amoco's Africa and Middle East Region in Houston. He received a B.A. degree in English and an M.A. degree in geology from the University of Texas at Austin. He worked for Conoco from 1977 to 1982, mostly on the offshore Dubai concessions. In 1982 he went to work for Thomas D. Coffman Exploration of Austin where he evaluated the company's holdings in

east Texas and southeastern Colorado. Since joining Amoco in 1982 he has been involved in regional stratigraphic studies in the United Arab Emirates and Oman.

Tom is primarily a sedimentologist. Carbonate depositional environments, using both log analysis and detailed petrographic description of cuttings and cores, have been his specialty. He has also worked extensively on terrigenous clastics for his master's thesis ("Colorado Delta of the Texas Coast") and on submarine fan deposits in Cat Canyon field, Santa Maria Basin of California. He has conducted reservoir studies on the Fateh and Rashid fields of Dubai; the Sajaa field in Sharjah, U.A.E.; and southeast Fruitvale field in Van Zandt County, Texas. He has published several papers on these topics.

Tom's current activities are in seismic modeling and seismic stratigraphy, integrating detailed stratigraphic studies with the seismic tool. He is an active member of the American Association of Petroleum Geologists, the Society of Economic Paleontologists and Mineralogists, the International Association of Sedimentologists, the Society of Professional Well Log Analysts and the Houston Geological Society.

**CRETACEOUS CARBONATES OF FATEH FIELD,
DUBAI, UNITED ARAB EMIRATES**

Fateh field, a giant oil field, has 12 platforms, 43 producing wells, and estimated reserves of 1.02 billion barrels of oil. Production is from three formations, with 71 percent coming from porous Cretaceous limestones of the Mishrif formation. Since production began in 1969, 530 million barrels of oil have been produced, averaging 120 thousand barrels per day. Reservoir facies in the Mishrif are fine-grained, molluscan-fragment grainstones and packstones deposited mainly in forereef environments. Porosities average 20 to 25 percent, and permeabilities average 15 to 50 md. These facies are part of a large rudist reef complex that rimmed the Khatiyah Embayment west of Fateh Field.

Backreef, reef/near-reef, forereef, and basinal facies are recognized in the Mishrif-Khatiyah sequence at Fateh. Regional distribution of these facies indicates that the Khatiyah formation represents a transgressive basinal facies that later retreated due to the progradational out-building of rudist reef facies of the Mishrif. Along strike, the outer-shelf reef facies are discontinuous and are replaced by near-reef grainstone facies of coarse reef debris.

The overlying Laffan shale provides an adequate seal for the Mishrif reservoir. It forms a blanket deposit throughout the Fateh area and averages about 90 feet thick. Source beds are found in the underlying Khatiyah formation, which is the basinal equivalent of the Mishrif. The structural/stratigraphic trap at Fateh is formed by a breached dome over a salt structure.

HGS FIELD TRIP

"FIELD TRIP TO DAMON MOUND"

INSTRUCTOR:

DR. STEVE SCHAFERSMAN & OTHERS

Date: April 7, 1984

Visit a typical Gulf Coast salt dome with many points of interest to see! Warm spring, calcite crystals lining fractures, root casts, exotic block in caprock, casing from sulphur well, vertebrate fossils.

Registration Fee: \$15.00

(Field trip guide book, lunch and refreshments provided.)

Participants provide their own transportation. Please complete the pre-registration form and mail as soon as possible.

Pre-Registration

"Field Trip To Damon Mound"

Name: _____

Company: _____

Phone: _____

MAIL TO: Tridib K. Guha

Conoco Inc.

P.O. Box 2197, Ste. 1318

Houston, Texas 77252

**KGS DATA BASE FOR 31 EASTERN STATES
NOW AVAILABLE FROM BLM**

A computerized data base describing the East's **Known Geologic Structures** — familiar to the oil and gas industry as KGSs — is now available from the Bureau of Land Management (BLM). Developed by BLM's Eastern States Office (ESO), the data base will be updated continually, with print-outs available from ESO at \$10.00 a copy.

ESO's technical staff has identified some 430 KGSs in the 31 States east of the Mississippi River. KGSs are indexed in the new data base by state and county, and identified by name and detailed legal description. The data base is designed to provide those involved in Federal oil and gas leasing a convenient and comprehensive reference source where none had previously existed.

Print-outs, updated monthly, will be available for public inspection at ESO and the BLM District Offices in Jackson, Mississippi and Milwaukee, Wisconsin. Orders for the print-outs will be filled with newly-generated copies from the data base itself.

To order, send \$10.00 by check or money order payable to the Bureau of Land Management to BLM, Eastern States Office, 350 South Pickett Street, Alexandria, Virginia 22304. (Note: Arkansas and Louisiana will not be entered into the data base until mid-January 1984.) Further details on the data base are available from Bob Hall at (703) 235-2846.

PERSONNEL PLACEMENT COMMITTEE

The services offered by the Personnel Placement Committee presently involve three types of activities:

1) **Job Openings:** A file of job openings listed with the committee by either companies or employment agencies is maintained in the offices of John Simpson, at 900 One Allen Center (telephone 759-9258). Job applicants are welcome to review the listings weekdays from nine to five.

2) **Resume File:** A file of applicant resumes is maintained in the offices described above. Resumes are held for one year unless the applicant requests their removal. Potential employers are welcome to review these resumes for openings with their firms.

