Service/News

Starred items (*) available from New Mexico Bureau of Mines & Mineral Resources

New publications

NMBMMR

***Circular 174**—Quaternary geology of Lake Animas, Hidalgo County, New Mexico, by H. L. Fleischhauer, Jr., and W. J. Stone, 1982, 25 p., 4 tables, 12 figs. This study describes the geomorphology, soil stratigraphy, and ages for Lake Animas in Hidalgo County, New Mexico. The mapping of shoreline features in the lower Animas Valley indicates three stages for Lake Animas. $6.50

***Circular 186**—Vertebrate paleontology, stratigraphy, and biostratigraphy of Eocene Galisteo Formation, north-central New Mexico, by S. G. Lucas, 1982, 35 p., 2 tables, 17 figs. Describes and identifies vertebrate fossils known from Galisteo Formation, places these vertebrates in their precise stratigraphic context in the Galisteo, uses vertebrate fossils and rock-stratigraphy to correlate major outcrops of Galisteo, and determines age of Galisteo and correlates it with other formations. $6.00

***Circular 188**—Adobe bricks in New Mexico, by E. W. Smith, 1982, 89 p., 9 tables, 102 figs. Includes a history of adobe-brick making, soil geology and mineralogy, and a listing of 48 adobe producers active in the state in 1980, as well as their production totals and prices. Also includes 149 black-and-white photographs illustrating old and contemporary adobe architecture and production methods across the state, as well as 16 architectural drawings showing construction details. $4.50

***Geologic Map 46**—Geology of Regina quadrangle, Rio Arriba and Sandoval Counties, New Mexico, by M. A. Merrick and L. A. Woodward, 1982, 1 sheet with text, scale 1:24,000. Regina quadrangle is located in Rio Arriba and Sandoval Counties in north-central New Mexico. The two major tectonic features in the quadrangle are the San Juan Basin on the west and the Nacimiento uplift on the east. $3.00

***Geologic Map 51**—Geology of Massacre Peak quadrangle, Luna County, New Mexico, by R. E. Clemons, 1982, 1 sheet with text, scale 1:24,000. Massacre Peak quadrangle is in north-central Luna County approximately 8 mi north-northeast of Deming. The southern Cooke's Range crosses the quadrangle from northwest to southeast, covering about half the area. $3.50

***Geologic Map 53**—Geology of northwest part of Las Cruces 1° x 2° sheet, New Mexico, by W. R. Seager, R. E. Clemons, J. W. Hawley, and R. E. Kelley, 1982, 3 sheets (geologic map, cross sections, and Bouguer gravity map), scale 1:125,000. This is first of a series of maps that will cover the Las Cruces 1° x 2° area. GM-54 will cover the Anthony quadrangle in the southern part, and GM-57, scheduled for publication in 1983, will cover the eastern part. $10.00

***Annual Report**—Annual report for the fiscal year July 1, 1980, to June 30, 1981, by F. E. Kottlowski and staff, 1982, 72 p. Summarizes Bureau activities and services for the fiscal year. Includes articles on Cretaceous fossils, reminiscences of a former director, uranium severance taxes, "tight" Abo gas sands, coal-paleontology workshop, and mineral production. $2.00

***Bibliography**—Bibliography and index of New Mexico geology, by Ghassan N. Rassam, ed., 1982, 122 p. This edition, issued in cooperation with the American Geological Institute and GeoRef Information System and containing approximately 750 references, represents published and unpublished material that was added to the GeoRef database in 1981. The Bureau did not participate in collecting or in formating the references for this volume. $5.00

***Brochure**—Scenic trips to the geologic past, 1982. Describes the series of 13 publications exploring New Mexico's roadside geology, landscape, and history and includes a map showing the routes followed by each book and a convenient order form. FREE

USGS

BULLETINS

1493—The geologic story of the Great Plains, by D. E. Trimble, 1980

CIRCULARS

841—Four reference soil and rock samples for measuring element availability in the western energy regions, by J. C. Crock and R. C. Severson, 1980

PROFESSIONAL PAPERS

1110-W—The Mississippian and Pennsylvanian (Carboniferous) Systems in the United States—New Mexico, by A. K. Armstrong and others, 1979

1199-D—Potassium-argon and fission-track zircon ages of Cerro Toledo rhyolite tephra in the Jemez Mountains, New Mexico, chapter D, *in* Shorter contributions to isotope research in the western United States, by G. A. Izett, J. D. Obradovich, C. W. Naeser, and G. T. Cebula, 1981

1202—Deformation of host rocks and flow of magma during growth of minette dikes and breccia bearing intrusions near Shiprock, New Mexico, by P. T. Delaney and D. D. Pollard, 1981 (1982), 61 p.

