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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.

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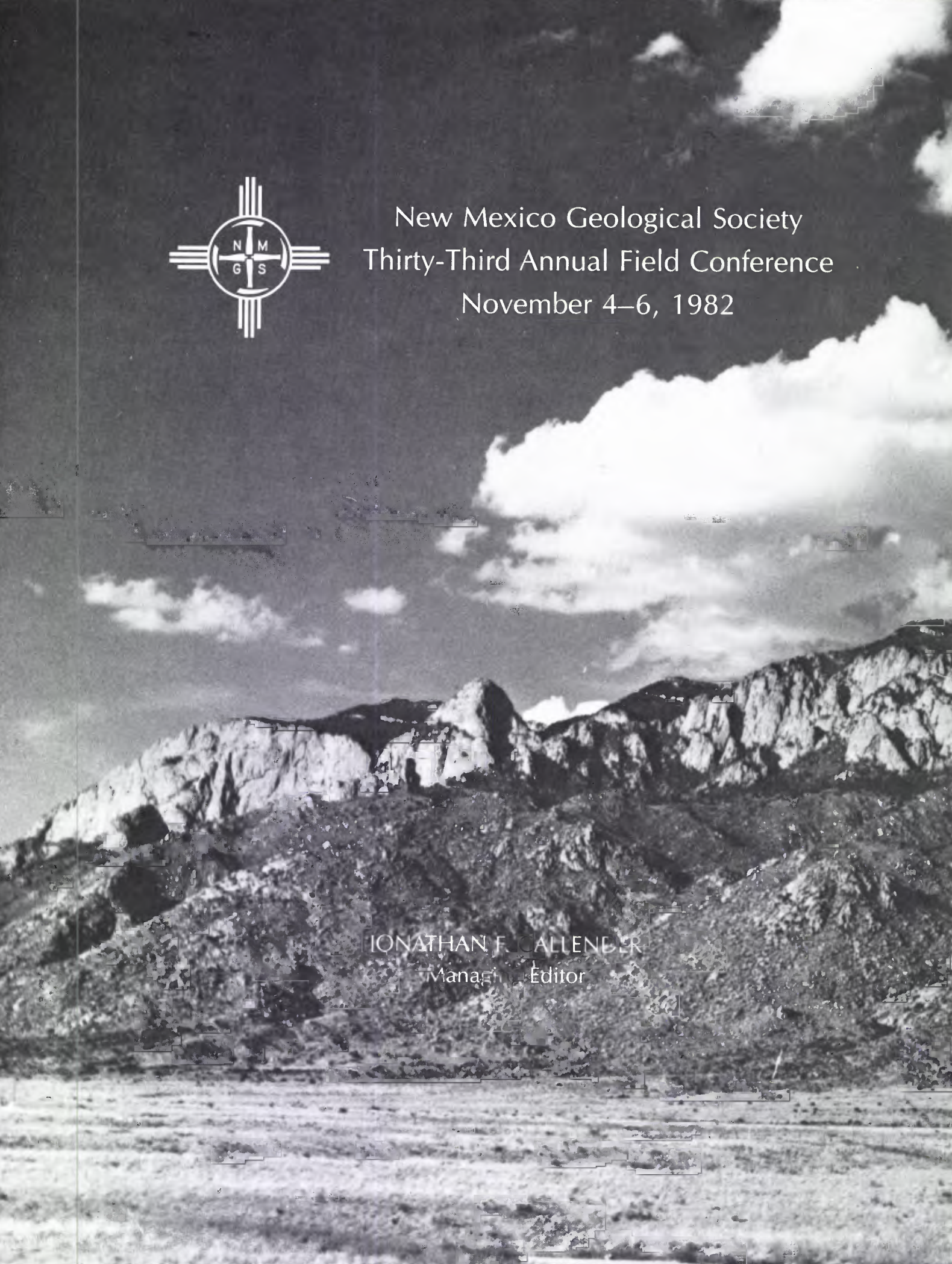
NMGS has decided to make peer-reviewed papers from our Fall Field Conference guidebooks available for free download. This is in keeping with our mission of promoting interest, research, and cooperation regarding geology in New Mexico. However, guidebook sales represent a significant proportion of our 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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New Mexico Geological Society
Thirty-Third Annual Field Conference
November 4–6, 1982

JONATHAN F. CALLENDER
Managing Editor



Rio Grande near Coronado Monument, New Mexico. Photo: J. F. Callender.

