Service/News

Only starred items (*) are available from New Mexico Bureau of Mines & Mineral Resources

New publications

NMBMMR

***Annual Report**—Annual report for the fiscal year July 1, 1982, to June 30, 1983, by F. E. Kottlowski and staff, 36 pp. $3.00

Summarizes Bureau activities and services for the fiscal year. Includes articles on mineral exploration in New Mexico in 1983, mineral and mineral-fuel production in 1982 and 1983, and Upper Cretaceous guide fossil.

***Geologic Map 59**—Geology of South Peak quadrangle, Luna County, New Mexico, by R. E. Clemons, 1985, 1 sheet with text, 2 cross sections, scale 1:24,000

South Peak quadrangle is one of four conterminous 7 ½-min quadrangles mapped in the Florida Mountains in east-central Luna County. GM-59 is the fourth phase of a comprehensive geologic and mineral-resource investigation of the Florida Mountains. It is preceded in publication by GM-52, *Geology of the Florida Gap quadrangle*, GM-56, *Geology of the Capitol Dome quadrangle*, and GM-58, *Geology of the Gym Peak quadrangle*. A comprehensive geologic report, *Geology of the Florida Mountains, Luna County, New Mexico*, will be published as Memoir 43 later this year.

USGS

BULLETINS

1534—Geochemical halos in the Silver City mining region and adjacent areas, Grant County, New Mexico, by K. C. Watts, J. R. Hassemer, and D. F. Siems, 1984, 85 pp.

1537-A—Subdivisions of the Menefee Formation and Cliff House Sandstone (Upper Cretaceous) in southwest San Juan Basin, New Mexico, by R. L. Miller, 1984, pp. A29–A53.

1558-B—Titanium mineral resources of the United States—definitions and documentation, by E. R. Force and L. E. Lynd, 1984, pp. B1–B11.

CIRCULAR

896-D—Earthquakes in the United States, October–December 1982, by C. W. Stover, J. H. Minsch, F. W. Baldwin, and L. R. Brewer, 1984, 33 pp.

MISCELLANEOUS FIELD STUDIES MAPS

MF-1634-A—Mineral resource potential map of the Ryan Hill roadless area, Socorro County, New Mexico, by C. H. Maxwell, A. V. Heyl, C. E. Ellis, and D. C. Scott, 1984, lat. 33°52′30″ to 34°07′30″, long. 107° to 107°15′, scale 1:50,000, 7 pp. text.

MF-1689—Stratigraphic framework structure and general geology of the Salt Lake coal field, Cibola and Catron Counties, New Mexico, by M. W. McLellan, L. R. Biewick, and E. R. Landes, 1984, lat. 34° 30′ to 34°45′, long. 108°37′30″ to 108°52′30″, scale 1:24,000.

PROFESSIONAL PAPER

1281—Palynological evaluation of Cedar Mountain and Burro Canyon Formations, Colorado Plateau, by R. H. Tschudy, B. D. Tschudy, and L. C. Craig, 1984, 42 pp.

Other publications

Salina-margin tepees, pisoliths, and aragonite cements, Lake MacLeod, western Australia—their significance in interpreting ancient analogs, by C. R. Handford, A. C. Kendall, D. R. Prezbindowski, J. B. Dunham, B. W. Logan, 1984: Geology, v. 12, no. 9, pp. 523–527.

Basement control of Tertiary intrusions and associated mineral deposits along Tijeras–Cañoncito fault system, New Mexico, by L. A. Woodward, 1984: Geology, v. 12, no. 9, pp. 531–533.

Cordilleran metamorphic core complexes—Cenozoic extensional relics of Mesozoic compression, by P. J. Coney, T. A. Harms, 1984: Geology, v. 12, no. 9, pp. 550–554.

Reinterpretation of Lime Peak thrust as a low-angle normal fault—implications for the tectonics of southeastern Arizona, by W. R. Dickinson, 1984: Geology, v. 12, no. 10, pp. 610–613.

Sedimentary fluorite in a lacustrine zeolitic tuff of the Gila conglomerate near Buckhorn, Grant County, New Mexico, by R. A. Sheppard and F. A. Mumpton, 1984: Journal of Sedimentary Petrology, v. 54, no. 3, pp. 853–860.

Terrestrial heat-flow estimates from petroleum bottom-hole temperature data in the Colorado Plateau and the eastern Basin and Range Province, by R. E. Eggleston and M. A. Reiter, 1984: Geological Society of America, Bulletin, v. 95, pp. 1027–1034.

Volcanic landforms and ore deposits, by R. H. Sillitoe and H. F. Bonham, Jr., 1984: Economic Geology, v. 79, no. 6, pp. 1286–1298.