MISCELLANEOUS INVESTIGATIONS SERIES

I-0345—Geology, structure, and uranium deposits of the Shiprock quadrangle, New Mexico and Arizona, compiled by R. B. O'Sullivan and H. M. Beikman, 1963 (reprint 1982), 2 sheets, lat 36° to 37°, long 108° to 110°, scale 1:250,000

I-1221—Geologic map of the Cotton City quadrangle and the adjacent part of the Vanar quadrangle, Hidalgo County, New Mexico, by H. Drewes and C. H. Thorman, 1981, scale 1:24,000

I-1231—Geologic map of the Gage SW quadrangle, Grant and Luna Counties, New Mexico, by C. H. Thorman and Harald Drewes, 1981, scale 1:24,000

***I-1327**—Energy resources map of New Mexico, by U.S. Geological Survey and New Mexico Bureau of Mines and Mineral Resources, 1981, lat 32° to 37°, long 103° to about 109°, scale 1:500,000

GEOLOGIC QUADRANGLE MAPS

GQ-1557—Geologic map of the Mogollon quadrangle, Catron County, New Mexico, by J. C. Ratté, 1981, 1 sheet, scale 1:24,000

HYDROLOGIC INVESTIGATIONS ATLAS

HA-349—Ground-water hydrology of the Mescalero Apache Indian Reservation, south-central New Mexico, by C. E. Sloan and M. S. Garber, 1971, scale 1:125,000

HA-0652—Water-level and saturated thickness changes, predevelopment to 1980, in the High Plains aquifer in parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming, by R. R. Luckey, E. D. Gutentag, and J. B. Weeks, 1981, 2 sheets, lat about 32° to about 43°, long about 96° to about 106°, scale 1:25,000

MISCELLANEOUS FIELD STUDIES MAPS

MF-1220—Geologic map of the Pueblo Alto Trading Post quadrangle, McKinley County, New Mexico, by D. L. Weide, J. W. Mytton, and G. R. Scott, 1980, scale 1:24,000

MF-1248—Geologic map of the Star Lake quadrangle, McKinley County, New Mexico, by G. R. Scott, J. W. Mytton, and G. B. Schneider, 1980, scale 1:24,000

MF-1249—Geologic map of the Ojo Encino Mesa quadrangle, McKinley and Sandoval Counties, New Mexico, by G. R. Scott, G. B. Schneider, and J. W. Mytton, 1980, scale 1:24,000

MF-1253—Preliminary geologic map of the Waterflow quadrangle, San Jose County, New Mexico, by J. D. Strobell, Jr., P. T. Hayes, and R. B. O'Sullivan, 1980, scale 1:24,000

MF-1263—Geologic map of the Redrock NW quadrangle, Grant County, New Mexico, by D. C. Hedlund, 1981, scale 1:24,000

MF-1264—Geologic map of the Redrock NE quadrangle, Grant County, New Mexico, by D. C. Hedlund, 1981, scale 1:24,000

MF-1265—Geologic map of the Redrock SE quadrangle, Grant and Hidalgo Counties, New Mexico, by D. C. Hedlund, 1980, scale 1:24,000

MF-1344-A—Geologic map of the Hells Hole Further Planning Area (Rare II), Greenlee County, Arizona, and Grant County, New Mexico, by J. C. Ratté and D. C. Hedlund, 1981 (1982), lat 32° 45′ to about 33°15′, long about 108°45′ to about 109°15′, scale 1:62,500, sheet 27 by 39 inches

MF-1344-B—Geophysical surveys of the Hells Hole Further Planning Area (Rare II), Greenlee County, Arizona, and Grant County, New Mexico, by R. A. Martin, 1981, lat 32°52′30″ to 33°09′, long 108°55′ to 109°10′, scale 1:62,500

MF-1407—Reconnaissance geologic map of the Mule Canyon quadrangle, Rio Arriba County, New Mexico, by Kim Manley and R. A. Wobus, 1982, lat 36°37′30″ to 36°45′, long 106° to 106° 07′30″, scale 1:24,000, sheet 29 by 32 inches

MF-1408—Reconnaissance geologic map of the Las Tablas quadrangle, Rio Arriba County, New Mexico, by Kim Manley and R. A. Wobus, 1982, lat 36°30′ to 36°37′30″, long 106°07′30″, scale 1:24,000, sheet 29 by 38 inches

MF-1409—Reconnaissance geologic map of the Burned Mountain quadrangle, Rio Arriba County, New Mexico, by R. A. Wobus and Kim Manley, 1982, lat 36°37′30″ to 36°45′, long 106°07′30″ to 106°15′, scale 1:24,000, sheet 28 by 33 inches