"In all its career the Rio Grande knows several typical kinds of landscape, some of which are repeated along its great length. It springs from tremendous mountains, and intermittently mountains accompany it for three fourths of its course. It often lies hidden and inaccessible in canyons, whether they cleave through mountains or wide level plains. From such forbidding obscurities it emerges again and again into pastoral valleys of bounty and grace. In such fertile passages all is green, and the shade of cottonwoods and willows is blue and cool, and there is reward for life in water and field. But always visible on either side are reaches of desert, and beyond stand mountains that limit the river's world."

Paul Horgan, Great River,
Rinehart and Company, Inc., 1954

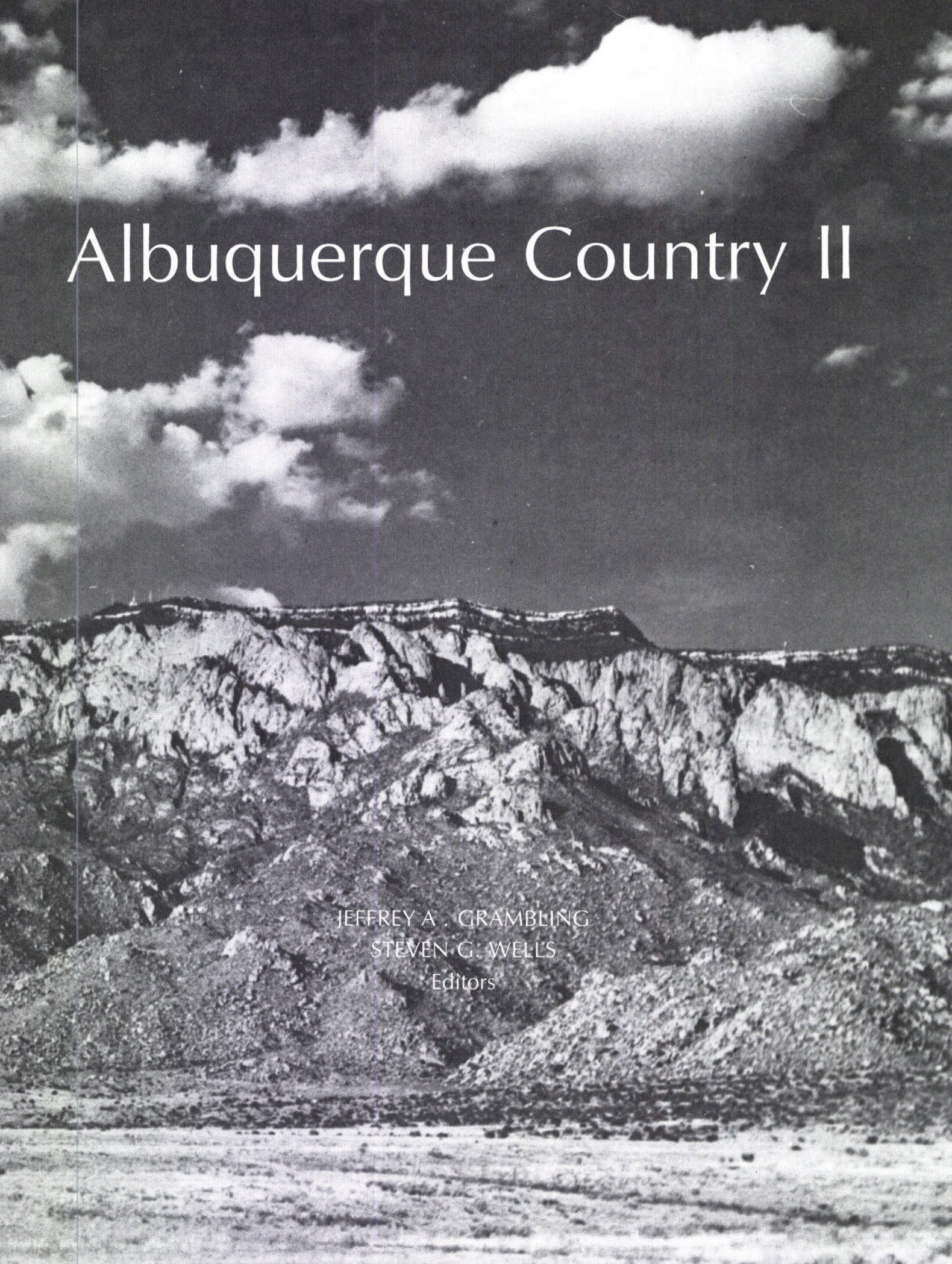


LANDSAT Photograph of Albuquerque Country

(Courtesy Technology Application Center)

GREAT PLAINS
ROCKY MOUNTAINS
COLORADO PLATEAU
Estancia Basin
San Juan Basin
Chaco
Mountainair
Manzano Mts.
Abo Pass
Los Pinos Mts.
Chupadera Mesa
Bernardo
Ladron Mts.
Belen
Los Lunas
Albuquerque
Mesa Lucero
Sierra Lucero
Mesa del Oro
El Malpais
Cebolleta Mesa
Rio San Jose
Grants
Mt. Taylor
Rio Puerco
Chivato Mesa
Mesa Prieta
Cabezon Peak
Rio Grande
Bernalillo
Llano de Albuquerque
Sandias
Tijeras Canyon
Ortiz Mts.
Espinoso Ridge
Santa Ana Mesa
San Ysidro
Jemez River
Glorieta Mesa
Cerrillos
Cerros de Rio
Santa Fe
Sangre de Cristo Mts.
White Rock Canyon
Pajarito Plateau
Valles Caldera
Sierra Nacimiento
Jemez Mts.
San Pedro Mtn.
Espanola
Abiquiu
Rio Chama
River
0
10 mi.
0
16 km.
N

Albuquerque Country II



JEFFREY A. GRAMBLING
STEVEN G. WELLS
Editors

CONTENTS

President's Message vi
Editors' Message vi
Dedication: Kirk Bryan ..... *Charles Stearns* vii
Committees viii
Field Conference Schedule and Credits ix
Stratigraphic Nomenclature Chart .....

ROAD LOGS

First Day: Road Log from Albuquerque to Tijeras Canyon, Manzano, Abo Canyon, Rio Grande Estates, Canon del Trigo, Belen, Los Lunas, and Return to Albuquerque 1