Open-file reports

NMBMMR

***147**—Geology of the D Cross Mountain quadrangle, Socorro and Catron Counties, New Mexico, by B. R. Robinson, 1981, 225 pp., 2 tables, 11 figs., 24 pls. $46.50

***207**—Geology and coal resources of the Fence Lake 1:50,000 quadrangle, by F. W. Campbell and G. H. Roybal, 1984, 37 pp., 2 tables, 7 figs., 2 pls. $10.40

***212**—Origin of Riley travertine as constrained by the clay mineralogy of acid- and EDTA-insoluble residues, by J. M. Barker, 1984, 77 pp. $15.40

***213**—Preliminary estimates of recharge at the Navajo mine based on chloride in the unsaturated zone, by W. J. Stone, 1984, 60 pp., 5 tables, 8 figs. $12.00

***214**—Recharge in the Salt Lake coal field based on chloride in the unsaturated zone, by W. J. Stone, 1984, 67 pp., 5 tables, 14 figs. $13.40

***217**—Investigation of alluvial valley floors in the Salt Lake coal area, western New Mexico, by D. W. Love, J. Hawley, and S. Palmer, 1984, 30 pp., 2 tables, 4 figs. $6.00

USGS

***84-663**—Thermal studies at the Brantley damsite on the Pecos River near Carlsbad, New Mexico, J. H. Sass, 1984, 25 pp.

USGS

TOPOGRAPHIC MAPS—NEW (scale 1:24,000)

	yr	lat.	long.	contour (ft)
Cabin Wells (NM–Mex.)	1977–83	31°30′	108°7′30″	20
Campbell Well	1977–83	31°22′30″	108°7′30″	20
Canal Creek (NM–CO)	1978–83	36°52′30″	108°45′	20 10
Chimney Rock	1978–83	36°45′	108°30′	20
Corner Well (NM–Mex.)	1977–83	31°15′	108°7′30″	20
Dog Mountains (NM–Mex.)	1977–83	31°15′	108°15′	20
Double Wells (NM–Mex.)	1977–83	31°37′30″	108°7′30″	20
Eagle Mountain (NM–Mex.)	1977–83	31°15′	108°22′30″	40
Garton Lake	1975–82	32°45′	106°7′30″	10
Guadalupe (NM–Mex.)	1977–83	31°15′	108°52′30″	10
Horse Mesa (NM–AZ)	1978–82	36°37′30″	109°	20 10
Lake Lucero SE	1975–82	32°30′	106°15′	10
Lang Canyon (NM–Mex.)	1977–83	31°15′	108°45′	10
Rattlesnake	1978–83	36°45′	108°45′	20 10
Rocky Point	1978–83	36°45′	108°52′30″	20
Shiprock	1978–83	36°45′	108°37′30″	20 10
Summerford Mountain	1974–82	32°30′	106°45′	10
Tres Hermanos SE	1975–82	32°30′	106°	10
Tres Hermanos SW	1975–82	32°30′	106°7′30″	10
Tucson Spring	1975–82	33°22′30″	106°52′30″	10
Whitewater Creek (NM–Mex.)	1977–83	31°15′	108°37′30″	20
Whitewater Mountains (NM–Mex.)	1977–83	31°15′	108°30′	20

INTERMEDIATE TOPOGRAPHIC MAPS (scale 1:100,000)

	yr	lat.	long.	contour (m)
Alamo Hueco Mountains	1983–83	31°	108°	50
Conchas Lake (BLM)	1978–82	35°	104°	20
Hatch (BLM)	1978–82	32°30′	107°	50
Quemado	1978–83	34°	108°	50
Santa Fe	1982–83	35°30′	105°	50
Villanueva	1980–83	35°	105°	50

REVISED TOPOGRAPHIC MAPS (SCALE 1:250,000)

	yr	lat.	long.	contour (m)
Albuquerque	1978–83	35°	106°	50
Santa Fe	1954–83	35°	104°	200 100

NURE geochemical reconnaissance maps of New Mexico

As part of the National Uranium Resource Evaluation (NURE), approximately 21,000 stream-sediment samples and 13,000 groundwater samples were collected in New Mexico for uranium and multi-element chemical analysis. At the request of the New Mexico Bureau of Mines and Mineral Resources (NMBMMR), the U.S. Department of Energy contracted Bendix Field Engineering Corporation to produce computer plots of NURE geochemical reconnaissance maps for each of the 1° × 2° quadrangles that cover New Mexico—a total of 1,220 maps that present more than 1,000,000 bits of data (Fig. 1).

Each geochemical reconnaissance map includes the following information: quadrangle name, element or other parameter plotted on map (e.g., pH), sample medium (stream sediment or ground water), analytical laboratory (Los Alamos or Oak Ridge), a 1:250,000-scale map with distinctive symbols (maximum of 15) that indicate the incremental concentration of the element at each sample location, a chart of concentration increments and equivalent symbols, a graph of cumulative probability and standard deviation from the median, a percent frequency bar graph, and a summary of basic statistics.

Increment schemes for the geochemical maps (specified by NMBMMR) are intended, as much as possible, to allow maximum resolution of geologically significant geochemical patterns and to permit recognition of both obvious and subtle geochemical anomalies that may indicate favorable areas for mineral exploration. When employed collectively (i.e., *all* the geochemical data is interpreted) and integrated with geological and geophysical data, the NURE geochemical maps can be an important tool in mineral exploration or for mineral-resource assessment. These geochemical maps also can lead to new insights in regional geologic, stratigraphic, hydrologic, and environmental studies.