OTHER NEW PUBLICATIONS

Adobes for sale, by E. W. Smith and Sharon Murray, New Mexico Magazine, April 1982, v. 60, no. 4

Bibliography of New Mexico paleontology, by B. S. Kues and S. A. Northrop, 1981, 150 p., University of New Mexico Press

Canyonlands geologic map—A beautiful full color geologic map of Canyonlands National Park and vicinity, Utah, has recently been published by the Canyonlands Natural History Association. The mapping was done by Peter W. Huntoon, George H. Billingsly, Jr., and William J. Breed. The spectacular facies changes in the Permian System of the region have been accurately and imaginatively interpreted. The map may be obtained from the Canyonlands Natural History Association, 446 S. Main Street, Moab, UT 84532, for $7.50, including postage, folded (Utah residents must include state sales tax). This detailed map (scale 1:62,500) is a major contribution to the geology of east-central Utah, and is a "must" for anyone interested in the geology of this unique region.

Los Alamos National Laboratory

LA-8679-MAP—Complete Bouguer gravity anomaly map of the Socorro 1° x 2° quadrangle, New Mexico, by M. Ander, W. Kennedy, and C. Aiken, 1981

LA-8812-MAP—Age and location of volcanic centers < 3.0 m.y. old in Arizona, New Mexico, and the trans-Pecos area of west Texas, by M. J. Aldrich and A. W. Laughlin, 1981

LA-9158—Orientation of least-principal horizontal stress—Arizona, New Mexico, and the trans-Pecos area of west Texas (stress data and references), by M. J. Aldrich and A. W. Laughlin, 1982, 19 p., 1 sheet, scale 1 inch: 16 mi

Sandia National Laboratories

SAND 82-0770—Bibliography of geology of southeastern New Mexico, by Sue-Ellen Shaffer, 1982, 148 p.

U.S. Bureau of Mines

TPR-117—A new sonic velocity-logging technique and results in near-surface sediments of northeastern New Mexico, by J. J. Snodgrass, 1982, 24 p.

Evaluation of current and future mineral land assessment program of U.S. Bureau of Mines, January 1982, by F. E. Kottlowski, J. F. Davis, W. L. Fisher, J. W. Gabelman, D. C. Jonson, R. N. Miller, M. E. Ostrom, J. W. Rold, and R. G. Schaff, 1982, contract J0113109 with New Mexico Bureau of Mines and Mineral Resources

U.S. Department of Energy

PGF/F-131(82)—National uranium resource evaluation—Silver City quadrangle, New Mexico and Arizona, by A. J. O'Neill and D. L. Weide, 1982, Bendix Field Engineering Corporation for U.S. Department of Energy, 87 p., 14 microfiche, 18 over-size sheets

New Mexico Energy Research and Development Institute

2-68-1213—Hydrotreating of coal liquids—phase two, by D. B. Wilson and J. M. Bogdanor, 1982, 126 p., 11 tables, 19 figs., 7 appendices

2-68-2232—Solar synthetic fuel production—hydrogen from the sun, by D. D. Davis, 1982, 32 p., 1 table, 6 figs., 4 appendices

2-68-3311—Geomorphology and surface hydrology in the strippable coal belts of northwestern New Mexico, by S. G. Wells, 1982, 2 v., 298 p., 30 tables, 106 figs., 3 appendices

2-68-3205—Oil and gas potential of the Tularosa Basin-Otero platform area, Otero County, New Mexico, by W. E. King and V. M. Harder, 1982, 69 p., 1 table, 14 figs., 3 plates

New Mexico State Engineer

TR-43—Water resources of the Rincon and Mesilla Valleys and adjacent areas, New Mexico, by C. A. Wilson, R. R. White, B. R. Orr, and R. G. Roybal, 1982

Open-file reports

NMBMMR

***132**—Drill hole and testing data compiled for hydrogeologic study of Animas Valley, Hidalgo County, New Mexico, by K. M. O'Brien and W. J. Stone, 1982, 109 p., 1 map $24.80

***139a**(formerly 139)—Geology of the Molino Peak quadrangle, by G. R. Osburn, D. M. Petty, and C. E. Chapin, 1981, 24 p., 2 maps $7.80

***139b**—Geology of the Lion Mountain quadrangle, by G. R. Osburn and T. M. Laroche, 1982, 39 p., 2 maps $10.80

***141**—Geology of the central Chupadera Mountains, Socorro County, New Mexico, by T. L. Eggleston, 1982, 162 p., 2 maps $35.40

