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Front Matter

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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.

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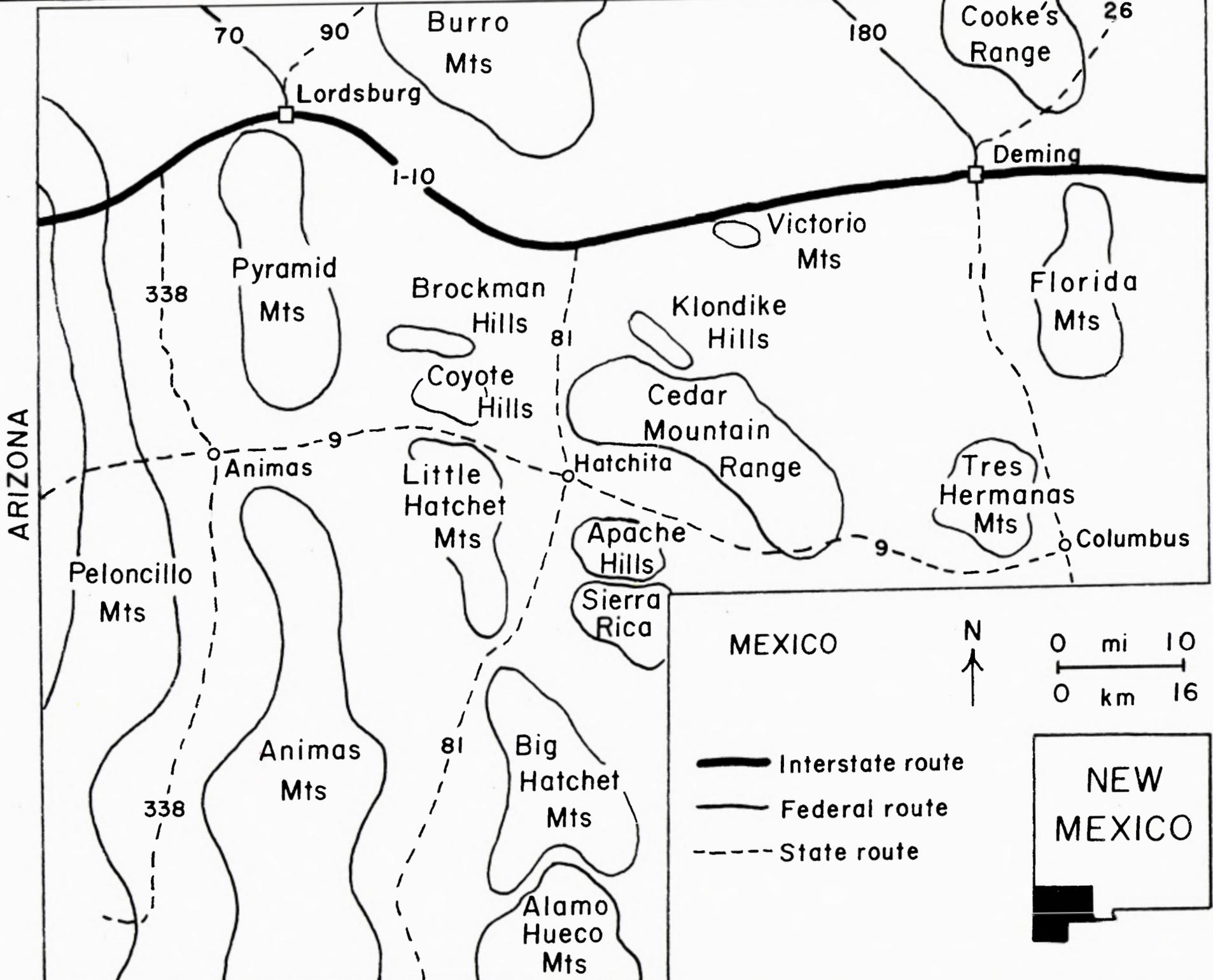
NMGS has decided to make peer-reviewed papers from our Fall Field Conference guidebooks available for free download. This is in keeping with our mission of promoting interest, research, and cooperation regarding geology in New Mexico. However, guidebook sales represent a significant proportion of our 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.