In addition to detecting uranium provinces, NURE geochemical maps can be useful in detecting favorable areas for copper, lead, zinc, nickel, cobalt, chromium, vanadium, manganese, iron, and silver(?) mineralization; also molybdenum can be detected in southern New Mexico. Unfortunately, gold, tin, tungsten, and niobium maps are of relatively little value because NURE sampling techniques and analytical methods were optimized for uranium. *Guidelines for using NURE geochemical reconnaissance maps of New Mexico* (NMBMMR Open-file Report 218) is included with map orders or may be purchased before any maps are ordered.

Blueline prints of NURE geochemical maps can be purchased from the NMBMMR Information, Resource, and Service Center for $3.00 per map. To order, photocopy Fig. 1; circle which quadrangle and element symbol(s) you want to purchase. (Use a different photocopy for each quadrangle ordered.) Be sure to distinguish the appropriate sample medium (stream sediment or ground water). For each quadrangle there is also a set of sample-location maps that can be purchased for $3.00/map.

—Richard Chamberlin and Virginia McLemore

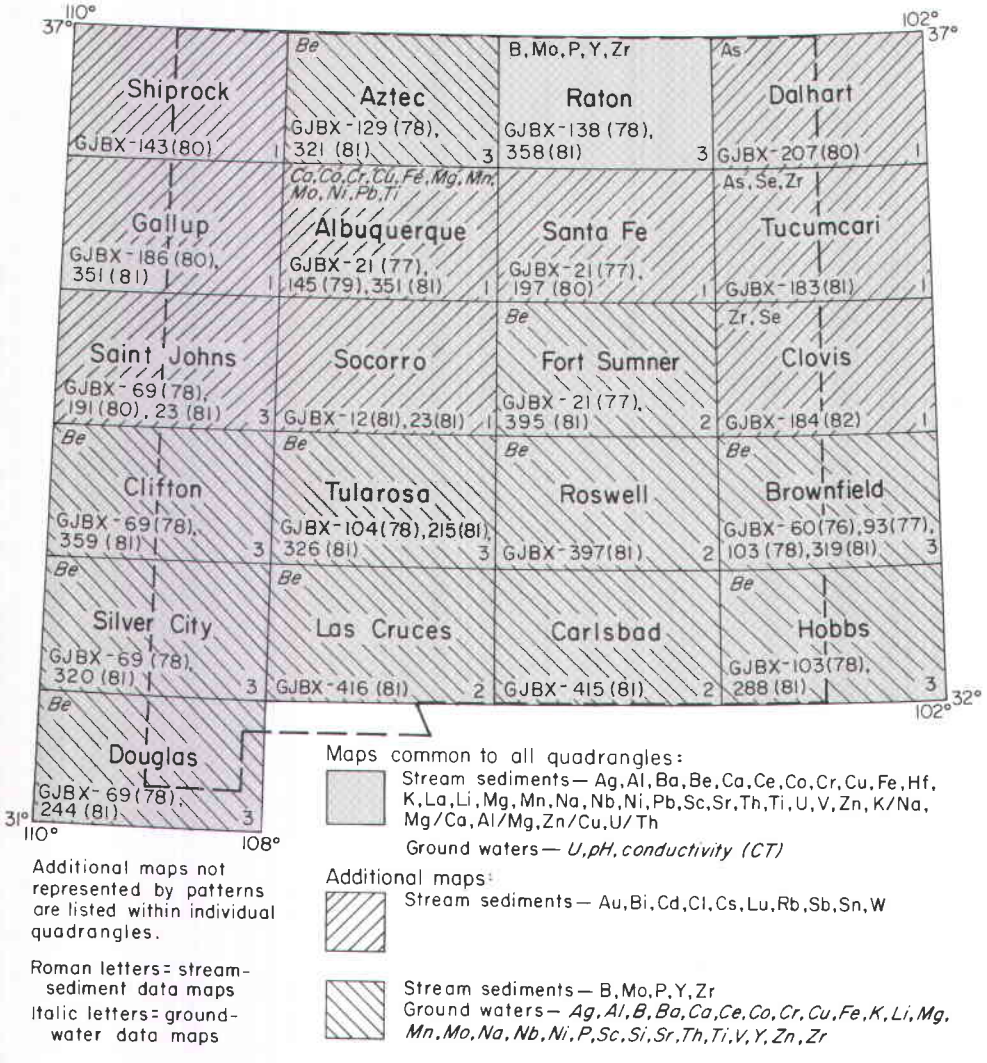

FIGURE 1—Index map for NURE geochemical reconnaissance maps of New Mexico. The "GJBX" number is the reference to the Open-file Report(s) that contain(s) the original, tabulated data for each quadrangle. These are available for examination at NMBMMR. The number in the lower right corner of each quadrangle represents the laboratory or laboratories responsible for collecting and analyzing the samples: **1,** Los Alamos National Laboratory; **2,** Oak Ridge Gaseous Diffusion Plant; **3,** both 1 and 2.

New Mexico Geological Society news

The spring meeting of the New Mexico Geological Society will be held on Friday, April 26, 1985, in the Macey Center, New Mexico Tech, Socorro, from 9 to 5. The annual business meeting will be held that day from 1 to 2 p.m. Symposia or technical sessions that cover many aspects of New Mexico geology are planned for a morning and afternoon session. A cocktail party and banquet will follow the day's activities. Information on registration, accommodation, and other activities planned for this meeting will be mailed to NMGS members this month. Inquiries should be directed to: G. S. Austin, General Chairman, NMBMMR, Campus Station, Socorro, NM 87801; (505) 835–5125.

