Sec

BUREAU OF ECONOMIC GEOLOGY

THE UNIVERSITY OF TEXAS AT AUSTIN

University Station, Box X • Austin, Texas 78713-7508 • (512) 471-1534 or 471-7721

WM DOCKET CONTROL CENTER

'85 AUG 22 A11:17

August 14, 1985

WM Record File 106

WM Project 16

Docket No.

PDR ✓

LPDR ✓

Distribution:

TRAPP

(Return to WM, 623-SS)

Mr. John Trapp
U.S.N.R.C.
Mail Stop 623-55
Washington, D.C. 20555

Subject: 1) Stratigraphic column for the Ogallala and Blackwater Draw Formations. 2) Northeast-southwest oriented thickness trends in eastern Deaf Smith County.

Dear John:

I have enclosed a preliminary draft of a stratigraphic section and a cartoon cross section of the Ogallala and Blackwater Draw Formations. The abstract by Machenberg and others summarizes our current interpretation of the origin and age of the Blackwater Draw Formation. Gerry Schultz's guidebook will provide a very useful review of Ogallala stratigraphic studies up to 1977, if you can obtain a copy.

I have also enclosed a series of copies of published maps that show northeast-southwest thickness trends in eastern Deaf Smith County.

If you have any questions or if there is any additional information that I can provide please call me at (512) 471-1534.

Sincerely yours,

Thomas C. Gustavson
Research Scientist

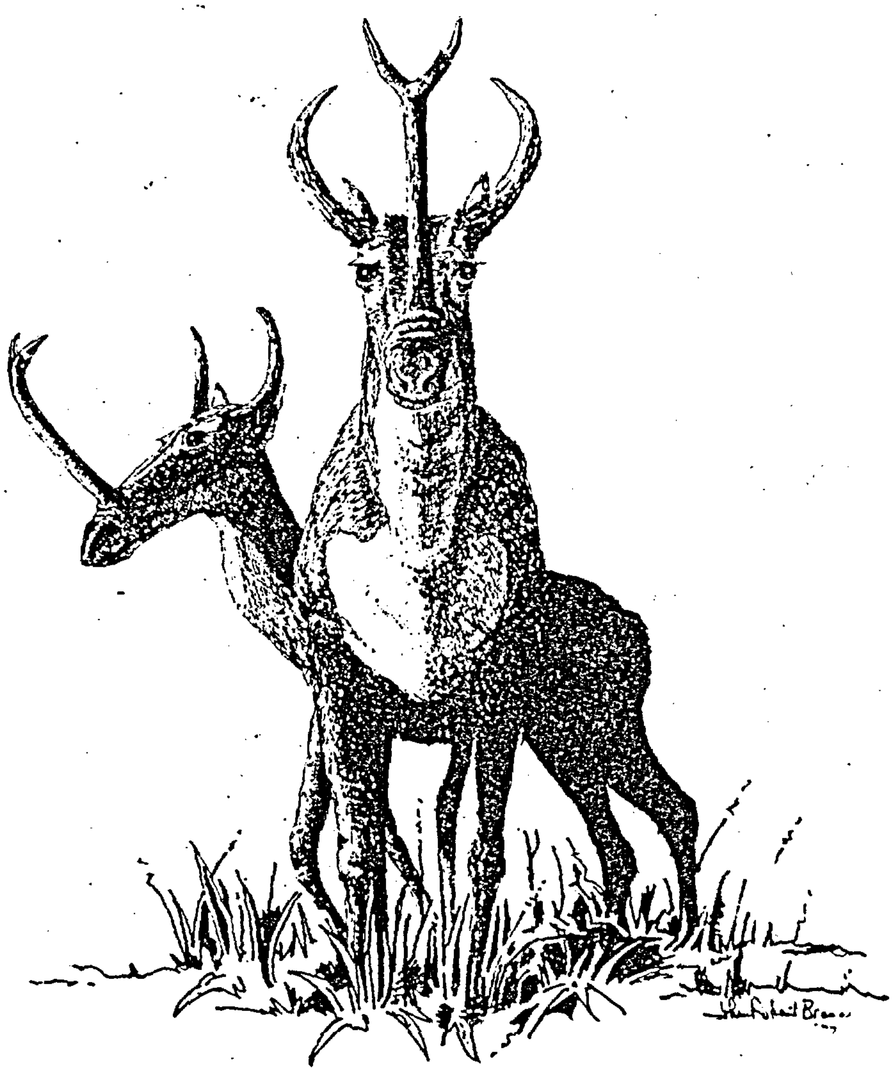
TCG:bbn
Enclosures

cc: Q/A file
E. C. Bingler

1171

GUIDEBOOK

Field Conference on Late Cenozoic Biostratigraphy of The Texas Panhandle and Adjacent Oklahoma August 4-6 1977



Gerald E. Schultz, Editor and Leader

Killgore Research Center
Department of Geology and Anthropology

Special Publication No.1

West Texas State University
Canyon, Texas

ABSTRACTS with PROGRAMS 1985

19th Annual Meeting

SOUTH-CENTRAL SECTION

The Geological Society of America

April 14–16, 1985
University of Arkansas
Fayetteville, Arkansas

Volume 17, Number 3, February 1985

leaching of toxic components. Unconfined compressive strengths of 20 to 1000 psi and permeabilities of 1 x 10^{-5} to less than 1 x 10^{-7} cm/sec. are common. Wastes suitable for cement stabilization include low-level radioactive waste, heavy metal sludges, heavy metal ash cakes, contaminated soils, mercury, chromium and cadmium sludges.

Little has been done with organic wastes due to concern about the effect of organics on hydration reaction of cement. Research is needed, particularly for low concentration of organics in large amounts of soil which makes incineration unattractive.

Cementation products should exhibit excellent field durability, but no protocol for evaluating long-term effects has been developed.

A study of cement stabilization of dioxin (2,3,7,8-TCDD) contaminated soils is underway at Univ.of Mo-Rolla, Civil Engrg. Dept. Dioxin has very low solubility and is strongly attracted to fine soil particles. If the soil particles are bound within the soil cement matrix the dioxin will be immobilized and not available as a health hazard. Conventional construction equipment can be used and a usable material is produced which will serve as a high quality roadway or airport base. Preliminary results will be reported.

ALKALINE MAGMATISM SUBSEQUENT TO COLLISION IN THE PAN-AFRICAN BELT OF THE ADRAR DES IFORAS (MALI) — Nº 69115

LIEGEOIS, J.P., Dept. de Geologie, Musee Royal de l'Afrique Centrale; B-1980, Tervuren Belgium, and BLACK, R., CNRS, Laboratoire de Petrologie, Universite Paris VI, France

The Cambrian silica oversaturated alkaline province of the Iforas consists of over fifteen massifs often displaying typical ring structures. It follows closely a cordilleran and collision related calc-alkaline composite batholith and thus must be connected in some way to orogenic processes that occurred at the close of the Pan-African.

Several alkaline complexes have been studied in detail. Kidal-Tibeljeljeline starts with the intrusion of quartz microsyenites forming the external polygonal ring dykes which are truncated by a central granitic massif 30 kilometres in diameter composed of twelve major intrusive phases All the complexes have been emplaced at shallow depth in a rigid environment beneath a thick cover of rhyolites and ignimbrites by a process of cauldron subsidence and major stoping. Petrological studies and detailed Rb-Sr geochronology have shown an evolution of the orogenic granitoids. (620 Ma to 560 Ma) from low-K calc-alkaline pre-tectonic magmas to potassic late to post-tectonic terms. Low 87/86 Sr (0.7035-0.7050) indicate mainly mantle source. Our geodynamic model proposes the calc-alkaline group had a depleted lithospheric mantle source which deepened with time and was contaminated by the lower crust. The transition from post-tectonic high-K calc-alkaline terms to the alkaline family occurred in less than 10 Ma. The sudden switch to alkaline magmatism with distinctive geochemical and isotopic features suggests the tapping of a new source. In our model we propose this source to be asthenospheric mantle originally underlying the subducted plate which has risen to shallow depth beneath the continental lithosphere after the rupture of cold plunging plate. This source would then be the same as that often proposed for thin-plate alkaline ring-complexes emplaced in a strictly anorogenic environment.

RECOGNITION OF UNCONFORMITIES IN THE SUBSURFACE MARBLE FALLS FORMATION (PENNSYLVANIAN), BROWN AND MILLS COUNTIES, CENTRAL TEXAS — Nº 59621

LUKER, Stephen, University of Oklahoma Geology, 830 Van Vleet Oval, Norman, OK 73019

The Marble Falls Formation (Pennsylvanian) of central Texas consists predominantly of limestone with secondary shale in the middle and upper parts. It rests unconformably on the Barnett Shale and is overlain conformably by the Smithwick Formation. The Marble Falls is informally divided into two members that are separated by an unconformity. This study is based on 13 complete cores distributed across an area of approximately 450 square miles that is located about 32 miles north of the Marble Falls outcrop belt. The Barnett-Marble Falls boundary, and thus the Mississippian-Pennsylvanian boundary in the region, has been found to be unconformable in all cores studied. Criteria for this conclusion include a boundary invariably sharp, clasts of Barnett sediment within the basal Marble Falls, eroded grains at the boundary, and pyritization with high concentrations of glauconite and phosphatic nodules.

The unconformity within the Marble Falls between the lower and upper members constitutes a division between strata of Morrowan and Atokan ages. This unconformity is present in all but the southeasternmost cores and is corroborated by terriginous coal and carbonaceous shale, chert conglomerates, weathered shales, rip-up clasts, paleosoils, and different lithologic assemblages (i.e. different depositional settings). This surface represents erosion on a more local scale, predominantly in the western part of the study area.

The Marble Falls-Smithwick boundary consistently exhibits a gradational contact and offers no criteria to suggest an unconformable contact.

