

New Mexico Geological Society

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Front Matter

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

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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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GUIDEBOOK
of the
SAN LUIS BASIN,
COLORADO

H. L. JAMES
Editor

NEW MEXICO GEOLOGICAL SOCIETY

TWENTY-SECOND FIELD CONFERENCE—September 30-October 1-2, 1971

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BACK POCKET PLATES

DE VOTO, PEEL, PIERCE (1), KNEPPER-MARRS (1), LOWELL (1), MERTZMAN (2)

PRESIDENT'S MESSAGE

This year's New Mexico Geological Society Field Conference—our twenty-second—is the brainchild of Harold James. He proposed the rail trip early in the year, even before there was any assurance that the railroad would be in operation, and saw the whole project of trip planning and guidebook preparation through to a most successful result. The conference promises to be a memorable one because of the exposure to a great variety of intriguing geology and because the rail trip will be something new and exciting for all of us.

It is especially appropriate for the Society to be among the first groups to travel the newly resurrected rail line and take advantage of its almost unique geologic appeal; the first and second clay trips into the eastern San Juans and the western flank of the Sangre de Cristos provide what would be, under ordinary circumstances, a first-rate conference in themselves. Adams State College has made every effort to see that our Alamosa headquarters is all that a conference group such as this could hope for.

The Society itself is well into its third decade of success, still demonstrating the wisdom of the founders who saw a genuine need and structured an organization to fulfill it. It has for twenty-two years managed to provide a focus for the interest of New Mexico geologists and sustained a uniformly strong series of publications on a self-supporting basis; several years ago our finances seem to have stabilized in a healthy cycle and continued success seems assured. Though the Society is self-supporting in the sense that no outside financial support is necessary to keep its activities, publications in particular, progressing from year to year, it is vital that members continue to be interested enough to provide lavish support in time and effort. That was the original design and will continue to be the key.

The "loosely knit" nature of the organization, as Bill King put it in his presidential message in 1968, really is the reason that it has functioned so well for so long. That has allowed people and policy to change to suit the interests of our membership and our conference guests. In some organizations, the desire for "progress," more polish, bigger programs, continuity, more diversity in goals, and so forth, has led to a trend toward paid management, various mergers and affiliations, and pursuit of outside money, and moved the whole affair further from the members. I'm for staying with the proven formula.

To return to the subject for which this book was prepared, I would welcome everyone to the conference and thank the people responsible for it—particularly Harold James of the New Mexico State Highway Commission, Dick Burroughs and Dick Peterson of Adams State, Roy Foster and Chuck Chapin of the New Mexico Bureau of Mines, and the committee members, trip leaders, and authors.

John W. Shomaker

A MESSAGE FROM THE EDITOR ...

The 22nd annual field conference embraces the San Luis Basin and its highland environs. Most people refer to this agricultural gem as "San Luis Valley," but geologically it is one of the truly great intermontane structural basins of the Rocky Mountain-Southwest; bounded on the east by the uplifted Sangre de Cristo Range and hinged on the west by the volcanic heights of the San Juans. Its width is 50 miles; its length a surprising 150 miles, stretching from Poncha Pass on the north and inclusive of the Taos Plateau south into New Mexico. It is a beautiful expanse that is dotted with volcanos, fertile farms and lush ranchlands. It is ribboned by a great river of history and set in the midst of Swiss-like mountains. Indeed, an interesting field for study.

Many people are responsible for the building of this book. First, to all of the authors of articles contained herein—a job well done. All of the manuscripts were received on or before the assigned deadline and all were in excellent editorial condition. The SOCIETY appreciates very much your time and effort in submitting such excellent articles to the conference. A special word of thanks to Chuck Chapin, Dick Burroughs, and Fred Trauger for help in the gathering of papers. To Art Butler and Pete Lipman for their indispensable contributions to the road logs. To Roy Foster for handling the logging chores and last but not least to Bob Price for an excellent piece of drafting on the conference map. The pen sketches used throughout the book are the courtesy of the New Mexico State Bureau of Mines and Mineral Resources. The cartoon drawings used in the rail log are the talents of George Swain. I would also like to take this opportunity to direct the reader to the Professional Directory in the back of the book. If a need arises, please consult the services they represent.

