

# New Mexico Geological Society

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## ***Front Matter***

*(Usually includes Dedication, President's Message, & Conference Organizer's Message.)*

*in:*  
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*This is a section from the 2000 NMGS Fall Field Conference Guidebook.*

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## **Annual NMGS Fall Field Conference Guidebooks**

Every fall since 1950, the New Mexico Geological Society (NMGS) has held an annual [Fall Field Conference](#) that explores some region of New Mexico (or surrounding states). Always well attended, these conferences provide a guidebook to participants. Besides detailed road logs, the guidebooks contain many well written, edited, and peer-reviewed geoscience papers. These books have set the national standard for geologic guidebooks and are an essential geologic reference for anyone working in or around New Mexico.

### **Free Downloads**

NMGS has decided to make peer-reviewed papers from our Fall Field Conference guidebooks available for free download. This is in keeping with our mission of promoting interest, research, and cooperation regarding geology in New Mexico. However, guidebook sales represent a significant proportion of our operating budget. Therefore, only *research papers* are available for download. *Road logs*, *mini-papers*, and other selected content are available only in print for recent guidebooks.

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# Southwest Passage

## A Trip Through the Phanerozoic

### **E d i t o r s**

Timothy F. Lawton  
Nancy J. McMillan  
Virginia T. McLemore

George S. Austin, *Managing Editor*  
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New Mexico Geological Society  
Fifty-first Annual Field Conference  
October 18-21, 2000

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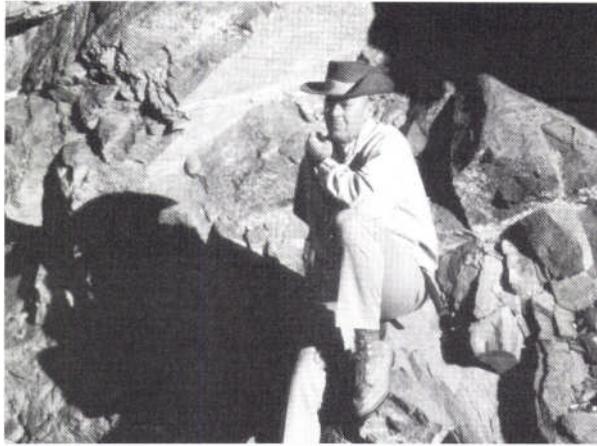
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## DEDICATION



Russ Clemons, 1980 Trans-Pecos NMGS

*Labor Day 1986: A geology graduate student, an untested junior professor, and a senior faculty member strike out in the pre-dawn darkness for the Animas Mountains in the far southwest corner of the state. The mission: a quick measured section of the Ringbone Formation, for the appendix of the thesis. A short stop at Bosa Donuts on Valley and Avenida de Mesilla for coffee and carbohydrates, and we're on the road, mixing it up with a few big rigs. Few other drivers are on the road at this hour. The senior geologist, a soft-spoken man with no hair, a slight New England accent and a broad-brimmed hat with one side of the brim turned up, Aussie-style, points out the geology in every range and every unseen exploration well on the three-hour drive. The rocks are interesting, but the day is uneventful. Uneventful, until we find that the Suburban won't start—the lights were left on in the morning daylight. Three attempts at push starting the elephantine vehicle fail, and the graduate student and eager new hire jog to a not-so-nearby ranch, where we are given a pickup and jumper cables. In returning the rig to the rancher, the senior faculty member is bitten on the thigh by the ranch-house dog, but the geologist seems remarkably unperturbed. Afterward, we stop in the village of Animas for much-deserved refreshments, prudently take the back road along the border to Columbus, then north to Deming in the gathering twilight. All the way, non-stop, the normally quiet man points out every geologic feature in all the ranges.*

Russ Clemons carried a big, well-traveled rock hammer, possessed a keen eye for detail and held an abiding, wide-ranging interest in geology. He was a mentor with infectious enthusiasm and a love of his craft. This 51st field conference is dedicated to the memory and spirit of Russ Clemons, who created much of the geologic knowledge that we have of southern New Mexico, and forever influenced the way we think about that geology.

