Oasis, New Mexico State Park Series

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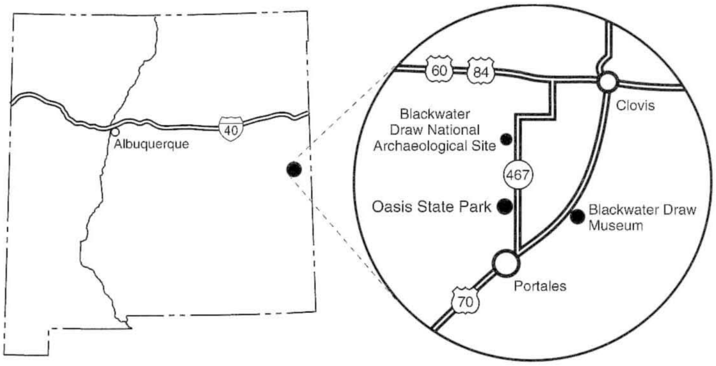

FIGURE 1—Location of Oasis State Park.

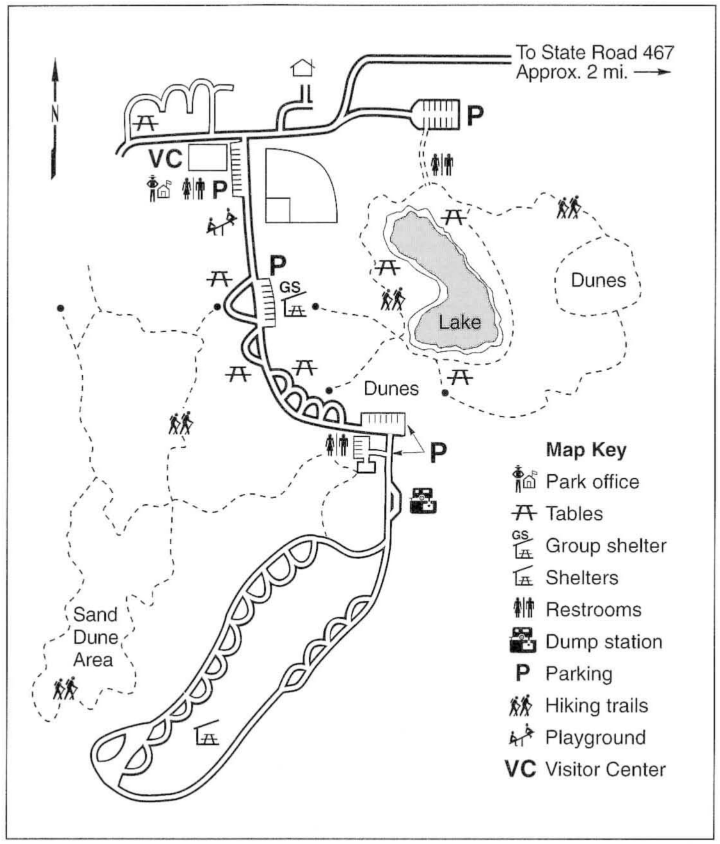

FIGURE 2—Facilities at Oasis State Park.

Introduction

Oasis State Park lies 18 mi southwest of Clovis and 7 mi north of Portales via US–60 and NM–467 (Fig. 1). It was established in 1961 to preserve the natural beauty of a true oasis in the sandy desert of the Llano Estacado or "staked plains" of the Great Plains physiographic province. The surrounding area is flat, treeless, featureless, and relatively dry. The summers are hot, the winters are cold, the wind seems to blow constantly. In contrast, the park offers shade trees and a small lake, as well as conveniences such as water, showers, electric hookups, and dump stations expected of picnic areas and modern campgrounds (Fig. 2). Many of the facilities are accessible to people with disabilities. In addition to picnicking and camping, fishing, hiking, and bird watching are popular activities (Figs. 3–5). The pond is stocked with catfish and trout. Trails weave up and down and around the sand dunes; watch carefully for lizards, snakes, and other wildlife that make the sand their home! A ballfield lies near the center of the park. A new visitor's center is being constructed. The Blackwater Draw Museum is located east of Oasis State Park on US-70, and the Blackwater Draw Archaeological Site is north of the state park (Fig. 1).