***162**—Geology of the perlite deposits of the No Agua Peak, Taos County, New Mexico, by K. A. Naert, L. A. Wright, and C. P. Thornton, 1982, 82 p. $17.60

***163**—Geology and coal resources of the Venadito Camp quadrangle, Cibola County, New Mexico, by O. J. Anderson, 1982, 30 p., 1 map $7.50

***164**—Geology and coal resources of three quadrangles in the central Datil Mountains coal field, Socorro County, New Mexico, by J. C. Osburn, 1982, 82 p., 6 maps $25.40

***167**—Geology and coal resources of the Atarque Lake quadrangle, Cibola County, New Mexico, by O. J. Anderson, 1982, 28 p., 1 map $7.10

***168**—MINES-CREF, a PASCAL computer code to maintain and manipulate the list of active mines and processing plants in New Mexico, by Paul Lloyd and Mark Logsdon, 1982, 10 p. text to generate 62 p. printout text $2.00

NOTE: In the August 1982 issue (v. IV, no. 3), senior author Gretchen H. Roybal was inadvertently left out of the notice of NMBMMR Open-file Rept. 145.

USGS

***79-0107**—Coal resource occurrence and coal development potential maps of the Lybrook NW quadrangle, San Juan County, New Mexico, by Dames and Moore, 25 p., 11 over-size sheets, scale 1:24,000

79-0110—Coal resource occurrence and coal development potential maps of the Fire Rock Well quadrangle, San Juan, McKinley, and Sandoval Counties, New Mexico, by Dames and Moore, 1982, 31 p., 18 over-size sheets, scale 1:24,000

79-0111—Coal resource occurrence and coal development potential maps of the Lybrook SE quadrangle, Sandoval, McKinley and San Juan Counties, New Mexico, by Dames and Moore, 27 p., 15 over-size sheets, scale 1:24,000

79-0113—Coal resource occurrence and coal development potential maps of the Pueblo Pintado quadrangle, McKinley County, New Mexico, by Dames and Moore, 25 p., 12 over-size sheets, scale 1:24,000

79-0115—Coal resource occurrence and coal development potential maps of the Star Lake quadrangle, McKinley and Sandoval Counties, New Mexico, by Dames and Moore, 31 p., 17 over-size sheets, scale 1:24,000

79-0154—Coal resource occurrence and coal development potential maps of the Pueblo Bonito NW quadrangle, San Juan County, New Mexico, by Dames and Moore, 31 p., 19 over-size sheets, scale 1:24,000

79-0155—Coal resource occurrence and coal development potential maps of the Kimbeto quadrangle, San Juan County, New Mexico, by Dames and Moore, 25 p., 11 over-size sheets, scale 1:24,000

79-0157—Coal resource occurrence maps of the Sargent Ranch quadrangle, San Juan and McKinley Counties, New Mexico, by Dames and Moore, 23 p., 9 over-size sheets, scale 1:24,000

79-0603—Coal resource occurrence and coal development potential maps of the Alamo Mesa East quadrangle, San Juan County, New Mexico, by Dames and Moore, 28 p., 16 over-size sheets, scale 1:24,000

79-0606—Coal resource occurrence and coal development potential maps of the Pretty Rock quadrangle, San Juan County, New Mexico, by Dames and Moore, 31 p., 23 over-size sheets, scale 1:24,000

Announcements

The New Mexico Geological Society 33rd annual field conference "Albuquerque Country II," will be held November 3-6, 1982, in the Albuquerque area. Registration ($125 members, $140 nonmembers) will be held in the Garden Room of the Albuquerque Hilton Inn on November 3, 1982. The guidebook for the conference *Albuquerque Country II* is available to those who cannot attend the conference at $30—softbound and $35—hardbound.

The Third Biennial New Mexico Minerals Symposium will be held November 13-14, 1982, at the Macey Conference Center on the New Mexico Tech campus in Socorro. Registration for the conference is $5.00 ($3.00 for students). In addition to presentation of papers, a silent auction will be held.