3) **Advertisement Column:** The committee will publish short "Positions Available" ads from companies but not from employment agencies, in the HGS monthly *Bulletin*. Responses to these ads should be addressed to the attention of the code number and will be forwarded unopened.

"Positions Wanted" ads may be placed by the applicant at no cost, but should include a phone number and hours to contact.

Ads will not be re-run automatically, but may be submitted again for subsequent issues. Submit 2-3 line ads, and responses to code numbers to:

Sherry Laufer
Conoco Inc.
P.O. Box 2197, Suite 1434
Houston, Texas 77252

Direct questions concerning the column to Sherry Laufer, at 965-2865 (days).

POSITIONS AVAILABLE

Exploration Geophysicist: Midland, Texas district office. BS required, MS preferred. Qualified candidate will possess 4 years seismic interpretation experience in West Texas. Code #4301.

Exploration Geophysicist: One onshore, one offshore, located at The Woodlands, Texas corporate offices. 4 years experience in seismic interpretation of the Upper Texas Gulf Coast region. Both positions require BS degrees; MS degree preferred. Code #4302.

Geologist/Geophysicist: 3-5 years structural interpretation experience, utilizing subsurface and seismic data banks for prospect generation. Texas State waters. Contact Indexgeo and Associates, Inc. (713) 526-3746.

Geologist: Aggressive small independent seeks top quality prospect generator in Texas Gulf Coast. Salary, car and override. All information kept confidential. Resume and references to Code #4303.

POSITIONS WANTED

Geologist: 8 years experience; 2 in the Rockies, 4 in Texas Gulf Coast (Districts 1-4), 3 in International (North Sea). Strength in stratigraphic plays, log analysis. Willing to relocate. (303) 690-9892.

Petrophysicist: 10 years experience, the last 3½ in computer log analysis. Background in mudlogging and well site consulting. All International, primarily North Sea. Willing to relocate. (303) 690-9892.

Geologist: 6 years of Gulf Coast Exploration. MBA degree, special skills: remote sensing, risk and economic evaluation, log analysis, published in O&GJ, July, '83. 486-1587.

Geological/Geophysical Drafting Department Supervisor: 5+ years geological and drafting experience, BS (cum laude) Geology. Seeks drafting supervisory or geologist position. All inquiries considered. 879-7323 (messages).

Explorationist: 28+ years experience; regional analysis, prospect generation frontier areas including Alaska, California (onshore-offshore), Gulf Coast, Rocky Mountains. Seeks permanent or retainer situation. (214) 446-4039 (days or eves).

Geologist: 7 years exploration and production experience plus 2 years seismic interpretation in Mid-Continent and South Louisiana areas. Seeks onshore position with major or large independent. 933-1259 (eves).

Prospect Generator: MS Geology, 10+ years, seeks exploration position with active independent. Experience concentrated in Gulf Coast Tertiary trends with heavy Wilcox exposure that includes deal screening. 852-8625.

Geologist: BS Geology, working on masters. 6 years experience, 3 years generating prospects Texas Gulf Coast and South Texas. Proven oil finder. Seeks exploration position or retainer. Go-getter. 622-7215 (days).

Geologist: MS, 13 years experience. Oil, gas, mineral prospecting and exploration. Mineralogy, petrography, sedimentology, igneous and metamorphic, reservoir research. 6 years oil and gas, 7 years minerals. Seeks permanent position in research or exploration. (713) 434-1658 days or eves.



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DECISION TREES FOR EXPLORATION MANAGERS: AN EXAMPLE

Paul R. Oman
Consulting Geologist

Paul Oman is a Houston-based consulting geologist. He is a graduate of California State University and will receive an MBA from the University of Houston in May, 1984. He has worked as a consulting geologist to a Houston oil company and has been employed by Total Petroleum and J. Rose & Associates. where in addition to geology, he worked on risk analysis and economics. He has published in the Oil & Gas Journal.

The job responsibilities confronting an exploration manager are vastly different from those which face an exploration staff geologist or geophysicist. By both personality and training, the staff explorationist is an optimist seeking that barrel of black gold. He enjoys the chance of beating the odds of a dry hole. The duster of yesterday is forgotten in the excitement of today.

The manager, on the other hand, has to be a realist. He is encouraged to dream of success but never allowed to overlook the cost of failure. He needs to examine and weigh everything in terms of its contribution toward the company's goals. Unlike the geologist who succeeds by being professionally subjective, the manager must be coldly objective. Because of the complex nature of the decisions confronting the manager, being totally objective requires more than mental discipline. It requires the use of one or several decision-making models which include the statistical probabilities of success or failure that are part of every decision faced by the manager. One of these models is the Decision Tree.

Consider the following situation. Mr. Crude, Exploration Manager of Hot Oil Company, has a prospect to consider, sitting on his desk. He must decide whether or not the purchase of seismic coverage to help "prove up" the prospect is a worthwhile expense. The probability of a "Hit" without the coverage is estimated at 30%. If the well comes in, it should generate \$4,000,000 net present value for Hot Oil. Dry hole cost is \$2,000,000 (Table I).

