The slope sediments were sampled at water depths ranging from 667 to 4,777 ft, and in test holes penetrating as much as 1,000 ft of sediment, mostly coccolith-foraminiferal ooze and terrigenous clay. Dolomite is most common in Pleistocene, Pliocene, and some Miocene sediments.

Two general groups of dolomite occur: (1) a northern suite of "ideal" composition, silt-size, abraded and ragged, rhombic dolomite crystals; and (2) a southern suite of calcium-rich, sand-size, euhedral, rhombic dolomite crystals that show no evidences of abrasion or corrosion. Sediments containing the northern suite of dolomite crystals have high percentages of terrigenous clay material; associated dolomite appears to be of detrital origin, and transported to the depositional site together with the clay. The calcium-rich dolomite of the southern suite is interpreted as authigenic and probably formed in water depths similar to present depths. From analysis of interstitial waters, this dolomite probably formed from water similar in composition to normal seawater.

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BREEDLOVE FIELD, MARTIN COUNTY, TEXAS

The Breedlove field is in northwest Martin County, Texas, approximately 30 mi north of Midland. The field is only a few miles east of the axis of the Midland basin and on the east flank of the ancient Tobosa basin. Stratigraphically, the field is northeast of the limit of Devonian carbonate deposition and the Silurian carbonate section (major producing zone in the field) has a maximum thickness of 550 ft near the field and thins north and east toward the margin of Tobosa basin—a result of pre-Woodford erosion and nondeposition. The Silurian section is overlain by the Woodford Shale of Devonian and Early Mississippian ages, has an average thickness of 100–120 ft, and is separated from the underlying Ordovician Montoya Formation by the Sylvan Shale that ranges in thickness from 0 to 10 ft.

The field was discovered in July 1951 with the completion of the Pan American Production Company No. 1 Breedlove. This well, 660 ft from the south and 4,620 ft from the east lines of League 258, Briscoe County School Land Survey, tested (flowing) 2,341 b/d of 40° oil at 60°F through a ¾-in. choke from perforations between 12,078 and 12,118 ft after washing with 600 gal of mud acid. The productive zone is in the upper part of the Silurian.

The Silurian reservoir consists predominantly of white to light-gray, finely to coarsely crystalline dolomite. Production is on an asymmetric anticline which plunges southwest. The accumulation is controlled on the north by a porosity barrier and on the south by the closure of the fold. A stratigraphically controlled, tilted water table is in the field.

Currently, there are 42 wells producing from the Silurian. Through January 1, 1968, these had produced 14,883,391 bbl. Other production in the field includes: (1) Spraberry (6 wells), cumulative production to January 1, 1968, 502,702 bbl; (2) Wolfcamp (2 wells), cumulative production, 41,528 bbl (abd.); and (3) Strawn (1 well), cumulative production, 94,370 bbl (abd.).

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(To be announced)

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PHYLLOID ALGAL BANKS

Phylloid algal banks form reservoir rocks in Upper Pennsylvanian shelf carbonates in many oil provinces of the United States. They are of special exploration interest in the Strawn (Desmoinesian) of West Texas and eastern New Mexico. Furthermore, the quantity of hydrocarbons in major fields which produce from these stratigraphic traps compares favorably with that produced from structural traps.

Phylloid algal banks were studied by the writer. Data were derived from studies of surface and subsurface occurrences of these carbonate buildups. The stratigraphic and regional distribution of these algal banks, their mode of formation, their environmental dependencies, and their synecological associations with other fossil assemblages were studied together with the evaluation of reservoir properties, such as formation and destruction of porosity, log characteristics, production data, and statistics on primary and secondary reserve estimates of major representative fields.

Algal mounds are formed by the sediment-baffling action of leaf-like (*i.e.*, "phylloid") algae of the *Ivanovia* group, a branch of $CaCO_3$-secreting green algae of the family Codiaceae. The dense, pitchy growths of these algae on local shoals on the sea floor form an efficient sediment baffle. Fine-grained carbonate sediment accumulates between the algal blades where it is sheltered from winnowing by wave and current action. This results in the gradual building of a mound-like accumulation of sediment in those places where dense growths of these algae occurred. Thus, these algal mounds are biogenic banks, which, if preserved in the geologic record, would be bioherms and biostromes.

Lithologic and paleontologic evidence indicates that these algal banks preferred shallow-water, wave-sheltered shelf environments in areas of clean carbonate deposition, distant from sources of land-derived clastics. Changes of water depth during transgressive and regressive cycles apparently exercised a sensitive control on the growth of these algae. The most luxuriant growth of these algae is obviously confined to an energy level below wave base, although these algae probably could endure intermittent higher wave action. Whenever the water became too shallow and the algal growths were above wave base, the algal mound development was interrupted. In many places, algal mounds are interbedded with layers of cleanly winnowed, well-sorted calcarenite or oölite.

Phylloid algae have been reported in the United States from areas in southeast Kansas, the Panhandle of Oklahoma, north-central Texas, the eastern shelf of the Midland basin, the northwestern shelf of the Delaware basin, Hueco Mountains, Franklin Mountains, Sacramento Mountains, Robledo Mountains, and the Four Corners area. These phylloid algae range in age from Morrowan to Wolfcampian in the United States, and to early Middle Permian in Europe. The major occurrences of these algal banks in the Permian basin area are in strata of Desmoinesian, Virgilian, and Wolfcampian ages.

In general, algal banks show evidence of a high primary porosity which formed when the highly warped algal blades were piled into a mound having a loose, or open fabric. The presence of such high primary porosity and permeability commonly leads to the development of secondary leaching porosity. Most commonly, the $CaCO_3$ mud matrix between the algal blades is leached. Selective leaching of the algal blades