USGS

New topographic maps

	yr	lat	long	scale	contour (ft)	
*Alamogordo North	75-81	32°52′30″	105°52′30″	1:24,000	40	
*Alamogordo South	75-81	32°45′	105°52′30″	1:24,000	40	20
*Bailey Points	75-81	33°15′	107°52′30″	1:24,000	40	
*Bear Peak	74-81	32°30′	105°30′	1:24,000	40	
*Big Gyp Mountain	75-81	33°15′	106°37′30″	1:24,000	25	
*Black Peak	75-81	34°	108°45′	1:24,000	20	
*Box Lake	75-81	33°45′	105°22′30″	1:24,000	20	
*Broken Back Crater	74-81	33°45′	106°	1:24,000	20	
*Bug Scuffle Canyon	75-81	32°37′30″	105°45′	1:24,000	40	
*Bull Gap SW	75-81	33°30′	106°7′30″	1:24,000	10	50
*Cañon Agua Buena	75-81	33°52′30″	106°37′30″	1:24,000	20	
*Cat Mountain	75-81	33°7′30″	105°52′30″	1:24,000	40	
*Cistern Draw	75-81	33°45′	105°	1:24,000	20	
*Collins Park	75-81	33°37′30″	108°22′30″	1:24,000	40	
*Cooper Canyon	74-81	33°52′30″	106°7′30″	1:24,000	20	
*Cowboy Mesa NW	75-81	34°7′30″	105°7′30″	1:24,000	10	
*Cub Mountain	75-81	33°30′	105°52′30″	1:24,000	20	

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	yr	lat	long	scale	contour (ft)	
*Culp Canyon	75-81	32°30′	105°45′	1:24,000	40	
*Deadman Canyon	75-81	32°37′30″	105°52′30″	1:24,000	20	10
*Dugout Canyon	75-81	33°	106°45′	1:24,000	10	
*Dulce Draw	74-81	33°52′30″	105°52′30″	1:24,000	20	
*Fairview Mountain	75-81	33°22′30″	106°30′	1:24,000	20	
*Fairview Well	75-81	33°15′	106°52′30″	1:24,000	10	
*Fence Canyon	75-81	33°15′	106°45′	1:24,000	20	
*Fleck Draw	75-81	32°45′	106°37′30″	1:24,000	20	
*Foster Well	75-81	33°30′	106°30′	1:24,000	10	5
*Gardner Peak	75-81	32°45′	106°30″	1:24,000	40	
*Gilmore Draw	74-81	32°45′	106°45′	1:24,000	10	
*Goldenburg Draw	74-81	32°37′30″	106°37′30″	1:24,000	10	
*Golondrina Well	75-81	33°52′30″	105°15″	1:24,000	20	
*Greens Baber Well	75-81	33°37′30″	106°30	1:24,000	5	
*Hardscrabble Mountains	75-81	33°7′30″	106°37′30″	1:24,000	40	
*Hembrillo Basin	75-81	32°52′30″	106°37′30″	1:24,000	40	
*Hembrillo Canyon	75-81	32°52′30″	106°30′	1:24,000	10	40
*Huff Hill	75-81	33°45′	105°7′30″	1:24,000	20	
*Indian Peaks East	75-81	33°30′	107°52′30″	1:24,000	20	
*Indian Peaks West	75-81	33°30′	108°	1:24,000	20	
*John Kerr Peak	75-81	33°45′	108°22′30″	1:24,000	40	
*Little Black Peak	74-81	33°45′	105°52′30″	1:24,000	20	
*Little Black Peak NE	74-81	33°52′30″	105°45′	1:24,000	20	
*Loco Draw	75-81	34°15′	104°52′30″	1:24,000	10	
*Malone Draw	75-81	32°52′30″	106°	1:24,000	10	
*O Bar D Canyon West	75-81	33°30′	108°15′	1:24,000	40	
*Paddys Hole	75-81	33°37′30″	107°45′	1:24,000	40	
*Polecat Tank	75-81	33°	106°52′30″	1:24,000	10	
*Prisor Hill	74-81	32°52′30″	106°52′30″	1:24,000	10	
*Prisor Well	74-81	32°52′30″	106°45′	1:24,000	10	
*Sacramento Peak	75-81	32°45′	105°45′	1:24,000	40	
*Salinas Peak	75-81	33°15′	106°30′	1:24,000	40	
*San Andres Peak	74-81	32°37′30″	106°30′	1:24,000	40	
*Shannon Canyon	75-81	33°7′30″	106°45′	1:24,000	20	
*Shannon Canyon NW	75-81	33°7′30″	106°52′30″	1:24,000	10	
*Sheep Mountain	75-81	33°15′	106°22′30″	1:24,000	10	40
*Strawberry Peak	75-81	33°	106°30′	1:24,000	10	40
*Sulphur Pass	75-81	33°	106°37′30″	1:24,000	40	
*Three Rivers	75-81	33°15′	106°	1:24,000	20	
*Three Rivers SW	75-81	33°15′	106°7′30″	1:24,000	10	
*Tip Top Canyon	75-81	33°7′30″	106°30′	1:24,000	10	40
*Trinity Site	75-81	33°37′30″	106°22′30″	1:24,000	40	
*Upham Hills	74-81	32°45′	106°52′30″	1:24,000	10	
*Wagon Canyon	75-82	33°37′30″	106°	1:24,000	20	
*Wahoo Peak	75-81	33°30′	107°45′	1:24,000	40	
*Wrye Peak	75-81	33°52′30″	106°15′	1:24,000	20	
*Wrye Peak NW	75-81	33°52′30″	106°22′30″	1:24,000	10	
*Yeso Mesa SE	75-81	34°15′	104°45′	1:24,000	20	10

Abstracts

AAPG BULLETIN, V. 66, NO. 2, FEBRUARY 1982.