TABLE I

	HIT	MISS
DRILL	\$4*	(\$2)
NO DRILL	0	0
PROBABILITY	.30	.70

*net present value dollars X 10⁶

TABLE I. Probabilities Without Seismic

TABLE II

OUTCOME (ACTUAL)

SEISMIC PREDICTS:	PRODUCE	DRY
HIT	.40	.10
?	.40	.50
DRY	.20	.40

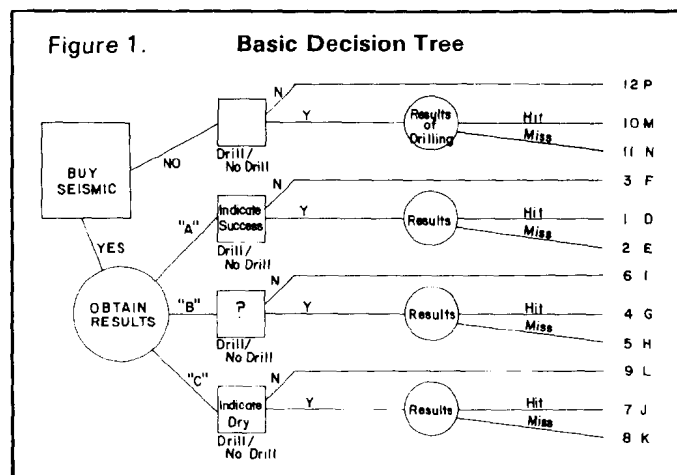
TABLE II. Conditional Probabilities Associated With the Use of Seismic

Seismic will cost \$200,000. The resulting data will predict a "Hit" 40% of the time when there is definitely production to be found. It will be inconclusive under the same circumstances also 40% of the time and wrong 20% of the time. Even if the well turns out to be a duster, the seismic will predict success 10% of the time, be inconclusive 50% of the time and wrong 40% of the time (Table II).

It should be noted at this point that the entire validity of the Decision Tree results is built upon the probabilities presented in Tables I and II. It is critical for the model to have the very best handle on these probabilities that is possible. Obtaining them is no easy task, yet this is where the bulk of your time should be spent to insure valid conclusions.

Where are these numbers obtained? Hopefully from your personal experience with whomever does your geophysical interpretations and the industry success ratio for that trend or county, obtained from statistics published by P I and others. In practice you'll probably have to generate these numbers in your head to the best of your ability. Do your very best, as these numbers are critical in the following analysis.

Figure 1 shows the initial Decision Tree. Circles represent events and boxes indicate decisions to be made. First the decision is made to buy or not to buy the seismic. Based upon the outcome of the seismic data, a Drill/No Drill decision is made. The possible outcomes of the drilling must then be considered. Looking at Figure 1, observe that there are 12 possible outcomes. We start with the outcomes and work back toward the initial decision. Therefore, we first need to determine the cash flow of each outcome. How to do this is illustrated in Table III.



Next, we need to determine the probabilities of: A; the odds of the seismic correctly predicting the outcome of a "Hit" (D), or a "Miss" (E).

$$A = (\text{probability of hit}) (\text{prob. of seismic hit}) = (\text{prob. of dry}) (\text{prob. of seismic dry})$$

$$= (.30) (.40) + (.70) (.10) = .19$$

$$A = .19 \quad D = .12 / .19 = .63 \quad E = .07 / .19 = .37$$

B — The odds of the seismic being inconclusive of either a "Hit" (G) or a "Miss" (H).

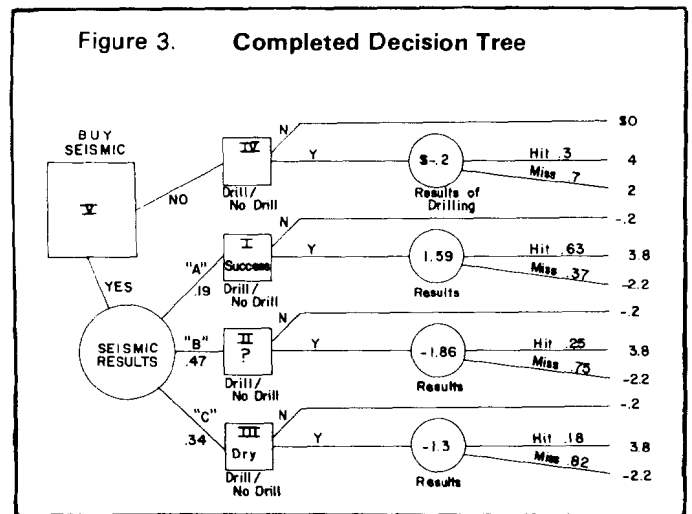
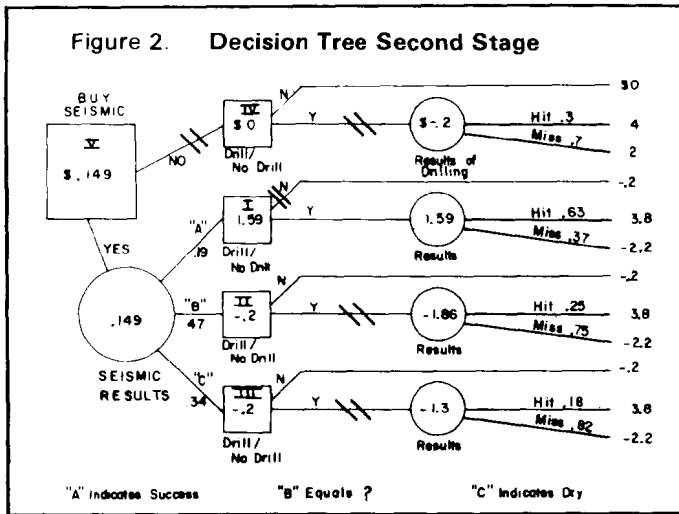
$$B = (\text{prob. hit}) (\text{prob. of seismic ? w/hit}) + (\text{prob. dry}) (\text{prob. of seismic ? w/miss}) = (.30) (.40) + (.70) (.50) = .47$$

