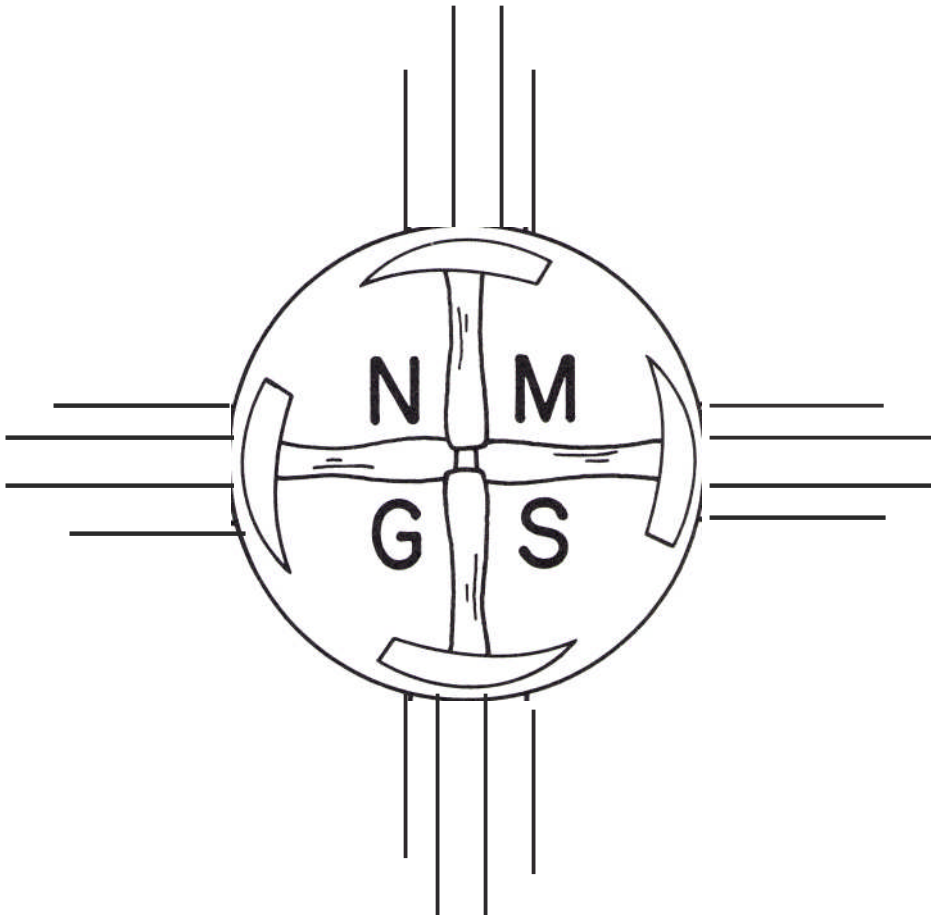


# NEW MEXICO GEOLOGICAL SOCIETY



## Guidebook

of the

## MOGOLLON RIM REGION

EAST-CENTRAL ARIZONA

Prepared in cooperation with the

ARIZONA GEOLOGICAL SOCIETY

Edited by

Robert H. Weber and H. Wesley Peirce

THIRTEENTH FIELD CONFERENCE

October 18, 19, and 20, 1962

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## PRESIDENT'S MESSAGE

Welcome to the Thirteenth Annual Field Conference of the New Mexico Geological Society in the Mogollon Rim country of Arizona. This is our second conference to be held in cooperation with the Arizona Geological Society, and the road logs and technical papers in this guidebook shed light on many problems which are of mutual interest to geologists in both states. The history of cooperation between the sister societies, as well as between Arizona and New Mexico geologists in general, helps to account for the fact that there are no "state-line faults" with "displacements" large enough to really separate the rocks or the geologists.