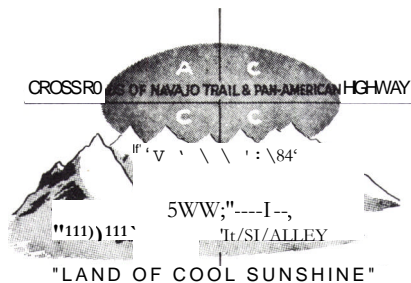
Traditionally the SOCIETY has reflected a diversity of papers in its guidebooks; to produce a scope of presentations that will encompass all of the interesting facets of the study area, both geologic and non-geologic. Thirty-five authors are represented in this guidebook spanning nearly every major subject on the geology of the area. This number includes contributions by experts in the fields of physics, biology, archaeology and history.

On behalf of the NEW MEXICO GEOLOGICAL SOCIETY I welcome you to these pages on the San Luis Basin. I sincerely hope that the contents will be as stimulating as its compilation and that the publication will be regarded as an authoritative reference for years to come.

H. L. James



"Shades of Hayden." Rail loggers at field base camp at Sublette, early spring (and d — — — cold!).



ALAMOSA COUNTY

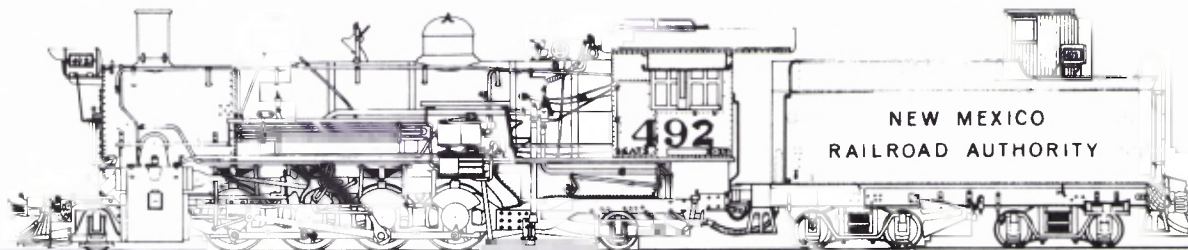
We are deeply pleased you have chosen Alamosa and the San Luis Valley as your convention site for 1971. You will, we are sure, find this a most interesting geological area offering a variety of fascinating features most deserving of your attention.

In addition you will enjoy comfortable accommodations and facilities complimented by pleasing personalities whose every desire will be to make yours a truly relaxing stay.

We look forward to visiting with each of you and repaying the compliment you have afforded us. We will do our rock bottom best to be your most gracious hosts.

Most sincerely,

John T. O'Leary
Secretary-Manager



po box b santa fe new mexico 87501

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September 30, 1971

New Mexico Geological Society
 Alamosa, Colorado

Hello!

Thirty air miles, yet sixty-four tortuous train miles, taking over one year of original back-breaking construction time; this is all that remains of a once vast narrow gauge railroad empire. Saturday you will have the opportunity to experience what the 1880 traveler found tucked magnificently away in the remote southern rocky mountains.

It has not been without your organization's assistance that this adventure awaits you. Mr. Harold James and your Board were the only individuals who stayed steadfast through the everyday political traumas that for four years continuously buffeted the dream of preserving the last main line narrow gauge railroad in the United States.

It is therefore a great pleasure for the Colorado and New Mexico Railroad Authorities to welcome you to the Cumbres And Toltec Scenic railroad as you cross our friendly state border eleven times on your trip from Antonito to Chama.

Sincerely,

Terence W. Ross, Chairman
 Joint Executive Committee
 Colorado and New Mexico Railroad Authorities
 1111 Barcelona Lane
 Santa Fe, NM 87501

TWR/sb



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.....	Consulting Geologist
Richard C. Peterson	Adams State College
Ralph E. Van Alstine	U.S. Geological Survey

