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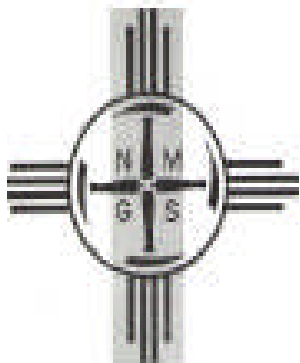
NMGS has decided to make peer-reviewed papers from our Fall Field Conference guidebooks available for free download. This is in keeping with our mission of promoting interest, research, and cooperation regarding geology in New Mexico. However, guidebook sales represent a significant proportion of our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

Southwestern New Mexico II

J. PAUL FITZSIMMONS

CHRISTINA LOCHMAN-BALK

Co-Editors

NEW MEXICO GEOLOGICAL SOCIETY

SIXTEENTH FIELD CONFERENCE - OCTOBER 15, 16 AND 17, 1965

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GEOLOGIC MAP OF THE SANTA RITA QUADRANGLE R. M. Hernon, W. R. Jones, S. L. Moore In Pocket



ROBERT MANN HERNON
May 6, 1907-June 29, 1965



WILLIAM RICH JONES
August 25, 1915-June 29, 1965

Geologists, U.S. Geological Survey

DEDICATION

In the warmth of a late afternoon sun two men died on a dusty road in southwestern New Mexico. They died instantly, without realization, without time for reflection. Had they time for realization and time for reflection, they could have taken satisfaction and pride in the knowledge that their being had touched the lives of a multitude of people and made those lives in some way easier, happier, better—their influence was like a ripple that results from a stone cast into quiet water, strong near the point of impact, less distinct at a distance, but going on to the far reaches of the pool.

To those nearest these two men—their wives and their children—their passing was as a giant earthquake, shaking and cracking the very foundation of their lives. We offer them our deepest sympathy, knowing that the task of rebuilding must be theirs alone. But all of us in the geologic profession, and particularly those of us in New Mexico, have also felt the shock, and we will feel the aftershocks and perceive the effects of that shattering moment for years to come.

We find it difficult to express our admiration and re-

spect for Bob and Bill—such common names for such uncommon men. One cannot say "I knew one and not the other," for to know one was to know both. To those of us who were privileged to "walk the outcrop" with them, words are unnecessary to express our feeling; to those who did not know them, words are inadequate to convey our deep sense of loss.

Bob and Bill were returning to the area they loved and to the geology they knew so well when their lives ended.

The contributions of these men who were humble, capable, and dedicated, will be the basis for the advancement of geologic knowledge in this area from now on. To them this guidebook is dedicated.

"No man is an island, intire of it selfe;—Any mans death diminishes me,—therefore never send to know for whom the bell tolls, it tolls for thee."*

WILL BALTOSSER AND FRED TRAUGER

*John Donne 1571, 72-1631.

Portrait sketches by Robert A. Keller.

PRESIDENT'S MESSAGE

Welcome to Number Sixteen! There may be a few societies that have accomplished this fine record, but surely no single society has contributed more to a state than the New Mexico Geological Society has contributed to ours. A vast amount of information has been accumulated from our annual spring meetings as well as from these annual field conferences. Unselfish foresight in Science Fair awards and in student aid and grants has been maintained. We may be justly proud of our recorded achievements.

Only those who have written a paper, edited a guidebook, or served as field trip chairman have full conception as to the number of hours necessary for the success of these meetings. Any brief review will reveal the faithful few who over and over again devote so much time and talent to insure our continued success.

As to the future! We must continually strive for greater participation in the activities and affairs of the Society. Perhaps an orderly succession of officers and activities from each quadrant of the state would stimulate more participation. We need long range planning to give added direction and purpose; and there is little doubt that the clay will soon arrive, if it has not indeed arrived already, when our area becomes saturated with field trips. Fourteen of our sixteen trips have been in New Mexico, and as many trips by other societies have been made in the state. What next? Perhaps the time is near when we should thoughtfully fit together the multitude of pertinent pieces, the fragments of geological information that are accumulating in various and scattered repositories, and make them into a detailed and meaningful picture. Perhaps the ultimate goal should be a compilation under one cover of all available (and hitherto unavailable) information on separate areas. A series of geologic atlases—whether by quadrangle, county, or quadrant—could be prepared to encompass the entire state. Such an undertaking should be comprehensive, including surface, subsurface, and economic data. Lastly, we should foster a program aimed at insuring early publication of road logs throughout the state. Hardly a road in the state has not been logged, and yet a visitor, or one of our own members, finds it very difficult to obtain this guidance for much of the excellent and varied geology New Mexico has to offer, or he finds it overwhelming to winnow the information from the extensive and varied sources.

