Service/News

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

New publications

NMBMMR

***Scenic Trip 10**—Southwestern New Mexico: Las Cruces, Deming, Lordsburg, Silver City, Columbus, by R. E. Clemons, P. W. Christiansen, and H. L. James, 1980, 120 p., 1 table, 74 figs. *Includes five road logs that discuss the geology, mining operations, history, and scenic attractions of the area. Completely revised in 1979; incorporates Scenic Trip 5, now out-of-print.* $4.00

USGS

BULLETINS

1451—Mineral resources of the Gila Primitive Area and Gila Wilderness, New Mexico, by J. C. Ratté and others, 1980, 229 p.

PROFESSIONAL PAPERS

P 1124-A-F—Shorter contributions to mineralogy and petrology, 1979—Part B, Potassium-argon ages from the Mount Taylor volcanic field, New Mexico, by P. W. Lipman and H. H. Mehnert, 1980, 57 p. (Separate chapters not available).

NTIS

MLM-2514—Assessment of the radiological impact of coal utilization I. Preliminary studies of Western coal, by C. E. Styron and others, 1979, 98 p.

PB-128 762—Interim data report on the geohydrology of the proposed Waste Isolation Pilot Plant site, southeast New Mexico, by J. W. Mercer and B. R. Orr, 1979, 188 p.

PB-300 827—Ground water in the vicinity of Capulin, New Mexico, by D. L. Hart, Jr., and C. Smith, 1979, 64 p.

PB-301 134—Hydrologic data on channel adjustments, 1970 to 1975, on the Rio Grande downstream from Cochiti Dam, New Mexico, before and after closure, by J. D. Dewey, F. E. Roybal, and D. E. Lunderburg, 1979, 540 p.

Open-file reports

NMBMMR

***111**—Exploratory drilling in the Datil Mountain coal field, by S. J. Frost, D. E. Tabet, and F. Campbell, 1980, 53 p., 7 figs. $3.45

***114**—Description of cuttings from Navajo water wells in New Mexico, 1978 and 1979, by W. J. Stone and R. Jackson, 1980, 26 p. $5.20

***117**—Data base and review of paleofaunas and floras of the Fruitland Formation (Late Cretaceous), San Juan Basin, with interpretive observations and age relationships, by D. Wolberg, 1980, 72 p. $14.40

***118**—Cenozoic stratigraphy and structure of the Socorro Peak volcanic structure, central New Mexico, by R. M. Chamberlin, 1980, 2 vol., 533 p. $112.60 incl. maps

***119**—Geology of the west flank of the Magdalena Mountains south of the Kelly mining district, Socorro County, New Mexico, by P. Allen, 1980, 61 p. $12.10 incl. map

USGS

79-838—Estimates of undiscovered oil and gas, Permian Basin of west Texas and southeast New Mexico, by G. L. Dolton and others, 1979, 118 p.

79-1496—Effects of uranium development on erosion and associated sedimentation in southern San Juan Basin, New Mexico, by M. E. Cooley, 1979, 25 p.

79-1499—Surface water environment in the area of the San Juan Basin regional uranium study, New Mexico, Arizona, Utah, and Colorado, by M. W. Busby, 1979, 64 p.

79-1500—Water use in the area of the San Juan Basin regional uranium study, New Mexico, Arizona, Utah, and Colorado, by M. W. Busby, 1979, 21 p.

80-77—Preliminary geologic map of the Twin Lakes quadrangle, McKinley County, New Mexico, by R. S. Zech, 1980, scale 1:24,000

80-103—Leasable mineral and waterpower land classification map of the Brownfield quadrangle, Texas, New Mexico, compiled by D. A. DeCicco and E. D. Patterson, 1980, scale 1:250,000

80-104—Leasable mineral and waterpower land classification map of the Santa Fe quadrangle, New Mexico, compiled by D. A. DeCicco and E. D. Patterson, 1980, scale 1:250,000

80-184—Measured stratigraphic sections of the upper coal-bearing part of the Cretaceous Menefee Formation in the Kin Klishin Ruins quadrangle of northwestern New Mexico, by R. B. O'Sullivan, 1980, 34 p.