DIPMETER INTERPRETATION OF CHERRY CANYON RESERVOIR SANDSTONES, DELAWARE BASIN, NEW MEXICO, by *Sandra Phillips*, 1982.

Stratigraphic interpretation of high-resolution dipmeter logs can provide important information concerning the morphology and distribution of reservoir sandstones. Stratigraphic dip data were correlated with primary rock properties observed in cores and with borehole-log data to define the internal morphology of turbidite channel sandstones in the Cherry Canyon Formation at Indian Draw field. Characteristic dip patterns allowed the delineation of erosional unconformities, channel sequences, slump faulting, contorted and massive bedding, and sedimentary drape. The erosional unconformity which marks the base of the Indian Draw channel exhibits a characteristic dip pattern consisting of an abrupt change in the trend of dip magnitude and dip azimuth across the unconformity, marked by higher dips (6–9°) above the unconformity in the channel fill and lower dips (2–4°) in the basin-plain sediments below. Slump faults exhibit an abrupt increase in dip with depth over a small interval and an associated progressive dip azimuth rotation approaching the fault. Contorted beds show a random dip pattern, often marked by poor-quality, high-magnitude dips. Massively bedded sandstones lack computed dips and sedimentary drape patterns typically consist of a decrease upward within basinal deposits overlying a sandstone. Detailed mapping of the reservoir sandstones indicates deposition as stacked, laterally discontinuous lenses within a previously eroded channel. Direction of sedimentary drape over sandstone lenses can be used to map their trends. Channel-fill lenses are 5–30 ft (1.5–9.1 m) thick, and are elongate parallel with depositional dip with a sinuous geometry. Such turbidite channel deposits can be anticipated to form complex multilayered reservoirs, consisting of a series of isolated sandstone lenses of restricted areal extent.

PETROLEUM EXPLORATION IN PEDREGOSA BASIN, SOUTHWESTERN NEW MEXICO, by *Sam Thompson III*, 1982.

In southern Hidalgo and Grant Counties, New Mexico, the northwestern end of the Pedregosa Basin has a high petroleum potential. Paleozoic rocks, dominantly shallow-marine carbonates, are over 11,000 ft (3,350 m) thick. Of the 11 formations, ranging in age from Cambrian to Permian, seven contain favorable oil- or gas-source units. Mesozoic rocks, generally shallow-marine limestones and deltaic sandstones-mudstones, are nearly 10,000 ft (3,050 m) thick. Two of the three Lower Cretaceous formations contain favorable source units. Gas-prone kerogens are more abundant than the oil-prone types. At normal depths of burial, organic matter in the source units has reached thermal maturity, and some in the older formations is overmature. In the lower plate of a major Laramide thrust fault, the Lower Cretaceous units are overmature and the older Paleozoic units may be thermally metamorphosed. Best reservoir objectives are the porous dolostones, totaling 484 ft (148 m) in thickness, in the upper part of the Horquilla Formation (Pennsylvanian–Permian). They are located at the shelf margin of a deep-marine basin. Other favorable reservoir units are indicated in surface exposures. In this frontier area, only 11 exploration wells have been drilled to Precambrian, Paleozoic, or Mesozoic rocks. Shows of oil or gas were reported in six of the wells. None of the wells have tested the better reservoir objectives in the deeper parts of the graben valleys, where commercial accumulations of petroleum are likely to be preserved. Tertiary-intrusive and volcanic-cauldron complexes have thermally metamorphosed older sedimentary units only locally. Basin-and-range faulting has disrupted subsurface fluid systems in many parts of the area. Despite the challenging risks, the high potential encourages further exploratory drilling on selected petroleum prospects.

THIRD ANNUAL GEOSCIENCE RESEARCH CONFERENCE, MAY 1, 1982, GRADUATE STUDENT ASSOCIATION NMIMT, 16 TOTAL ABSTRACTS.

RADIONUCLIDE AND HEAVY-METAL DISTRIBUTION IN RECENT SEDIMENTS OF THE RIO PUERCO AND RIO SAN JOSE IN THE GRANTS MINERAL BELT, by *K. J. Novo-Gradac*, NMIMT.