Russ received his B.S. and M.S. degrees in geology from UNM in 1960 and 1962, respectively. He worked under the supervision of Vin Kelley, mapping with UNM student Donald McLeroy in the region of the Sierra Madre near Torreon. He received his Ph.D. in geology in 1966 from the University of Texas at Austin. At UT, under the supervision of Bill Muchlberger, Russ mapped an area of 500 km<sup>2</sup> along the Polochik fault in southwestern Guatemala. He took a temporary position at the University of Texas at Arlington, then Arlington State College, in 1965, and advanced to Assistant Professor in 1967. In Arlington, he met Frankie Clemons, and they married in 1968. Recruited by former UNM classmate Bill Seager, he began as an Associate Professor in the Department of Earth Sciences at New

Mexico State University in 1969.

Had Russ been a fisherman, it would have been said that he cast a wide net. Of his nearly 100 scholarly publications, no fewer than fifteen are geologic quadrangles and maps, five of them quadrangles in Mexico and Guatemala. His geologic mapping in New Mexico was primarily done in Luna and Doha Ana Counties, within and near the region covered by the 2000 Field Conference. He published on such diverse topics as the regional geology and stratigraphy of Guatemala, regional geology, stratigraphy and geochronology of southern New Mexico, and carbonate petrology of the El Paso Group. A structural geologist by training, he taught himself volcanology and carbonate petrology, topics encountered along the way in a career as a field geologist.

His service to the New Mexico Geological Society is now legend. He served as President, was chairman of the map committee which designed the New Mexico Highway Geologic Map, and co-edited three guidebooks (1975, 1978, and 1986), each of which is now a classic. In 1979, he was elected to honorary membership in the society.

These highlights understate the impact of a man who spoke softly but firmly, and usually only said things once, because that was usually sufficient. His almost laconic style probably derived from an upbringing in New England. All of us, past and present in variously titled geology departments at NMSU, count Russ as a mentor and benefactor. He led by example, not by coercion. Even after retirement, he maintained an office that he frequented and came to department meetings to offer advice if such was solicited. Perhaps his longest-ranging contribution to New Mexico geology was the establishment in the late 1980s of the R. E. and F. D. Clemons Field Endowed Scholarship, available each year to a graduate student contemplating a field-based project in New Mexico. Already, a decade of young geologists has received assistance from the field scholarship. In his vision of future generations of field geologists, Russ lives on.

*Tim Lawton*

For further reading: Seager, W. R., 1994, Russell E. Clemons: 1930-1994: *New Mexico Geology*, v. 16, p. 78.

## PRESIDENT'S MESSAGE

The 51st New Mexico Geological Society Fall Field Conference allows us to revisit the geologically intriguing and historically significant southwestern part of the state after more than a decade. Much new research has been completed and fresh insight gained in the area since the 39th field conference was held there in 1988. The trip will feature rocks spanning the Proterozoic to Recent so there's bound to be something of interest for everyone. This year, an unprecedented pre-meeting fieldtrip will be led to the Redrock Wildlife Refuge in the Burro Mountains by Virginia McLemore and will visit famous mineralized zones in the area. Co-chairmen, Timothy Lawton (Guidebook Editor), Nancy McMillan (Conference Chair), and Virginia McLemore (Road Log Chair), have organized a *tour de force* through the fascinating and complex geologic framework of this area. The Society and fieldtrip participants are indebted to this year's Chairs for assembling this outstanding series of geologic stops through the area. Muchas gracias.

We owe tremendous thanks to our guidebook Managing Editor, George Austin, who will retire from this illustrious post after this year. George has taken on the challenging task over the past several years of trying to bring the Society and its contributors into the digital age of publishing. Through all the glitches and frustrations involved in this metamorphosis we can see progress was made and has opened a new pathway for the Society.

The Society is indebted to the New Mexico Bureau of Mines and Mineral Resources (NMBM&MR) for both financial and personnel support that insures the success and high quality of the NMGS Fall Field Conference, meetings, and publications. We've enjoyed working with the new Director of the NMBM&MR, Dr. Peter Scholle, this past year and look forward to a continued supportive and collaborative relationship in the future. We thank Norma Meeks at the NMBM&MR for handling all the publication sales, mailings, membership renewals, and conference registration. Special thanks to the 2000 Annual Spring Meeting Co-chairman, Nelia Dunbar (General Chair), Virginia McLemore (Program Chair) and Brian Brister (Registration Chair) for organizing a truly outstanding meeting this year. With 5 jam-packed oral presentation sessions

and nearly 30 poster presentations, this year was the largest meeting yet. We also enjoyed a special presentation by astronaut Dr. James D. Reilly on "Space Exploration: Lessons Learned on the Rocks in New Mexico".