History

The area is known to have been occupied by man about 11,500 yrs ago as evidenced by stone tools and projectile points found at the Blackwater Draw Archaeological Site (Agogino and Egan, 1972; Haynes, 1995; Holliday, 1995). At this site, projectile points were found with fossil remains of Late Pleistocene fauna, woolly mammoth, camel, horse, bison, sabertooth tiger, and dire wolf. A large pond at the site attracted the game animals and hunters, including man, from approximately 15,000 to 6,000 yrs ago (Hester, 1972). Evidence indicates that the winters were warmer than today and the summers were cooler; permanent streams and rivers were common. The oldest artifacts are of the Clovis or Llano culture; only spear points, cutting tools, and a butchered mammoth remain. The Clovis culture was dominant in this area from about 11,000 to 9,000 B.C. It was followed by the Folsom culture from about 10,000 to 8,000 B.C. Other, lesser-known cultures followed, including Portales and Archaic (Agogino and Egan, 1972; Hester, 1972; Haynes, 1995). About 7,000 yrs ago, the pond dried up following widespread change in the climate, but man continued to occupy the area as evidenced by camp fires, hand-dug wells, and butchering sites. Finally, the site was abandoned about 4,950 yrs ago as the water completely dried up (Hester, 1972).

Later, Comanche, Cheyenne, and Kiowa roamed these plains; subsequently, settlers migrated into the area and lived in sod huts and depended on buffalo chips for heat. Numerous cattle drives went through the area in the 1800s. Early settlers came and dug shallow wells to tap the high water table; the stagnant water quickly turned dark, hence the name Blackwater Draw (Julyan, 1996). In 1902, a homesteader, Will Taylor, settled at the present location of Oasis State Park and planted cottonwood, chinaberry, locust, elm, and cedar trees. Some of these trees still stand in the state park. Before the area became a state park, it was known as Taylor's Grove, a popular picnicking site (Young, 1984). The natural artesian springs that attracted Taylor to the area have long since dried up as a result of heavy irrigation. Now water is pumped from a well to feed a four-acre pond. The pond also serves as a stopover for migratory waterfowl.

In 1932 Walter Burns, a New Mexico State Highway Department engineer, discovered bones in a gravel pit being quarried for construction of US–70. Burns contacted archaeologists at the University of New Mexico, and excavations began at the quarry now known as the Blackwater Draw Archaeological Site north of the state park. Studies were also conducted by the University of Pennsylvania in 1932–1937 (Katz, 1997). Studies over the next 30–40 yrs slowly pieced together the prehistory of the area (Haynes, 1995; Holliday, 1995; Katz, 1997). It is now part of Eastern New Mexico University.

Clovis and Portales are the largest cities in the area. Clovis was originally known as Riley Switch in 1906, after a local ranching family. The name was changed to Clovis in 1907 when the Atchison, Topeka, and Santa Fe Railroad was completed through the town. Today, Clovis is home to Cannon Air Force Base.

Portales is older than the more-populated Clovis. Springs once issued from seven caves that early Spanish settlers called Las Portales because the overhanging cliffs resembled porches or portales of Spanish adobe houses (Julyan, 1996). Las Portales became an important water stop on the Fort Sumner Trail. Billy the Kid camped at the springs, and it is said that he dreamed of building a ranch at Las Portales. Josh Morrison built a store in the late 1800s, and soon afterward the Pecos Valley and Northeastern Railroad built a construction camp nearby. A post office was established in 1899, and the town's name was shortened to Portales.

Today the springs are dry because of pumping for irrigation. Portales is home to Eastern New Mexico University, established in 1934. Agriculture, especially dairy production, is a major industry for both the Portales and Clovis areas.

Geology

Oasis State Park is in the Portales Valley, an inset in the Llano Estacado. The llano extends from the Pecos River on the west to Palo Duro Canyon in Texas on the east and southward to Hobbs, New Mexico. It covers an area of about 32,000 mi^2 (Reeves, 1972, Hawley, 1993; Holliday, 1995). The origin and meaning of Llano Estacado are controversial. Some claim that the name refers to natural stockades created along the rough rim of this plateau that rises 150 ft above the adjacent plains and river valleys. *Estacada* is Spanish for palisade or fence, and canyons along the rim became famous as pasture for cattle and horses. Other explanations for the term range from the tall native yuccas, resembling stakes at a distance, to tales of Indians and then wagon trains from the east marking their routes across this vast, featureless plateau with stakes (Julyan, 1996).