PUBLICATIONS OF THE NEW MEXICO GEOLOGICAL SOCIETY

FIELD CONFERENCE GUIDEBOOKS

* Out of Print

1. San Juan Basin [covering north and east sides], New Mexico and Colorado, 1950, Vincent C. Kelley, ed., 152 p., 40 illus. Second printing, 1971 . . \$5.00
2. San Juan Basin [covering south and west sides], New Mexico and Arizona, 1951, Clay T. Smith and Caswell Silver, eds., 163 p., 71 illus. Second printing, 1971. \$5.00
- *3. Rio Grande country, central New Mexico, 1952, Ross B. Johnson and Charles B. Read, eds., 126 p., 50 illus.
4. Southwestern New Mexico, 1953, Frank E. Kottlow-ski, ed., 153 p., 70 illus.....\$5.00
5. Southeastern New Mexico, 1954, T. F. Stipp, ed., 209 p., 76 illus.\$5.00
- *6. South-central New Mexico, 1955, J. Paul Fitzsimmons, 193 p., 66 illus. Prepared with the cooperation of the Roswell Geological Society.
7. Southeastern Sangre de Cristo Mountains, New Mex-ico, 1956, A. Rosenzweig, ed., 151 p., 61 illus.....\$7.00
8. Southwestern San Juan Mountains, Colorado, 1957, Frank E. Kottlowski and Brewster Baldwin, eds., 258 p., 110 illus.\$7.00
9. Black Mesa Basin [northeastern Arizona], 1958, Roger Y. Anderson and John W. Harshbarger, eds., 205 p., 106 illus. Prepared in cooperation with the Arizona Geological Society.\$8.50
10. West-central New Mexico, 1959, James E. Weir, Jr., and Elmer H. Baltz, eds., 162 p., 91 illus. \$8.50
11. Rio Chama country [New Mexico and Colorado] 1960, Edward C. Beaumont and Charles B. Read, eds., 129 p., 35 illus. \$8.50
12. Albuquerque country [New Mexico], 1961, Stuart A. Northrop, ed., 199 p., 83 illus. \$9.50
13. Mogollon Rim region [east-central Arizona], 1962, Robert H. Weber and H. Wesley Peirce, eds., 175 p., 77 illus. Prepared in cooperation with the Arizona Geological Society.\$9.50
14. Socorro region [New Mexico], 1963, Frederick J. Kuellmer, ed., 240 p., 90 illus.\$9.00
15. Ruidoso country [New Mexico], 1964, Sidney R. Ash and Leon V. Davis, eds., 195 p., 64 illus.\$9.00
16. Southwestern New Mexico II, 1965, J. Paul Fitz-simmons and Christina Lochman Balk, eds., 244 p., 73 illus.\$9.50
17. Taos-Raton-Spanish Peaks country [New Mexico and Colorado], 1966, Stuart A. Northrop and Charles B. Read, eds., 128 p., 40 illus.\$7.50
18. Defiance-Zuni-Mt. Taylor region [Arizona and New

Mexico], 1967, Fred Trauger, cd, 228 p., 98 illus. \$9.00

19. San Juan-San Miguel-La Plata Region [New Mexico and Colorado], 1968, John Shomaker, ed., 212 p., 95 illus.\$9.00
20. The Border Region [Chihuahua and the United States], 1969, Cordoba, Wengerd Shomaker, eds., 228 p., 159 illus. \$13.50
21. Tyrone-Big Hatchet Mountains-Florida Mountains Region [New Mexico], 1970, Woodward, ed., 1\$7162.p50., 84 illus.
22. San Luis Basin (Colorado), 1971, H. L. James, ed., 340 p., 226 illus.\$15.00