This, then, for the future! For the present, welcome again to the Sixteenth Field Conference of the New Mexico Geological Society. On behalf of the Executive Committee, a resounding "Thank you" to those whose labor has made possible this conference and this memorial volume.

Curtis J. Little

C O M M I T T E E S

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PUBLICATIONS OF THE NEW MEXICO GEOLOGICAL SOCIETY

GUIDEBOOKS

1. Guidebook of the San Juan Basin [covering the north and east sides], New Mexico and Colorado; First Field Conference, 1950; edited by Vincent C. Kelley and others; 152ii pages, 40 illustrations. (Out of print)
2. Guidebook of the south and west sides of the San Juan Basin, New Mexico and Arizona; Second Field Conference, 1951; edited by Clay T. Smith and Caswell Silver; 163 + iv pages, 71 illustrations. (Out of print)
3. Guidebook of the Rio Grande country, central New Mexico; Third Field Conference, 1952; edited by Ross B. Johnson and Charles B. Read; 126 + iii pages, 50 illustrations. (Out of print)
4. Guidebook of southwestern New Mexico; Fourth Field Conference, 1953; edited by Frank E. Kottowski and others; 153 + v pages, 70 illustrations. \$5.00
5. Guidebook of southeastern New Mexico; Fifth Field Conference, 1954; edited by T. F. Stipp; 209 + viii pages, 76 illustrations. \$5.00
6. Guidebook of south-central New Mexico; Sixth Field Conference, 1955; edited by J. Paul Fitzsimmons; 193 + vii pages, 66 illustrations, hard binding. Prepared with the cooperation of the Roswell Geological Society. (Out of print)
7. Guidebook of southeastern Sangre de Cristo Mountains, New Mexico; Seventh Field Conference, 1956; edited by A. Rosenweig; 151 iii pages, 61 illustrations. \$7.00
8. Guidebook of southwestern San Juan Mountains, Colorado; Eighth Field Conference, 1957; edited by Frank E. Kottowski and Brewster Baldwin; 258 + vi pages, 110 illustrations. \$7.00
9. Guidebook of the Black Mesa Basin, northeastern Arizona; Ninth Field Conference, 1958; edited by Roger Y. Anderson and John W. Harshbarger; 205 vii pages, 106 illustrations; hard binding. Prepared in cooperation with the Arizona Geological Society. \$8.50
10. Guidebook of west-central New Mexico; Tenth Field Conference, 1959; edited by James E. Weir, Jr., and Elmer H. Baltz; 162 + iv pages, 91 illustrations; hard binding. \$8.50
11. Guidebook of the Rio Chama county [New Mexico and Colorado]; Eleventh Field Conference, 1960; edited by Edward C. Beaumont and Charles B. Read; 129 + vii pages, 35 illustrations, hard binding. \$8.50
12. Guidebook of the Albuquerque country [New Mexico]; Twelfth Field Conference, 1961, edited by Stuart A. Northrop; 199 + viii pages, 83 illustrations, hard binding. \$9.50
13. Guidebook of the Mogollon Rim region, east-central Arizona; Thirteenth Field Conference, 1962; edited by Robert H. Weber and H. Wesley Pierce; 175 + xi pages, 77 illustrations, hard binding. Prepared with the cooperation of the Arizona Geological Society. \$9.50
14. Guidebook of the Socorro region, New Mexico; Fourteenth Field Conference 1963; edited by Frederick J. Kuellmer; 240 + ix pages, 90 illustrations, hard binding. \$9.00
15. Guidebook of the Ruidoso country [New Mexico]; Fifteenth Field Conference, 1964; edited by Sidney R. Ash and Leon V. Davis; 204 pages, 64 illustrations, hard binding. \$9.00
16. Guidebook of southwestern New Mexico II; Sixteenth Field Conference, 1965; edited by J. Paul Fitzsimmons and Christina Lochman-Balk, hard binding. \$9.50