80-377—Polarization of geomagnetic bay-type disturbances in the Rio Grande rift, by J. N. Towle, 1980, 67 p., 51 figs.

80-383—Upper Paleozoic depositional and diagenetic facies in a mature petroleum province (a field guide to the Guadalupe and Sacramento Mountains), by P. A. Scholle and R. B. Halley, 195 p., 2 map sheets, scale 1:250,000

U.S. Department of Energy

GJBX SERIES

GJBX-65(80)—Aerial radiometric and magnetic survey, Aztec national topographic map, New Mexico, prepared by Geodata International, Inc., 1980

Theses—NMIMT

The following theses and independent studies on New Mexico geology were completed by geoscience students at New Mexico Institute of Mining and Technology from December 1978 to December 1979 (the list does not include theses available as open-file reports from NMBMMR or NMIMT):

Anderholm, S. K., Hydrogeology and water resources of the Cuba quadrangle, Sandoval and Rio Arriba Counties, New Mexico

Brod, R. C., Hydrogeology and water resources of the Ambrosia Lake-San Mateo area, McKinley and Valencia Counties, New Mexico

Cima, J., Physical properties of selected scoria cones in New Mexico

Davis, P., Estimation of recharge from springflow data for a portion of the Roswell artesian basin

Fisher, R. A., A biogeochemical study of the recent calcite deposits along the Lucero uplift, Valencia County, New Mexico

Hoy, R. N., Stable isotopes in the waters of the Roswell groundwater basin

Loehr, C. A., Mineralogical and geochemical effects of basaltic dike intrusion into evaporite sequences near Carlsbad, New Mexico

McLafferty, S. W., Depositional environments in the transition from Mancos Shale to Mesaverde Group near Carthage, Socorro County, New Mexico

Montoya, A. H., Aspects of oil accumulation in Silurian-Devonian rocks in southeastern New Mexico

Russell, J. A., Refractory clay resources of the Burro Canyon(?) Formation-Dakota Sandstone, north-central New Mexico

Siemers, W. T., The stratigraphy, petrology, and paleoenvironments of the Pennsylvanian System of the Socorro region, west-central New Mexico

Updegraff, C. D., Parameter estimation for a lumped-parameter groundwater model of the Mesilla Valley, New Mexico

Wilcox, R. W. III, The Socorro and Sedillo Spring ground-water system

Abstracts

Geoscience Research Symposium, NMIMT, April 12, 1980

Ten papers were presented at this first geoscience graduate-student research symposium. Abstracts of those papers dealing with New Mexico are printed below. Other papers included: Solution chemistry of molybdenum at elevated pressures and temperatures, by R. W. Smith; Stochastic analysis of two-dimensional steady groundwater flow, by S. A. Mizell; The geology of the Chloride mining district, Mojave County, Arizona, by L. G. Eaton; A geochemical study of the low-grade metamorphic zone in the Tonota arm of the Tati greenstone belt, northeast Botswana, by S. J. White; Stable oxygen isotopic study of the cherts, western DeLong Mountains, Alaska, by R. D. Harrover; and Geology of the Mayo-Darle tin deposit, Cameroon, by F. R. Nguene.

PRECAMBRIAN GEOLOGY OF THE COW CREEK ULTRAMAFIC COMPLEX, SAN MIGUEL COUNTY, NEW MEXICO, by B. Wyman

The only known occurrences of ultramafic rocks in New Mexico are exposed in two separate areas along Cow Creek near the town of Pecos. Both areas were mapped in detail (scale 1:6,000) during the summer of 1979. Over 100 rock samples were collected, from which 24 were selected for whole-rock and trace-metal geochemistry and 50 thin sections were cut and examined.

