GUIDEBOOK
of the
SAN LUIS BASIN,
COLORADO

H. L. JAMES
Editor

NEW MEXICO GEOLOGICAL SOCIETY
CONTENTS

PRESIDENT'S MESSAGE ................................................................................................. iv
A MESSAGE FROM THE EDITOR ...................................................................................... v
WELCOME LETTERS .......................................................................................................... vi
COMMITTEES .................................................................................................................... viii
PUBLICATIONS OF THE NEW MEXICO GEOLOGICAL SOCIETY ........................................ x
CONFERENCE MAP ......................................................................................................... xi
SCHEDULE OF CONFERENCE ......................................................................................... xii

ROAD LOGS

FIRST DAY: ALAMOSA TO THE EASTERN SAN JUAN MOUNTAINS, VIA ALAMOSA RIVER, JASPER, SUMMITVILLE, SOUTH FORK AND RETURN ................................................................................................................................. 1
SECOND DAY: ALAMOSA TO THE GREAT SAND DUNES NATIONAL MONUMENT, PONCHA PASS, SALIDA, HOWARD AND RETURN VIA SAGUACHE AND MONTE VISTA ................................................................................................................................. 15
THIRD DAY: RAIL LOG FROM ANTONITO, COLORADO, TO CHAMA, NEW MEXICO ................................................................................................................................. 43

SUPPLEMENTAL LOGS

LOG NO. 1: VILLA GROVE TO BONANZA ........................................................................... 70
LOG NO. 2: DEL NORTE TO SUMMER COON VOLCANIC AREA AND RETURN ......................... 73
LOG NO. 3: FORT GARLAND TO ROMEO, VIA SAN LUIS, SAN ACACIO AND MANASSA ................................................................................................................................. 78
LOG NO. 4: CHAMA, NEW MEXICO, TO ANTONITO, COLORADO ................................................................................................................................. 82

ARTICLES

THE CREST OF THE CONTINENT ......................................................................................... Ernest Ingersoll 88
LEXICON OF STRATIGRAPHIC NAMES .............................................................................. Christina Lochman-Balk and James E. Bruning 101
PHYSIOGRAPHIC SUBDIVISIONS OF THE SAN LUIS VALLEY, SOUTHERN COLORADO ......................................................................................................................... J.E. Upson 113
THE GREAT SAND DUNES OF SOUTHERN COLORADO .............................................................. Ross B. Johnson 123
WATER RESOURCES OF THE SAN LUIS VALLEY, COLORADO .................................................. Phillip A. Emery 129
FLORA OF THE SAN LUIS VALLEY ...................................................................................... Hobart N. Dixon 133
FAUNA OF THE SAN LUIS VALLEY ..................................................................................... Veryl F. Keen 137
PENNSYLVANIAN AND PERMIAN STRATIGRAPHY, TECTONISM AND HISTORY, NORTHERN SANGRE DE CRISTO RANGE, COLORADO ......................................................................................................................... Richard H. De Voto, Frederick A. Peel and Walter H. Pierce 141
NEW MEXICO GEOLOGICAL SOCIETY - TWENTY-SECOND FIELD CONFERENCE

GLACIATION IN THE SANGRE DE CRISTO RANGE, COLORADO .......................................................... Richard C. Peterson 165

ALLOCHTHONOUS PALEOZOIC BLOCKS IN THE TERTIARY SAN LUIS-UPPER ARKANSAS GRABEN, COLORADO ................................................................. Ralph E. Van Alstine 169

RESULTS OF PRELIMINARY STUDIES OF THE AIR POLLUTION METEOROLOGY OF LIMITED AREAS IN THE SAN LUIS VALLEY ................................................... Theodore A. Mueller 179

STRATIGRAPHIC RELATIONS BETWEEN BONANZA CENTER AND ADJACENT PARTS OF THE SAN JUAN VOLCANIC FIELD, SOUTHWEST-CENTRAL COLORADO ................................................................. Dennis L. Bruns, Rudy C. Epis, Robert J. Weimer and Thomas A. Stevan 183

THE RIO GRANDE RIFT, PART I: MODIFICATIONS AND ADDITIONS ................................................ Charles E. Chapin 191

"THEY CAME TO HUNT." EARLY MAN IN THE SAN LUIS VALLEY .................................................. Dorothy D. Wilson 203

CENOZOIC GEOLOGY OF THE ARKANSAS HILLS REGION OF THE SOUTHERN MOSQUITO RANGE, CENTRAL COLORADO ................................................................. Gary R. Lowell 209

PRELIMINARY PALEOPALYNOLOGICAL ANALYSIS OF ALAMOSA FORMATION SEDIMENTS .......................................................... Charles R. Price 219

RECONNAISSANCE GEOLOGY AND ECONOMIC SIGNIFICANCE OF THE PLATORO CALDERA, SOUTHEASTERN SAN JUAN MOUNTAINS, COLORADO .............................................. Peter W. Lipman and Thomas A. Stevan 221

MINERALS OF THE SAN LUIS VALLEY AND ADJACENT AREAS OF COLORADO ........................................ Charles F. Bauer 231

SOME PETROLOGIC AND ALTERATION ASPECTS OF THE ALUM CREEK AREA, SAN JUAN VOLCANIC FIELD, COLORADO ........................................................ William S. Calkin 235

THE SAN LUIS VALLEY-A LAND OF PARADOX .................................................................................. Robert H. Buchanan 243

CREED SHALE FOSSILS .................................................................................................................. J. Robert Thompson, Jr. 247

GEOLOGICAL DEVELOPMENT OF THE BONANZA-SAN LUIS VALLEY-SANGRE DE CRISTO RANGE AREA, SOUTHWEST-CENTRAL COLORADO ........................................... Daniel H. Knepper, Jr. and Ronald W. Marrs 249