These publications are available by mail (please add 25 cents for postage and handling) from the New Mexico Bureau of Mines and Mineral Resources, Campus Station, Socorro, New Mexico. Also over-the-counter sales at the New Mexico Bureau of Mines and Mineral Resources, Socorro; the Department of Geology, University of New Mexico, Albuquerque; Holman's Book Store, Albuquerque, N. Mex.; and Museum of Northern Arizona, Flagstaff. Checks should be made payable to the New Mexico Geological Society. Discounts of 20 percent are available on all guidebooks except Nos. 12, 13, 14, 15, and 16 to members of New Mexico Geological Society and to non-members who purchase one set or more. Dealer's discounts are available on all publications by request.

SPECIAL PUBLICATIONS

1. Bibliography and index of the New Mexico Geological Society Guidebooks, 1950-63; compiled by Sidney R. Ash. \$1.00
2. A history of the New Mexico Geological Society; by Stuart A. Northrop. In preparation.

MAPS

Geological maps are available by mail or over the counter from the New Mexico Bureau of Mines and Mineral Resources, Socorro, as follows:

- (a) Geologic highway map of New Mexico; compiled by Frank E. Kottowski and others. \$1.25 folded; \$1.50 rolled. Also available from the Department of Geology, University of New Mexico, and Holman's Book Store, Albuquerque; and Roswell Map Company, Roswell.
- (b) Geologic map of the Sierra County Region, New Mexico; compiled by Vincent C. Kelley; accom-

panics Guidebook of the Sixth Field Conference, \$1.00

- (c) Geologic map of the Rio Chama country; compiled by Clay T. Smith and William R. Muehlberger; accompanies Guidebook of the Eleventh Field Conference. \$0.50
- (d) Geologic map of the Albuquerque country; compiled by Stuart A. Northrop and Arlette Hill; accompanies Guidebook of the Twelfth Field Conference. \$0.50
- (e) Tectonic map of the Ruidoso-Carrizozo region; compiled by V. C. Kelley and Tommy B. Thompson; accompanied Guidebook of the Fifteenth Field Conference. \$1.00

ROAD LOGS

Entry and exit road logs to supplement Guidebook of the Ninth Field Conference. \$0.10 each. The Road Logs are available by mail or over the counter from the

New Mexico Bureau of Mines and Mineral Resources, Socorro, as follows:

- (a) Albuquerque to Gallup (N.M.) and return, by E. H. Baltz, Jr. and S. W. West.
- (b) Mountainair to Como (N.M.) and return, by Frank B. Titus Jr.
- (c) Gallup (N.M.) to Cortez (Colo.) and return, by K. G. Smith, W. D. Fenex, et al.
- (d) Socorro (N.M.) to Holbrook (Ariz.) and return, by S. Thompson III and O. C. Hutson.
- (e) Globe to Showlow and to Sanders (Ariz.) and return, by J. P. Akers and H. W. Pierce.
- (f) Monticello (Utah) to Tuba City (Ariz.) and return, by T. L. Britt, E. L. Howard, and W. F. Auer.
- (g) Kingman via Grand Canyon Junction to Flagstaff (Ariz.) and return, by W. L. Chenoweth, D. R. Dow, and C. H. Williams.
- (h) Flagstaff to Prescott (Ariz.) and return, by D. G. Metzger and F. R. Twenter.
- (i) Gap Trading Post (Ariz.) to Kanab (Utah) and return, by J. P. Akers.

SCHEDULE OF CONFERENCE

Thursday, October 14
5:00-10:00 p.m.

Registration at the Palms Motor Hotel, U.S. 70-80W, Las Cruces, New Mexico.

Friday, October 15
7:00-8:00 a.m.

Late registration, at assembly point, Highway 70E.

7:30-8:00 a.m.

The caravan will assemble on the SE side of U.S. 70E (N. Main St.) opposite the "3-Crosses," by the Century 21 Motel and Rocket Drive-in Theater, and across the highway from Hieberts Restaurant (open 6:00 a.m.). The caravan will leave promptly at 8:00 a.m.