$$B = .47 \quad G = .12 / .47 = .25 \quad H = .35 / .45 = .75$$

TABLE III Outcomes and Costs

OUTCOME	BUY SEISMIC	SEISMIC YES	SEISMIC ?	SEISMIC NO	DRILL	HIT	\$X10 ⁶	NOTES
1	Y	X			Y	Y	3.8	1
2	Y	X			Y	N	-2.2	2
3	Y	X			N	N	.2	3
4	Y		X		Y	Y	3.8	
5	Y		X		Y	N	-2.2	
6	Y		X		N	N	-.2	
7	Y			X	Y	Y	3.8	
8	Y			X	Y	N	-2.2	
9	Y			X	N	N	-.2	
10	N				Y	Y	4	4
11	N				Y	N	2	5
12	N				N	N	0	6

NOTES: 1 profit less seismic cost, 2 dry hole cost plus seismic cost, 3 seismic cost, 4 profit, 5 dry hole cost, 6 no action



C — The odds of the seismic being wrong given either a "Hit" (J) or a "Miss" (K).

$$C = (\text{prob. hit}) (\text{prob. seismic miss}) + (\text{prob. dry}) (\text{prob. seismic miss w/dry})$$

$$= (.30) (.20) + (.70) (.40) = .34$$

$$B = .34 \quad J = .06 / .34 = .18 \quad K = .28 / .34 = .82$$

M and N — The probabilities of a "Hit" or "Miss" without the purchase of the seismic data.

$$M = .30 \quad N = .70$$

(as listed directly in Table I)

Note that every event, as indicated in the Decision Tree by a circle, has probabilities associated with each of the branches leading out of it.

The next step is to generate Expected Values for each of the above stated branches. This is achieved by multiplying the calculated probabilities by the dollar value. (See Table III) for that particular branch. This is done for each branch leading out of a circle. The results are summed and this value goes into the circle. For example, for outcomes D and E,

$$(.63) (\$3.8) + (.37) (-\$2.2) = \$1.59$$

See Figure 2 for a summary of all computations to date.

Now the decision Boxes I, II, III and IV of Figure 3 are filled in. This is done by picking the best dollar value associated with the legs leading out of the box in Figure 2. One value might be the expected value listed in a circle and the other(s) in a leg(s) without a circle (the dollar value at the end of the branch). For

Box I compare \$1.59 from the circle against \$-.2 from the other leg; \$1.59 is better than losing \$.2 so \$1.59 is entered into Box I and the "No" branch is crossed out because a "No" decision is economically not the best option.

In Box II we obtain \$-.2 with the "Y" leg crossed out. Again, \$-.2 with the "Y" leg crossed out for Box III, and \$0 with the "Y" leg crossed out in Box IV.

Now find the Expected Value to fill into the "Obtain Seismic Results" circle. This is done in the same fashion as was done for the "Results of Drilling" circles. The dollar values obtained from Boxes I, II, III and the possibilities for A, B, and C have already been developed.

$$(.19) (\$1.59) + (.47) (\$-.2) + (.34) (\$-.2) = \$1.49$$

The .149 goes into the "Obtain Results" circle.

The left "Yes" leg of the Decision Tree has \$.149 in the circle and the right "No" leg has \$0 in the "Drill/No Drill" box. Because .149 is greater than 0 it is put into the "Buy Seismic" box and the lesser \$0 "No" leg is crossed off.

The Decision Tree is now complete (Figure 3). The EVIPI (Expected Value of Imperfect Information) (i.e., the seismic data) is equal to its cost plus the generated expected value less the cost of the other decision, or: \$.2 + (\$.149 - \$0) = \$349,000. Thus, we have obtained \$349,000 worth of information for only \$200,000. Hot Oil Company should buy the seismic and drill if the results of the seismic survey are encouraging.

The Decision Tree has answered an exploration question in a repeatable, logical, quantitative fashion. Normally most exploration managers would simply make a seat-of-the-pants decision on problems of this nature. If his decision is grossly in error and he has to justify his actions, what defense does he have? The "Well, I thought..." just isn't good enough. Just as the geologist uses all the tools available, so should the exploration manager, even if it means learning new techniques or methods.

GENERAL REFERENCES

Cook, T. M. and R. A. Russell; *Introduction to Management Science*; 2nd edition; Printice Hall, Englewood Cliffs, N.J. 1981; pp 363-373.

Mendenhall, W. and J. E. Reinmuth; *Statistics for Management and Economics*; Duxbury Press, North Scituate, Mass.; 1978; pp 349-350.

Weston, J. F. and E. F. Brigham; *Managerial Finance* 7th edition; Dryden Press, Hinsdale, Illinois; 1981; pp 516-520.

PASSAGE

Claude Riney, Jr., Vice President for Westland Oil Development Corp., died in Montgomery, Texas, December 25, 1983.