Road-log Segment I-A: Albuquerque to Tijeras Canyon ..... *J. R. Connolly, L. A. Woodward, and J. W. Hawley* 2
Road-log Segment I-B: Tijeras Canyon to Abo Canyon via Estancia and Manzano ..... *J. W. Hawley, R. W. Foster, R. Broadhead, and D. W. Love* 8
Road-log Segment I-C: Abo Canyon–Blue Springs Area to Albuquerque via Belen and Los Lunas ..... *J. W. Hawley, D. W. Love, and P. W. Lambert* 24
Road-log Segment I-D: Rio Grande Estates to Canon del Trigo via Hubbell Bench ..... *J. A. Grambling, J. W. Hawley, and D. W. Love* 30
Second Day: Road Log from Albuquerque to El Cerro de Los Lunas, Rio Puerco, Correo, Laguna, Paguate, El Malpais, Grants, La Jara Mesa, and Return to Albuquerque 37
Road-log Segment II-A: Albuquerque to Correo via El Cerro de Los Lunas and Rio Puerco ..... *J. W. Hawley, D. W. Love, and S. G. Wells* 38
Road-log Segment II-B: I-40/NM 6 Interchange to La Jara Mesa Northwest of Mount Taylor via Laguna, Paguate, El Malpais, and Grants ..... *J. W. Hawley, L. S. Crumpler, and S. G. Wells* 49
Road-log Segment II-C: Grants to Albuquerque Exit Log via 1-40 ..... *J. W. Hawley* 70
Third Day: Road Log from Albuquerque to Sandia Peak Tramway, Alameda, Rio Rancho, Ceja del Rio Puerco Escarpment, Bernalillo, Placitas, and Return to Albuquerque 75
Road-log Segment Ill-A: Albuquerque to Sandia Peak Tramway via 1-25, Montgomery Blvd, and Tramway Blvd ..... *V. C. Kelley, J. W. Hawley, and S. G. Wells* 76
Road-log Segment **III-B:** Sandia Mountains at Tramway Terminal to Placitas via Alameda, Rio Rancho, Ceja del Rio Puerco, Loma Duran, and Bernalillo ..... *J. W. Hawley, P. W. Lambert, V C. Kelley, and L. A. Woodward* 80
Road-log Segment III-C: Bernalillo to Albuquerque Exit Log via 1-25 ..... *P. W. Lambert* 94
Supplemental Road-log Segment III-S: Urban and Environmental Geology of the Albuquerque Area ..... *P. W. Lambert, J. W. Hawley, and S. G. Wells* 97