1985 New Mexico Geological Society field conference

The 1985 New Mexico Geological Society fall field conference will be held September 26–28 in east-central New Mexico (Santa Rosa–Tucumcari Country). Emphasis will be on the stratigraphy, sedimentology, and paleontology of Mesozoic rocks and the Ogallala Formation and on the oil, gas, and uranium resources of upper Paleozoic–Mesozoic rocks. Contributed papers on this area for the guidebook are welcome. For more information contact the conference organizer: S. Lucas, Department of Geology, University of New Mexico, Albuquerque, NM 87131; telephone: 505/277-1646.

Abstracts

New Mexico Mineral Symposium

The purpose of the New Mexico Mineral Symposium is to bring together for an exchange of ideas both professionals and amateurs interested in mineralogy. The 4th symposium was held November 12–13, 1983, at the New Mexico Institute of Mining and Technology, Socorro, New Mexico. Following are abstracts from talks given at the meeting.

Some mineral localities in the Black Range and vicinity, south-central New Mexico, by A. V. Heyl, U.S. Geological Survey, Denver, CO 80225

Many well known mines and mineral localities are in the general region of the Black Range west of Truth or Consequences, New Mexico, and the nearby bedrock areas. The best known locality is Iron Mountain, on the west side of the Black Range, where Richard Jahns has reported the occurrence of nearly 200 minerals including helvite, danalite, fluorescent fluorite, hypogene willemite, and molybdenian scheelite. About 20 mi to the northwest (on top of the range) is Nugget Gulch, one of the best localities for 0.5–5.0 cm diameter, banded, brown nuggets of cassiterite in the form of red, yellow, and brown wood tin. Some make beautiful gems when tumbled and polished. North of NM–52, 1 mi into the Black Range, a wood-gathering road leads northeast into Sheep Canyon where a large wall-forming gold-quartz vein contains some beautiful, coarse amethyst that is suitable for slabbing. Up Turkey Creek and then left up Buster Creek a jeep road leads to the Black Range front. The south fork at the front, if followed one-fourth mi, will lead to an area along the creek in andesite with many amygdaloidal vugs as much as 5 cm across, which contain stilbite and heulandite crystals, some of which are very beautiful. West of Chloride, up Chloride Creek about 2 mi, a well maintained cliff road rises to the south. Over the crest the dumps of the U.S. Treasury mine can be seen and driven to with a four-wheel-drive vehicle. At the northwest end of the dump, across from the old powder house, small flecks of gold can be collected in dark bands of copper and silver minerals in quartz. Twelve mi to the west, up Chloride Creek and near its source, is the Silver Monument mine, where the dumps contain beautiful, massive bornite, freibergite, and (seen under the microscope) native silver. South of the highway to Hillsboro and 2.5 mi east of the town is a passable road down Ready Pay Gulch to the east end of the Percha Creek Box. Here, old vanadium mines have good yellow-buff crystals of type-locality endlichite, orange vanadinite, wulfenite, and descloizite. The Macho district lies 8 mi southwest of Lake Valley, 13 mi northwest of Nutt, and about 0.5 mi west of the Wallace ranch on the north side of Macho Creek. The main dumps have silver-lead sulfides and sphalerite, but the older dumps across the draw to the northeast have good small crystal crusts of endlichite, vanadinite, wulfenite, descloizite, smithsonite, anglesite, hemimorphite, supergene willemite, and, possibly, coronadite.

Epithermal silver mineralization in the Carbonate Creek area, Kingston, New Mexico, by V. M. Canby and R. L. Evatt, New Mexico Institute of Mining and Technology, Socorro, NM 87801

The Kingston district has been historically a producer of base and precious metals, and its enriched lead–zinc–silver deposits have produced phenomenal near-surface oxidized silver ores in the past. The area was extremely active in Tertiary time, typified by an early period of major north–south faulting, followed by intrusion and extrusion of shallow, intermediate to acidic, porphyritic rocks. Finally, there was regional silicification and minor fracturing followed by ore emplacement. Mineralization on Carbonate Creek is of a type that is apparently unique in the area. Argentite (acanthite) float, reportedly in masses up to 200 lbs, was found in Silver Gulch in the early 1880's. Although 80,000 ounces were produced from float alone, extensive development failed to reveal the source of the large masses. The source area of the argentite is in highly altered limestones adjacent to an andesite body, which also is altered in places. Work by the authors using geochemical and other methods has revealed the presence of argentite unevenly distributed within a "replacement" deposit in several members of the Lake Valley limestone. This bed consists almost entirely of fine-grained silica and varying amounts of argentite, almost to the exclusion of other minerals. Minor native gold with high silver content fills cavities and seems to be the last mineral deposited. The deposit is interesting because it appears to be the top of an epithermal system.

