The fluvial sequence from Unit A to Unit B is thought to represent the transition from a fine-grained to a coarse-grained meander-belt system. The transition to Unit C reflects a change to flash-flood, ephemeral-stream controlled sedimentation. Allocyclic phenomena are suggested as probably cause of these fluvial transitions.

CRAIN, WILLIAM, and WILLIAM MERO, Chevron USA, Concord, CA, and COLIN WILKENSON, Phillips Petroleum, Denver, CO

Geology of Point Arguello Discovery

Chevron (as operator for its partners, Phillips, Champlin, and Impkemix) discovered the Point Arguello oil field in 1981. The discovery well, the Chevron et al 1 P-0316, was drilled in federal waters 7.3 mi (11.8 km) south of Point Arguello, California. Delineation drilling on adjoining leases P-0315 (Texaco group), P-0316 (Chevron, Phillips, Champlin, and Impkemix), and P-0450 (Chevron and Phillips) confirmed the presence of a giant oil field with estimated recoverable reserves in excess of 300 million bbl.

The oil field is in a small subbasin at the southern edge of the offshore Santa Maria basin. This local depocenter developed in response to regional strike-slip tectonics and contains more than 15,000 ft (4,570 m) of Neogene sediments.

The Point Arguello structure is a large north-northwest trending anticlinal complex composed of 2 major highs separated by a faulted saddle. Reverse faults may cut the southwest flank and northern plunge of the Point Arguello structure.

The main reservoir is the middle and late Miocene Monterey Formation, composed of highly fractured cherts, porcellanites, and dolostones. Producibility is dependent on fracturing, as matrix permeabilities are low. Matrix porosities average about 13.5% and fracture porosities 1.5% of the reservoir volume. Analyses of pressure buildups indicate in-situ permeabilities up to 782 md.

Crestal wells have indicated productivities, after acid, of approximately 6,000 bbl/day. Platform Hermosa is scheduled to be installed on the P-0316 lease in May 1985, with oil production expected by January 1986.

CRANE, DAVID C., D. C. Crane, Inc., Dallas, TX

Microcomputers in Exploration—Perspective and Forecast

General purpose microcomputers have become so inexpensive that powerful systems now are within the budget of a one-person company. The uninitiated have visions of a desktop machine that can do budget reports, royalty accounting, lease control, interactive modeling of the subsurface, contour maps, decision making, dart throwing, and much more. Old hands in major oil companies can see the opposite side: horror stories about expensive programming projects, machines that are overloaded and slow, and enormous staffs required to interface the working geologist with the machine.

The truth about microcomputers is somewhere in between. An intelligent search for software packages will turn up a few that pay for themselves and the computer(s) they require. But buying a machine and attempting to make it fit a "grand vision" can lead to disaster.

This paper presents a perspective on microcomputer capabilities, both software and hardware, now and for the next few years, and suggests a method and a schedule for small-company geologists to become involved with computers.

CROUCH, JAMES K., and STEVE BACHMAN, Nekton, Inc., San Diego, CA

Seismic Reflection Profiles from Offshore Central California: Evidence for Post-Miocene Imbricate Thrust Faulting

High-resolution, 36-fold seismic reflection data with penetration to 3 sec have been collected recently in the northeastern offshore Santa Maria basin, the northern Santa Barbara Channel, and off Point Conception, California. These profiles reveal major east-over-west thrust faults in areas previously interpreted as being characterized by strike-slip faults and/or high-angle normal or reverse faults. Like those in well known foreland thrust belts, these faults typically form an imbricate system in which they curve asymptotically downward to a common basal sole thrust. "Soling out" generally occurs at depths of 1.5-3 km (5,000-10,000 ft).

Detailed mapping of faults and folds associated with these thrust systems coupled with fault-plane solutions suggest that (1) these thrusts formed within the last 5 m.y., (2) many have modern activity, and (3) compressive forces causing them are normal to the strike of the San Andreas fault. These observations agree with present-day plate motion studies which require that Pacific-North American relative plate motion include a component of compression orthogonal to the San Andreas fault.

These overthrust regions are all sites of recent major petroleum discoveries. However, these discoveries have all been made on obvious anticlinal structures that generally are attributed to wrench tectonics. Recognition of thrust faulting in these areas may lead to additional discoveries from more subtle geologic traps associated with overthrusting.

CROUCH, JAMES K., and STEVE BACHMAN, Nekton, Inc., San Diego, CA

Regional Post-Late Miocene Thrust Faulting in Offshore Central California—Implications for Wrench-Style Tectonics

High-resolution, deep-penetration seismic reflection data have recently been collected in the offshore Santa Maria basin, northern Santa Barbara Channel, and off Point Conception, California. These data reveal major post-late Miocene east-over-west thrust faulting in offshore central California. Recognizable on both dip and strike lines, the thrust faults are generally imbricate and curve downward to a basal sole thrust at depths of 1.5-3 km (4,900-9,800 ft).

The offshore Santa Maria basin is generally regarded as a wrench-style basin. However, the Hosgri and other northwest-trending faults within the basin appear to be predominantly thrusts rather than strike-slip faults. Also, detailed mapping within the basin indicates that the overall structural pattern does not fit accepted models of wrench tectonics; for example, folds have a preferred asymmetry and their axes closely parallel faults rather than lie en echelon to them. We conclude that the folds and faults as well as the present morphology of the offshore Santa Maria basin are largely due to post-late Miocene northeast-southwest compression. Similar conclusions can be drawn from the onshore Santa Maria basin on the basis of field relations and well data.

These data, and the conclusions drawn from them, raise questions as to the validity of the generally accepted notion that all California Neogene basins are products of wrench-style tectonics.

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Upward-Shoaling Origin of an Eastern Gulf Coast Barrier Island

North Bunces Key is a narrow barrier island which has formed on the northern portion of the ebb-tidal platform of Egmont Channel which services Tampa Bay. The island first became supratidal in 1960. Since that time, it has grown to a length of 2 km (1.2 mi) with widespread vegetation and dunes which rise about 2 m (6 ft) above mean sea level.

Most investigators discount upward shoaling as a mechanism for barrier formation in favor of drowned beach ridges. A closely spaced sequence of aerial photos documents the origin of North Bunces Key from a subtidal shoal area without benefit of significant storm activity. Requirements for formation of the barrier appear to be (1) abundant sediment, (2) shallow, very gently sloping platform, and (3) low wave energy.

Vibracores taken from several traverses across the barrier show a general stratigraphic sequence of nearshore sediments successively overlain by foreshore, backbeach, and dune sediments. Cores immediately landward of the barrier contain muddy lagoonal sands containing fining-upward washover deposits. Absence of typical nearshore sediments landward of the barrier may result from low energy conditions which permitted mud to accumulate even prior to emergence of the shoal or reworking and addition of mud as pellets by benthic organisms.