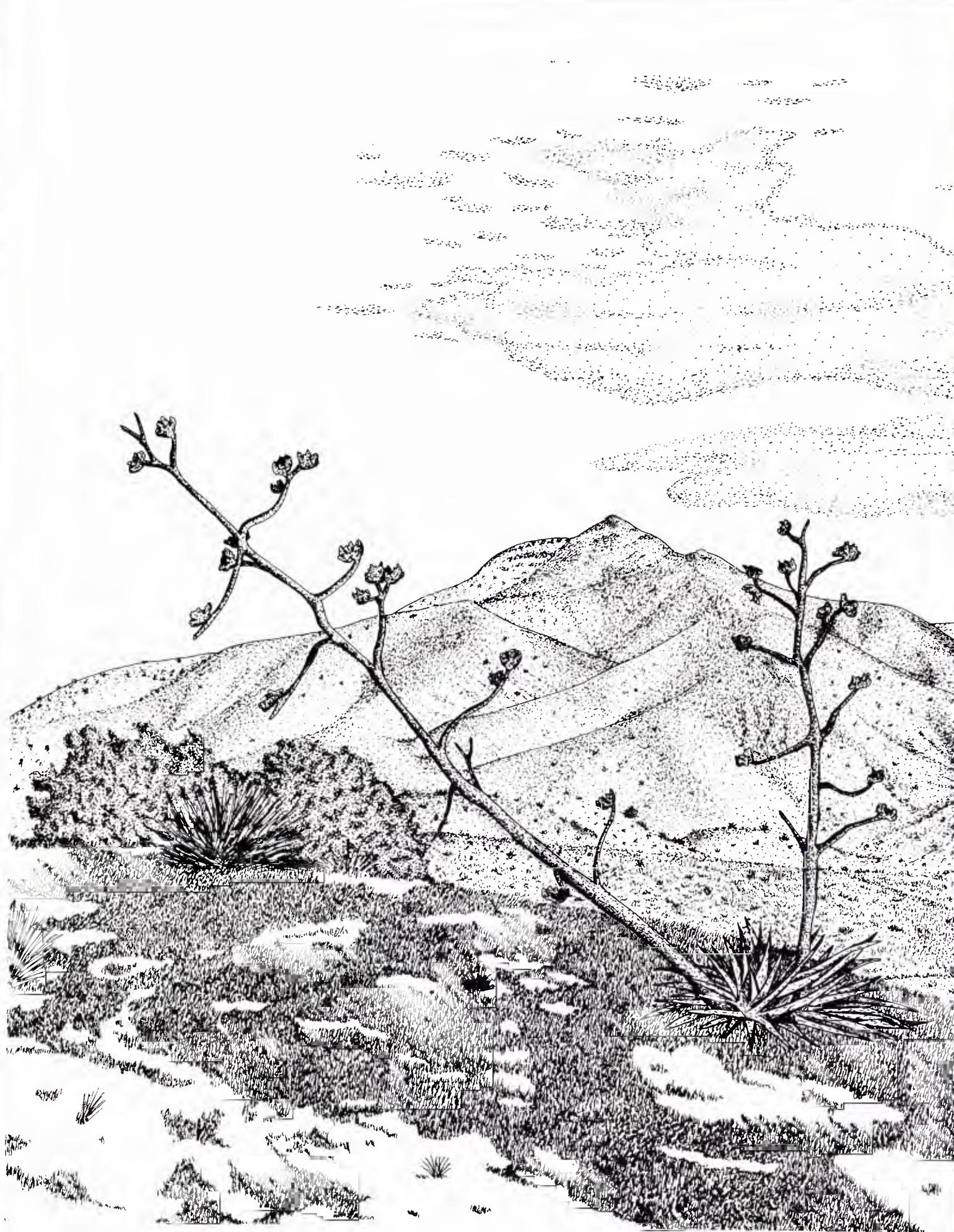
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Cretaceous and Laramide Tectonic Evolution of Southwestern New Mexico

Editors

GREG H. MACK
TIMOTHY F. LAWTON
SPENCER G. LUCAS



New Mexico Geological
Society Thirty-ninth
Annual Field
Conference,
October 5–8,
1988





Capitol Dome from ridge south of Tubb Spring, Florida Mountains. View is due north. Capitol Dome, a prominent landmark near the north end of the Florida Mountains, is an erosional remnant of andesitic lava flows and pyroclastic rocks of Tertiary age. Slopes below the Rubio Peak to left of Capitol Dome are underlain by Lobo, Montoya, El Paso and Bliss formations, in descending order. In right half of photo Rubio Peak overlies Lobo that was deposited on uplifted block of Upper Cambrian syenite; slope in foreground also on the syenite. Site of Stop 3, Day 1. Tubb Spring is at the base of the ridge beyond the small cleared area at left center. Numerous rounded clumps of shrubby mesquite and sparse grass cover the slightly dissected alluvial fan in the middle of the photograph. Sotol, cactus and abundant grass are present in the foreground. Camera station is in SW¹/₄ NW¹/₄, sec. 14, T25S, R8W. Altitude about 1520 m. W. Lambert photograph No. 87L23. 20 July 1987, 5:44 p.m., MDT.