Minerals of Point of Rocks—new findings, by R. S. DeMark, Albuquerque, NM

The minerals from Point of Rocks mesa (T. 26 N., R. 26 E.) in eastern Colfax County, New Mexico, were first discussed at the 3rd annual New Mexico Minerals Symposium in November, 1982. New discoveries at Point of Rocks mesa in the intervening months have enhanced further the significance of this unique New Mexico mineral location. The uncommon species found at Point of Rocks: villiaumite, serandite, acmite, searlesite, neptunite, and polylithionite were discussed previously. Since then, the exceedingly rare sulfide mineral rasvumite and the more prosaic sulfide minerals, galena, spalerite and pyrrhotite have been found. Eudialyte, cancrinite, and natrolite also have been identified as occurring in relative abundance. Additionally, the first New Mexico occurrence of the mineral lorenzenite has been established. These minerals, plus additional unknown species, portend that Point of Rocks mesa will soon rank as one of the most prolific New Mexico locations for mineral species.

Data on vug minerals from Point of Rocks, New Mexico: lorenzenite, searlesite, and cancrinite, by P. J. Modreski, U.S. Geological Survey, Denver, CO 80225

Lorenzenite, searlesite, and cancrinite are three of the uncommon minerals that occur as euhedral crystals in the phonolite sill that forms Point of Rocks mesa, Colfax County, New Mexico. These minerals are contained in late-stage gas cavities up to several cm in size, which are lined with projecting crystals mainly of alkali feldspar, acmite, and nepheline. The lorenzenite is a niobium-bearing variety, $Na_2(Ti,Nb)_2Si_2O_9$; it forms brown, transparent prisms less than 1 mm long. Lorenzenite was known previously from several alkalic massifs in the U.S.S.R., Norway, Narsarsuk, Greenland, and Mont St. Hilaire, Quebec. Searlesite, a borosilicate, $NaBSi_2O_5(OH)_2$, forms colorless prismatic to bladed crystals as much as 2 cm long. It is previously known only from boron-containing evaporite beds in California, Nevada, Wyoming, and the U.S.S.R. Cancrinite occurs in alkalic, silica-poor igneous rocks, often with nepheline and sodalite. At Point of Rocks, it forms cylindrical or tapering hexagonal prisms as much as 2 cm long and 0.5–1.0 mm thick. Some of these crystals consist of a core of transparent or violet-tinged cancrinite (about 0.15 mm in diameter) that is surrounded by a layer of gray, inclusion-filled natrolite about 0.10 mm thick and covered by an outer layer of colorless, subhedral analcime about 0.02 mm thick. The cancrinite family is a group of hexagonal alkali aluminosilicate minerals, with the general formula $(Na,Ca,K)_{6\text{-}9}(Si,Al)_{12\text{-}24}[(SO_4),(CO_3),(Cl,OH)_2]_{2\text{-}4}\cdot nH_2O$, which differ according to the dominant cations present (Na or Ca), anions present (CO_3, SO_4, Cl, or OH), and details of the crystal lattice (space group and number of atoms per unit cell). Point of Rocks cancrinite appears to belong to the species cancrinite *sensu strictu*. The formula inferred from microprobe analysis is near $Na_8Al_6Si_6O_{24}(CO_3)_{0.8}(SO_4)_{0.3}$; it corresponds to 29–33 mole percent of the sulfatian end-member, vishnevite. The cancrinite is uniaxial (−) with ε = 1.494 and ω = 1.500.

Of bridal chambers, jewelry shops, and crystal caverns—A glimpse at New Mexico's mining camps, characters, and their mineral treasures, by R. W. Eveleth, New Mexico Bureau of Mines and Mineral Resources, Socorro, NM 87801

Mineral collectors today, whether we be miner, prospector, engineer, geologist, or just plain enthusiast, are actively involved in preserving a small part of our natural history whether we realize it or not. Although collecting has obviously taken the back seat to the quest for ore, few who have been involved with minerals in one endeavor or another have not been moved to gather a cabinet of nature's treasures. Just how long has this phenomena been going on? Perhaps since the first human bent to pick up a sky-blue or dense red stone and wondered where it came from. Here in the area we currently call New Mexico, diligent research would undoubtedly reveal that the Spanish collected copper minerals from the Santa Rita del Cobre some 200 years ago. And documentary evidence currently on hand can take the reader/listener on an armchair journey spanning nearly 150 years to places with exotic names like Santo Domingo de las Calzadas, Mount Chalchiutl, and Pinos Altos as well as the others mentioned above. The journey exposes us to both heroes and villains of the past and reveals a brief glimpse into their daily lives.

Collecting history of the Hansonburg mining district, Blanchard claims, by Jerry Ostrom, Enchanted Mesa Minerals, Belen, NM

Since 1881, there has been interest in the mineral possibilities of the Oscura Mountains, which are located about 10 mi south of Socorro and about 35 mi east of San Antonio. The Blanchard mine is located about 9 mi south of Bingham, New Mexico, and it is this location that is of particular interest. The presentation was divided into three parts: a brief history of what has been written about the territory; a few anecdotes about collecting at the site; and some slides about how the site looked in the past, how it looks at the present time and some pictures of minerals from the location.

Mineralogy of the carbonatites and barite–fluorite–sulfide veins in the eastern Lemitar Mountains, Socorro County, New Mexico, by V. T. McLemore and R. M. North, New Mexico Bureau of Mines and Mineral Resources, Socorro, NM 87801

Paleozoic carbonatites (minimum age 449 m.y. ± 16 m.y.) intrude the Precambrian rocks exposed in the eastern Lemitar Mountains, Socorro County.