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Racquetball March 10	Stu Stouffer (Hunt Oil - 681-9742)	Cambe, Exlog, Reservoirs, Inc.
Golf March 26	Gary Wirey (Wirey Resources - 469-1874)	Baroid, Cambe, Data Log, Geomap, Geomasters, Inc., IDL, Inc., PGA and Assoc., Petty Ray Geophysical, Ragsdale Well Logging Co., Stratagraph
Tennis May 11	Wayne Sealey (Core Lab - 460-9600)	Core Lab, P.I., Stratagraph, Welex
Trap & Skeet May 19	David Lazor (Valero - 497-6711)	The Analysts, Baroid, Big E Drilling, Dresser, Exlog
Bar-B-Q May 18	Stephanie Hrabar (Union Tex. Pet. 960-7500)	Data Log
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NEW ORLEANS SPWLA SHORT COURSE

The New Orleans Society of Professional Well Log Analysts will host a short course on the evaluation of old well electric logs on Wednesday and Thursday, April 4-5, 1984 from 8:00 a.m. to 3:15 p.m. The course will be held in the Renaissance Room of the LePavillion Hotel on Poydras Street in New Orleans. The first day's session will include a review of SP theory, normal and lateral curve shape and microlog interpretation. The second day will be a work session on electric logs. A hand held calculator will be used. Advanced Registration prior to March 29, 1984 is \$100.00. If space permits door registration on April 3 is also \$100. To register send the form below with payment to:

Mr. John C. Bibb
c/o Mobil Oil Company
1250 Poydras Street
New Orleans, Louisiana 70113

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Sea Fan Sedimentation - Gulf of Mexico

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James M. Coleman
Coastal Studies Institute
Louisiana State University
Baton Rouge, LA 70803

Arnold H. Bouma
Gulf Res. and Dev. Co.
P.O. Box 36506
Houston, TX 77236

GEOLOGY FOR NON-GEOLOGISTS FIELD TRIP

The beautiful fall weather helped provide a great opportunity for 118 people to learn some basic geology on HGS's "Geology for Non-Geologists" field trip on November 12. At various stops the group examined Oligocene fluvial sandstones with petrified wood and fossil leaves; late Eocene non-marine shales, sands and lignites; and middle Eocene shallow marine sands, shales and glauconites with marine fossils.

More than 25 companies, consultants and independents, and an Explorer Scout group, were represented by people from all walks of life. The trip was designed to present a short course in sedimentary geology at the layman level, in as inexpensive a way as possible. Attendees provided their own transportation in 35 cars and 2 motorcycles, and ate their lunches on the go in order to spend more time on the outcrops.

The trip was organized and led by Dick Zingula (Exxon), assisted by John Herbert (Tenneco) and Kevin Kilmartin (Exxon), and the guidebook was printed by Exxon. Riverside Crushed Stone Co. kindly allowed the group to visit their quarry.

If the number and enthusiasm of people attending was any indication, HGS may need to run more trips for non-geologists. What better way to educate people about our profession?

Photos by A. M. Wang



A view of the Riverside Quarry -
Oligocene Gueydan Formation.



Dick Zingula describing the Eocene Jackson coals
at Lake Somerville.

4th ANNUAL RACQUETBALL TOURNAMENT AND PACMAN COMPETITION March 10, 1984

The Houston Geological Society will hold its Fourth Annual Racquetball Tournament on Saturday, March 10, 1984. The location will be the same as the last three years: Courts Etc. Racquetball Club, 2620 Tanglewilde. The club is in the Woodlake Shopping Center near Westheimer and Gessner. The tournament is open to all HGS members and family.

First round matches will begin at 10:00 A.M. All players will be notified, in advance, of their starting time. However, everyone is encouraged to attend all day. Also, last year winners will be seeded.

Each person should indicate level or skill on the entry form (please, no sandbaggers). The tournament director may reclassify people if necessary. The tournament will be by single elimination with a consolation round. Round robins will be used if any division has less than six players. Matches will be two games to 15 points with a tie breaker to 11. Penn racquetballs will be used this year.

Entry fees are \$15.00 per person. This includes court time, balls, lunch, refreshments, T-shirts, and trophies. The **deadline** for signing up is **Friday, March 2, 1984**. The field may be limited so entry fees should be mailed as early as possible.

Sponsors for this year's tourney are **Exlog, Reservoirs Inc., Formatech, Cambe, Dresser, Continental Labs, Prokop, Schlumberger Offshore, and Stratagraph.**



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REVIEW OF EXPLORATION ACTIVITY

OFFSHORE GULF COAST

Gulf will drill an 18,500' **Plio-Pleistocene** wildcat on **West Cameron Block 505**, offshore southwest Louisiana. The #1 OCS-G-5337 is 2-1/2 miles northeast of Plio-Pleistocene production at Block 504 Field.

A projected 16,000' wildcat has been scheduled by Shell on **Eugene Island Block 281**, approximately 60 miles off the coast of southwest Louisiana. The #1 OCS-G-5511 is 3-1/2 miles north of Eugene Island Block 276 Field, a prolific oil and gas reservoir.

Tenneco will drill a 14,500' **Pliocene** test on **Mississippi Canyon Block 408**, offshore southeast Louisiana. The #1 OCS-G-5849 is 15 miles southwest of Mississippi Canyon Block 281 Field.

Two deep water wildcats have been staked in the northern Gulf of Mexico off southeast Louisiana. Placid will drill a 13,000' **Pleistocene** test on **Green Canyon Block 39** in 2133' of water. The #1 OCS-G-5883 is 40 miles south of nearest production in Grand Isle Block 95 Field. On **Mississippi Canyon Block 197**, Conoco will drill a 12,000' **Pliocene** test in 1900' of water. The #1 OCS-G-5868 is 15 miles southeast of Pliocene production at South Pass Block 51 Field.