ARTICLES

Lexicon

Lexicon of Phanerozoic Stratigraphic Names Used in the Albuquerque Area ..... *Barry S. Kues, Spencer Lucas, and Raymond V. Ingersoll* 125

Scenes from the Past

Scenes from the Past—V111 ..... Sherman A. Wengerd 139

Tectonics, Structure, and Geophysics

Tectonic Framework of Albuquerque Country ..... Lee A. Woodward 141
The Right-Relayed Rio Grande Rift ..... Vincent C. *Kelley* 147
Paleozoic History of the Albuquerque Trough: Implications of Basement Control on the Rio Grande Rift ..... D. L. Baars 153
Diverse Geology of the Hubbell Bench, Albuquerque Basin ..... Vincent C. Kelley 159
Quaternary and Pliocene Faults in the La Jencia and Southern Part of the Albuquerque-Belen Basins, New Mexico: Evidence of Fault History from Fault-Scarp Morphology and Quaternary Geology ..... Michael N. Machette 161
Earthquakes of the Albuquerque Country ..... Stuart A. Northrop 171
Mapping the Northern and Eastern Extent of the Socorro Midcrustal Magma Body by Wide-Angle Seismic Reflections ..... Kenneth H. Olsen, Dan J. Cash, and John N. Stewart 179

Precambrian Geology

Radiometric Age of Precambrian Rocks from Central New Mexico ..... *Douglas G. Brookins* 187

Precambrian Stratigraphy of Manzanita and North Manzano Mountains, New Mexico ..... *William J. Cavin, James R. Connolly, Duncan L. Edwards, Mark Parchman, and Lee A. Woodward* 191

Structure and Metamorphism in the Precambrian Cibola Gneiss and Tijeras Greenstone, Bernalillo County, New Mexico ..... *James R. Connolly* 197

Precambrian Rocks of a Portion of the Pedernal Highlands, Torrance County, New Mexico ..... *Dale G. Armstrong and R. J. Holcombe* 203

Precambrian Geology and Tectonics of the Southern Manzano Mountains, Central New Mexico ..... *Paul W. Bauer* 211

Precambrian Structures in Cañon del Trigo, Manzano Mountains, Central New Mexico ..... *Jeffery A. Grambling* 217

The Sandia Granite: Single- or Multi-plutons? ..... *Douglas G. Brookins and Arun Majumdar* 221

Newly Described Occurrences of Orbicular Rock in Precambrian Granite, Sandia and Zuni Mountains, New Mexico ..... *K. A. Affholter and E. E. Lambert* 225

Stratigraphy, Sedimentology, and Paleontology

Stratigraphic Summary of Pennsylvanian and Lower Permian Rocks, Manzano Mountains, New Mexico ..... *Donald A. Myers* 233

Pennsylvanian Trilobites from the Madera Formation, Cedro Canyon, New Mexico ..... *Barry S. Kues* 239

Notes on the Upper Paleozoic Plants of Central New Mexico ..... *Sidney Ash and William Tidwell* 245

Stratigraphy and Copper Deposits of the Abo Formation, Abo Canyon Area, Central New Mexico ..... *William O. Hatchell, John W. Blagbrough, and James M. Hill* 249

Mesozoic Stratigraphy of the Laguna-Grants Region ..... *Charles H. Maxwell* 261

Correlation and Paleoenvironments of the Jackpile Sandstone (Upper Jurassic) and Intertongued Dakota Sandstone–Lower Mancos Shale (Upper Cretaceous) in West-Central New Mexico ..... *Donald E. Owen* 267