A SIMPLE DETERMINATION FOR OUTFLOW FROM A MAN-MADE RESERVOIR IN A CARBONATE TERRAIN — Nº 72727

LUNSFORD, David L., Geology Dept., Univ. of Arkansas, Fayetteville, AR 72701; MACK, Leslie E., Geology Dept., Univ. of Arkansas, Fayetteville, AR 72701; WEEKS, Donnie P., Geology Dept., Univ. of Arkansas, Fayetteville, AR 72701

The purpose of the investigation was to locate, with conductivity readings, flow into subsurface channels from a lake in a carbonate terrain of northwest Arkansas. A YSI model 33 with a 250 foot probe was used to take conductivity and temperature readings. The lake, designed to be 36 acres in water surface area and have a water surface elevation of 1200 feet above sea level, could only attain a water surface elevation of 1193 feet. It was evident that there was significant leakage from the lake. Once the natural conductivities of the lake, springs, and wells in the area were determined, an electrolyte solution consisting of sodium cloride and water was introduced into the lake at four locations to determine if there was flow that would effect the migration of the electrolyte 'tracer'. There were two locations that displayed evidence of significant migration of the electrolyte solution. A spring close to one of these locations responded with an elevation in conductivity shortly after the electrolyte solution was introduced. One location displayed inconclusive migration and one location displayed no migration of electrolyte solution.

A DEPOSITIONAL MODEL FOR POST-OGALLALA SEDIMENTS ON THE SOUTHERN HIGH PLAINS[1] — Nº 56236

MACHENBERG, Marcie D., DUBAR, Jules R., GUSTAVSON, Thomas C., Bureau of Economic Geology, The University of Texas at Austin, Austin, TX 78713, and HOLLIDAY, Vance T., Dept. of Geography, Texas A&M University, College Station, TX 77843.

The geomorphic processes of eolian deposition, deflation, and pedogenesis have apparently operated on the Southern High Plains from post-Ogallala time to the present, as evidenced by the distribution of coarse eolian deposits which mantle much of the surface. The distinctive reddish sediments contain as many as six well-developed buried soils which resemble each other, as well as the surface soils, in lithology and morphology. This, combined with limited exposures at widely-scattered localities, makes correlations between individual soils difficult. Although these sediments ("Blackwater Draw Formation") were originally assigned an Illinoian age, pedologic similarities of soils beneath ash deposits dated as 1.4-my (Guaje ash) and 0.6-my (Lava Creek "B") in Crosby and Swisher Counties, respectively, to paleosols at a thick section in Lubbock County, suggest that these processes were operating much earlier.

It is hypothesized here that, at least from near the start of the Pleistocene, eolian "cover sands" aggraded contemporaneously with lacustrine facies in a mosaic of laterally-restricted lenses of eolian and playa sediments. Pulses of deposition were separated by relatively long periods of either landscape stability, during which soil development occurred, or deflation, which stripped surface horizons from newly-formed soils. Variations in climate throughout the last 2 my and local topographic irregularities produced a cyclical sedimentary package, only a fraction of which is preserved at any one locality. Modern processes appear to be analogous to those that operated much earlier, suggesting that on the Southern High Plains, the present is indeed the key to the past.

[1]Funded by U.S. Dept. of Energy under contract no. DE-AC97-83WM46651.

PENNSYLVANIAN HYOLITHA (MOLLUSCA) FROM THE SOUTHERN MIDCONTINENT AND THEIR PALEOECOLOGIC SIGNIFICANCE — Nº 63132

MALINKY, John M., Dept. of Paleobiology, U.S. National Museum, Washington, D.C. 20560; MAPES, Royal H., Dept. of Geology, Ohio Univ., Athens, OH 45701, and BOARDMAN, Darwin R. Dept. of Geosciences, Texas Tech Univ., Lubbock, TX 79409

Hyoliths are more common in the Midcontinent Pennsylvanian than has been previously recognized. Formerly, seven occurrences were recorded from the Late Paleozoic of North America; now, approximately 20 new localities in southern Oklahoma and north-central Texas have yielded over 800 specimens. The hyoliths occur in strata ranging in age from Morrowan to Virgilian, although most occur in the Virgilian. All hyoliths represent the order Hyolithida. These are conical shells with sub-triangular transverse sections and a shelf or ligula along the ventral margin of the aperture. Most specimens are too poorly preserved for identification at the generic level; however, the variable array of morphologies among specimens indicates that several taxa are present. The occurrence of hyoliths in the Midcontinent Pennsylvanian fills a geographic and stratigraphic gap in the distribution of these organisms in North America.

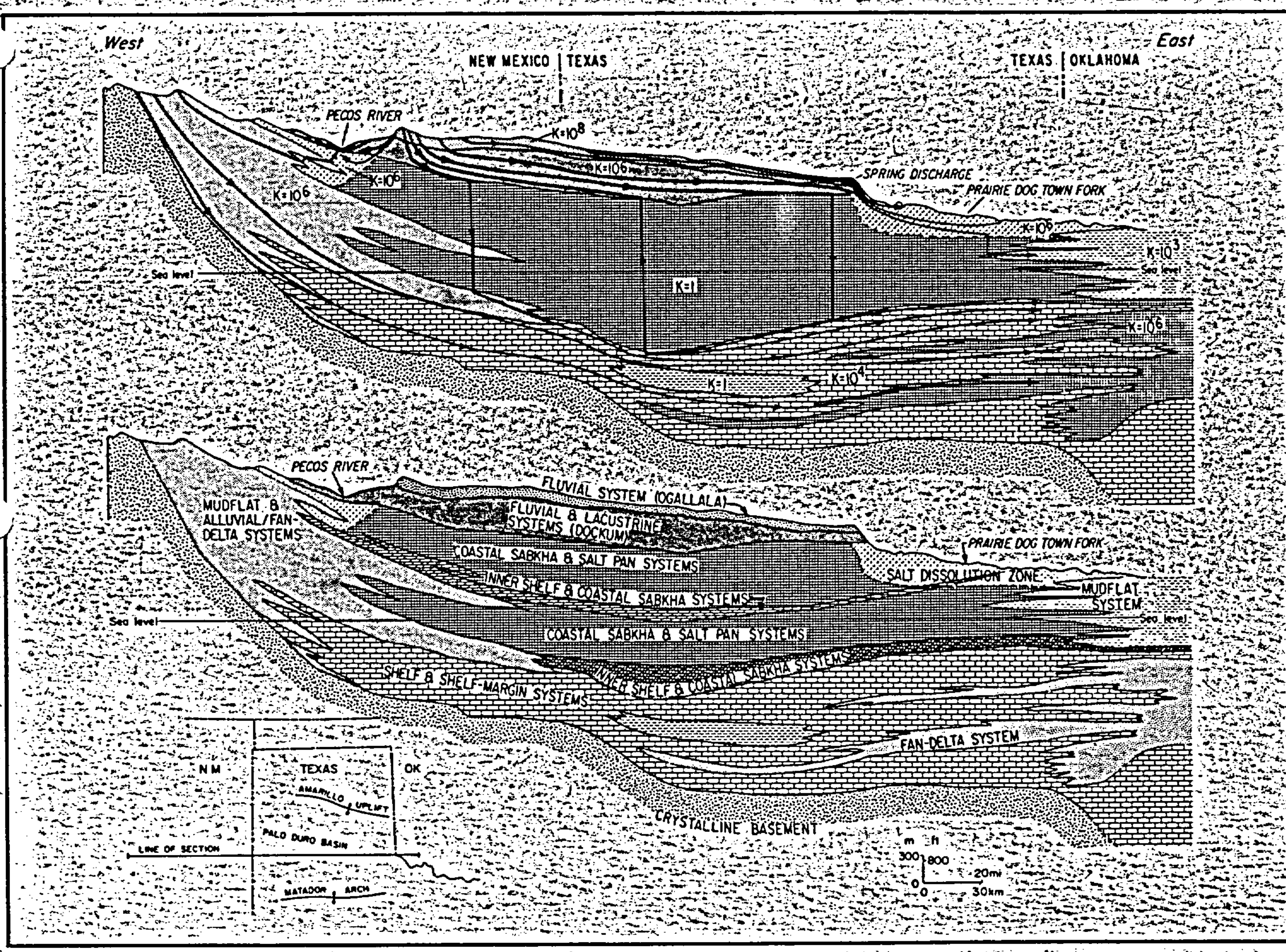
Strata yielding the hyoliths are part of cyclic sequences (cyclothems) which include a basal fluvial/deltaic package usually overlain by a fossiliferous mudstone or shale, followed by a marine limestone. The hyoliths are part of the Sinuitina-juvenile ammonoid "community", confined to the dark gray portion of the fossiliferous mudstone/shale. This interval is the most offshore facies of the cyclothem, correlative to "core" shales in cyclothems of the northern Midcontinent. The apparent restriction of hyolith to this interval may reflect a preference for slightly oxygen-poor, offshore environments, and may aid in recognition and correlation of similar facies elsewhere in the North American Pennsylvanian.