The llano is formed on the Ogallala Formation. The Ogallala Formation consists of eolian (wind-blown) sand and silt and fluvial (stream or river) and lacustrine (lake) sand, silt, clay, and gravel derived from the Rocky Mountains between middle Miocene and early Pliocene time, about 1–12 million yrs (m.y.) ago (Reeves, 1972; Hawley, 1984, 1993; Gustavson et al., 1991). These surficial deposits were reworked and deposited by water and wind. In many places a caprock of hard, impermeable calcium carbonate ($CaCO_3$), locally called caliche, formed near the surface in arid conditions during the early Pliocene or later. This caprock forms the rim of the Llano Estacado and is approximately 10–40 ft thick in the Clovis–Portales area (Galloway, 1956, 1972). The caprock consists of fractured and permeable deposits of gravel, sand, silt, and clay that are cemented by calcium carbonate (McGrath and Hawley, 1985). It is used locally for crushed and decorative stone. The caprock is a calcrete and is formed primarily by the process of downward percolation of surface waters depositing calcium carbonate in the upper soil horizons in the Ogallala Formation and perhaps, even in the overlying Blackwater Draw Formation and recent eolian deposits (Bachman, 1976; McGrath and Hawley, 1985). Important aquifers (reservoirs of ground water) occur in the Ogallala Formation, and they supply much of the water used for livestock, irrigated farms, and recreation areas such as the state park. Much of this water originally was derived from the Sangre de Cristo Mountains before the Pecos River captured most of the water now migrating from those mountains. The only recharge or new water to the Ogallala aquifer in this area of New Mexico–Texas is from rain along the Llano Estacado. Pumping for irrigation and municipal use is depleting the aquifer faster than it is being recharged.

The rocks underlying the Ogallala Formation are not exposed in the area, but belong to the Chinle Group (formerly known as the Dockum Group) of Triassic age (245–208 m.y.; Lucas, 1993). From wells drilled in the area looking for deeper reservoirs of water and even oil and gas, we know that these older rocks consist of red-brown siltstone, sandstone, and shale. Similar rocks are exposed elsewhere in eastern New Mexico, such as in the Tucumcari–Santa Rosa area.

The Pleistocene Blackwater Draw Formation overlies the Ogallala Formation in parts of Curry and Roosevelt Counties and consists of thin, silty to clayey soils. The Portales Valley is the headwaters for two draws, Blackwater and Yellowhorse (Holliday, 1995), and merges with the Llano Estacado. Lacustrine deposition

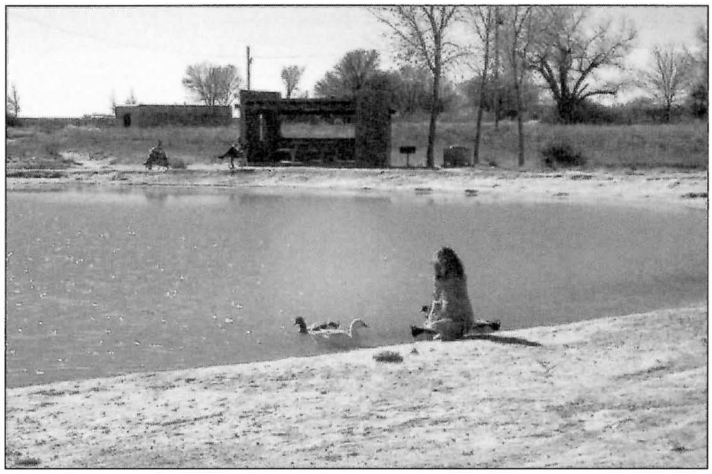

FIGURE 3—Feeding the ducks at the lake is a favorite activity in the park.

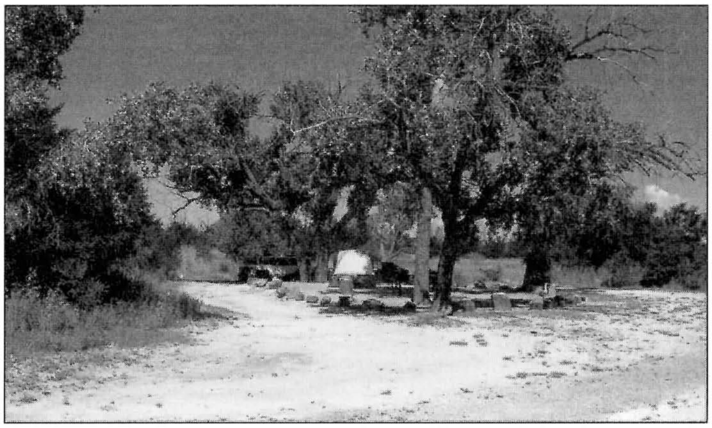

FIGURE 4—Campsite at Oasis State Park.