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Wolfgang E. Elston

DEDICATION

The 1988 New Mexico Geological Society Guidebook is dedicated to Wolfgang E. Elston, Professor of Geology, University of New Mexico. Wolf's interest in and contributions to our understanding of the geology of southwestern New Mexico span almost 40 years. In 1950, he began field work in the Dwyer quadrangle northwest of the Cooke's Range as a doctoral student at Columbia University. His dissertation, completed in 1953, was published as Bulletin 38 by the New Mexico Bureau of Mines and Mineral Resources in 1957, the year he arrived at UNM after a two-year term on the faculty of Texas Tech.

Wolf's doctoral studies early directed his attention to the complex Tertiary volcanic terrane of the Mogollon-Datil subprovince, and much of his work during the past 30 years has been devoted to the distribution, petrology, origin and regional relationships of the ash-flow tuff (ignimbrite) flows and other volcanic units that characterize this area and adjacent parts of southwestern New Mexico. By 1968, three cauldrons were identified as probable sources of some of these volcanics, and the unique features of this volcanic field began to be recognized. Subsequent work by Wolf, about 30 of his graduate students and several colleagues has suggested that nearly 30 cauldrons, some among the largest in the world, were active in southwestern New Mexico during mid-Tertiary time. Moreover, understanding of the surficial geology of the cauldron remnants, the structure and history of individual cauldrons, the relationships of the "ignimbrite flareup" to plate movements and the effects of this volcanic activity on mineral and geothermal resources have proceeded apace. Our views on the Tertiary history of this area have truly undergone a profound change in the past three decades, a revolution that Wolf inspired and continues to lead.

Research on the mid-Tertiary cauldrons of southwestern New Mexico was brought together and summarized in two volumes published by the New Mexico Geological Society—Special Publication No. 5 (1976) and No. 7 (1978), both co-edited by Wolf. Moreover, he has contributed numerous papers and road logs to NMGS guidebooks over the years, as well as serving as Treasurer (1961-1963) and President (1963-1964) of the Society. It is perhaps noteworthy that the number of years Wolf has been studying New Mexico geology, beginning in 1950, corresponds exactly to the number of yearly guidebooks the New Mexico Geological Society has published—a serendipitous coincidence that underscores his long involvement in the activities of the Society.

In addition to his work on mid-Tertiary cauldrons, Wolf has also been involved in studies of such diverse subjects as the economic geology of central New Mexico, the geology of Mars, and the origin of the Bushveld Complex in South Africa. He has been adviser and mentor to dozens of students, many of whom have continued to study volcanic phenomena after leaving graduate school. In recognition and appreciation of his contributions to the discipline of geology, to our understanding of the geologic history of southwestern New Mexico, and to the New Mexico Geological Society, this 39th NMGS Guidebook is dedicated to Wolf Elston.

Barry S. Kues

PRESIDENT'S MESSAGE

On behalf of the Executive Committee and everyone who has contributed to this event, I wish to express my pleasure that you have elected to attend the thirty-ninth annual Fall Field Conference of the New Mexico Geological Society. I feel very confident that you will enjoy studying the geology of beautiful mountainous southwestern New Mexico during the three-day field symposium. Although the major emphasis of the conference will be on Cretaceous stratigraphy and Laramide tectonic evolution, a multitude of other geologic phenomena will be examined in road logs, technical papers, discussions and friendly disagreements.

I hope that you will read the page in this guidebook which lists the personnel of the conference committees. It has been the custom over the thirty-nine consecutive years that the Society has held field conferences to have one of the major New Mexico institutions take primary responsibility for organizing the conference. This year the faculty and graduate students of New Mexico State University are highlighting the results of their research in the study region. In addition, manuscripts and contributions from many other geologists enlarge the body of knowledge regarding this delightfully complex area. As usual, we acknowledge the solid support of the New Mexico Bureau of Mines and Mineral Resources; support so helpful to the Society that it is never to be taken for granted.

When given the opportunity to write a message to the membership, the president should, I believe, describe the state of the Society as he perceives it. Many of my remarks will relate to financial matters and ongoing activities.