Preliminary geochemical data indicate that the two separate exposures (called Area 1 and Area 2) of mafic and ultramafic rocks are chemically distinct. Ultramafic and mafic rocks of Area 2 contain 6 and 7 percent more total iron (expressed as total Fe_2O_3) and 10 and 4 percent less MgO respectively, than the ultramafic and mafic rocks of Area 1. Further differences are well illustrated on the AFM diagram and various other chemical plots. In Area 1 the amphibolites appear to be genetically related to the associated ultramafic rocks based primarily on whole-rock chemistry and to a lesser extent on field relations. The ultramafic rocks of Area 2 may be either xenoliths or more mafic cumulates in a mainly amphibolitic terrane. Field and petrographic data are inconclusive at present.

Field and petrographic data indicate that the mafic and ultramafic rocks of Area 1 are intrusive rather than extrusive. This conclusion is based primarily on textural similarities and differences between the rocks of Area 1 and other metamorphosed intrusive and extrusive volcanic rocks described in the literature. Volcanic rocks of the nearby Pecos greenstone belt are chemically similar to the amphibolites of Area 2 (upper Cow Creek) but not to those of Area 1. Mafic and ultramafic rocks of Area 1 may not be related to the rocks of the Pecos greenstone belt or may represent the older and deeper core of the Pecos greenstone belt volcanic pile. Data is inconclusive at present.

PROTEROZOIC SEDIMENTATION AND TECTONIC EVOLUTION OF THE CORKSCREW CANYON SEQUENCE IN THE LEMITAR MOUNTAINS, SOCORRO, NEW MEXICO, by V. T. McLemore

Precambrian rocks crop out along the eastern flanks of the Lemitar Mountains and consist of a sequence of recrystallized and metamorphosed sediments, the Corkscrew Canyon sequence. This sequence is intruded by mafic dikes, the Lemitar diorite/gabbro, granitic rocks, and carbonatite dikes. Granitic rocks intrude the sediments at the base and the top of the sequence. The Corkscrew Canyon sequence consists of two stratigraphic units—an upper unit and a lower unit—although the age relationship is uncertain because of poor exposures and east-west faults. The lower unit consists of a massive arkose (less than 75 percent quartz) to subarkose (75-90 percent quartz) and is gradational with the overlying upper unit consisting of foliated and interbedded arkoses,subarkoses, and quartzites (more than 90 percent quartz). The sediments are high in SiO_2 (greater than 62 percent) and have low SiO_2/Al_2O_3 ratios and K_2O/Na_2O ratios equal to or greater than one, similar to young arkoses and lithic arenites.

Relict bedding is distinguished from foliation by color and textural contrasts. Relict crossbedding and graded bedding in the upper unit indicate that the sequence youngs to the east. Relict bedding and foliation are poorly exposed in the lower unit and are locally preserved along the southern intrusive contact with the granitic rocks.

The abundance of quartz and feldspar indicates a source area consisting of granite or gneiss, and bedding structures suggest a fluvial or deltaic environment. Petrographic and geochemical studies are consistent with deposition in either a continental-rift setting or a rapidly rising continental-margin setting. Quartzite beds in the Corkscrew Canyon sequence may reflect either a local tectonically stable environment or localized reworking of quartzo-feldspathic sediments in a high-energy environment.

FACTORS CONTROLLING WATER COMPOSITION OF THE RIO GRANDE, CENTRAL NEW MEXICO, by R. W. Smith and C. J. Popp

The Rio Grande in central New Mexico is characterized by high loads of suspended sediments and high total dissolved solids. Quantitative evaluation of major solutes and pH has been carried out on an irregular basis at 13 sampling sites between 1972 and 1978. In addition, the minerals present in the suspended sediments were determined by x-ray diffraction. A computer code, WATEQF, was used to chemically model the river water and to determine saturation indices for several ideal minerals. This modeling suggests that the Rio Grande is saturated with calcite and is also equilibrated with kaolinite, illite, and Mg-beidellite. Furthermore, the variation of major solutes in the river may be explained in terms of evaporation, selective dissolution of soil salts by rain water, and the interaction of water with the suspended sediment load.