After reviewing presidential messages in the preceding guidebooks, I find it difficult to avoid repetition in this message. The reasons are obvious: so many things have been well said by past presidents, and so many things are worth repeating. The Mogollon Rim conference was conceived several years ago and was predicted in the presidential messages by Frank Kottowski and Richard Holt in the guidebooks for the 11th and 12th field conferences. These men and others in both societies, who are responsible for conceiving and carrying out this and other field conferences, are not "prophets" in the usual sense but, instead, are people with a capacity for hard work who unselfishly give their time, ideas, and professional knowledge in order that predictions will come true. It is gratifying to note that others who are not affiliated with either society also contribute greatly. Until one has worked on a field trip and observed at first hand the planning and execution of the trip and publication of the guidebook, it is difficult to realize the complexities involved, and appreciate the talents and hard work of the members of field trip committees. A large debt of gratitude is due the General Chairman and Vice-Chairman, the Editors, the chairmen and members of the various committees, the authors of the articles, and the companies and State and Federal organizations that donated "company time" and services. I hope that everyone who uses this guidebook will read the list of committees in the front of the guidebook and determine the names and affiliations of those who made the field conference possible.

The Mogollon-Tonto Rim field conference again emphasizes the non-specialized purposes of the New Mexico Geological Society. The route of the field trip was chosen to cover the general geology of the entire region. The second day's trip in the Globe-Superior area takes us into the heart of one of the famous metal mining areas of Arizona and should prove of interest to a segment of the profession which is often neglected.

The guidebooks of the New Mexico Geological Society now form an unbroken series of thirteen. The 1st, 2nd, 3rd, and 6th guidebooks are out of print, and the stocks of several others are low. Thousands of guidebooks have been sold, the sale of these books providing a continuing single source of revenue for the society. However, we presently have an inventory of about \$40,000 worth of guidebooks. These books are all paid for, but the income from their sale is nearly static, whereas, the price of publishing

new guidebooks has slowly risen. In 1961, the cost and income curves "crossed" and the price of publication exceeded the income to the Society. In spite of economies in the preparation of the 13th guidebook we may find ourselves in a similar position in 1962. This rattles an old skeleton in the Society's closet; should the field conferences and elaborate guidebooks be continued as in the past, or should the Society change its approach to both the conferences and the guidebooks? This question has been raised and discussed by the membership on several occasions. Very few people really wanted to change the mainly satisfactory operations of the Society, and it has always been decided overwhelmingly that we should continue with the status quo. However, the financial situation has become critical this year and a realistic approach is necessary.

Several solutions have been suggested. All of them have merit, but all of them have certain disadvantages. An obvious solution is to sell our back inventory of guidebooks. This is easier said than done. We must admit that the market for these books is somewhat limited. Undoubtedly most of them will be sold eventually, but it is difficult to accelerate the demand. The Executive Committee began an advertising campaign in 1961 and this is being continued. The campaign helped but, it will not solve all of our fiscal problems unless the audience for whom the guidebooks are published has a change of heart, or at least a change of financial status. A related, partial solution is to limit the size of the editions, and this has been done with the present guidebook. However, there are certain basic costs in publishing an elaborate guidebook whether the edition is 500, 1000, or more; limiting the number of books printed is by no means a total solution to publication costs.

It has been suggested that we postpone our next field conference for one or two years and recuperate financially. This suggestion has not met with much favor. Another suggestion is that we sponsor several small trips by local groups each year, but this seems to infringe on the functions of the local societies.

A suggestion which has merit is that our future field conferences should concentrate on specific problems in limited areas rather than attempting to cover the geology of large regions. An "outcrop" trip would consist of visiting and examining in detail those localities which provide important evidence used in interpreting regional geology. The localities would include such things as on-laps and angular unconformities, well-exposed faults, bioherms, mineralized areas, important stratigraphic localities, etc. This kind of field conference would satisfy the remark often heard on field trips, to wit: "I wish I could see the 'significant' outcrops in those hills 5 miles away

that he's describing." An outcrop trip probably could be planned in such a way that a modest and inexpensive guidebook could be prepared, the trip would be interesting, financially successful, and the complex work of the vari-

ous committees could be lightened. Certainly, such trips will be very much in order within a very few years unless we are to re-run some of our earlier trips. Re-runs may not be desirable because in some areas very little new work has been done, while in other areas other societies have held recent field conferences and published guidebooks.

In discussing some of the problems of future operations of the Society, I do not intend to be pessimistic. The Society has done an excellent job of providing valuable information to many geologists and bringing together representatives of all the disciplines of the geological sciences. The continuing need for the services of the Society, and the vigor, willingness and initiative of its members guarantees its future success. However, now seems to be a good time for some reflection on the

financial problems of the organization and the future course of its activities. Change is inevitable in the course of geological societies as in other human activities. The Executive Committee will be engaged shortly in preparing for some of next year's activities — these things take time — and will have to make decisions about a field conference. The officers of the Society attempt to act in accord with the wishes of the membership and your thoughtful comments are invited.