Lunch—Conferees will bring their own lunches. There are no restaurants or stores at Lake Valley. Box lunches can be obtained at the Palms, Ramada Inn, Hieberts, or other restaurants in the Las Cruces area.

6:00-7:00 p.m.

Late-late Registration, Drifter Lounge, Silver City. Order box lunches for the 2nd and 3rd days of the conference at the Murray Hotel, Drifter Motel Restaurant, Chef Grill, or other restaurants in the Silver City area.

Saturday, October 16
7:45-8:00 a.m.

The caravan will assemble north of junction of N.M. 25 with U.S. 180 on northeastern outskirts of Silver City. The caravan will leave promptly at 8:00 a.m.

Lunch—Conferees will bring their own lunches. The ± 700 year-old corn-on-the-cob at the Cliff Dwellings is not for sale, so pick up something in Silver City.

Cocktail Hour and Banquet at the Murray Hotel, Silver City; time to be announced.

Sunday, October 17
7:45-8:00 a.m.

The caravan will assemble one mile south of Grant County Courthouse on N.M. 90 in front of Silver City cemetery. The caravan will leave promptly at 8:00 a.m.

Lunch—Conferees will bring their own lunches. The lunch stop will be at the Cave Creek Canyon picnic area near Portal, Arizona.

Adjournment of the Conference, near Blue Mountain, about 14 miles south of San Simon U.S. 83 (Interstate 10), Arizona, at about 4:00 p.m.

PHYSIOGRAPHIC SETTING

The southwestern quarter of New Mexico and immediately adjacent areas include parts of the physiographic units listed below. These are designated on the basis of Fenneman's classification (1931). The general boundaries of the units are shown on the inset sketch map (fig. 1), which is a recent modification of Fenneman's 1930 physiographic map by the U.S. Geological Survey (New Mexico Bur. Mines and Mineral Res. Bull. 87, p. 21).

- | | |
|-----------------------------------|-------|
| Southern Rocky Mountains province | (A) |
| Colorado Plateau province | (B) |
| Navajo section | (B 1) |
| Datil section | (B 2) |
| Basin and Range province | (C) |
| Mexican Highland section | (C 1) |
| Sacramento section | (C 2) |
| Great Plains province | (D) |

The Sixteenth Field Conference tour route will be confined to the Mexican Highland section of the Basin and Range province and the Datil section of the Colorado Plateau province. Characteristics of these sections (after Thornbury, 1965) are as follows:

"Datil section. The topography of this section is largely volcanic in origin. Much of the area was covered with lava flows, and extensive lava-capped mesas and benches abound throughout the section. Hundreds of volcanic necks add diversity to the landscape." (p. 417)

"Mexican Highland section. Geologic structure is more variable here than in most of the province; high desert valleys and mountain ranges occur in about equal proportions; most of the section has external drainage." (p. 483)