Carbonatites are unique carbonate-rich rocks of apparent magmatic origin, and they are characterized by a distinct but variable mineralogy, chemistry, and associated alteration. The Lemitar carbonatites occur as dikes, stockworks, and veins, and they display textures, mineralogy, chemistry and wall-rock alteration typical of carbonatite complexes. They contain greater than 50% carbonate minerals and varying amounts of apatite, magnetite, pyroxene, and other accessory minerals. Despite variations in texture of the Lemitar carbonatites, they can be grouped on the basis of mineralogy and mode of emplacement as: 1) silicocarbonatite dikes; 2) sovite (greater than 90% calcite), ravhaugite (greater than 90% dolomite), and carbonatite veins; 3) ankerite–dolomite carbonatite dikes; and 4) stockwork carbonatites. Barite–fluorite–sulfide veins occur in the vicinity of the carbonatite dikes and locally occur with some carbonatites. The primary mineralization of the veins is barite, fluorite, galena, sphalerite, quartz, and small amounts of chalcopyrite, pyrite, and calcite. Many of the veins contain silver. Subsequent alteration has produced wulfenite, hemimorphite, cerussite, hematite, and a small amount of malachite, chrysocolla, and anglesite. Barite–fluorite–galena mineralization is common in central New Mexico and is considered to be Tertiary in age. This mineralization is probably formed by the expulsion of basinal brines along fractures related to the Rio Grande rift. However, it is possible, that some of the barite mineralization in the Lemitar Mountains is related to the carbonatites and is of Paleozoic age. The presence of carbonatites in the Lemitar Mountains also may have tectonic significance. Carbonatites are commonly associated with continental rifts or lineaments and the carbonatites in Socorro County support current theories of rifting occurring as early as the Precambrian or Paleozoic. Other carbonatites and alkalic rocks in New Mexico and Colorado are similar in composition and age to the Lemitar carbonatites, which further supports Precambrian or early Paleozoic rifting.

PRECAMBRIAN ROCKS OF THE RATTLESNAKE AND PEDERNAL HILLS, TORRANCE COUNTY, NEW MEXICO, by J. R. D. Setter, KRITI Exploration, Inc., Houston, TX 77024

Fabric mapping, petrographic and geochemical studies in the Rattlesnake Hills (RH) and Pedernal Hills (PH) have shown that two different tectonostratigraphic assemblages may be present. The RH compose an area of scattered exposure (approximately 50 km^2) of medium-grade quartzo-feldspathic augen gneisses and subordinate mylonite gneisses, which are consistently foliated south–southeast with moderate to steep dips. Small, subvertical aplite veins trend south–southeast along with the axial planes of en echelon, ptygmatic quartz veins. Originally mapped by Kelley (1972) as schists and granite gneisses, the RH appear to be lithologically distinct from the PH. Quartz-muscovite-staurolite and quartz-muscovite-kyanite schists, alkali granites, amphibolites, and quartzites, which are foliated parallel to layering east–northeast (approximately 300 km^2), form the PH. Also, the minor hematite-malachite-chalcopyrite mineralization, characteristic of portions of the PH, was not found in the RH. However, the RH are assumed contemporaneous with the 1.4 b.y. age assigned to the metamorphic rocks of the PH (Mukhopadhyay et al., 1975). Additional tectonic analysis of Precambrian structures shows the presence of shallow (15–20°), easterly thrust in the northern portion of the PH. The kinematics of this event currently are highly speculative, although field evidence suggests that these shallow thrusts postdate the high angle, north-trending thrusts of Laramide age. K–Ar dating, in progress on a previously unmapped, fresh, unsheared intrusive body of basalt in the RH, revealed an age of 848 ± 42 m.y., which helps to constrain further the structural deformational history of the RH–PH Precambrian terrane.

NOTES ON UNUSUAL MINERALS FROM THE HARDING PEGMATITE, by Paul Hlava, Sandia Laboratories, Albuquerque, NM

Most people who collect at the Harding pegmatite are familiar with the common minerals and the major ore minerals of the mine. Mixed in with these are small, rare grains of more unusual minerals, such as the bismuth minerals, that most collectors miss or do not recognize. Minerals, and some features of their chemistry, discussed are native bismuth, bismuthinite, bismutite, bayerite, spessartine, zircon, thorite, and bertrandite and pucherite and mottramite, which are new records for the Harding pegmatite.

AN OVERVIEW OF THE MINERALOGY OF BISBEE, ARIZONA, by Richard Graeme, Sharon Steel Corporation, Hanover, NM 88041

Bisbee, Arizona, is truly the classic North American mineral locality. During the near century of its operation, literally hundreds of thousands of fine specimens were produced and preserved. From a relatively simple geologic environment, an impressive array of more than 200 distinct species, including six new ones were produced. This talk was a broad overview of the history, geology, and more notable species that, combined, have made the name Bisbee synonymous with fine minerals.