In the meantime, I am sure we will enjoy the spectacular scenery and the geology of the Mogollon Rim, and with our hosts, the Arizona Geological Society, we will count this as one of our memorable field conferences.

Elmer H. Boltz, President  
New Mexico Geological Society

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## ACKNOWLEDGMENTS

Once again, as for the Ninth Field Conference in 1958, we are indebted to our Arizona colleagues for their splendid cooperation in preparing an informative guidebook and conducting an excursion through one of the more scenic and geologically significant regions of their domain. Members and friends of the Arizona Geological Society have contributed unstintingly of their time and talents toward the success of this field conference. The measure of their contribution is only partially revealed by the committee memberships and technical contributors listed in the pages following.

A perusal of this guidebook perhaps more fully reveals the broad spectrum of organizational affiliations of the committee members and authors, representing many segments of governmental, commercial, and academic fields of activity. The New Mexico Geological Society is most grateful, both to the individuals so identified, and the organizations that they represent, for the many man-days that were devoted to the preparation for, and conduct of, this field conference. Within many of these

organizations are a number of persons who contributed significantly, but anonymously, to the success of this program. Although especially noteworthy are the staffs of the Ground Water Branch of the U. S. Geological Survey, the New Mexico Bureau of Mines and Mineral Resources, and the Arizona Bureau of Mines, others share in our appreciation of these efforts even though not individually identified herein.

To the management and staff of the Miami Copper Company Division of the Tennessee Copper Corporation, the Inspiration Consolidated Copper Company, and the Phelps Dodge Corporation, the Society extends its sincere thanks for courtesies rendered during stops at their respective mining properties.

Escort services provided by the New Mexico State Police, the Arizona Highway Patrol, and the Miami City Police greatly assisted the progress of the caravan.

**EXECUTIVE COMMITTEE — NEW MEXICO GEOLOGICAL SOCIETY**

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## PUBLICATIONS OF THE NEW MEXICO GEOLOGICAL SOCIETY

1. Guidebook of the San Juan Basin [covering north and east sides], New Mexico and Colorado; First Field Conference, 1950; edited by Vincent C. Kelley and others; 153 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 pages, 69 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 pages, 51 illustrations. (Out of print)
  4. Guidebook of southwestern New Mexico; Fourth Field Conference, 1953; edited by Frank E. Kottlowski and others; 165 pages, 67 illustrations. \$5.00
  5. Guidebook of southeastern New Mexico; Fifth Field Conference, 1954; edited by T. F. Stipp; 213 pages, 83 illustrations. \$5.00
  6. Guidebook of south-central New Mexico; Sixth Field Conference, 1955; edited by J. Paul Fitzsimmons; 193 pages, 70 illustrations. Prepared with the cooperation of the Roswell Geological Society. \$7.00 (Out of print)
  7. Guidebook of southeastern Sangre de Cristo Mountains, New Mexico; Seventh Field Conference, 1956; Edited by A. Rosenzweig; 154 pages, 61 illustrations. \$7.00
  8. Guidebook of southwestern San Juan Mountains, Colorado; Eighth Field Conference, 1957; edited by Frank E. Kottlowski and Brewster Baldwin; 258 pages, 109 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 pages, 105 illustrations. 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 pages, 83 illustrations. \$8.50
  11. Guidebook of Rio Chama country [New Mexico and Colorado]; Eleventh Field Conference, 1960; edited by Edward C. Beaumont and Charles B. Read; 129 pages, 35 illustrations. \$8.50
  12. Guidebook of the Albuquerque country [New Mexico]; Twelfth Field Conference, 1961; edited by Stuart A. Northrop; 199 pages, 73 illustrations. \$9.50
  13. Guidebook of the Mogollon Rim region, east-central Arizona; Thirteenth Field Conference, 1962; edited by Robert H. Weber and H. Wesley Peirce. \$9.50
- These publications are available by mail (please add 25c 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 either the Bureau of Mines or the Department of Geology, University of New Mexico, Albuquerque. Checks should be made payable to the New Mexico Geological Society. Geologic maps are available by mail or over the counter at the Bureau of Mines, Socorro, as follows:
- (a) Geologic highway map of New Mexico; compiled by Frank E. Kottlowski and others. \$1.25 folded; \$1.50 rolled. Also available from the Department of Geology, University of New Mexico, Albuquerque.
  - (b) Geologic map of the Sierra County Region, New Mexico; compiled by Vincent C. Kelley; accompanies 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) Entry and exit road logs to supplement Guidebook of the Ninth Field Conference. \$0.50 to \$0.75

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### SCHEDULE

**Wednesday, October 17**  
5:00-10:00 p.m.

Registration at the El Rancho Hotel, Gallup, New Mexico.