SPECIAL PUBLICATIONS

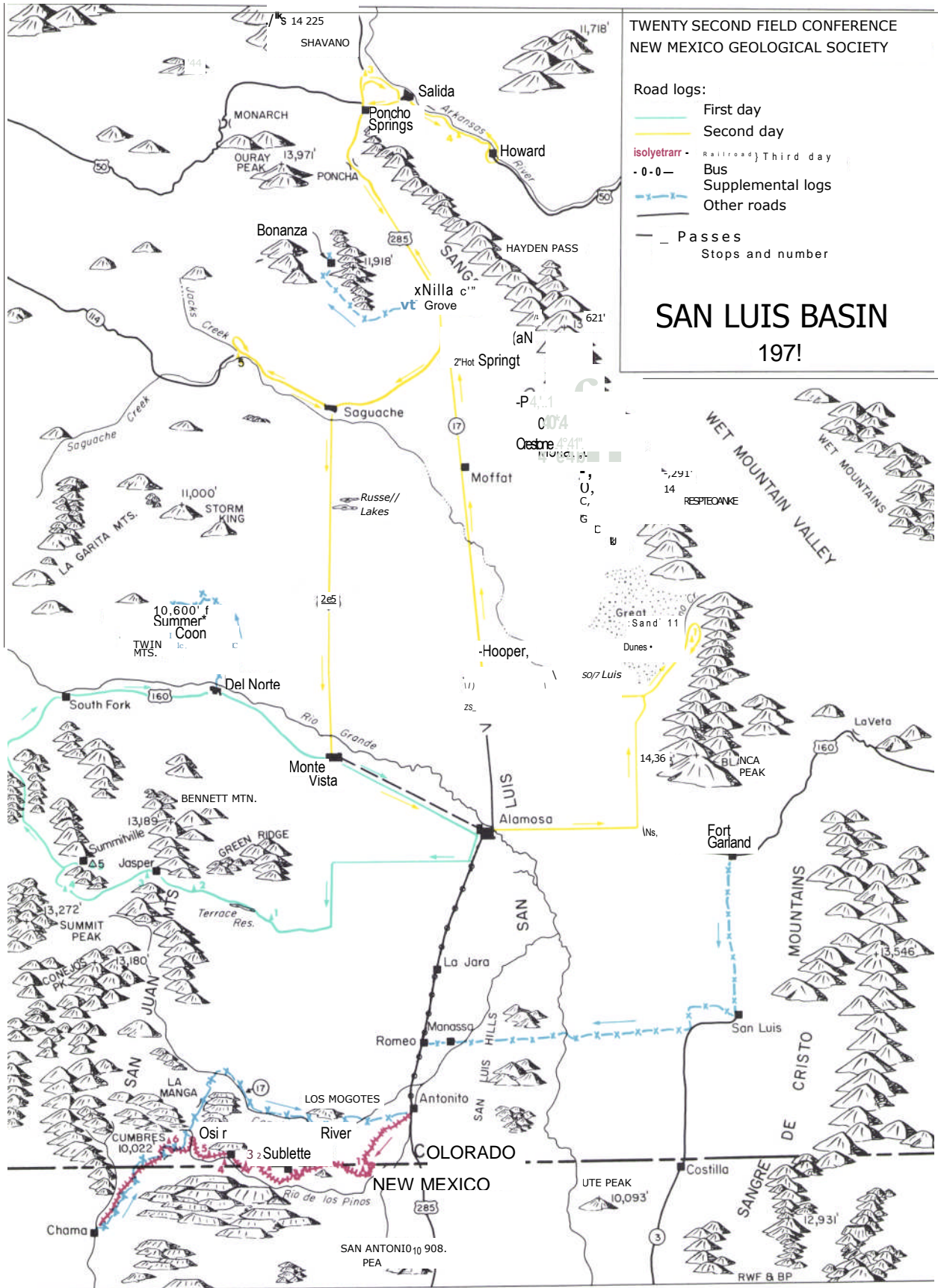
1. Bibliography and index of the New Mexico Geologi-cal Society Guidebooks, 1950-63; compiled by Sidney R. Ash.\$0.75
2. A history of the New Mexico Geological Society; by Stuart A. Northrop.
3. The San Andres Limestone: a reservoir for oil, gas and water . . . [a symposium]; F. E. Kottlowski and W. K. Summers, eds.\$3.00

MAPS

- a. Geologic highway map of New Mexico, in color, 23x29 in.; compiled by Frank E. Kottlowski and others.\$1.00 folded; \$1.25 rolled
- b. Geologic map of the Sierra County Region, compiled by Vincent C. Kelley; in Guidebook 6.\$0.50
- c. Geologic map of the Rio Chama country; compiled by Clay T. Smith and William R. Muehlberger, in Guidebook 11.\$0.50
- d. Geologic map of the Albuquerque country; compiled by Stuart A. Northrop and Arlette Hill; in Guidebook 12.\$0.50
- e. Tectonic map of the Ruidoso-Carrizozo region compiled by V. C. Kelley and Tommy B. Thompson; in Guidebook 15.\$0.75
- f. Tectonic map of the Defiance-Zuni-Mt. Taylor re-gion; compiled by V. C. Kelley; in Guidebook 18
..... \$1.50