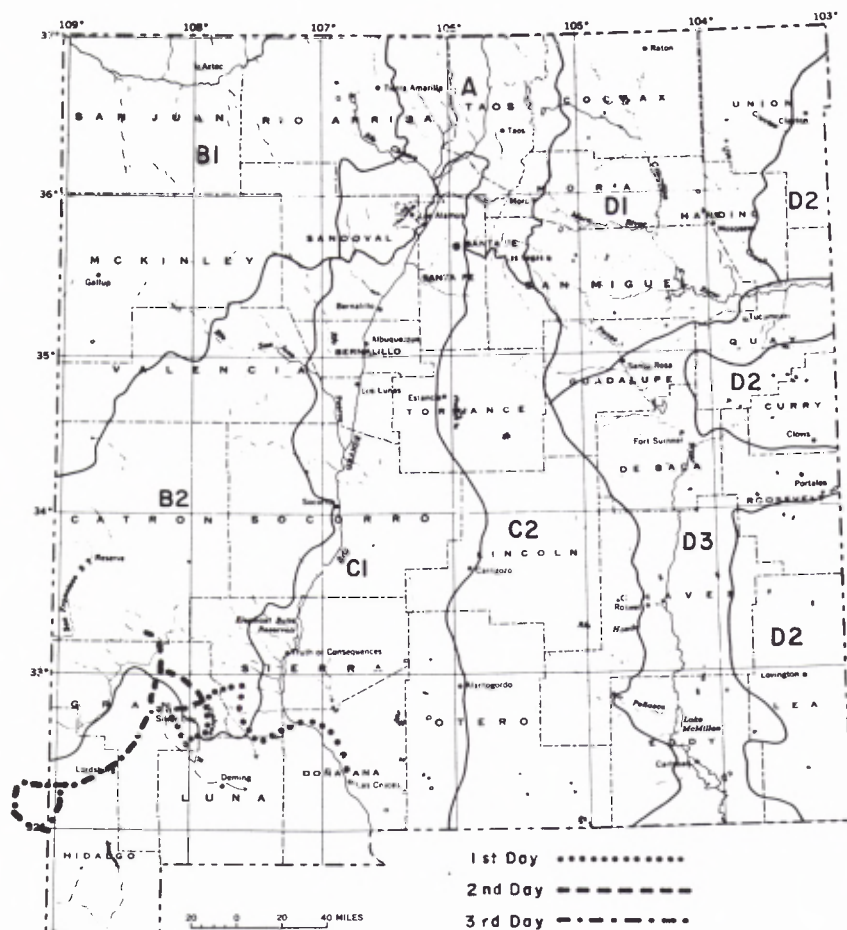


FIGURE 1

Physical divisions of New Mexico. (A, Southern Rocky Mountains; B1, Colorado Plateaus, Navajo section; B2, Colorado Plateaus, Datil section; C1, Basin and Range province, Mexican highland; C2, Basin and Range province, Sacramento section; D1, Great Plains province, Raton section; D2, Great Plains province, High Plains; D3, Great Plains province, Pecos Valley. (Fenneman, 1962.)

Fenneman (1931, p. 384) recognized that "the flood of lava overlapping the edges of the two provinces (Colorado Plateau, and Basin and Range in southwestern New Mexico and easternmost Arizona) has made it impossible to draw a clear line between them."

The first day's caravan route starts in the Mexican Highland section, following the Rio Grande depression, with an excursion onto the Jornada del Muerto plain, into the Rincon-Palomas Valley. After crossing a remnant of the Palomas basin surface, the Good-sight Mountains and the Nutt basin, the route traverses the southeastern prong of the Datil section from near Lake Valley to Dwyer in the Mimbres Valley. The route from the vicinity of Dwyer and City of Rocks to Silver City again crosses part of the Mexican Highland section.

Most of the second day of the conference will be spent in the Datil section in the upper Gila and Mimbres River basins. The caravan route leaves the Mexican Highland section just north of Pinos Altos and re-enters it near Santa Rita. In addition to the spectacular vistas of the plateaus, peaks and ranges of the Datil section, striking features seen on the first and second days of the conference will be the stepped-

sequence of geomorphic surfaces flanking the Rio Grande, the Mimbres and Gila Rivers, and their tributaries. These Pleistocene and Recent surfaces are inset below the floors of the ancient basins, plains and valleys whose late-Cenozoic fills have been variously considered to be part of the Santa Fe Group or Gila Conglomerate intermontane basin-fill deposits.

The third and final day of the conference will be spent in the Mexican Highland section in the southern New Mexico-Arizona border areas. The caravan route will cross the Burro Mountains uplifts, the Lordsburg and Animas Valleys (site of Pleistocene Lake Animas), the Peloncillo Range, and San Simon Valley. The conference will end on the east flank of the Chiricahua Mountains in an area of classic Basin and Range geology and geomorphology.

REFERENCES

- Fenneman, N. M., 1931, *Physiography of Western United States*: New York, McGraw-Hill, 534 p.
———, 1962, *Physical divisions of the United States*: U.S. Geol. Survey Map.
Thornbury, W. D., 1965, *Regional Geomorphology of the United States*: New York, John Wiley & Sons, Inc., 609 p.
U.S. Geological Survey, 1965, *Mineral and Water Resources of New Mexico*: New Mexico Bur. Mines and Mineral Res. Bull. 87, p. 21.