THE SUMMER COON VOLCANO, EASTERN SAN JUAN MOUNTAINS, COLORADO ........................................ Stanley A. Mertzman, Jr. 265

A STUDY OF RECENT SEDIMENTATION IN THE SAN LUIS HILLS ..................................................... Robert P. Fling 273

GEOLOGY OF THE SAN LUIS HILLS, SOUTHWEST-CENTRAL COLORADO ......................................... Richard L. Burroughs 277

TERTIARY VOLCANIC STRATIGRAPHY OF THE EASTERN TUSAS MOUNTAINS, SOUTHWEST OF THE SAN LUIS VALLEY, COLORADO-NEW MEXICO ......................................................... Arthur P. Butler, Jr. 289

HISTORICAL SKETCH OF FORT GARLAND .................................................................................... William Hoagland 301

NARROW GAUGE OVER CUMBRES ................................................................................................. William Hoogland 305

HISTORY, LOCATION AND DEVELOPMENT OF THE JOHNS-MANVILLE PERLITE DEPOSITS, NO AGUA, NEW MEXICO ................................................................. M. B. Mickelsen 321

ABSTRACTS

ABSTRACTS OF TECHNICAL PAPERS, NEW MEXICO GEOLOGICAL SOCIETY, 25TH ANNUAL MEETING, ROSWELL, NEW MEXICO, MAY 14, 1971 .................................................. 323

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!).
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
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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### PUBLICATIONS OF THE NEW MEXICO GEOLOGICAL SOCIETY

#### FIELD CONFERENCE GUIDEBOOKS

* Out of Print

<table>
<thead>
<tr>
<th>Guidebook</th>
<th>Title</th>
<th>Author(s)</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>San Juan Basin [covering north and east sides], New Mexico and Colorado, 1950</td>
<td>Vincent C. Kelley, ed.</td>
<td>$5.00</td>
</tr>
<tr>
<td>2.</td>
<td>San Juan Basin [covering south and west sides], New Mexico and Arizona, 1951</td>
<td>Clay T. Smith and Caswell Silver, eds.</td>
<td>$5.00</td>
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<tr>
<td>3.</td>
<td>Rio Grande country, central New Mexico, 1952</td>
<td>Ross B. Johnson and Charles B. Read, eds.</td>
<td>$5.00</td>
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<td>4.</td>
<td>Southwestern New Mexico, 1953</td>
<td>Frank E. Kottlowski, ed.</td>
<td>$5.00</td>
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<td>5.</td>
<td>Southeastern New Mexico, 1954</td>
<td>T. F. Stipp, ed.</td>
<td>$5.00</td>
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<tr>
<td>6.</td>
<td>South-central New Mexico, 1955</td>
<td>J. Paul Fitzsimmons, 193 p., 66 illus.</td>
<td>$5.00</td>
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<tr>
<td>7.</td>
<td>Southeastern Sangre de Cristo Mountains, New Mexico, 1956</td>
<td>A. Rosenzweig, ed.</td>
<td>$7.00</td>
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<td>8.</td>
<td>Southwestern San Juan Mountains, Colorado, 1957</td>
<td>Frank E. Kottlowski and Brewster Baldwin, eds.</td>
<td>$7.00</td>
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<td>9.</td>
<td>Black Mesa Basin [northeastern Arizona], 1958</td>
<td>Roger Y. Anderson and John W. Harshbarger, eds.</td>
<td>$7.00</td>
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<td>10.</td>
<td>West-central New Mexico, 1959</td>
<td>James E. Weir, Jr., and Elmer H. Baltz, eds.</td>
<td>$8.50</td>
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<td>12.</td>
<td>Albuquerque country [New Mexico], 1961</td>
<td>Stuart A. Northrop, ed.</td>
<td>$8.50</td>
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<tr>
<td>14.</td>
<td>Socorro region [New Mexico], 1963</td>
<td>Frederick J. Kuellmer, ed.</td>
<td>$9.00</td>
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<td>15.</td>
<td>Ruidoso country [New Mexico], 1964</td>
<td>Sidney R. Ash and Leon V. Davis, eds.</td>
<td>$9.00</td>
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<td>16.</td>
<td>Southwestern New Mexico II, 1965</td>
<td>J. Paul Fitzsimmons and Christina Lochman Balk, eds.</td>
<td>$9.50</td>
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<tr>
<td>17.</td>
<td>Taos-Raton-Spanish Peaks country [New Mexico and Colorado], 1966</td>
<td>Stuart A. Northrop and Charles B. Read, eds.</td>
<td>$7.50</td>
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<tr>
<td>18.</td>
<td>Defiance-Zuni-Mt. Taylor region [Arizona and New Mexico], 1967</td>
<td>Fred Trauger, ed.</td>
<td>$9.00</td>
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#### SPECIAL PUBLICATIONS

1. | Bibliography and index of the New Mexico Geological Society Guidebooks, 1950-63 | Sidney R. Ash | $0.75 |
2. | A history of the New Mexico Geological Society | by Stuart A. Northrop | $0.75 |
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-Carrizo region compiled by V. C. Kelley and Tommy B. Thompson; in Guidebook 15. | | $0.75 |
- f. | Tectonic map of the Defiance-Zuni-Mt. Taylor region; 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 Service, Roswell; and the Museum of Northern Arizona, Flagstaff, Arizona.

Checks should be made payable to the New Mexico Geological Society.
NEW MEXICO GEOLOGICAL SOCIETY
TWENTY-SECOND FIELD CONFERENCE

Road logs:
- First day
- Second day
- Supplemental logs
- Other roads
- Passes
- Stops and number

SAN LUIS BASIN
1971

FIELD CONFERENCE MAP
1971
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. 245 south of Alamosa.