All publications are available by mail (please add 25 cents for postage and handling each guidebook) from, or over the counter, at the New Mexico Bureau of Mines and Mineral Resources, Socorro, New Mexico. Guidebooks, and the geologic highway maps are available over the counter at the Dept. of Geology, Univ. of N. Mex., Albuquerque; Holmans, Albuquerque; Roswell Map Ser-vice, Roswell; and the Museum of Northern Arizona, Flagstaff, Arizona.

Checks should be made payable to the New Mexico Geological Society.



FIELD CONFERENCE MAP

1 9 7 1

FIELD CONFERENCE SCHEDULE

Wednesday, September 29th REGISTRATION DAY

1:00 P.M.-10:00 P.M. Registration in lobby of Student Center Building on the campus of Adams State College, Alamosa, Colorado.

Thursday, September 30th *FIRST DAY FIELD TRIP*

7:00 A.M.-7:30 A.M. Auto-caravan will assemble at the Alamosa Auction Barn on U.S. 285 at the south city limits of Alamosa.

Trip will include a circuitous route through the eastern San Juan Mountains, via the Alamosa River, Jasper (lunch stop), Summitville, and South Fork.

7:00 P.M.-9:00 P.M. "ICE-BREAKER" PARTY *at the Alamosa Inn.*

Friday, October 1st SECOND DAY FIELD TRIP

7:00 A.M.-7:30 A.M. Auto-caravan will assemble on U.S. 160 at the east city limits of Alamosa (east of junction of State Highway 17 near D&RG Railroad siding).

Trip will include a visit to the Great Sand Dunes National Monument. The geologic character of the San Luis Basin and the east flanking Sangre de Cristo Mountains will be studied on today's trip. The caravan will extend as far north as the Arkansas River, via Poncha Pass and Salida (lunch and gas stop) before retracing the route back on U.S. 285 to view volcanic outcrops to the west near Saguache.

8:00 P.M.-10:00 P.M. *ANNUAL FALL BANQUET* to be held in the dining hall at the Student Center Building on the Campus of Adams State College. A welcome address will be delivered by Dr. James F. Craft, Chairman of the Division of Science and Mathematics at Adams State College. The principal speaker will be Mr. Teranee W. Ross, Vice Chairman of the New Mexico Railroad Authority, Santa Fe, New Mexico. Mr. Ross will speak and narrate slides on his title, "Save The Narrow Gauge."

Saturday, October 2nd **THIRD DAY FIELD TRIP**

7:00 A.M.-7:30 A.M. Conferees will board chartered busses at the east football field parking lot (opposite Student Center Building at Adams State College). Personal cars may be left in lot until return. Busses will depart promptly at 7:30 A.M. for Antonito, Colorado, for hoarding on the Cumbres and Toltec Scenic Railroad. (Note: If you miss your bus you can drive to the boarding site at the south city limits of Antonito near the junction of U.S. 285 and State Highway 17). Rail excursion will depart promptly at 8:30 A.M. for Chama, New Mexico. Box lunches and soft drinks will be provided enroute. (PLEASE! NO ALCOHOLIC BEVERAGES. State law prohibits its use on Colorado/New Mexico property). Lunch stop scheduled at ghost town of Osier.

The Third Day promises to be a full 16 hours of wild activity coupled with magnificent scenery and interesting geology. Schedules and the best laid plans will probably run amuck, but on a grand excursion such as this—who cares! Dress warmly as elevations exceed 10,000 feet in the Cumbres Pass section. Watch your step at the Toltec Gorge Stop; the first step is 3 feet, the second one-600'. Oh yes, one other thing—registration fee does not include toilet paper.

6:00 P.M.-6:30 P.M. Tentative arrival in Chama, New Mexico. Reboard chartered busses for 25-mile trip to Elk Creek Campground.