Geological Circular 81-3

1981

Geology and Geohydrology of the Palo Duro Basin, Texas Panhandle

A Report on the Progress of Nuclear Waste Isolation Feasibility Studies (1980)



T. C. Gustavson, R. L. Bassett, R. J. Finley, A. G. Goldstein, C. R. Handford, J. H. McGowen, M. W. Presley, R. W. Baumgardner, Jr., M. E. Bentley, S. P. Dutton, J. A. Griffin, A. D. Hoadley, R. C. Howard, D. A. McGookey, K. A. McGillis, D. P. Palmer, P. J. Ramondetta, E. Roedder, W. W. Simpkins, and W. D. Wiggins

Bureau of Economic Geology
W. L. Fisher, Director

The University of Texas at Austin
Austin, Texas 78712

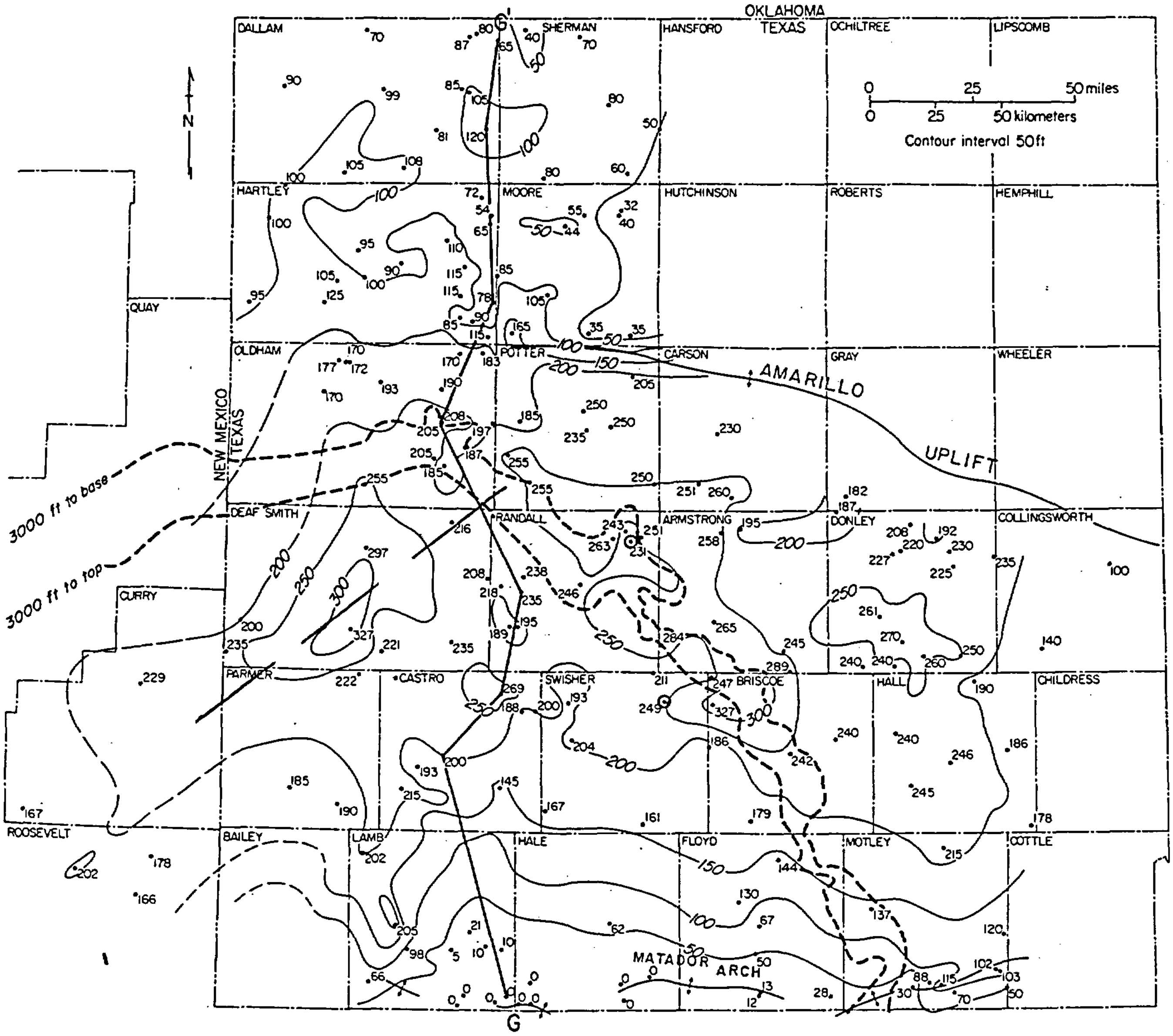


Figure 15. Net salt map of upper Clear Fork Formation. Depths of 3,000 ft (914 m) to the top and base of the unit are shown by dashed line; upper Clear Fork salt beds are at shallower depths to the north. Cores used in this study are circled data points.

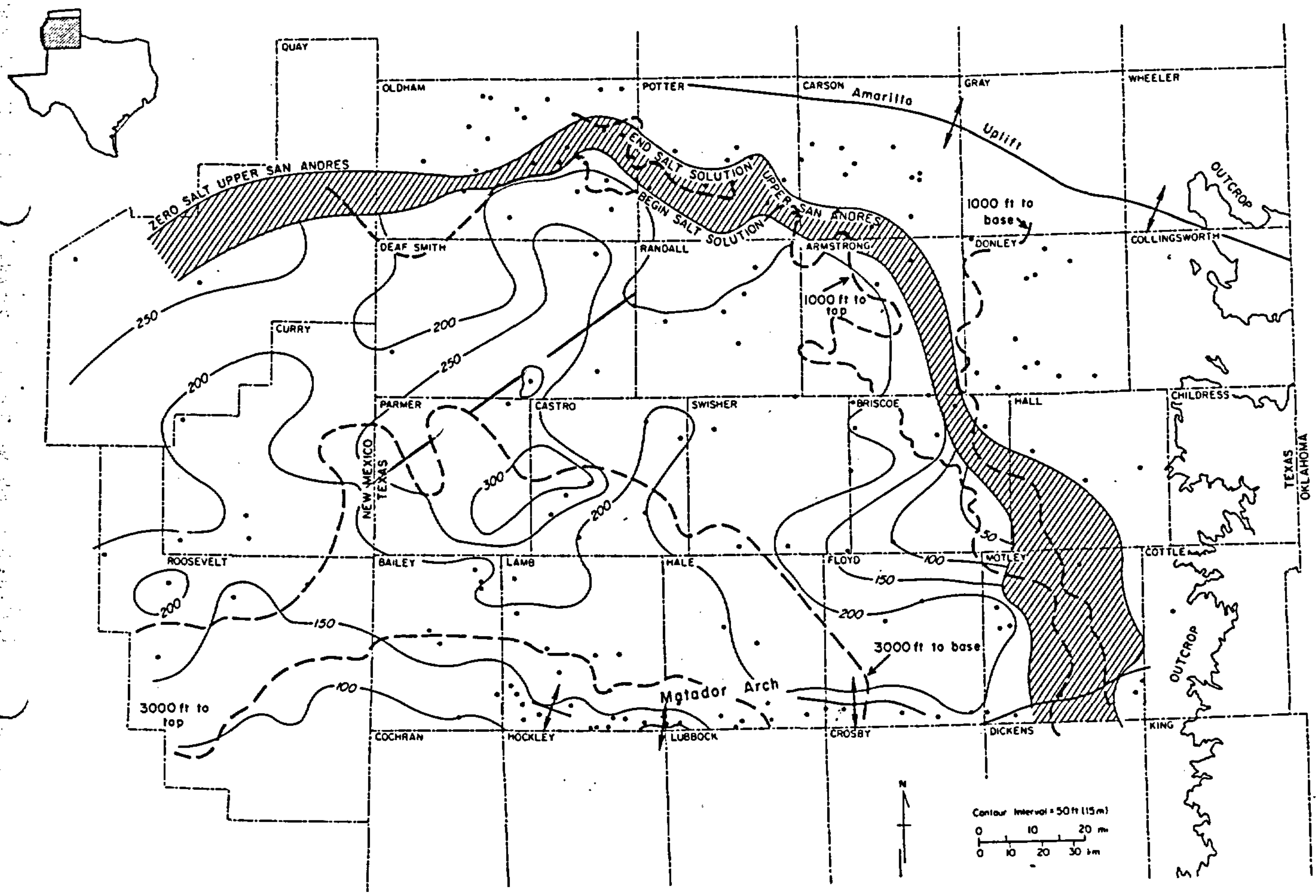


Figure 23. Net salt map, upper part of the San Andres Formation. Patterned region is the zone of subsurface dissolution of salt by ground-water processes. Depths of 1,000 and 3,000 ft (305 and 914 m) to top and base of formation are shown.