The NMGS continues to be financially stable, particularly in our scholarship holdings, irrespective of the highly volatile financial market of the new millennium. This year the NMGS will award more than \$20,000 to undergraduate and graduate geoscientists at New Mexico universities and more than \$5,000 to K-12-age aspiring geoscientists.

Early next year will bear the fruits of two long-term NMGS projects, the publication of a substantially revised New Mexico Geologic Highway Map and a special publication on the "Geology of New Mexico." The map project has been spearheaded by Frank Kottowski and Bob Newcomer. The special publication has been edited by Greg Mack, Virgil Lueth, and me.

The NMGS is one of the most active geological societies in the country and I'd venture the "world." We rely completely on the countless hours of hard work by our volunteers for this honor. Ask any former or present Fall Field Conference Chair, Managing Editor, Annual Spring Meeting Chair, or Executive Committee Member about their experience and they'll probably say through gritted teeth that it was tough, but definitely worth the effort. I encourage you all to become involved in this great Society and family of geoscientists and lend us your talents. We New Mexicans are a very lucky lot, because not only do we have the best rocks, but also we have the best assemblage of geoscientists lookin' at 'em. As always on a Fall Field Conference, enjoy the geology, enjoy the scenery, enjoy the heritage of our fair state and don't forget to enjoy the people with whom you're sharing them.

*Kate Giles*

## EDITORS' MESSAGE

Welcome to the Southwest Passage, the arid steppes and mountains of southwestern New Mexico's Basin-and-Range Province. Dry and windy, high and lonesome: this region's descriptors do not elicit comfort, yet the area has been a key crossroads as long as we have knowledge of human transit. On the trade route between the opulent kingdoms of the Toltecs and the scattered thirteenth-century settlements of the San Juan River, the country sustained the great city of Paquime in what is now northwestern Chihuahua and the Mogollon hamlets that served as way stations for traders between Mesoamerica and the interior frontier. It has been as well an important east-west route between the plains and the coast, hosting the Comancheros, the Butterfield Stage and next the Southern Pacific linking the maturing economies of the eastern seaboard with the adolescent wealth and talent of California, and finally, the ribbon of Interstate 10. Historically, it was a wide country anchored by the settlements of Tucson and El Paso, with only small villages along the way to serve as havens for rest and water. Picture yourself with clogged fuel injectors and no cell phone, on foot or horseback, and suddenly the region is vast. Few other parts of the Cordillera offer vistas beyond the vanishing point such as the plains west of Deming and New Mexico Highway 146 south to Hachita.

The country is a geographic crossroads as well. In this transition from the Colorado Plateau to the vast broken basin-and-range country of Chihuahua, the scant water that falls, as if confused by the complicated topography, is unable to carve a decisive route to the sea. The Rio Casas Grandes and Mimbres River fall from high volcanic fields only to wander into the huge playas of the border country. Drainage from the Bootheel runs south into Sonora's Rio Yaqui, and into the dry lakes of Laguna los Moscos, Animas, and Playas. The Gila River skirts north of the region, striking into the huge drainage basin of the Colorado River. Almost unnoticed, the Continental Divide wanders ambivalently through the country.

This cultural and geographic crossroads owes its existence to the geologic transitions, both north- and west-trending, that lie here. This is the broken back of the once-contiguous Sierra Madre-Mogollon volcanic field of the Cenozoic. Interstate 10 follows the edge of the mid-Mesozoic Bisbee basin that lay south of basement highlands of the Mogollon-Burro uplift. This is the edge of the late Paleozoic Pedregosa basin, the spine of a north-trending earliest Paleozoic alkalic igneous trend, and the early Paleozoic miogeoclinal-platform boundary. This is the southern sweep of Laramide uplifts and basins, largely concealed in the mosaic of basins and ranges that overprint them. The geologic record of these transitions is superposed and complex. Each range

seems to hold a different story, an exposure here and there, a separate piece of the puzzle, and each piece essential to understanding of the country's geologic evolution. The ranges to be visited on this field conference only begin to hint at the complex history of this extraordinary region.