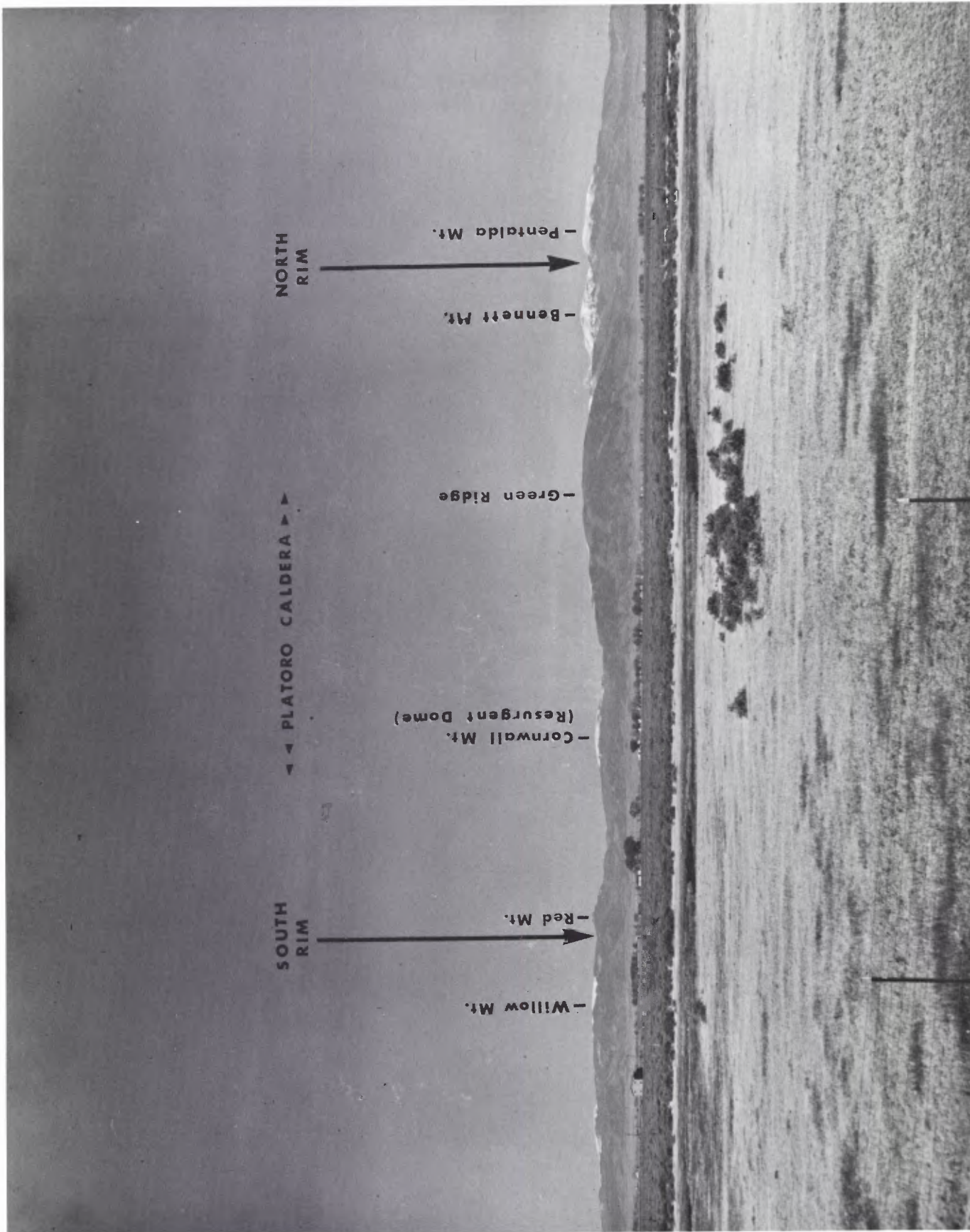
7:00 P.M.-9:00 P.M. *BARBECUE PICNIC* at Elk Creek Campground (Conejos River Valley).

9:00 P.M. Reboard chartered busses for return to Alamosa.

END OF CONFERENCE!

**IT WAS A PLEASURE TO HAVE YOU
AS OUR GUESTS.**

SEE YOU NEXT YEAR?



View of the east front of the San Juan Mountains from U.S. 285 south of Alamosa.