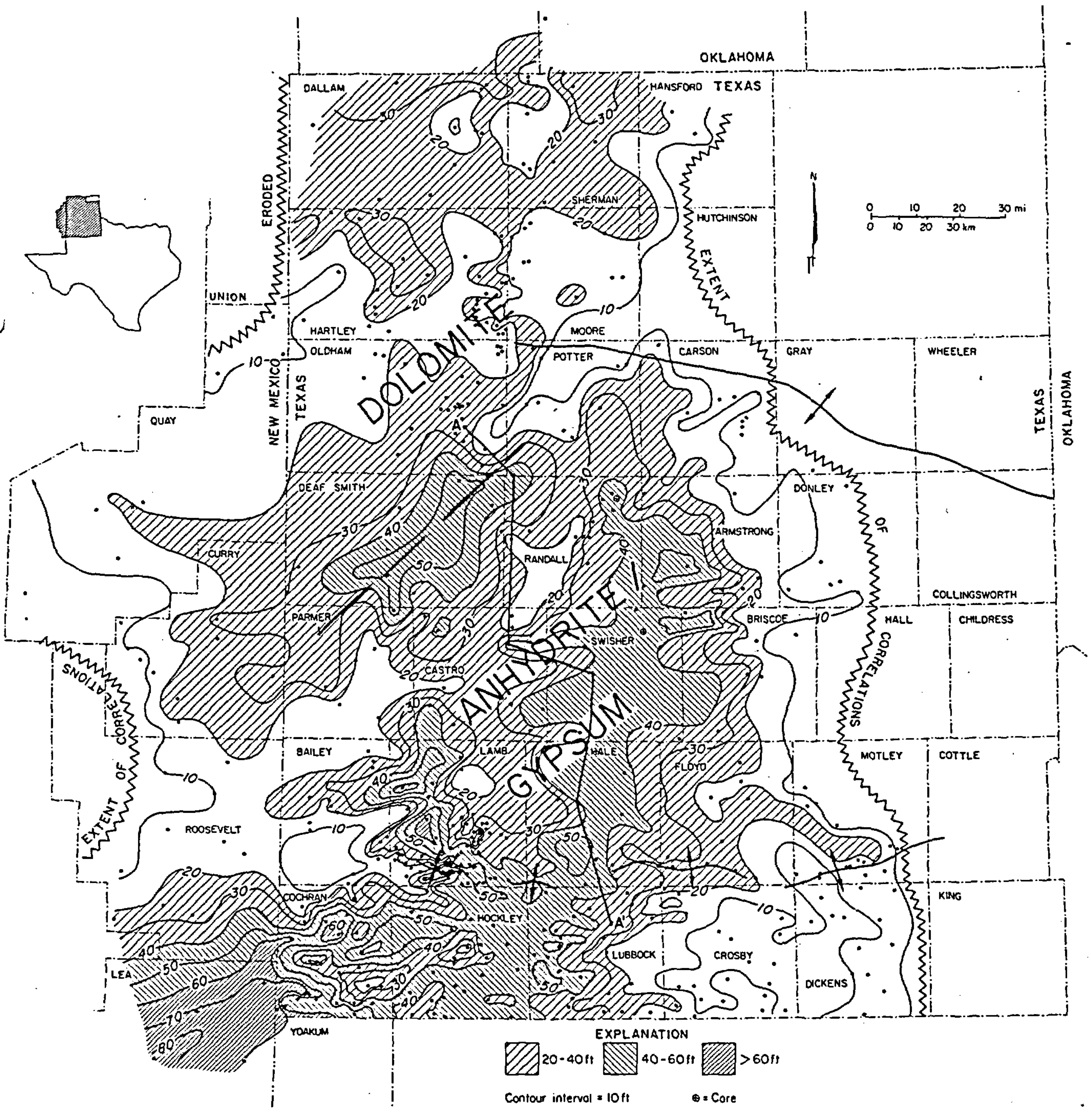
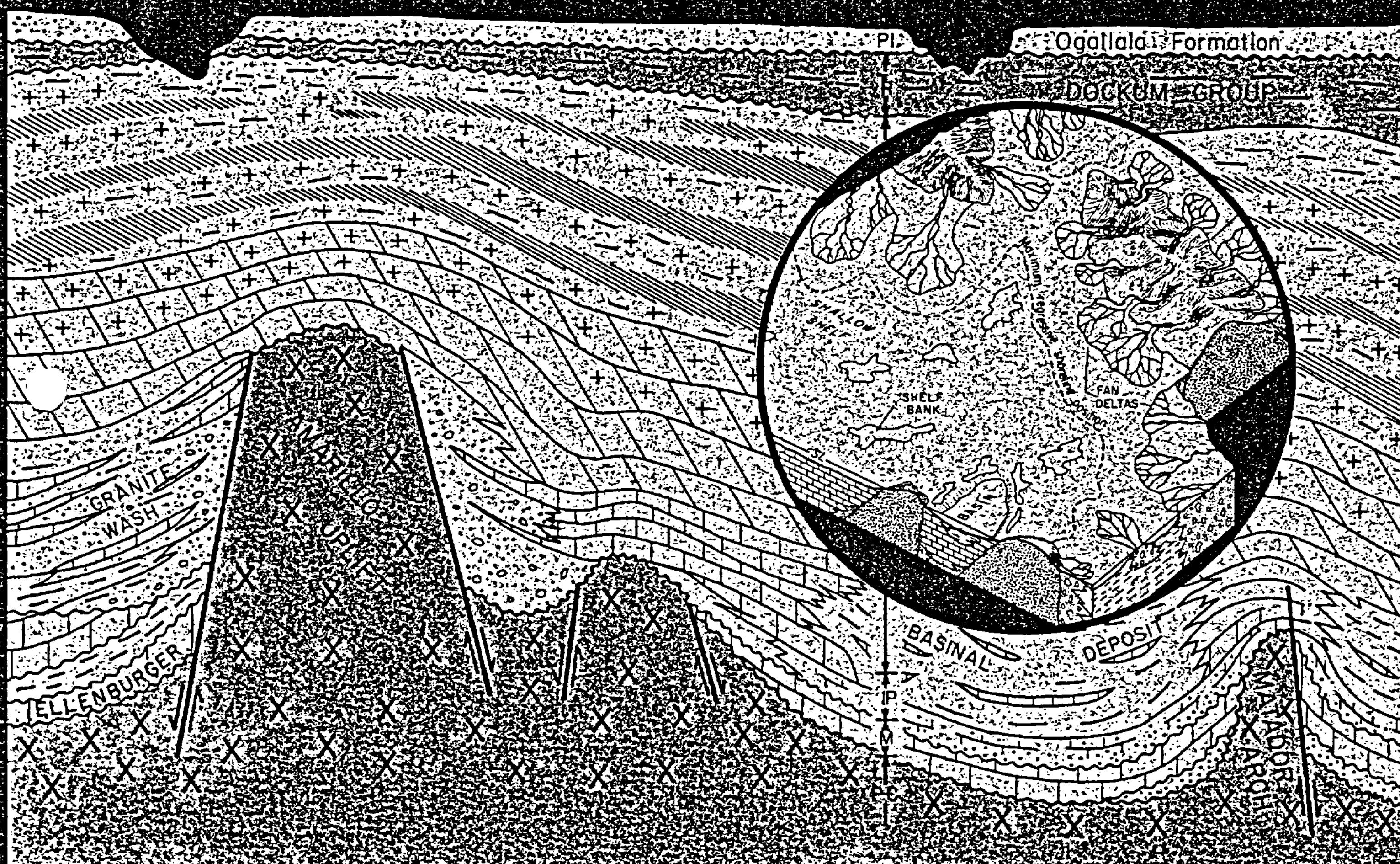


Figure 29. Isopach map, Alibates Formation. Serrate lines mark depositional and erosional boundaries of formation. Dominant lithology of Alibates as recorded on sample logs is noted.

Depositional Systems And Hydrocarbon Resource Potential Of The Pennsylvanian System, Palo Duro And Dalhart Basins, Texas Panhandle

Shirley P. Dutton



Bureau of Economic Geology
W. L. Fisher, Director
The University of Texas at Austin

1980

Geological Circular 80-8

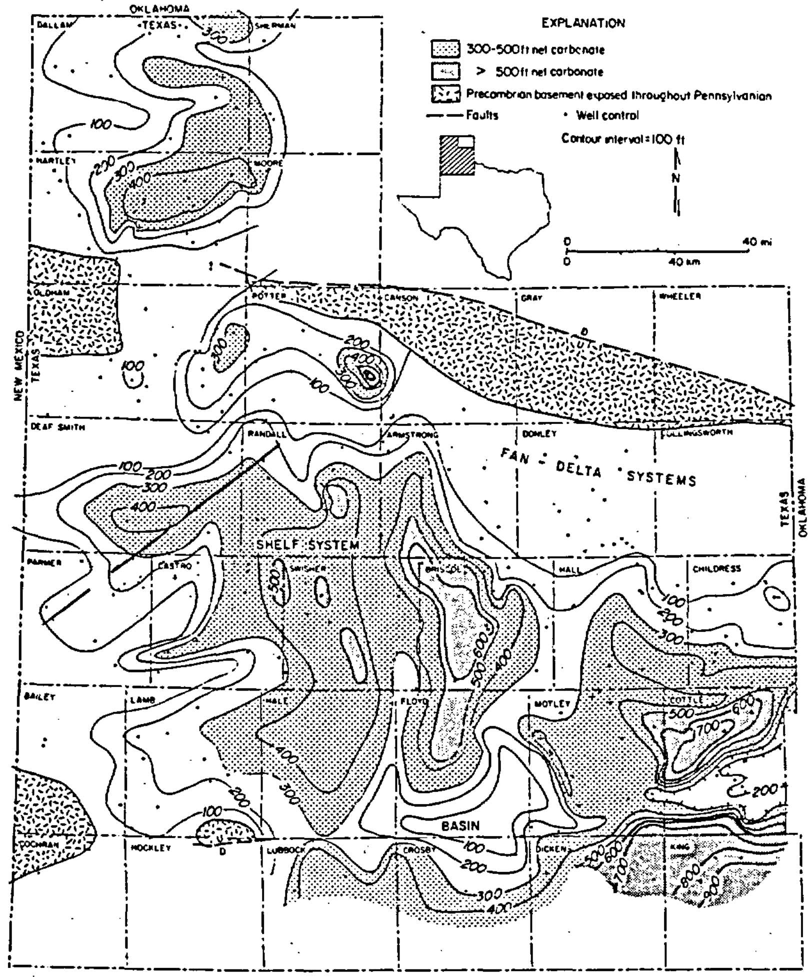


Figure 20. Net limestone map of lower part of the Pennsylvanian System.

Each pulse of clastic deposition initiated a new cycle. These interbedded carbonate and clastic units display reciprocity, as each unit helped control the distribution of the next. Clastic and carbonate sedimentation in the Palo Duro and Dalhart Basins may have also exhibited such reciprocity.