AZURITES FROM THE HANOVER NO. 2 MINE, GRANT COUNTY, NEW MEXICO, by R. W. Graeme, IV, and D. L. Graeme, Hanover, NM 88041

The Hanover No. 2 mine in Fierro, Grant County, New Mexico, lately has been the source of a great many small, but fine, azurite rosettes. This azurite occurrence is very similar in geologic environment to other localities that have produced similar specimens. Unfortunately, little has been done to document the features that allow the development of this form. The purpose of this discussion was to fill this longstanding void.

COLLECTION OF SMALL MINERAL SPECIMENS, by Les Cubit, Socorro, NM 87801

This talk was a general discussion about collecting different sized specimens, advantages and disadvantages of each with emphasis on small specimens, and idiosyncrasies of collectors and how those idiosyncrasies affect their collections. Slides of some of the world's most exotic small minerals that occur in the southwest U.S. were shown.

Staff notes

(continued from page 20)

that the Arco No. 1 Fitzpatrick petroleum test will be drilled in southwestern Hidalgo County in the Pedregosa Basin area.

A resolution approved at the New Mexico Mining Association's annual meeting praised and supported NMBMMR's efforts. The September *Geological Society of America Bulletin* contained an article by Roberta Eggleston and Marshall Reiter entitled *Terrestrial heat-flow estimates from petroleum-hole temperature data in the Colorado Plateau and the eastern Basin and Range Province*. Deborah Shaw represented NMBMMR at the Governor's Career Development Conference for Women. Gary Johnpeer gave a talk at the Association of Engineering Geologists on "Coal mine subsidence in New Mexico."

At the New Mexico Mineral Symposium, held in Socorro in November, Bob North and Ginger McLemore gave a talk on "Geology and mineralogy of El Cuervo Butte barite–fluorite–galena deposits in Santa Fe County," and Bob North gave a talk on "Geology and mineralogy of Bear Mountains mining district in Socorro County." Judy Vaiza, Zana Wolf, Norma Meeks, Vicki Pollmann, and Carol Hjellming helped Bob North set up the symposium; New Mexico Tech President, Larry Lattman, gave the banquet address. The Southwest AAPG section will meet in the Ruidoso area in 1986; preliminary plans for a field trip to see the Cretaceous rocks and coal deposits of that area, under the direction of Art Bowsher, field trip chairman, are being made by JoAnne Osburn, Brian Arkell, Orin Anderson, and Bill Cobban.

Bob Weber attended the Mogollon conference in Las Cruces. Dave Love was NMBMMR's (and New Mexico's) representative at the Western States Seismic Policy Council in Sacramento; he is also on the steering committee of the New Mexico Mapping Advisory Committee. Don Wolberg is a nominee for secretary of the Paleontologic Society; he is also vice-chairman of the Society of Vertebrate Paleontologists' Government Liaison Committee. Don and Rick Lozinsky are helping Peter Greene of the State Park and Recreation Division plan the scientific display at the Elephant Butte State Park headquarters.

The New Mexico Coal Surface Mining Commission, chaired by Frank Kottlowski, upheld Director Ed Kelley's (Mining and Minerals Division, NMEMD) decision to cancel the Arroyo No. 1 Mine permit; Frank is serving on the Office of Technology Assessment Advisory Panel, which reviews technologies for surface mine reclamation on western federal lands.

The SME-AIME meeting is planned for October 1985 in Albuquerque; George Austin and Jim Barker are on the Program Committee; Mike Harris will lead a field trip to the Ortiz gold mine, Jim Barker will lead a field trip to the Jemez area, and George Austin will lead a field trip to the Grants uranium district. Lynn Brandvold, NMBMMR's representative on the Water Quality Control Commission, reports that WQCC is working on Project LUST, Leaking Underground Storage Tanks.

John Hawley was NMBMMR's representative at the Governor's Conference on the Environment; Gary Johnpeer, John Hawley, Dave Love, and George Austin attended the meetings of the Hazardous Waste Management Society, and Jim Barker represented us at the meeting of the Landsman Association.

The latest oil and gas production figures for August 1984 were given to Bob Bieberman by Dick Stamets (who replaced Joe Ramey as Director of the Oil Conservation Division). They showed continuing increase in production of crude oil and a spring-through-summer increase in production of natural gas in New Mexico.

Bob Eveleth and Diane Murray have transmitted the final report on the CRIB project to USGS. Gretchen Roybal and Brian Arkell located and cleared drilling locations for the Coal Quality study in the San Juan Basin. Mickey Wooldridge worked with George Austin and Jiri Zidek in planning cooperative projects with U.S. Bureau of Mines on mineral potential of federal lands. Sales of NMBMMR and NMGS publications are above budget; the sales are handled by Norma Meeks and overseen by Lois Devlin. □

New Mexico Bureau of Mines and Mineral Resources staff notes

Irean Rae joined the staff as a Drafter; Nanette Dynan resigned as Secretary/Receptionist for the Information, Resource, and Service Center and was replaced by Marie Chavez; Danny Bobrow was hired as Paleontologic Curator. Jacques Renault had served 20 years in September and Lynn Brandvold 19 years in November.