Camarasaurus cf. *supremus* from the Morrison Formation near San Ysidro, New Mexico—the San Ysidro Dinosaur ..... *J. Keith Rigby, Jr.* 271

Neogene Stratigraphy of the Northwestern Albuquerque Basin ..... *Richard H. Tedford* 273

Volcanic Geology

Tectonic Setting and History of Late-Cenozoic Volcanism in West-Central New Mexico ..... *A. W. Laughlin, M. J. Aldrich, Jr., M. E. Ander, G. H. Heiken, and D. T. Vaniman* 279

Rift Volcanics of the Albuquerque Basin: Overview with Some New Data ..... *A. M. Kudo* 285

Volcanism in the Mount Taylor Region ..... *L. S. Crumpler* 291

El Malpais ..... *Charles H. Maxwell* 299

Economic Geology

Mineralization in Precambrian Rocks in the Manzana–North Manzano Mountains, Central New Mexico ..... *Michael S. Fulp, William J. Cavin, James R. Connolly, and Lee A. Woodward* 303

Uranium in the Albuquerque Area, New Mexico ..... *Virginia T. McLemore* 305

Oil and Gas Exploration in the Albuquerque Basin ..... *Bruce A. Black* 313

Geothermal Potential in the Albuquerque Area, New Mexico ..... *P. R. (Bob) Grant* 325

Geophysical Exploration for Geothermal Prospects West of Albuquerque, New Mexico ..... *George R. Jiracek, Edward P. Gustafson, and Mark D. Parker* 333

Geomorphology and Quaternary Geology

Quaternary History of the Estancia Valley, Central New Mexico ..... *F. W. Bachhuber* 343

Pleistocene-Holocene Climate of the Estancia Basin, Central New Mexico ..... *Lawrence N. Smith and Roger Y. Anderson* 347

Hydrogeology and Environmental Geology

History of Water Use in the Greater Albuquerque Area ..... *T. E. Kelly* 351

Pollution of the Rio Grande Valley-Fill Aquifer ..... *Dennis M. McQuillan* 357

Geohydrology of the Madera Group, Western Estancia Basin, New Mexico ..... *David N. Jenkins* 361

Geochemical Studies of Discharge Water from a Uranium Acid Leach Process ..... *P. A. Longmire and D. G. Brookins* 367

PRESIDENT'S MESSAGE

Welcome to the thirty-third annual fall field conference of the New Mexico Geological Society. The entire Society membership owes a debt of gratitude to chairwoman Sandy Feldman who, together with Jeff Grambling, Steve Wells, Jon Callender, John Hawley, Dave Love, Ed Beaumont, and John Shomaker, has worked diligently and unremuneratively for more than a year to bring this conference to fruition.

I want to take this opportunity to thank Jon Callender for his dedicated service as Society Managing Editor, Jamie Robertson, who directs the Society's publications program, and Frank Kottlowski and the Publications Office of the New Mexico Bureau of Mines and Mineral Resources for their support and facilitation of the Society's Publications Program.

Special thanks are due Welex for providing a sound truck at each year's conference and Schlumberger for making available the conference's most popular truck. Less visible but no less important is the contribution by the Los Alamos Geological Society, through Bob and Beverly Wellnitz, of ten scholarships to support students attending the field conference.

Next year's fall field conference will be held in Socorro Country under the able leadership of Chuck Chapin. See you there.

Jerry Mueller
President

EDITORS' MESSAGE

After 21 years, the fall field conference returns to the Albuquerque area, the largest urban center in New Mexico. Since 1961, Albuquerque's population has mushroomed from about 200,000 to well over 370,000. Albuquerque and its surrounding area are characterized by a multifaceted geologic setting. Such geologic variety results from the fact that the Albuquerque area lies at the juncture of four major physiographic provinces: Basin and Range, Colorado Plateau, Great Plains, and Rocky Mountains. Consequently, this year's conference area contains something for every geologist: Precambrian geology, Paleozoic through Quaternary stratigraphy and paleontology, Laramide and rift tectonics, volcanic geology, geomorphology, and economic geology (including ground-water, geothermal, uranium, coal, and oil and gas resources). The topics of the 40 papers contributed to the guidebook reflect this diversity. Both contributed articles and road-log text emphasize the influence of geology on urban growth and human interactions with the geologic environment of the Albuquerque area.