Marine Shelf and Basinal Systems

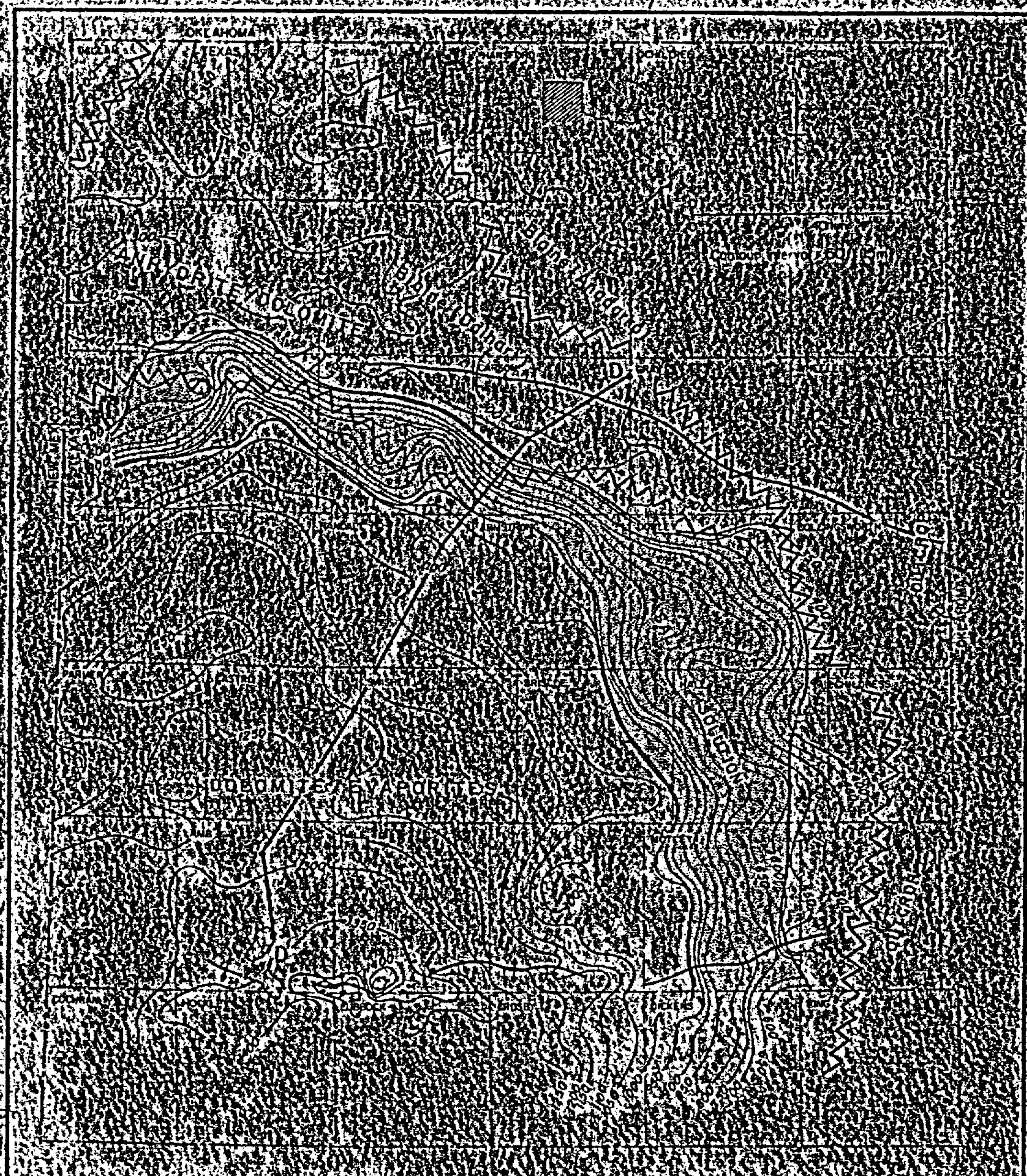
Subsidence of the Palo Duro Basin began to produce a broad, shallow basin during early Pennsylvanian time. The southern part of the basin was far enough from the mountains so that only a limited amount of fan-delta sand reached it (fig. 14); sedimentation consisted of deposition of thin shelf carbonates and terrigenous mud. A net limestone map outlines broad areas of carbonate deposition (fig. 20). Thickest accumulations of lower Pennsylvanian limestone in Cottle, King, Briscoe, Floyd, Randall, and Swisher Counties coincide with areas where upper Pennsylvanian shelf margins later developed. In the Dalhart Basin, carbonate production was restricted to the eastern side, away from the thick wedge of granite wash

Geological Circular 80-7

1980

Geology and Geohydrology of the Palo Duro Basin, Texas Panhandle

A Report on the Progress of Nuclear Waste Isolation Feasibility Studies (1979)



by T. C. Gustavson, M. W. Presley, C. R. Handford, R. J. Finley, S. P. Dutton,
R. W. Baumgardner, Jr., K. A. McGillis, and W. W. Simpkins

Bureau of Economic Geology ■ The University of Texas at Austin
W. L. Fisher, Director ■ Austin, Texas 78712

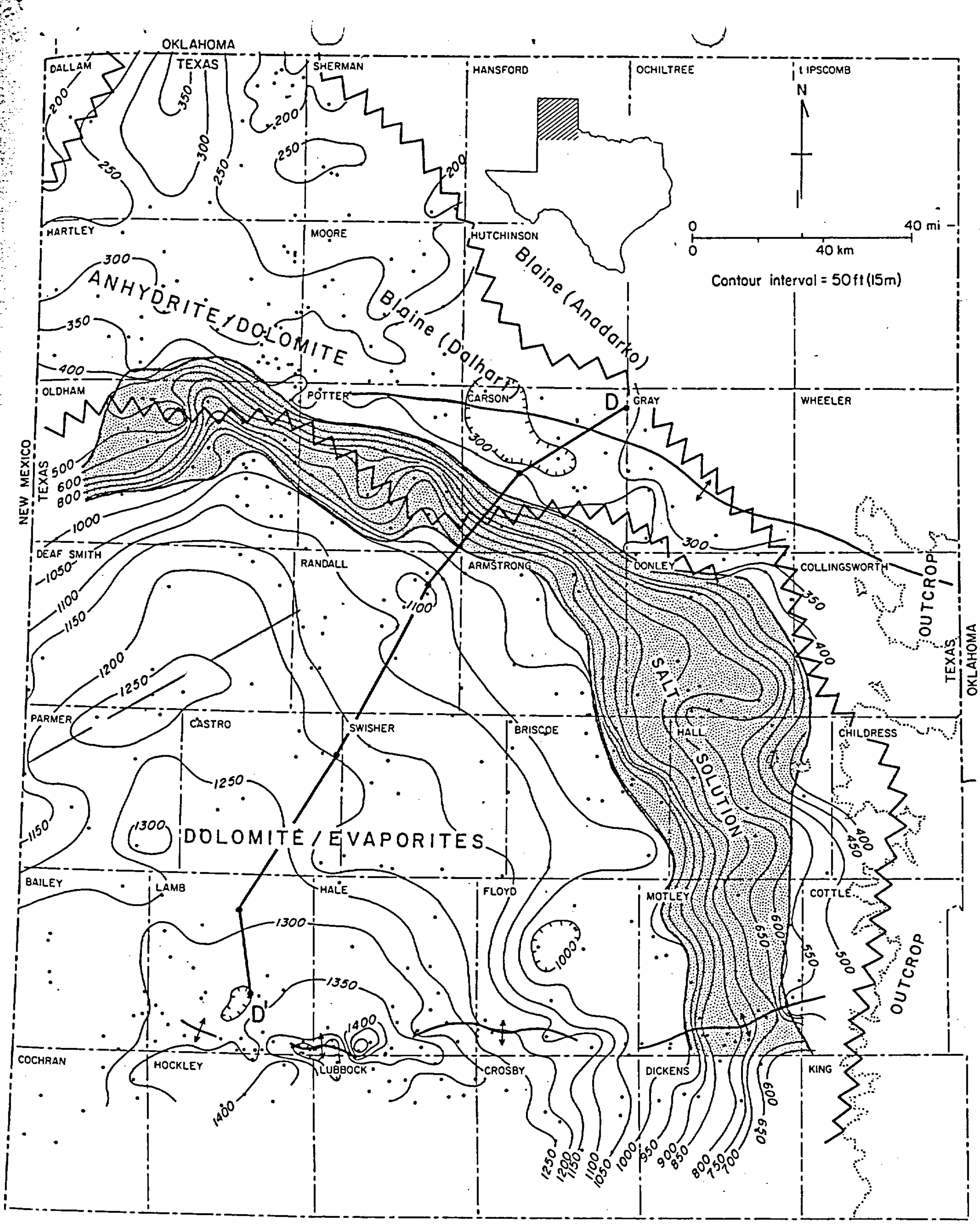


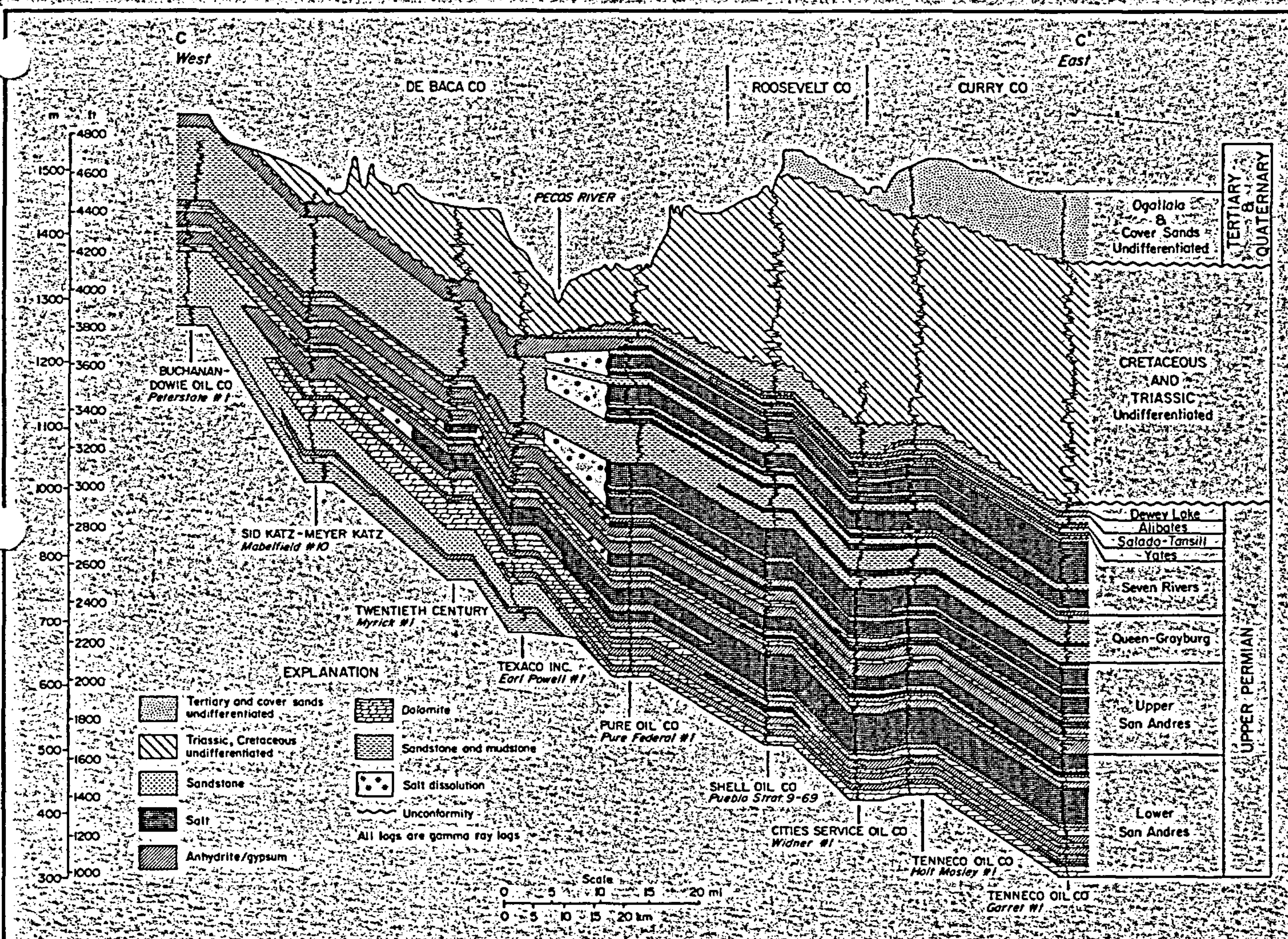
Figure 10. Thickness of San Andres Formation, Texas Panhandle. Cross section D-D' shown in figure 9.

