back-reef. The Abo reef is a clean white to light tan, anhydritic, fine to coarse crystalline dolomite exhibiting secondary porosity development due to fracturing and solution activity. Interconnecting vertical fractures and vugs give the reef excellent reservoir characteristics which would otherwise be absent in the tight reef matrix. Basin deposits (fore-reef) include black to dark brown argillaceous and cherty dolomites and limestones interbedded with fine-grained sandstones. Fore-reef deposits are called "Bone Spring formation" and are believed to be Abo equivalent.

Hydrocarbons are trapped where porosity has been well developed in relatively high structural areas along the reef. Four fields have been discovered along the Abo reef trend in New Mexico: (1) Lovington Abo, (2) Empire Abo, (3) Corbin Abo, and (4) Turner Abo. The latter three are currently being developed. The size and reserves of these fields are dependent on the following factors: (1) thickness of reef above water, (2) structural configuration of the reef, and (3) quality of the reef pay. In the Corbin and Turner Abo fields, oil is trapped along the crest of an elongated reef ridge, one or two locations wide. The productive limits are defined by their respective water tables. The reef in Empire and Lovington is characterized by the same steep dip toward the basin (10°–30°) but it has a gentle slope toward the shelf; thus, the productive limits are wider (3–6 locations wide) and production is limited shelfward by an effective permeability barrier.

A successful exploratory procedure has been to estimate a well's proximity to the reef crest by defining its relative stratigraphic position through correlation with areas of close control which traverse the reef. The intermediate drilling depth (4,000–8,500 feet) and high reserves (average 500,000 barrels per location) account for the acceleration of activity along the Abo reef trend.

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Helium

Helium demands a price approximately 100 times greater than natural gas, with a possibility of the price doubling in the very near future. It is obvious that any company or individual engaged in exploratory work should give this gas consideration in their drilling program.

Due to the many unique properties of helium, it is of extreme importance to our national defense, research, and industry. The authors discuss these properties and their relation to the many and varying uses of helium.

Further discussion concerns the location of producing and non-producing helium reserves, the Government's proposed conservation program, past production, and possible future demand.

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Page Field, Schleicher County, Texas

The Page field is in south-central Schleicher County, 9 miles southeast of Eldorado, the county seat. Geologically, the field is located near the southwestern margin of the Eastern platform. The discovery well, Page 1-A-40, was completed by Cooper Gas Company as a gas-condensate well in 1936. Oil production was opened in 1939 with the completion of Lone Star Gas Company's Humble-Page 1. Gas production occurs in several porosity lenses in a Strawn reef-limestone at approximately 5,300 feet. Mapping of the reef buildup indicates 250–300 feet of relief. Oil production occurs in three porosity lenses below the main Strawn reef buildup. Mapping of the first oil porosity shows primarily regional west dip with some low relief. The trapping results from an updip porosity pinch-out due to lithologic change.

Cities Service Oil Company recently purchased all producing properties in the field and plans for a pilot water-flood project in the oil zones and additional gas well completions have been proposed.

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Edwards Gas Trend in South Texas

Drilling since 1954 across a wide area in South Texas has established a new and deeper trend of production which may be an important reserve of oil and gas. It extends from the Mexican border on the Rio Grande northeastward across Webb, LaSalle, McMullen, Atascosa, Karnes, DeWitt, and Lavaca counties, a distance of 200 miles, and has reached a width of 13 miles in McMullen County.

Several factors held back the early development of the play: it is deeper than most operators in the district usually drill; the gas encountered was sour; and the geology is more complex than anticipated. These factors are now fading into the background and additional development is expected. The large size of some of the reservoirs and their capability makes this a profitable operation.

The new development ranges in depth from 9,000 to below 14,000 feet, with the latter figure expected to be increased. Production is established in various structural features The Edwards limestone (Fredericksburg group of the middle Albian Cretaceous) is the main producing zone to date although additional drilling should prove other Cretaceous formations to be productive.

Structural patterns proved to date include piercement-type and deep-seated salt domes, folding along both down-to-the-coast and upthrown fault blocks, and possibly simple reef development in the limestone.

Across central Atascosa County is a series of up-to-the-coast fault blocks which have been tested and yielded several profitable oil and gas fields at depths of 7,000–8,000 feet in the Edwards limestone. This trend is now almost completely explored, and is not considered part of the new development area.

Seismic work has been largely responsible for most discoveries though some fields were mapped as surface structures as early as 1932. An unconformity at the top of the Cretaceous in some areas makes shallow subsurface misleading and the seismic interpretation difficult. Additional sample work is needed to determine newly found stratigraphic changes.

Well expenses have been reduced as contractors solve their local problems. A dry hole will range from $100,000 to $125,000, though some of the deeper tests have been extremely expensive. Completion costs are high due to the need of high-pressure connections and the sulphur content which makes corrosion-proof tubing and fittings necessary. The gas must be cleaned before sale and additional expensive plants will be required.

It is too early to estimate gross reserves for the district, but development to date indicates a major figure. The first opinions on the trends assumed that gas would be the only product, as the first ten fields yielded only minor condensate production. The discovery of the Persons field in Karnes County in 1959 changed that idea. One oil well was also completed on the north end of the Fashing field in Karnes County, with accumulation caused by a stratigraphic or permeability trap, within the gas reservoir.