FLUID INCLUSION AND MICROCHEMICAL ANALYSIS OF THE HANSONBURG MISSISSIPPI VALLEY TYPE ORE DEPOSITS IN CENTRAL NEW MEXICO, by B. R. Putnam III

Heating and freezing of both primary and pseudosecondary inclusions in quartz and fluorite yield a range of temperatures that delineate zonations and trends through the paragenetic sequence. These trends indicate potential source areas and flow directions of the fluids responsible for the mineralization. The homogenization temperatures range from 140-200° C and are characterized by fluids saturated in Na^+, Ca^{++} – Cl^- brines with commonly over 17 eq. weight percent NaCl. Microchemical analysis of these fluids yields concentration data that vary along with the change in mineralogy through the paragenetic sequence but that in general reflect concentrations reported from a number of Mississippi Valley type deposits. The location of this deposit directly on the margins of the active Rio Grande rift may shed important light on the genesis of these deposits elsewhere in the world.

Announcements

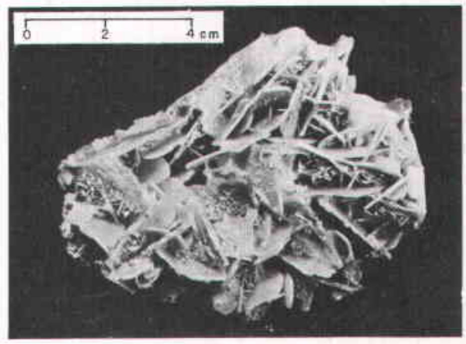
Second Annual New Mexico Minerals Symposium

The second annual New Mexico Minerals Symposium will be held October 25 and 26 at New Mexico Institute of Mining and Technology. Students, interested laymen, and professionals are invited to attend. Papers related to mineral occurrences in New Mexico will be presented in two sessions on October 25. A field trip is planned for October 26. Registration cost is $2.00 per person. Those interested should contact: Ramon S. Demark, 9012 Hilton Ave., NE, Albuquerque, NM 87111 (505-296-1332) or Robert M. North, New Mexico Bureau of Mines and Mineral Resources, Socorro, NM 87801 (505-835-5246).

Ground-water publication

W.K. Summers and Associates, Inc., has published the first issue in a new series entitled *W.K. Summers' Ground-Water Notebook*. The May 1980 issue discusses "Using hydrochemical plumes to explore for lenticular orebodies" by W.K. Young of W.K. Summers and Associates, Inc., formerly with the New Mexico Institute of Mining and Technology. Future issues of the *Ground-Water Notebook* will include other articles dealing with the behavior of fluids in rocks. Topics to be covered will deal with practical applications; theory; and such special interests as water supply, waste disposal, and geothermal features. Anticipated publication is three to six issues per year. The first issue can be obtained free by writing to W.K. Summers and Associates, Inc., P.O. Box 684, Socorro, NM 87801, or by calling 505/835-2095.

New Mexico's minerals



WULFENITE, $PbMoO_4$. ORGAN MOUNTAINS, DOÑA ANA COUNTY, NEW MEXICO
Crystal system: tetragonal. Hardness: 2
Specific gravity: 6.8 ±. Cleavage (011) distinct.
Color: yellow, orange, red; streak white.

Wulfenite (named for X. F. Wulfen, Austrian mineralogist) is a popular species among mineral collectors, probably because it is colorful and commonly occurs as well-formed crystals. Wulfenite occurs in the oxidized zone of lead deposits, commonly associated with cerussite ($PbCO_3$), vanadinite ($Pb_5(VO_4)_3C$), and pyromorphite ($Pb_5(PO_4)_3C$). The specimen pictured is from the Stevenson–Bennett mine in the Organ Mountains, Doña Ana County, New Mexico. *Photo by Mark R. Leo*

New Mexico GEOLOGY
• Science and Service
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