Geological Circular 82-7

1982

Geology and Geohydrology of the Palo Duro Basin, Texas Panhandle

A Report on the Progress of Nuclear Waste Isolation Feasibility Studies (1981)



T. C. Gustavson, R. L. Bassett, R. Budnik, R. J. Finley, A. G. Goldstein, J. H. McGowen, E. Roedder, S. C. Ruppel, R. W. Baumgardner, Jr., M. E. Bentley, S. P. Dutton, G. E. Fogg, S. D. Hovorka, D. A. McGookey, P. J. Ramondetta, W. W. Simpkins, D. Smith, D. A. Smith, E. A. Duncan, J. A. Griffin, R. M. Merritt, and E. R. Naiman

Bureau of Economic Geology
W. L. Fisher, Director

The University of Texas at Austin
Austin, Texas 78712

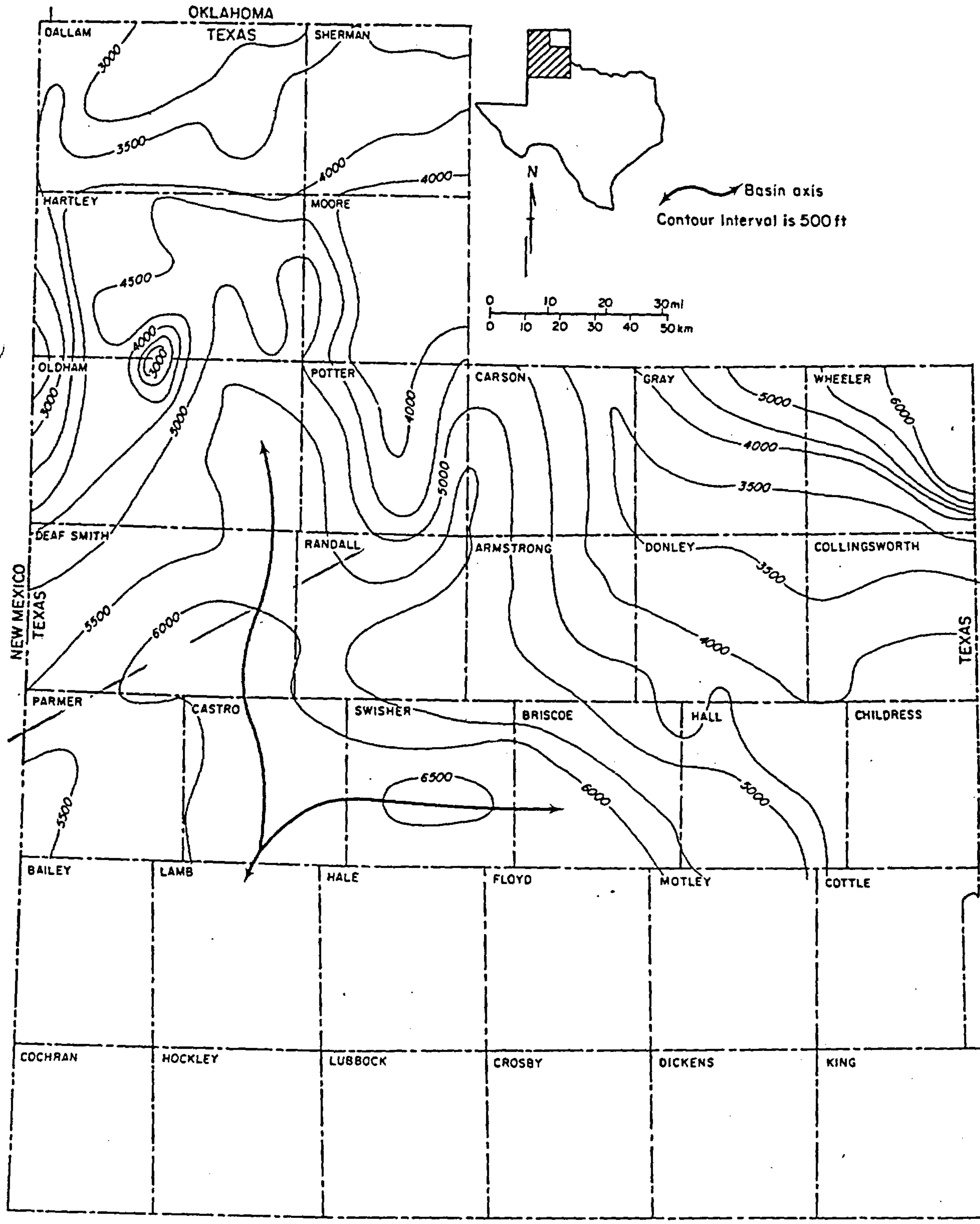


Figure 35. Isopach map of Permian System. From McKee and Oriel (1967).

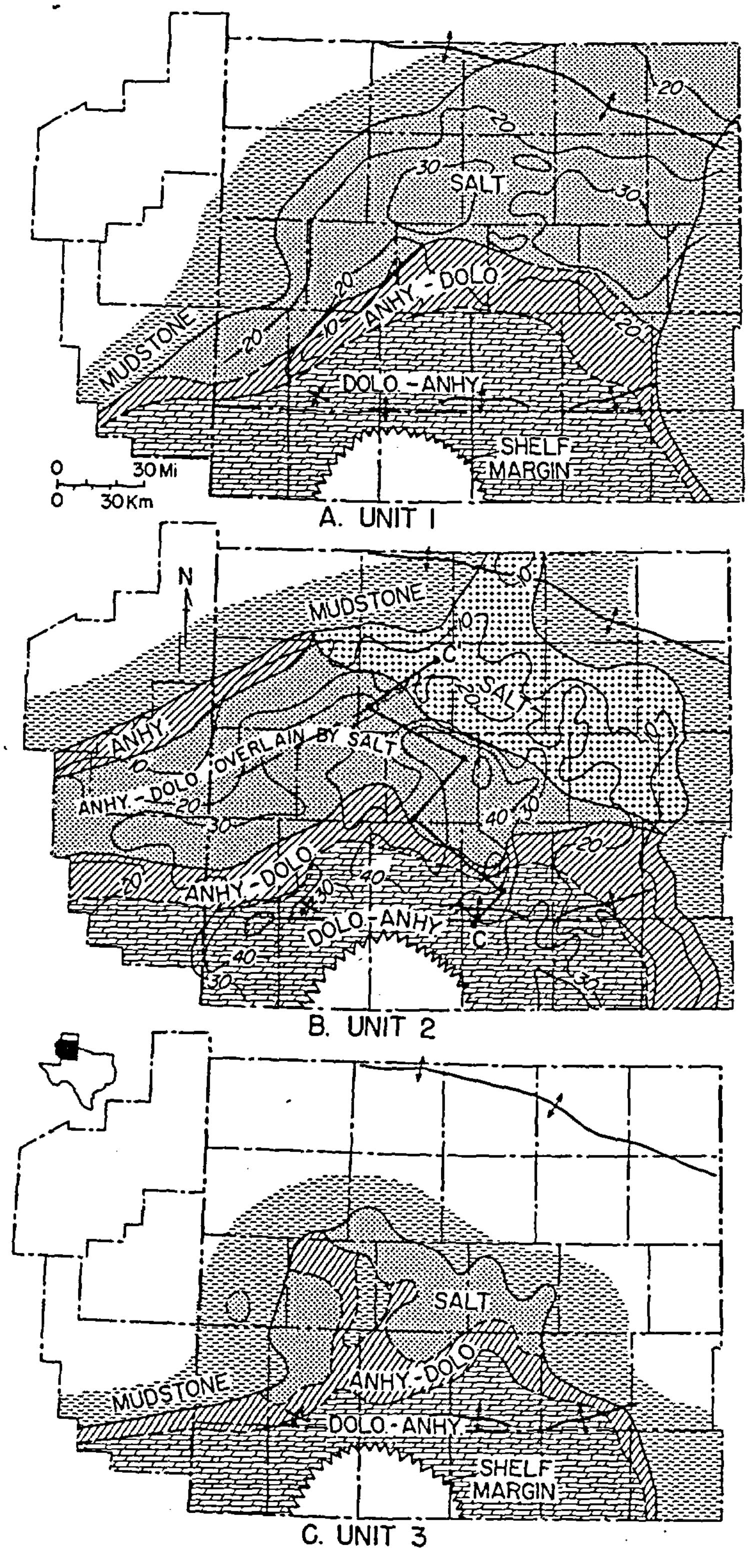


Figure 42. Facies maps of evaporite-carbonate units 1, 2, and 3 (oldest to youngest) of the Tubb Formation. Salt is dominant in updip regions to the north; carbonate is dominant to the south. These units show progressive southerly migration of evaporite-carbonate facies. From Presley (1980b).