FIGURE 5—Picnic site along the lake at Oasis State Park.

began about 11,000 yrs ago in the beginning of the Folsom period (Holliday, 1989, 1995). The Blackwater Draw Formation was formed by episodic cycles of eolian deposition during dry periods, followed by subhumid to semiarid conditions forming more-cemented soils. Numerous cycles occurred for at least 1.6 m.y. to form the Blackwater Draw Formation. This unit is as thick as 81 ft

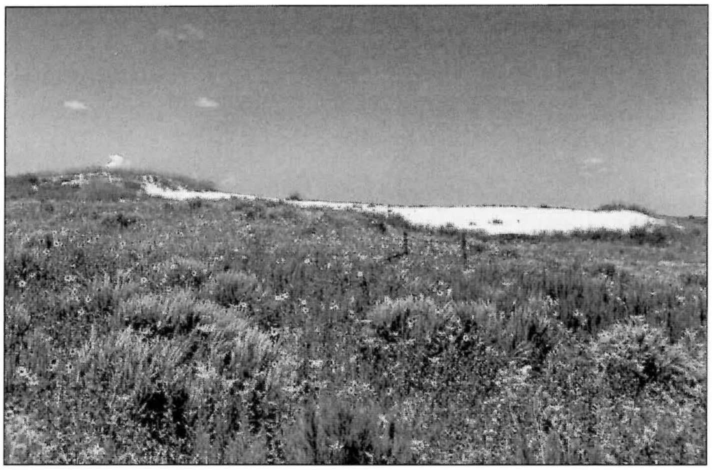

FIGURE 6—Sand dunes surrounded by fields of wildflowers.

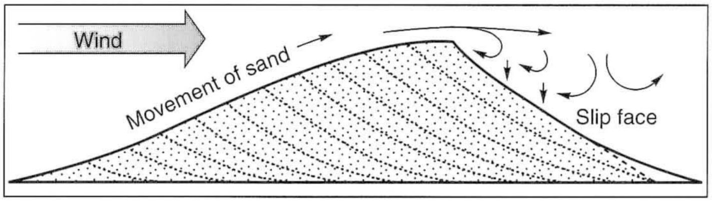

FIGURE 7—Cross section through a sand dune (simplified from Skinner and Porter, 1987).

and extends from the Pecos River valley eastward to Amarillo and Lubbock, Texas (Holliday, 1989). The grain size of the soils decreases from the southwest (predominantly sand) to the northeast (predominantly silt), indicating that the source was the Pecos River valley (Holliday, 1989). Three ash units occur in the formation and have been dated as 1.61 m.y. (Guaje or Otowi Ash), 1.59–1.22 m.y. (Cerro Toledo Ash), and 1.22 m.y. (Tshirege Ash). These ash beds were formed by ash erupted and blown by the wind from the Jemez volcanic field (Izett et al., 1972; Gardner and Goff, 1996; Spell et al., 1996). The Brazos River flowed through the Portales area earlier and deposited the gravels that localized the pond used by prehistoric man at the Blackwater Draw Archaeological Site (Taylor and Pitt, 1972; Hester, 1972; Holliday, 1995). In the Pleistocene, the Pecos River captured the Brazos River, and the springs were formed. The springs fed the pond at Blackwater Draw Archaeological Site.

Recent sand dunes locally overlie the Blackwater Draw Formation. At the state park (Fig. 6), these sand dunes are white because the sand is composed of medium-to fine-grained, white to clear quartz, gypsum, calcite, and feldspar crystals. The constant wind moves the sand, forming new dunes almost daily. Geologists can tell from the shape of the dunes which way the wind is blowing (Fig. 7). Most of the dunes are crescent shaped in plan view because they are formed by constant wind predominantly from one direction across a flat desert floor; these are called barchan dunes. Parabolic dunes, which are also crescent shaped, are locally formed by wind from the opposite direction.

Summary

Oasis State Park has been a popular picnic and camp spot for nearly a hundred years. Before then, early man roamed these hills in search of food, water, and shade. Today, modern visitors can enjoy the quiet beauty of the shifting sand dunes, fish at the pond, or watch for birds. Camping and picnicking are still favorite pastimes. The nearby Blackwater Draw Archaeological Site and Museum offer a glimpse into the prehistoric past.