Despite the most prolonged and deep recession in the mineral industries in my memory (and colleagues claim that I have been around since the Pennsylvanian), your Society is in good health. Although membership has dropped from a high of about eight hundred in the days of wine and roses, largely as a function of fewer geologists paying dues at field conferences, other vital signs of the organization remain stable to vigorous. We continue to fund student grants-in-aid at a level of about \$6,500 to \$7,500 a year and award the Frank E. Kottowski Fellowship of \$1,000 annually. Further, we award scholarships for the field conference, support flag persons and give cash awards at the State Science Fair. Our Scholarship Committee for 1988 consists of Christina Lochman-Balk, Rhea Graham and Robert Myers, an impartial group not on any university payroll.

We are particularly indebted to Beverly Wellnitz for her generous contributions to the Society scholarship funds in memory of her late husband, Bob. Another Wellnitz Scholarship will be awarded at the banquet ceremonies during this conference.

Shortly after attending our Northeastern New Mexico Field Conference last year, Lucille H. Pipkin of Roswell sent a sizable check to be added to the scholarship fund. Since she has expressed a desire to help needy undergraduate students, we have, of course, honored her wishes in making our 1988 awards.

Depending upon the bond-market fluctuations in any given month, our total scholarship funds recently have ranged in the neighborhood of \$76,000 to \$77,000 total. We have averaged a rate of return that has exceeded money-market or short-term certificate-of-deposit investments. Our Financial Committee is composed of Robyn Wright, Jerry Mueller and Jamie Robertson.

During 1987, sales of Society publications earned approximately \$40,000. Richard Chamberlin, our capable and conscientious Publications Chairman, estimates that we will have a higher level of sales in 1988. Norma Meeks and Jill Collis are of tremendous aid to us in handling publication sales and other Society business transactions. While discussing publications, it should be noted that the time is almost at hand to reprint the New Mexico Highway Geologic Map, our best-selling publication.

At the time of writing this message, it is still too early to tell what the guidebook advertising revenue will be, but I can state that it will be sufficient to offset meaningfully some of the costs of the field conference. I believe that we need to intensify significantly advertising campaigns in order to help ensure the financial solvency of the Society. When the next "boom period" comes, advertisements will be easy to obtain, and the revenue will really help our scholarship fund and publication reprinting program. I urge future Executive Committees to keep the advertising in the guidebooks. Please patronize this year's advertisers and/or thank them.

I again want to thank the Los Alamos Geological Society for continued support for student field-conference scholarships. Our Los Alamos friends have been very good to the Society. During the field trip, please take the opportunity to thank them.

The spring meeting was very successful with over one hundred participants in attendance and a program of thirty-four papers. We owe special thanks to Gretchen Roybal, William Chavez and James Barker for organizing a splendid meeting and to Clay Smith for presenting a clever and enlightening keynote address. It is certainly gratifying to observe the fact that many graduate students who receive Society financial aid give papers related to their research projects.

If you have looked critically at the last few guidebooks, you have undoubtedly noticed that the Executive Committee has adopted the policy of dedicating the book. This year we are pleased to honor Wolfgang Elston, a member of the University of New Mexico faculty, for extensive excellent research in southwestern New Mexico. This is recognition well-deserved and long overdue!

The 1989 Fall Field Conference is a project of geologists from the New Mexico Bureau of Mines and Mineral Resources and will be held in west-central New Mexico in the Gallup-Grants area on the southeastern margin of the Colorado Plateau. A call for papers was issued in May, and it is to be hoped that you received it. If you wish to write a paper or contribute in any way, please get in touch with Orin Anderson or Richard Chamberlin at the Bureau. We welcome your assistance.

Finally, it has been a pleasure to serve as president of one of the best, if not *the* best, state geological societies in the nation, and I thank you for the opportunity.

William E. King

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FIELD CONFERENCE SCHEDULE

Wednesday, October 5 Registration Day

5:00-9:00 p.m. Registration: Grand Motor Inn, Deming, NM. 5:00-?
Cocktail party: Grand Motor Inn, Deming, NM.

Thursday, October 6 First Day

7:15 a.m. Rendezvous in parking lot of Luna Cotton Co-op Gin, west side of Columbus Highway (State Highway 11), south of Deming.
7:30 a.m. Caravan departs for first day's tour (lunch provided).
5:30 p.m. Caravan returns to Deming.
7:00 p.m. Barbecue dinner at Luna County Ranchette Owners Association Hall.
9:00 p.m. Return to Deming.

Friday, October 7 Second Day

7:45 a.m. Rendezvous in parking lot behind the Susi Belle Lounge at the corner of Pine and 1 1th Street, west side of Deming.
8:00 a.m. Caravan departs for second day's tour (lunch provided).
5:30 p.m. Caravan returns to Deming.
7:30 p.m. Banquet at Grand Motor Inn.
8:30 p.m. Speaker: Dr. William R. Dickinson, University of Arizona.