The journey through the Phanerozoic of the 51st NMGS field conference actually begins in the Proterozoic, with a supplemental pre-meeting trip to examine the granites and magma mixing in the basement rocks of the Burro uplift. The first day route traverses the Pyramid Mountains near Lordsburg to visit the Lordsburg Mining District, ash-flow tuffs in the range, and hydrothermal sites associated with the western range-bounding fault. The second day features the Little Hatchet Mountains, with an overview of the Eureka Mining District in the northern part of the range, an assessment of recent discoveries and advances in the Mesozoic stratigraphy and igneous history, and a stop at a skarn deposit formed at an intrusive contact of Tertiary granite and Paleozoic carbonate rocks. An optional final stop provides an overview of the mineral deposits and structure of the Victorio Mountains on the way to Deming, the host town for the final night of the conference. The third day route visits Cambrian alkalic basement exposures and low-angle faults of controversial affinity in the Florida Mountains. The final stop is at a classic magma-mixing locality in the range.

This guidebook would not have been possible without technical support from the New Mexico Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology, and without material financial and technical support from the Institute of Tectonic Studies at New Mexico State University. Institute personnel Stephanie Furgal and Yvette Lopez provided computer and drafting assistance for the road logs and many of the articles in the volume. John Kennedy, New Mexico Water Resources Institute, supplied the satellite images for Days 2 and 3 road logs routes. Russell Mott printed the black and white photographs for the Day 2 road log, and Bob Diven made the charcoal drawings on the front cover and throughout the guidebook. George Austin and Jim Barker tirelessly formatted the guidebook and checked it for errors. We thank these individuals for their talented assistance.

*Tim Lawton, Virginia McLemore, and Nancy McMillan*

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## FIELD CONFERENCE SCHEDULE

### Tuesday, October 17, 2000—Registration for Pre-meeting Field Trip Participants

6:00-8:00 p.m. Registration at Holiday Inn Express, Lordsburg, NM (dinner not provided)

### Wednesday, October 18, 2000—Pre-meeting Trip, Travel, and Registration Day

6:00-7:15 a.m. Breakfast (not provided)  
 7:15 a.m. Rendezvous at Holiday Inn Express, Lordsburg  
 7:30 a.m. Pre-meeting caravan trip to Redrock Wildlife Refuge leaves Holiday Inn Express, Lordsburg (lunches provided)  
 5:00 p.m. 4:00- Caravan returns to Lordsburg  
 8:00 p.m. 6:00- Registration: El Charro Restaurant, Lordsburg  
 9:00 p.m. Ice-breaker party, El Charro Restaurant, Lordsburg

### Thursday, October 19, 2000—First Day, round trip from Lordsburg and return

6:00-7:15 a.m. Breakfast (not provided)  
 7:00-7:30 a.m. Registration, Holiday Inn Express, Lordsburg  
 7:15 a.m. Rendezvous at Holiday Inn Express Lordsburg  
 7:30 a.m. Four-wheel-drive (4WD) caravan depart Holiday Inn Express, Lordsburg (lunch provided)  
 5:30 p.m. Caravan arrives at Steins for barbecue (provided)  
 9:00 p.m. Return to Lordsburg; vehicles return individually

### Friday, October 20, 2000—Second Day, Lordsburg to Deming

6:00-7:15 a.m. Breakfast (not provided)  
 7:15 a.m. 7:30 a.m. All vehicles rendezvous at Holiday Inn Express, Lordsburg  
 All vehicles depart Holiday Inn Express and drive to Egg Nest in Hachita; non-4-WD vehicles remain and 4-WDs take participants for the field trip (lunch provided); vehicles retrieved en route to Deming after stops  
 5:30 p.m. 7:30- Caravan arrives at Grand Motor Inn, Deming  
 9:00 p.m. Annual banquet (provided), Grand Motor Inn, Deming

### Saturday, October 21, 2000—Third Day

6:00-7:45 a.m. Breakfast (not provided)  
 7:45 a.m. Rendezvous at Grand Motor Inn, Deming  
 8:00 a.m. Caravan departs Grand Motor Inn, Deming (lunches provided)  
 2:00 p.m. End of field conference on NM-11 south of Deming; participants depart

### CREDITS

**Front Cover:** Building in Old Hachita, New Mexico. Drawing by Bob Diven from a photograph by Tim Lawton. Front cover design by Yvette Lopez.

**Inside Front Cover:** Thematic mapper image of southwestern New Mexico provided and processed by David Shearer, University of Texas at El Paso. Line interpretation (facing page) by Tim Lawton and Yvette Lopez. Trip routes for each day shown on the line interpretation.

**Inside back Cover:** Stratigraphy and geologic history of Southwest Passage, compiled by T. F. Lawton, 5/2000

**Frontispiece:** Spires of Eocene Rubio Peak Formation, Florida Mountains, New Mexico. Drawing by Bob Diven from a photograph by Nancy McMillan.

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