**Thursday, October 18**  
**Gallup, New Mexico to**  
**Globe, Arizona.**  
7:00 a.m.

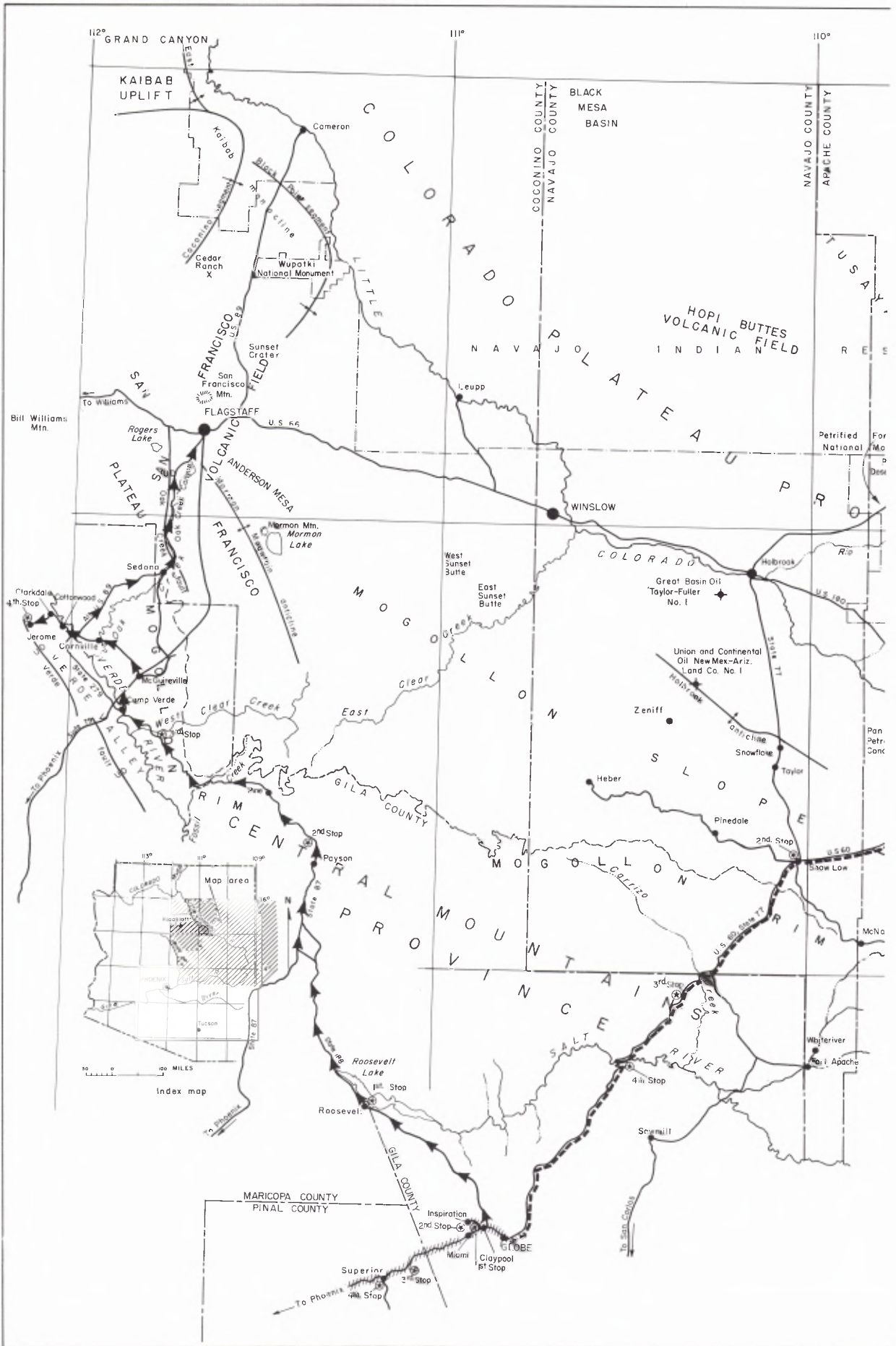
Late registration at the El Rancho Hotel.  
Caravan assembles at mile point 0.5 on New Mexico Highway 32, at the south side of town.