ACKNOWLEDGMENTS—Special thanks to the state park personnel and Joanne Dickenson, curator of the Blackwater Draw Locality No. 1, for discussions and information on the history of the park and the Blackwater Draw Archaeological Site. Frank Kottlowski, Bruce Harrison, and Dave Love reviewed an earlier version of this manuscript, and their comments are appreciated. Paul Brown of the New Mexico Bureau of Mines and Mineral Resources Cartography Department drafted the figures.

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New publications

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***Memoir 43**—Geology of the Florida Mountains, southwestern New Mexico, by R. E. Clemons, 1998, 113 pp., 10 tables, 61 figs, 5 appendices, 5 sheets, scales 1:24,000 and ca. 1:8,000. $35.00

The Florida Mountains are an eastward-tilted Basin and Range fault block approximately 15 mi southeast of Deming. The mountains are surrounded by a broad bajada that slopes gently into the Mimbres Basin. Sediments conceal the range-bounding faults except at the northwest end. Ephemeral streams are continuing the erosive processes that have reduced the exposed bedrock area to less than one-half of its initial size.

Although the mountains had been mapped before (by Darton in 1916 and by Corbitt in 1971), questions about interpretations of several aspects of the geology of the Florida Mountains had not been settled. Are the plutonic rocks of Precambrian, Ordovician, Mesozoic, or some other age? Are the plutonic rocks related, or are they formed by multiple episodes of plutonism? Are the gabbros and diorites older or younger than the granites and syenites? What is the origin of the south Florida Mountains fault and associated thrust faults? Are they part of the Cordilleran overthrust belt? Clemons spent nearly two decades mapping in the Florida Mountains trying to answer these (and other) questions.

Rather than hold all the data until completion of mapping and laboratory studies, several progress reports and four geologic maps (GM–52, *Geology of Florida Gap quadrangle,* 1982; GM–58, *Geology of Gym Peak quadrangle,* 1983; GM–56, *Geology of Capitol Dome quadrangle,* 1984; and GM–59, *Geology of South Peak quadrangle,* 1985) were published previously. Terminology, interpretation, and ideas in this report represent revisions from Clemons' earlier publications.

***Resource Map 19**—Distribution of near-surface coal deposits in the San Juan Basin, New Mexico, by E. C. Beaumont, 1998, 2 sheets, lat 37°00′ to 35°19′28″, long 109°02′40″ to 106′40′18″, scale 1:250,000. $20.00

RM–19 shows the distribution of seven major regressive and transgressive Cretaceous coal-bearing geologic units with surface-mining potential: the Dilco and Gibson Coal Members of the Crevasse Canyon Formation, the undivided Gibson Coal Member and Cleary Coal Member of the Menefee Formation, the undivided Cleary Coal and lower coal members of the Menefee Formation, the upper coal member of the Menefee Formation, the undivided Mesaverde Group, and the Fruitland Formation. The maps show the formational croplines and the approximate position of the 200-ft cover line.

The writer began geologic mapping of the Upper Cretaceous rocks in northwestern New Mexico in 1948 as an employee of the U.S. Geological Survey. In text on the back of Sheet 1 he recounts early USGS investigations into the area, describes depositional sequences, evaluates the potential of individual coal-bearing units, reviews the history of coal mining in the San Juan Basin, and closes with a candid discussion of the factors influencing the future of San Juan Basin's coal-mining industry.

Supplementing the geologic map and text are a diagrammatic cross section, 36 years of coal prices, extensive references, and tables summarizing coal production (1961–1996) and individual mine statistics.

RM–19 is an important addition to the library of anyone involved in the coal industry, power generation, energy resources, or San Juan Basin Cretaceous geology.

***Geologic Map 77**—Geology of McLeod Tank quadrangle, Sierra County, New Mexico, by W. R. Seager and G. H. Mack, 1998, 2 sheets, lat 32°52′30″ to 32°45′, long 107°15′ to 107°07′30″, scale 1:24,000, 8 cross sections. $15.00

The McLeod Tank quadrangle is located in the heart of the southern Caballo Mountains. All but a 2-mi-wide strip along the quadrangle's southern boundary lies in Sierra County. One of the major uplifts in the southern Rio Grande rift, Caballo fault blocks expose rocks of every geologic system, except the Triassic and Jurassic. Of special interest are thick lower and upper Tertiary orogenic deposits, which together with structural features of the same age, offer a relatively complete record of the nature of the Laramide orogeny and evolution of the Rio Grande rift in south-central New Mexico.