ONSHORE GULF COAST

Lower Texas Gulf Coast

Mesa has staked location for a pair of **Frio** wildcats 1-1/2 miles east of Frio production at Nichols Field in **Hidalgo County**. The #1 Crow, projected to 5500', and the #1 Garza, projected to 6000', will attempt to find productive Frio sands downthrown to a large down-to-the-southeast fault at the *Textularia warreni* horizon.

Conoco has opened two new "**Lobo**" **Wilcox** fields in **Webb County**. The #2 Frost, 1-1/4 miles southeast of "**Lobo**" production at Lundell Field, flowed 1720 MCFGPD through perfs 9686-97' as the discovery for Rapture Field. About 2-1/2 miles southeast of Lundell Field, the #3 Frost flowed 2043 MCFGPD from 9712-33' (OA) to open Ruffle Field. Both discoveries are located in a slight reentrant along regional southeast dip at the Lower Wilcox horizon.

In **Jim Hogg County**, CPC Exploration has opened Northeast Mestena Grande Field about 1/2 mile west of Yegua oil production in Mestena Field. The #1 Lopez-Canales flowed 2948 MCFGPD and 29 BCPD from **Queen City** perfs between 9787' and 9866'.

J. H. Robison & Associates have completed the #1 Pawlik Trust as a new **Yegua** gas discovery 2-1/2 miles southwest of Yegua production at Paul White Field in **Jim Wells County**. Flow rate was 3400 MCFGPD through perfs at 7260-66'. At the yegua horizon, the discovery spots on southeast dip, downthrown to a small down-to-the-southeast fault.

Middle Texas Gulf Coast

Drexel Operating will drill an 8500' **Olmos** test, the #3301 Maltsberger, 3-1/2 miles north of Edwards, Olmos and Wilcox production at Cooke West Field in **LaSalle County**. Nearest tests encountered no appreciable Olmos sand development. Structure at the Edwards horizon is regional southeast dip.

Farther east, in **McMullen County**, Sohio has staked location for the #1 Alamo National Bank Trustee, an 8000' **Wilcox** test 4 miles southeast of Wilcox gas production at

Washburn South Field. Well developed Wilcox and Queen City sands are present and productive in the area. Structure at the lower Wilcox horizon is regional southeast dip.

Jack N. Blair has completed the #1 Abercrombie 74 Ranch as a new **Wilcox** discovery 3-1/4 miles northwest of Wilcox production at Southeast Christine Field in **Atascosa County**. Flow rate was 56 BOPD and 20 MCFGPD from 5620-24'.

In **Goliad County**, Esenjay Petroleum has completed a new **Cook Mountain** discovery 1-1/2 miles south of Cook Mountain and Frio production at South Marshall Field. The #1 Fromme Gas Unit flowed 1090 MCFGPD and 21 BCPD from perfs at 5586-5601'.

Upper Texas Gulf Coast

Hamman Oil has opened Lake Anahuac Field 1-1/2 miles northeast of Vicksburg gas production at South White Bayou Field in **Chambers County**. The # State Tract 37 flowed 152 MCFGPD from the **Frio** at 9678-88'.

South Louisiana

Amoco Production will drill a 15,000' **Wilcox** test one mile west of abandoned Frio production at Lobdell Field in **West Baton Rouge Parish** and 9 miles southeast of nearest Wilcox production at Bayou Tommy Field. The #1 Starmount Number Four, Inc. should encounter some well-developed Wilcox sands with intervening shales. At the *Nonion struma* horizon, the wildcat spots on a sharp south-plunging nose.

In **East Baton Rouge Parish**, James A. Whitson, Jr. will drill an 11,500' **Wilcox** test, the #1 Martone, 2-1/2 miles northeast of Lower Tuscaloosa production at Comite Field. Previous Wilcox production has been established at Alsen Field, 10-1/2 miles northwest, from a thin pay sand overlying thicker, water-bearing sands. Structure at the Wilcox horizon is southwest dip with minor local nosing.

Farther north, in **East Feliciana Parish**, Cities Service will test the **Lower Tuscaloosa** at its proposed 15,500' wildcat, the #1 Wall Estate. Nearest Lower Tuscaloosa production is at Freeland Field, 14 miles west. Nearby tests encountered some well-developed but water-bearing sands, slightly gas-cut. At the Lower Tuscaloosa horizon, the wildcat spots on moderate southwest dip.

Amoco Production will drill a 12,500' **Lower Tuscaloosa** wildcat in lightly drilled **St. Tammany Parish**, extreme southeast Louisiana. The #1 Perschall, et al is 7 miles northwest of Lower Cretaceous production at Fort Pike Field. The wildcat should lie behind the Comanchean shelf edge, and should encounter fairly well-developed Lower Tuscaloosa sands. Structure at the Lower Tuscaloosa horizon is fairly steep southwest dip.

MESOZOIC TREND

East Texas Basin

Santa Fe Minerals has staked location for the #1 Creamer, an 11,500' **Smackover** test 8 miles north of Cotton Valley production at Linden North Field in **Cass County**. A Sunray Mid-Continent dry hole 1 mile northeast cored slightly porous but nonpermeable oolitic and dolomitic Smackover lime. At the Top Smackover horizon, the wildcat spots on the west flank of a southwest-northeast trending structural anomaly.