The Rio Puerco and Rio San Jose are intermittent streams which drain the active uranium mining district east of the Continental Divide. Episodic major floods deliver large quantities of sediments derived from the uranium mining and milling area into these streams. Available data have made possible the sampling of sediments in the Rio Puerco and Rio San Jose oxbows and channels that are known to be pre- or post mine-mill operations. Analysis of these sediment samples by environmental gamma counts, neutron activation analysis, atomic absorption, and other techniques are only partially complete at this time. When the data collections process is complete, it should be possible to gauge the influence of uranium operations on the transport of heavy metals and isotopes in this area. The observed concentrations in these sediments for Th-234, U, Cu, Pb, Cr, Cd, Hg, As, Se, and others and the correlation to relative age, depth, and various other factors will be discussed.

A PRELIMINARY TAPHONOMIC STUDY OF THE FRUITLAND FORMATION (LATE CRETACEOUS) IN THE WEST-CENTRAL SAN JOSE BASIN, NEW MEXICO, by *Adrian Hunt*, NMIMT.

The Fruitland Formation is a Late Cretaceous deltaic and back-barrier coal-bearing sequence. Fossils are common but neither as abundant nor as well preserved as in some other Late Cretaceous formations such as the Hell Creek–Lance or Oldman. Macerated plant material is ubiquitous in all rock types. Channel-form sandstones contain sand-sized (Wentworth) clasts of usually coalified plant material. In overbank siltstones and mudstones, plant material is larger but more scattered and usually consists of stem fragments. Well preserved leaves, usually compressions, are found only in local "pond" facies. Of other fossils silicified wood is the most abundant, mainly in the form of petrified stumps and less commonly logs of coniferous trees. Stumps often occur in groups. Logs are sometimes found in channel-form sandstones, but stumps are usually restricted to overbank deposits. Dinosaur remains are more common in overbank than channel deposits but are most often isolated in the former. Subcomplete skeletons are and usually occur in channel-form sandstones. Of other vertebrates, turtles are by far the most abundant, usually occurring in overbank mudstones. Crocodile remains are far less common. Predator damage on vertebrate fossils is rare. Invertebrate remains high in the Fruitland are rarely preserved in situ and usually occur in clay-pebble conglomerates with plant and vertebrate remains, often associated with sideritic concretions. Clay-pebble conglomerates also yield the vast majority of the mammal, lizard, and amphibian remains and most of the fish scales and vertebrae. Lower in the Fruitland are coquinas of brackish invertebrates. Some clay-pebble conglomerates yield many calcitic snail opercula but very little body shell material.

THE PALEOENVIRONMENTS OF THE PENNSYLVANIAN SYSTEM ALONG THE EASTERN MARGIN OF THE RIO GRANDE RIFT, CENTRAL NEW MEXICO, by *J. H. Bauch,* NMIMT.

Surface exposures east of Socorro, New Mexico, contain a complete stratigraphic section of the Pennsylvanian System. These sediments were deposited on a northwest trending shelf, connecting the larger and deeper Paradox and Delaware Basins. The Sandia Formation (Atokan) lies unconformably on Precambrian quartz monzonite. It largely consists of quartz arenites occasionally interbedded with wackestones and is interpreted to represent the transgression of the Pennsylvanian sea. The Madera Limestone conformably overlies the Sandia and is divided into a lower gray limestone member (Desmoinesian) and an upper arkosic limestone member (Missourian–Virgilian). The lower gray limestone consists of cherty mudstones and wackestones with a diverse fauna. These sediments probably accumulated in very shallow water with normal marine salinities. The upper arkosic limestone consists of interbedded gray shales, brown fossiliferous sandstones, and wackestones. The shales are barren of plant and animal debris. They are interpreted to have been deposited in shallow, quiet water under anoxic conditions. There is no evidence of a transgression between the Desmoinesian and Missourian rocks. Storms periodically interrupted mud sedimentation by rapidly depositing shallow-water carbonate grains (oncolites and oolites) with quartz. Carbonate sedimentation resumed whenever clastic influx decreased, resulting in wackestones.

LATE CENOZOIC GEOLOGY OF THE LOWER RIO PUERCO, SOCORRO AND VALENCIA COUNTIES, NEW MEXICO, by *J. D. Young,* NMIMT.