**Friday, October 19**  
**Globe to Superior, Arizona**  
**and return.**  
8:00 a.m.

Caravan assembles 3.6 miles west of the Globe Court House in the parking lot next to the bowling alley associated with the Copper Hills Motel, on the left side of U. S. Highway 60-70.

**Saturday, October 20**  
**Globe to Flagstaff, Arizona**  
7:00 a.m.

Caravan assembles on Arizona Highway 88 in front of the Cobre Valley Country Club, just north of the junction of Arizona 88 and U. S. 60-70, on the right shoulder. Field Conference ends at Flagstaff.





# ROAD LOG FROM GALLUP, NEW MEXICO TO GLOBE, ARIZONA

FIRST DAY — OCTOBER 18, 1962

Gallup to Zuni, New Mexico by Roy W. Foster and Robert Ostrander

Zuni, New Mexico to Show Low, Arizona by J. P. Akers, P. W. Johnson, and M. E. Cooley

Show Low, Arizona to Becker Butte on North Rim Salt River Canyon by T. L. Finnell and E. J. McKay

Becker Butte to Globe, Arizona by H. Wesley Peirce and George R. Roseveare, with comments by A. F. Shride

**Distance of Travel:** 236.5 miles.

**Starting Time:** 7:00 a.m.

**Assembly Point:** Mileage point 0.5, State Road 32, south side of town. (Fig. 1 shows route of trip.)

## RESUME

The first day of our trip takes us southward and westward from Gallup, New Mexico into Arizona and the Mogollon Rim country. As we travel toward the Rim, we will see Cretaceous and younger rocks that have been deposited on the beveled surfaces of progressively older rocks. We will drive through the northwestern edge of the Datil volcanic field and will be able to trace some of the ancient drainage channels of the Little Colorado River, down which the lava flowed, by the erosional remnants.

The Rim marks the boundary between the Colorado Plateau Province and the Central Mountains Province. The Central Mountains Province is the transitional zone between the Plateau and the Basin and Range Province to the southwest. South of the Rim we descend rapidly from the Plateau through the complete section of Mesozoic and Paleozoic rocks. In the sequence in Salt River Canyon, the Paleozoic and younger Precambrian rocks have been intruded by diabase.

**Note:**—Users of the road log should bear in mind that the cumulative mileages are approximate. Variations can be expected due to differences in individual odometers and errors on the part of those preparing the log. Check points such as bridges and road intersections in the log permit ready correction.

## Cumulative Mileage

0.0	Junction Third Street (State Road 32) and Coal Avenue (U.S. 66). GO SOUTH ON THIRD STREET.
	0.1
0.1	TURN LEFT onto Aztec.
	0.1
0.2	TURN RIGHT onto Second Street (State Road 32).
	0.2
0.4	Gallup Sandstone crops out on right.
	0.1
0.5	Outcrops of sandstone, shale, and coal in the Crevasse Canyon Formation on both sides of road. ASSEMBLY POINT. Rear of caravan at this mileage.
	2.0
2.5	Cattle guard.
	0.1
2.6	Coal seam in the Crevasse Canyon Formation at 3:00 (read "three o'clock").
	0.4
3.0	Lenticular sandstone overlying thin coal bed and shale in Crevasse Canyon Formation.
	0.4
3.4	Cattle guard. Outcrops to the right on hill are in the Menefee Formation. Road continues through outcrops of sandstone, shale, and thin coal beds in the Crevasse Canyon Formation. Note the lenticular nature of the sandstones in this interval.
	2.8
6.2	Bridge.
	0.2
6.4	Bridge.
	1.2
7.6	Road cuts and outcrops on both sides of road of Menefee Formation.
	0.8
8.4	Sandstone, shale, and thin coal beds in the Menefee Formation.