A northwest-trending belt of overturning and thrust faulting exposed in the McLeod Hills in the northeast part of the quadrangle is the structural boundary between the Laramide (latest Cretaceous–early Tertiary) Rio Grande uplift and complementary Love Ranch Basin. The structurally high area to the southwest of the McLeod Hills is demonstrated by an unconformity at the base of the Love Ranch Formation that truncates strata ranging in age from Late Cretaceous to Precambrian. From 3,280 ft to as much as 6,070 ft of strata were removed by erosion.

The modern topography in the McLeod Tank quadrangle is the result of eroded fault blocks—grabens, horsts, and tilted blocks—formed during the Miocene- and Pliocene-age extensional deformation in the southern Rio Grande rift.

The Garfield 7½-min quadrangle directly to the west is described in Bulletin 128.

***Digital Data Series–Database DDS–DB2**—The New Mexico petroleum source rock database, by R. F. Broadhead, M. Wilks, M. Morgan, and R. E. Johnson, 1998. $50.00

The CD–ROM database contains petroleum source rock data on 133 petroleum exploration wells in New Mexico, two outcrop sections in New Mexico, and one exploration well in the State of Chihuahua, Mexico. There are analyses of 3,142 samples from these wells and outcrops. Data include total organic carbon, maturity data, Rock-eval, sample stratigraphy, and lithology.

The database is available in five file formats: Microsoft Access 2.0, 7.0, and 97; Microsoft Excel 5.0; and comma-delimited relational ASCII. To read, the data users will require either a database, spreadsheet, or text program that can read one of the above file formats. Information on the database is documented in Readme.doc. This CD–ROM was produced in accordance with the ISSO 9660 Standard. Minimum system requirements to use this disk are as follows: For IBM or compatible personal computer users, Microsoft Windows 3.1 or later, 8 MB RAM, VGA color monitor (SVGA recommended), CD–ROM drive, and hard disk drive. For Macintosh users, Macintosh running System 7 or later, 13″ color monitor, and CD–ROM drive.

***Postcard**—Generalized geologic map of New Mexico, 1998, scale 1:5,000,000. $0.75

The geology of New Mexico is generalized to 13 rock units, reduced in scale to postcard format, and printed in vivid color. An explanation identifies the rock type and age of each rock-stratigraphic unit. Perfect for short geologic correspondence.

NMGS

***Guidebook 49**—Las Cruces Country II, edited by G. H. Mack, G. S. Austin, and J. M. Barker, 1998, 326 pp. $45.00

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Conference title	Dates	Location	Contact for more information
Los Alamos Geological Society Earth Treasure Show	Dec. 5–6	B. Ehart Sr. Ctr. Los Alamos, NM	Linda Hoffman (505)662-7823 Shari Kelley (505) 661-6171
Tucson Gem & Mineral Society show	Feb. 11–14	Convention Center Tucson, AZ	TGMS Show Comm. P.O. Box 42543 Tucson, AZ 85733 Phone (520) 322-5773
Applied Geologic Remote Sensing	Mar. 1–3	Vancouver, BC	ERIM Intl. Inc., Conferences P.O. Box 134008 Ann Arbor, MI 48113-4008 Phone (734) 994-1200x3234
Albuquerque Gem & Mineral Club show	Mar. 19–21	UNM Continuing Ed. Center Albuquerque, NM	Paul Hlava Access to Gems & Minerals P.O. Box 80784 Alb., NM 87198-0784 Phone (505) 255-5478 E-mail: agatehome@aol.com
New Mexico Geological Society spring meeting (see this issue p. 105 for details)	Apr. 9	Macey Center Socorro, NM	Nelia Dunbar NMBMMR NMT, 801 Leroy Pl Socorro, NM 87801-4796 E-mail: nelia@nmt.edu Virginia McLemore ginger@gis.nmt.edu Mic Heyencamp heyenkam@gis.nmt.edu
AAPG and SEPM annual meeting	Apr. 11–14	San Antonio, TX	AAPG Convention Dept. P.O. Box 979 Tulsa, OK 74101-0979
New Mexico Geological Society 50th Fall Field Conference (see this issue p. 105 for details)	Sept. 22–25	Albuquerque, NM	Frank J. Pazzaglia Dept. of Earth & Planet. Sci. UNM Spencer G. Lucas NM Museum of Nat. Hist.

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