A report on the mineral potential of Torrance County was prepared for BLM by Ginger McLemore with cooperation from Dick Chamberlin, George Austin, JoAnne Osburn, Gary Johnpeer, Ron Broadhead, Bob North, Kathy Campbell, Linda Wells-McCowan, James Brannan, Deborah Shaw, Lynne McNeil, and Lisa Zangara. Mineral potential of the general Sandoval–Bernalillo Counties area for BLM was in final draft, prepared by the same cooperators with additional aid by Gretchen Roybal, Sam Thompson, Lynn Brandvold, and Dave Menzie.

JoAnne Osburn's Geologic Map 55, which describes the geology of the Pueblo Viejo Mesa quadrangle in Socorro and Cibola Counties, was published with drafting by Linda Wells-McCowan and editing by Steve Blodgett. We received the NURE geochemical maps of the 21 quadrangles that cover the state, a total of 1,220 maps; these are available from Dick Chamberlin and Ginger McLemore (*see* p. 17). Jim Barker's Open-file Report 212 describing the origin of the Riley travertine is available. Circular 193, written by Ron Broadhead and entitled *Subsurface petroleum geology of the Santa Rosa Sandstone in northeastern New Mexico*, was published with help from Jiri Zidek, Jim Brannan, and Lynne McNeil.

Chuck Chapin has been selected as an AAPG 1985–86 Distinguished Lecturer; he will discuss Eocene wrench faulting and associated syntectonic structures in the southern Rocky Mountains. Bulletin 109, entitled *Bibliography of New Mexico geology and mineral technology 1976–1980*, was co-written by Dana Adkins-Heljeson and Candace Holts, with very considerable aid by Jane Love. Dick Chamberlin led a field trip into the Lemitar Mountains to show petroleum geologists the characteristic faults of that range. Rousseau Flower's report, *New species and structures in Narthecoceratidae (Nautiloidea, Orthocerida)*, was published in the July issue of Paläontologische Zeitschrift.

John Hawley gave a talk to the Colorado Geological Society in Golden entitled "Late Neogene history of southern New Mexico." Rick Lozinsky spoke about the Late Cretaceous dinosaurs in the McRae Formation at the Northern Arizona Symposium in Flagstaff, a paper he had co-written with Adrian Hunt, Don Wolberg, and Spencer Lucas. The August 1984 *Geological Society of America Bulletin* included John Hawley's comments on receiving the Kirk Brian award with L. H. Gile and R. B. Grossman.

JoAnne Osburn gave a talk on the Crevasse Canyon Formation of the Datil Mountains coal field area at the SEPM meeting in San Jose. Numerous Bureau personnel aided at the State Fair exhibit, including Bob North, Diane Murray, Carol Hjellming, Jane Love, Dave Love, Gary Johnpeer, Kathy Campbell, Jim Barker, Bob Eveleth, Dave Menzie, Ron Broadhead, and Orin Anderson. Pricelist 18, Open-file List 3, and announcement cards 41, 42, and 43 were prepared by Carol Hjellming.

Open-file Report 214, by Bill Stone, is entitled *Recharge in the Salt Lake coal field based on chloride in the unsaturated zone*. Bob Eveleth's talk at the Sigma Xi annual meeting was "Socorro, the mining center of the southwest." Mike Harris worked on leach tests of gold ore from Lincoln County. Bob Eveleth picked up the Howard Rothrock collection of books from Howard's relatives in Silver City.

Mineral-potential reports for the BLM on Cibola, Valencia, McKinley, and San Juan Counties are in the planning stage by Ginger McLemore and George Austin. Bill Stone's talk at the Hydrology seminar was on "Estimating ground water recharge from chloride in the unsaturated zone."

The New Mexico Geological Society field trip near Taos, the AIME meeting in Denver, and the GSA meeting in Reno were attended by numerous Bureau staff members. Norma Meeks and Orin Anderson made publications available at the NMGS meeting. Jim Barker coordinated and chaired a borite symposium at the AIME meeting. At the GSA meeting, John Hawley presented a poster entitled "Identification of possible sites in New Mexico for disposal of hazardous waste"; Dick Chamberlin and Bob Osburn's poster was entitled "Character and evolution of extensional domains in the Socorro area of the Rio Grande rift." Jamie Robertson met with the SEG Council concerning the short-course volumes.

Jane Love and Deborah Shaw wrote a paper entitled *Media-conversion services and products*. This paper, on guidelines to make computer systems compatible for manuscript processing, was presented at the Association of Earth Science Editors meeting. Bill Stone's Open-file Report 213, which describes the ground-water recharge at the Navajo mine, is available; Bill's conclusions were presented to OSM in Denver. John Hawley and Dave Love visited the Deming area to examine the earth cracks caused by withdrawal of ground water.

Frank Kottlowski will receive an Honorary Membership in AAPG at the March national meeting. Bob Eveleth gave a talk to the Cooney Mining Club entitled "History of mining in Socorro County." The Bureau coal analytical laboratory participated in a round-robin of chemical analyses with excellent results thanks to careful work by Frank Campbell and his crew. Bob North visited Grants to give advice about setting up their Mining Museum.

Ron Broadhead talked at the IOCC meeting in Santa Fe on "Petroleum exploration targets in New Mexico" and Paige Christiansen described the history of petroleum exploration in the state. Bob North visited the Newberry Library to obtain mining reports for the Information, Resource, and Service Center. Sam Thompson has been informed

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