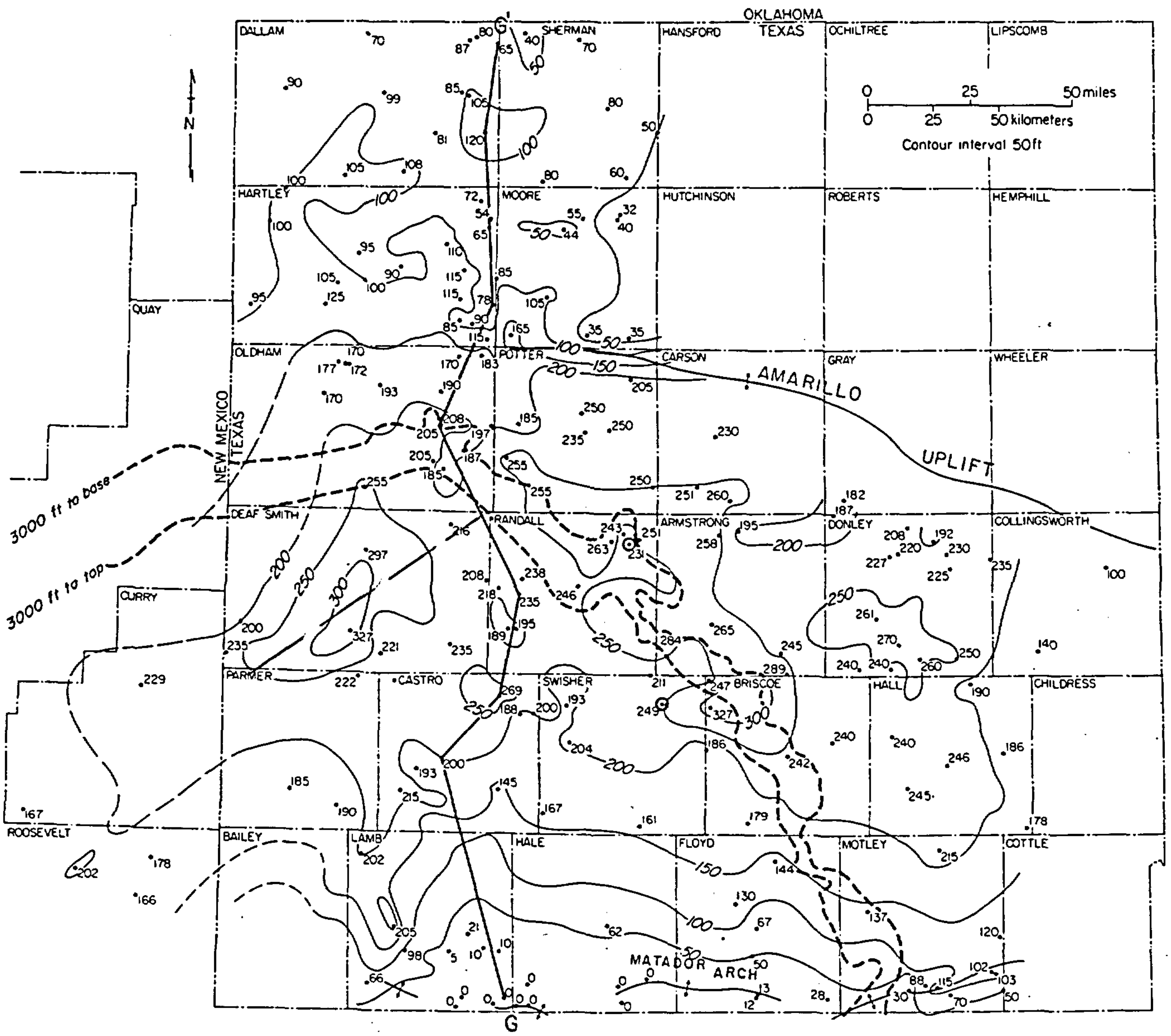


Figure 45. Net-salt map of upper Clear Fork Formation. From Presley and McGillis (1981a).

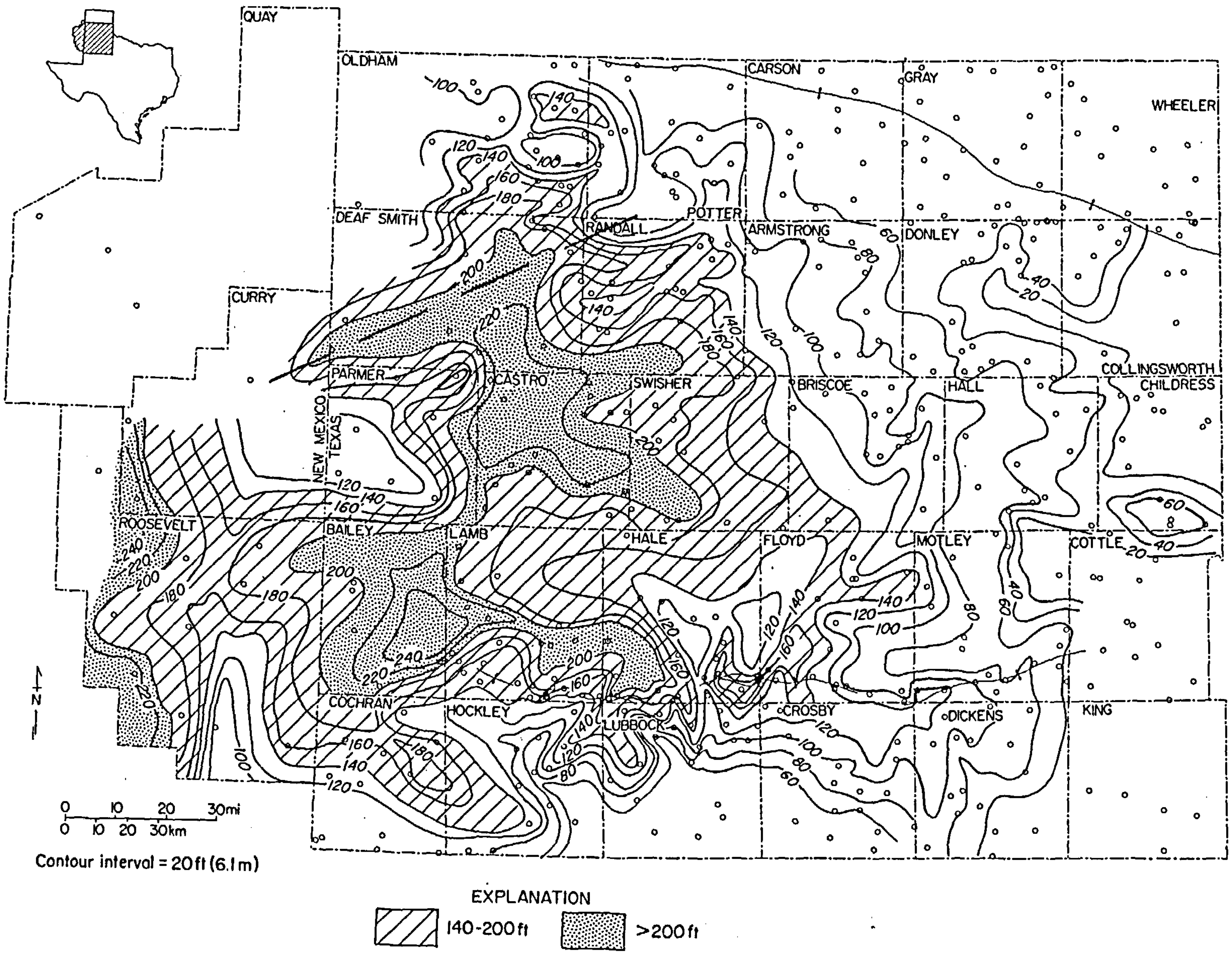


Figure 46. Isopach map of net clastics, Glorieta Formation, Palo Duro Basin and east-central New Mexico (Presley, unpublished data).