This year's guidebook contains two major innovations in style. First, road logs for each day are divided into segments with mileages starting at 0.0 at the beginning of each segment. Road-log segments allow future guidebook users to focus on smaller parts of the field-trip route and enter the route at selected locations on any of the three days, with convenient starting points. Secondly, we have included short, informative summary papers in the road-log text. These eighteen summary papers deal with the geomorphology, anthropology, Precambrian geology, geophysics, paleontology, stratigraphy, and tectonics of specific areas on the field trip route. They hopefully make the road logs more informative and entertaining to read.

On Vin Kelley's excellent suggestion, we have dedicated this year's guidebook posthumously to Kirk Bryan, a native of Albuquerque and a pioneering geologist in the Albuquerque area. It is only fitting that field-trip participants and future guidebook users be reminded of the significant role Kirk Bryan played in our knowledge of the geology of the Albuquerque area.

We wish to express our appreciation to those who provided ideas, gave freely of their time, and contributed materials for the guidebook. Our special thanks go to: authors of papers and summaries, Vin Kelley, Bill Chenoweth, Donald Myers, Charles Maxwell, Gene Saucier, Barry Kues, Lee Woodward, Wayne Lambert, Ray Ingersoll, Bill Cavin, Louann Jordan, Judy Salas, Dick Kent, Joel Grimm, and personnel at the Technology Application Center, University of New Mexico Special Collections Department of Zimmerman Library, and Albuquerque Museum Photoarchives. Our deep appreciation is given to John Hawley, Dave Love, Sandra Feldman, and Jon Callender for their exceptional contributions given to produce this guidebook. And finally, we want to thank our wives, Gail and Beth, for their patience, support, and the time they loaned their husbands to the New Mexico Geological Society.

Jeffrey A. Grambling
Stephen G. Wells

DEDICATION:
Kirk Bryan, 1888-1950



Kirk Bryan was a native son, prepared in the public schools of Albuquerque and introduced to geology at the University of New Mexico. His professor of geology, W. H. Tight, was also President of the University. His senior thesis (1909) summarized the geology of the Albuquerque valley as it was then understood. The "old Albuquerque" in which he had grown, and the valley in which it lay, never ceased to be important to him.

In December 1907, 28 members of the Geological Society of America attended its annual meeting in Albuquerque. Young Kirk acted as a local field guide on an excursion to the Albuquerque volcanoes. Here he met H. S. Gregory, whose influence attracted him to Yale for a second A.B. (1910) and, eventually, his Ph.D. (1920).

Bryan joined the U.S. Geological Survey (Ground-Water Division) in 1912. His Ph.D. thesis grew out of four months' field work in the Papago country of Arizona (1917). His work in the Papago country firmly established his interest in the development of desert landscape, his recognition of the importance of climatic changes in that development, and his abiding concern for the relationship of man to his environment.

Before joining the faculty of Harvard University in 1926, he had accumulated field experience in the western U.S., from Arizona to California to Washington. He had also returned to New Mexico for many occasional visits and for some field projects. In later life, he referred to his discovery that the "Rio Grande Beds" were observably deformed as an important early milestone in his view of the Rio Grande depression. His visits to Chaco Canyon in 1924 and 1925 were presumably his first formal contact with archeologists, the beginning of a fruitful interaction which would continue the rest of his life.

By 1931, Bryan had organized the first of three Harvard Geological Field Schools in New Mexico. These were successful recruiting devices as well as training sessions, and they enlisted the interest of his first students in the Rio Grande depression. It was characteristic that, although his interests stemmed in large part from the landscape, he regarded geomorphology as a field science and part of field geology. Thus, the histories of the Rio Grande depression and of the deformed alluvial and volcanic beds which underlie its several basins were essential to an understanding of the landscape of central New Mexico. The field studies involved problems in general geology and provided a first-class training ground.