In **Anderson County**, Hudson Resources will drill a 17,800' **Jurassic** test 2 miles northwest of Woodbine production at Dogwood Field. The #1 Temple-Eastex should

penetrate the Cotton Valley and possibly test the Smackover. The closest comparable control is an 18,200' Cotton Valley Lime test 17 miles southeast, the Texaco #1 Dean. No details were released for the Jurassic portion. At the Base Massive Anhydrite horizon, the wildcat spots on a broad, southwest-plunging nose.

Also in **Anderson County**, Mosbacher Production has completed the #1 Heidleberg Estate Unit as a **Pettet** gas discovery 3-3/4 miles east of Frankston Field. Flow rate was 1620 MCFGPD from 12,306-334'. At the Base Massive Anhydrite horizon, the discovery appears to be located in a structural low, but deep control is extremely sparse.

Mason & Bates has completed a new **Travis Peak** gas discovery in extreme southern **Nacogdoches County** to open Lacyville West Field. The #2 Johnson flowed 1572 MCFGPD from 10,067-105', and followed reentry of a Union Producing dry hole drilled in 1956. Structure at the Top Pettet is a broad, southwest-plunging nose.

Mississippi-Alabama-Florida

Shell is waiting on a rig at the #1 McCorquodale, et al Unit 31-1, a 14,570' **Smackover** wildcat in **Clarke County**, Alabama, 12-3/4 miles northwest of Smackover production at Lovetts Creek Field (Monroe County). Shell drilled a 13,707' dry hole 1 mile north last year, but no details were released. Structure at the Top Smackover horizon is regional southwest dip.

In **Monroe County**, Brock Exploration has staked location for the #1 Koenig Trust, a 15,500' **Smackover** test 5-3/4 miles northwest of Smackover production at Little River Field. Several cores were cut in a 15,200' dry hole drilled by Kaiser 3-1/2 miles southwest, but no details were released. At the Top Smackover horizon, the wildcat spots near the axis of a structural trough, but control is extremely sparse.

Texaco has completed the #1 McMillan as a new **Smackover** oil discovery 11-3/4 miles east of Smackover oil production at Barnet Field in **Escambia County**. Flow rate was 661 BOPD and 1060 MCFGPD from 12,902-38'. Structure at the Top Smackover horizon is moderate regional southwest dip.

BILL EISENHARDT
Geomap Company

AWG MEETING: Wednesday, March 21, 1984

The Association for Women Geoscientists invites all interested persons to attend their dinner meeting. The meeting will include:

TALK BY: Karen Christina Lee,
Manager, American Express Travel Management Services

TOPIC: "The Woman Traveler: making plans, utilizing time, and safety and assistance on the road."

The meeting will be held at the Quality Inn Greenway Plaza located at 4020 S.W. Freeway at Wesleyan

COCKTAILS: 5:30, DINNER: 6:30, SPEAKER: 7:30

\$10.50 members \$12.50 non-members

R.S.V.P. Joan F. Sarah-Foster 463-6934 by Monday, March 19, 1984.

All no shows and late cancellations will be responsible for the cost of the dinner.

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Past presidents of the Houston Geological Society met for their sixteenth annual luncheon on November 11, 1983 at the Petroleum Club. The event, hosted by Peggy Rice (1982-83), was attended by 26 past presidents and by the current president.

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Field trip participants examining coal seams from the Eocene Jackson near Lake Somerville, Washington County, Texas. *Photo courtesy of A. M. Wang.*