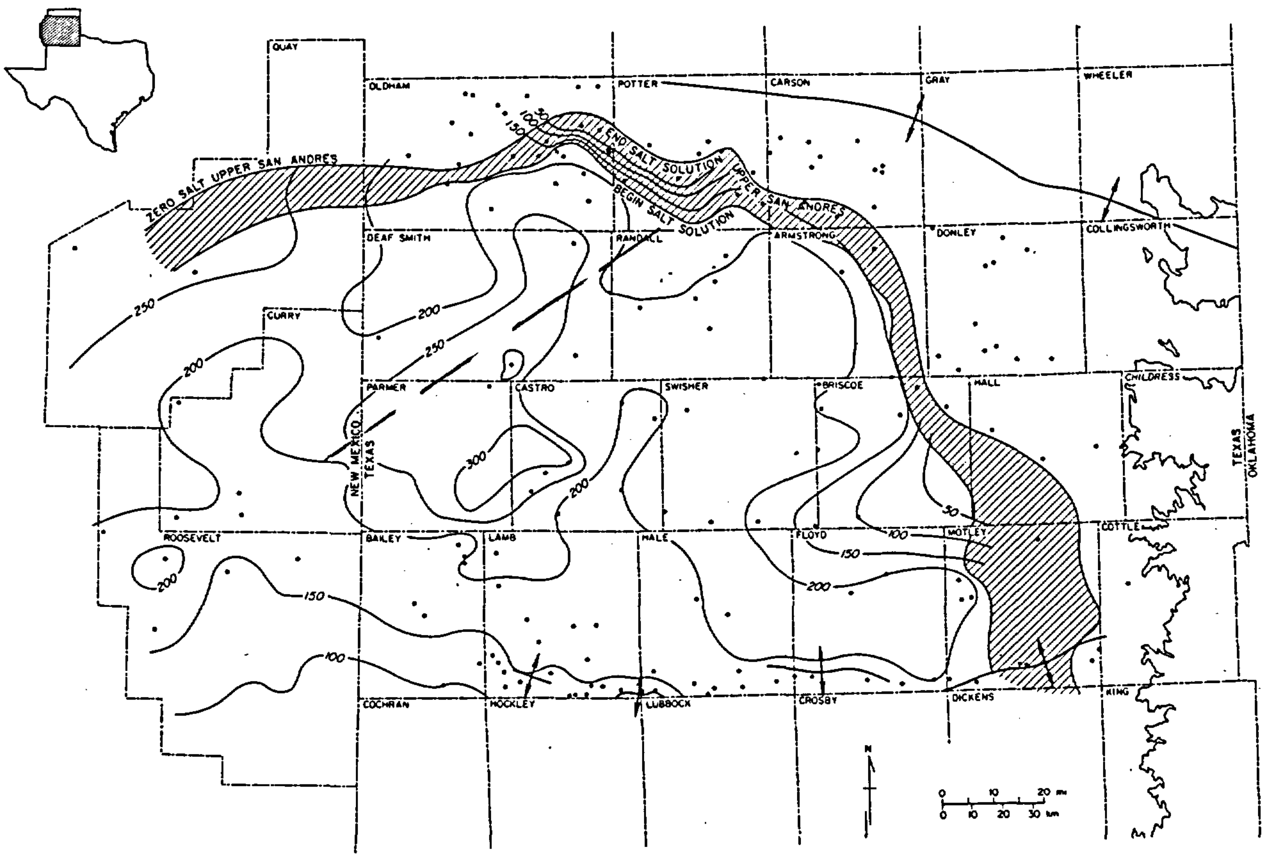


Figure 49. Net-salt map, upper part of the San Andres Formation. Patterned region is the zone of subsurface dissolution of salt by ground-water processes. From Presley (1981c).

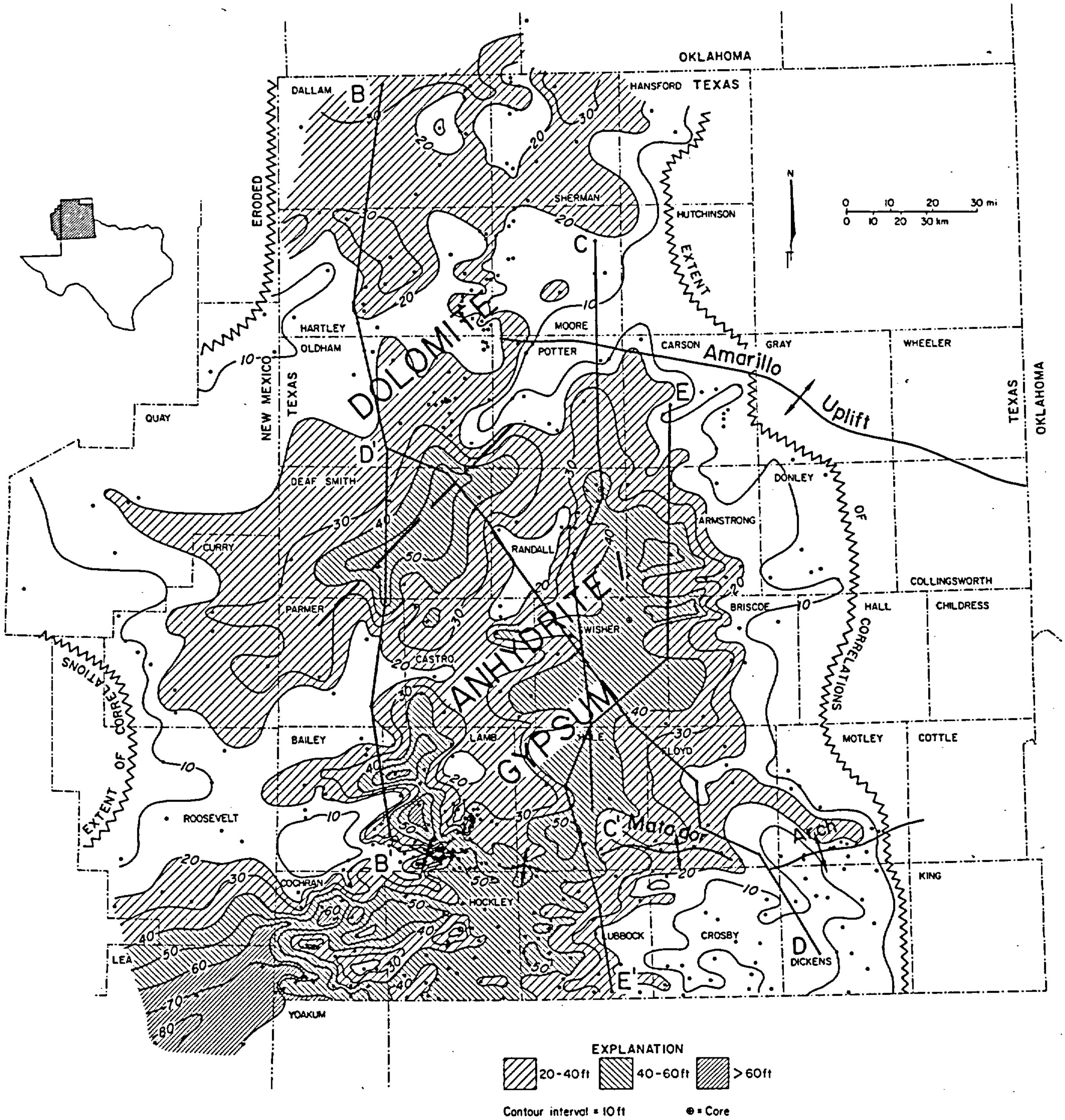
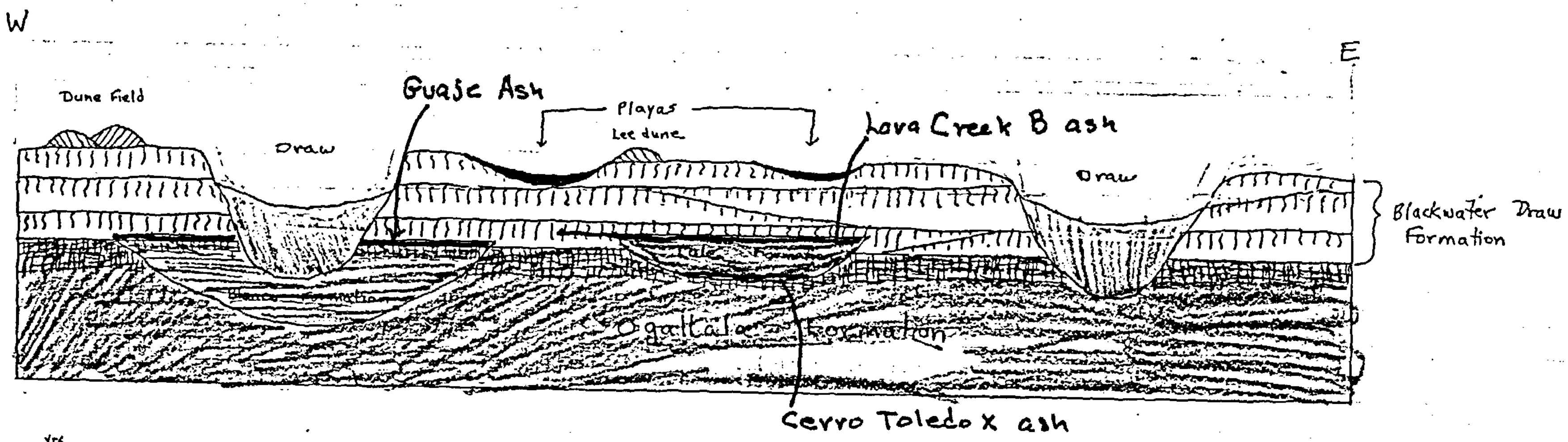
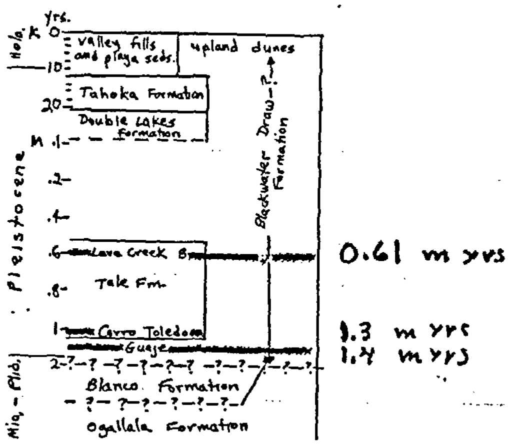
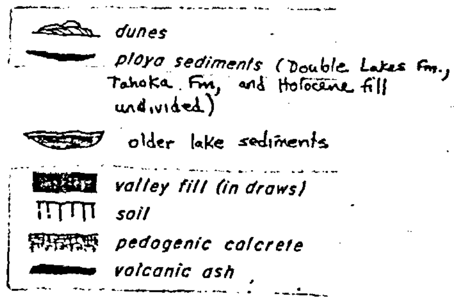


Figure 54. Isopach map, Alibates Formation. Serrate lines mark depositional and erosional boundaries of formation. Dominant lithology of Alibates as recorded on sample logs is noted. From McGillis and Presley (1981b).







Not to scale

[illegible]

TITLE Generalized stratigraphic cross section and age relationships of Southern High Plains

AUTHOR M Machenberg

PROJECT WTWI

8/8/84

UTILIZATION Text fig. 1984 Annual Rept.