Bryan was a superb teacher, convinced that geologic argument eventually must be founded on careful field observation. He gave generously of his time, energy, and ideas. It was clear that nothing was more important than his students. He taught them to think independently; their role was to be active colleagues, not passive disciples. He was a severe and insightful critic, a loyal and compassionate friend. He held strong opinions on almost everything and expressed them forcefully, but he found no greater delight than when one of his students successfully led him to change his mind.

Bryan's own review of the Rio Grande depression (1938) drew both on his own prior reconnaissances and on studies which grew out of the Harvard field camps. He had established the fruitfulness of several lines of attack which are still being followed by a new generation of geologists studying the Rio Grande rift:

1. The basin deposits have an internal stratigraphy. Their lithologies provide a basis for paleogeographic reconstructions of individual basins. Chronologic controls are vital to such reconstructions, both of their patterns in space and of their succession in time. He did not live to see either the development of radiometric techniques or the availability in the public domain of biostratigraphic data from the Frick collections, but he foretold the importance of both.

2. A master stream, the ancestral Rio Grande, eventually integrated the individual basins; and eventually a regional erosion surface, the Ortiz surface, was graded to that stream. If he over-estimated the antiquity of the first and under-estimated the role of continuing deformation during the second, it was for lack of detailed chronological control.

3. The volcanic history of the region must be integrated with that of the depression itself. He may not have foreseen entirely how crucial this would be to present interpretations, but he recognized its importance.

Bryan said in 1933 that "the difficult problems of central New Mexico will yield to the attack. We will know how these striking land forms came into being, the history of our landscape, and, perhaps also, a hint or two as to how man can best adapt himself to this somewhat harsh environment." He would rejoice to see the attack renewed on a broader front and with increased sophistication.

After 1938, Bryan continued to supervise the work of students in the Rio Grande depression. His own work, however, and that of his later students, was increasingly preoccupied with the interface of geology and archeology, in the building of chronology and interpretation of paleo-environments, in this country and abroad. He died "with his boots on" in 1950, at an archeological conference in Cody, Wyoming. Geologists, archeologists, and botanists mourned the loss of a vigorous and stimulating colleague and of an irreplaceable friend.

Charles E. Stearns
Department of Geology
Tufts University
Medford, Massachusetts 02155

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1 9 8 2
FIELD CONFERENCE SCHEDULE

WEDNESDAY, November 3 **Registration Day**

3:00-10:00 p.m. Registration: Garden Room, Hilton Inn, Albuquerque, New Mexico

5:30-8:30 p.m. Cocktail party: Mediterranean Room, Hilton Inn (hosted by Halliburton Services)

THURSDAY, November 4 **First Day**

7:00-7:30 a.m. Registration for late arrivals: Garden Room, Hilton Inn

7:45 a.m. Buses depart from Hilton Inn parking lot for tour through Tijeras Canyon (I-40) and around Manzanita and Manzano Mountains (N.M. 14, N.M. 60, N.M. 6, U.S. 85, 1-25) **(lunch provided)**

5:30 p.m. Bar-B-Q dinner at J.F.K. campground (Canon del Trigo), Manzano Mountains

FRIDAY, November 5 **Second Day**

7:45 a. m. Buses depart from Hilton Inn parking lot for tour of southwestern part of Albuquerque basin (I-25, N.M. 6) and junction of Basin and Range and Colorado Plateau provinces (1-40, N.M. 279, N.M. 117) **(lunch provided)**

7:30-8:30 p.m. Cash bar: Mediterranean Room, Hilton Inn

8:30 p.m. Speaker: Lee R. Russell. Shell Oil Co.
"Structural style of the Albuquerque basin segment of the Rio Grande rift"
International Ballroom. Hilton Inn

SATURDAY, November 6 **Third Day**

7:15 a.m. Buses depart from Hilton Inn parking lot for tour of Sandia Mountains (Sandia Tram) and northern Albuquerque basin (1-25, N.M. 44) **(lunch provided)**

3:30-4:00 p.m. Return to Hilton Inn

CREDITS

Front Cover: Dick Kent

Front End Sheet: LANDSAT photograph of Albuquerque area; Technology Application Center, UNM.

Frontispiece: Rio Grande near Coronado Monument; J. F. Callender.

Title Page: Sandia Mountains, circa 1930; Albuquerque Museum Photoarchives.

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