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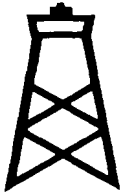
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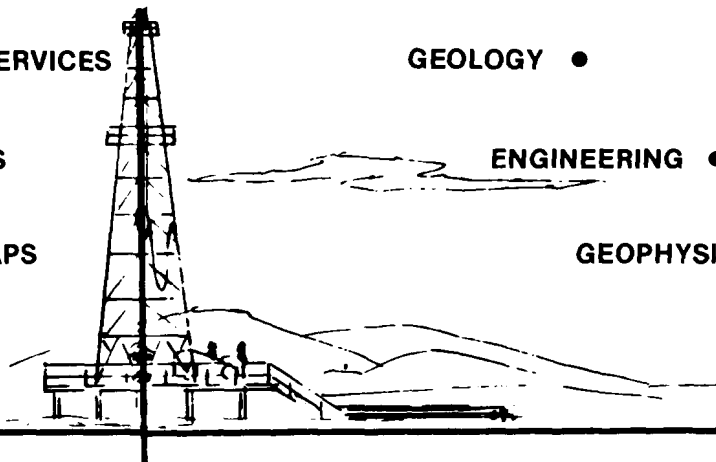
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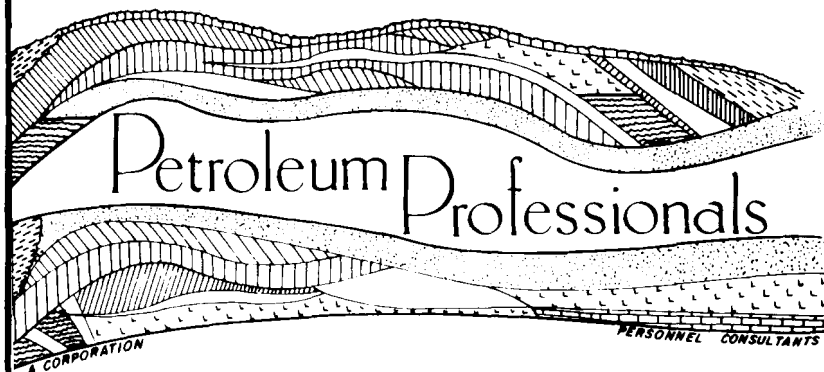
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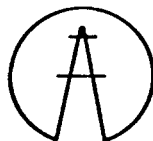
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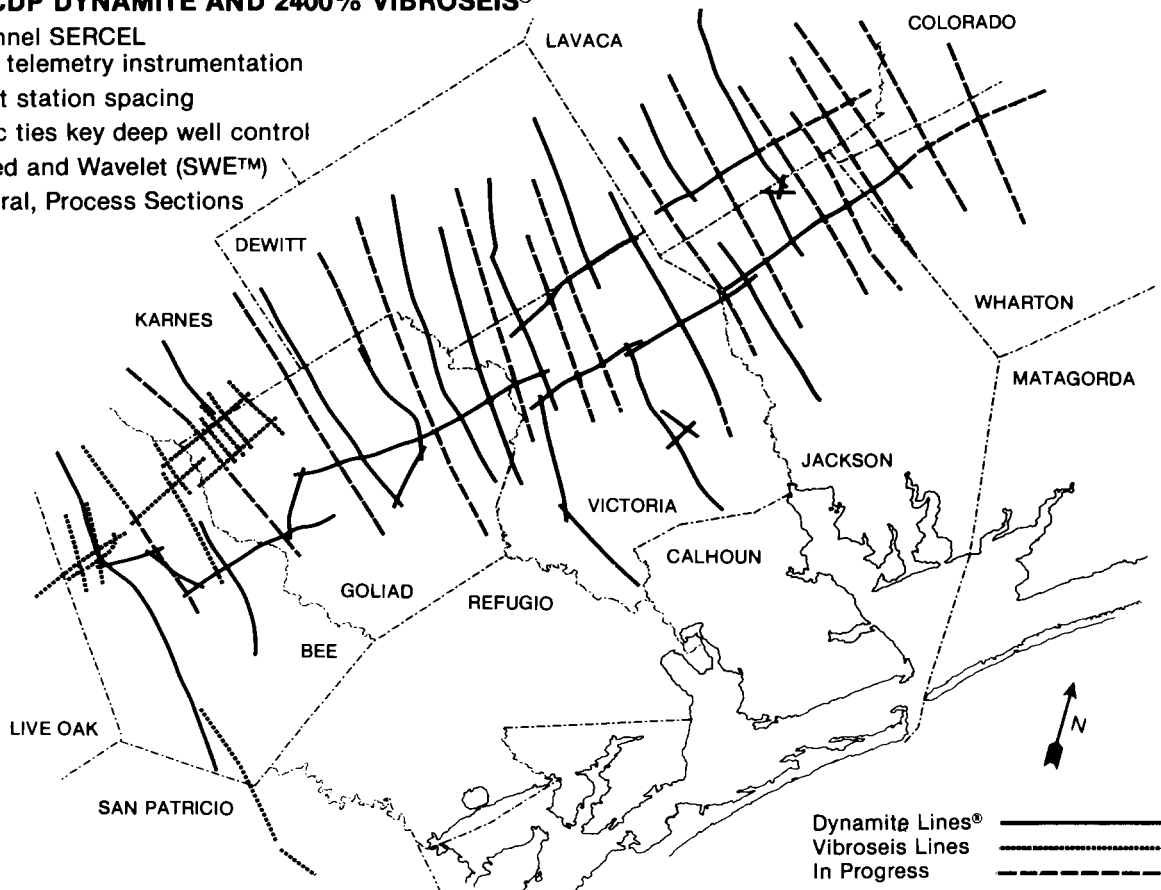
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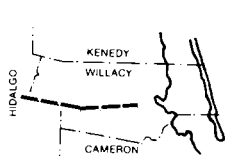
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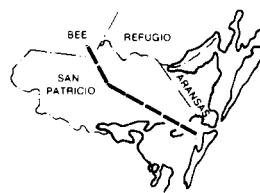
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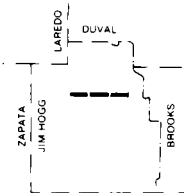
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				1	2	3 HGA COUPLES PARTY PETROLEUM CLUB
4	5	6	7	8	9	10 HGS RACQUETBALL TOURNAMENT
11	12 DINNER MEETING WESTIN GALLERIA EUGENE BRUMBAUGH	13 CRUDE CLUB WHITEHORSE CELLAR 878-7167	14 UH ALUMNI LUNCHEON HGS INT'L. GROUP DINNER MEETING WESTIN GALLERIA TOM CONNALLY	15 SIPES LUNCHEON PETROLEUM CLUB 651-1839	16	17
18	19	20	21	22	23	24
25	26 HGS GOLF TOURNAMENT KINGWOOD COUNTRY CLUB	27 SPWLA Downtown 280-4545 Northside 972-1749 Westside 972-6972 EAST TEXAS JURASSIC SYMPOSIUM TYLER, TEXAS	28 LUNCHEON MEETING MERIDIEN HOTEL EDWARD DUNCAN	29	30	31 APRIL 7 FIELD TRIP TO DAMON MOUND