Sediments of the lower Rio Puerco study area may be divided into two broad categories: 1) the Santa Fe Group which represents a rapidly aggrading fluvial system filling the Albuquerque Basin and 2) post-Santa Fe valley-fill sediments which include valley-margin deposits and valley-floor deposits. The latter group represents processes of erosion and deposition that have prevailed since the entrenchment of the Santa Fe basin fill. Both groups contain many of the same types of sediments. The Santa Fe Group is divided into two formations: 1) the Miocene–Pliocene Popotosa Formation which consists of piedmont and playa facies deposited in a closed basin and 2) the late-Pliocene (?) to mid-Pleistocene Sierra Ladrones Formation which represents deposition by a through-flowing river or rivers. Paleocurrent indicators and the presence of Grants obsidian in the Sierra Ladrones indicates a source area to the northwest. Two facies are suggested for the Sierra Ladrones based on composition and texture of gravels: 1) a through-flowing fluvial facies and 2) through-flowing fluvial facies associated with marginal slopes (this is more of an interfingering zone between distal piedmont material and through-flowing fluvial facies). The through-flowing fluvial system that deposited the Sierra Ladrones was primarily a high-gradient, low-sinuosity, flat-bottomed braided system. The Llano de Albuquerque landform and associated soil capping the Sierra Ladrones Formation represents a period of surface stability and soil formation on the Albuquerque Basin floor during mid-Pleistocene time.

MINERALIZATION TEMPERATURES AND SOURCES OF HYDROTHERMAL FLUIDS AT THE QUESTA, NEW MEXICO, MOLYBDENITE DEPOSIT, by *R. W. Smith,* NMIMT.

Mineralization of the granite-type porphyry molybdenite deposit at Questa, New Mexico, consists of quartz-biotite-feldspar-molybdenite and quartz-molybdenite veins associated with potassic alteration. Also present are later quartz-pyrite-molybdenite and quartz-base metal sulfide veins associated with phyllic alteration. Studies of fluid inclusions of vein quartz associated with molybdenite mineralization indicate a wide dispersion of temperatures (300–500 °C) with a mode of 400 °C for mineralization associated with potassic alteration and slightly lower temperatures for mineralization associated with phyllic alteration. Halite-trend fluids characterized the potassic alteration zone, with more dilute fluids common in veins associated with phyllic alteration. Oxygen isotopic data suggest high temperature (550 °C) magmatic fluids ($\delta^{18}O = +7.6$ ‰) were responsible for early mineralization. Later mineralization was from fluids of a mixed meteoric and magmatic water. Fluid inclusion, oxygen isotope, and published sulfur and strontium isotope data are consistent with early mineralizing fluids exsolving directly from a "granite-minimum" intrusive, with later mineralization resulting from mixing of magmatic and meteoric water, or remobilization of earlier mineralization by meteoric water.

VOLATILES IN PHYLLOSILICATES FROM THE BINGHAM, UTAH, AND COPPER FLAT, NEW MEXICO, PORPHYRY COPPER DEPOSITS, by *J. M. Palin,* NMIMT.

Whole-rock samples, containing phyllosilicate minerals, have been collected from the porphyry copper deposits at Bingham, Utah, and Copper Flat, New Mexico. Upon heating, these phyllosilicates release H_2O and other volatiles. Measurements of these volatiles, using a quadrapole mass spectrometer, have been done in an attempt to develop an exploration tool. The H_2S/H_2O ratios for the samples from Bingham show patterns similar to those for hydrothermal alteration and Mg/ (Mg + Fe) ratios in biotite. Surface samples from Copper Flat also show a spatial distribution of thermally evolved volatiles about the orebody, which does not crop out at the surface and has no well developed alteration pattern. The results indicate that thermally evolved volatiles from phyllosilicates may serve as an exploration tool for hidden hydrothermal mineral deposits. □

Hyde Memorial *(continued from p. 59)*

schist. The original internal structure of the sandstone has not been changed greatly. The metamorphic effects are mainly confined to concentrations of brown and gold mica along the bedding planes of schistosity (planes of weakness).

Exposures of schist occur at higher elevations, near the crests of the ridges bordering the central valley, and are easily identified by their color and the presence of bedding.

Sedimentary rocks of Pennsylvanian age have been recognized lying directly on top of the Precambrian in several areas of the complex, but not within the park. Sedimentary rocks are formed from water-transported sediments and comprise the third major rock type. The presence of these rocks indicates that north-central New Mexico was occupied by an ocean during Pennsylvanian time, between 320–270 m.y. ago. No evidence remains to indicate what occurred in this area during the millions of years that elapsed between the Precambrian and the Pennsylvanian.

In some areas of the complex, Pennsylvanian rocks are overlain by remnants of younger formations. Field evidence indicates that at least several hundred feet of post-Pennsylvanian rocks formerly existed in this area. Undoubtedly Pennsylvanian and younger rocks partially covered Hyde Memorial Park sometime in the past. However, these rocks, as well as part of the Precambrian have been eroded by streams and glaciers, shaping the landscape as we see it today. □

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