Saturday, October 8 Third Day

7:45 a.m. Rendezvous in parking lot behind the Susi Belle Lounge at the corner of Pine and 11th Street, west side of Deming.
8:00 a.m. Caravan departs for third day's tour (lunch provided).

CREDITS

Front Cover: Drawing of the northern end of the Florida Mountains by Randy Pence from a photograph by R. E. Clemons.

Front End Sheet: LANDSAT false-color composite image of southwestern New Mexico and corresponding map of major topographic features and highways drafted by G. H. Mack.

Title Page: Drawing of Hachita Peak by Randy Pence from a photograph by T. F. Lawton.

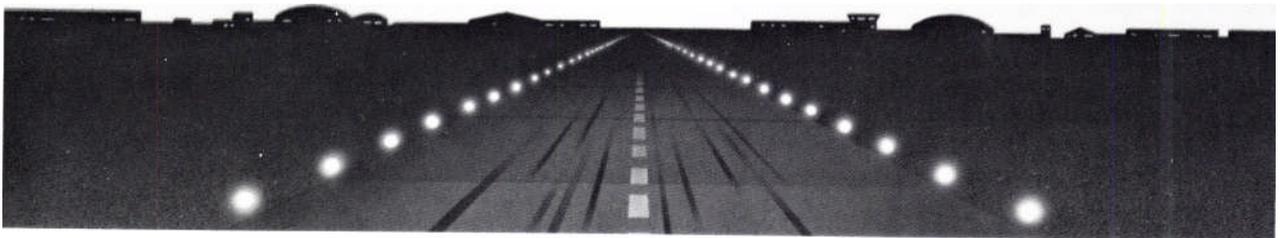
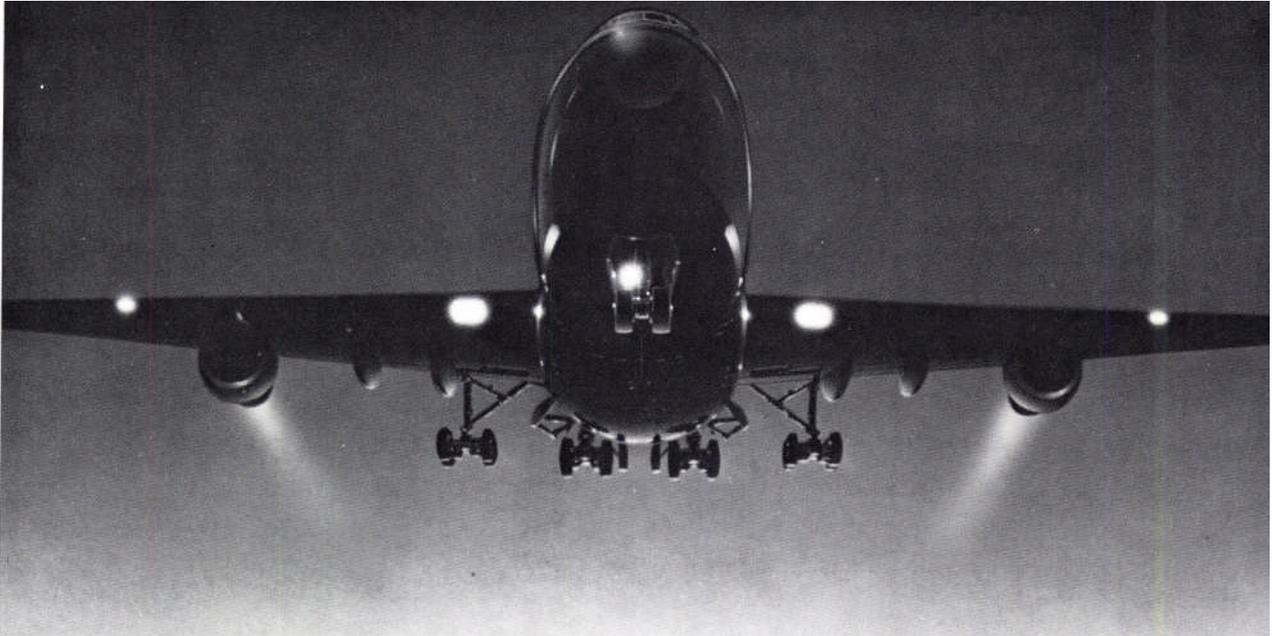
Back End Sheet: Field trip routes and generalized stratigraphic column, compiled by R. E. Clemons; map drafted by Robin Y. Ransom.

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