

# New Mexico Geological Society

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## ***Front Matter***

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

*in:*

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*This is a section from the 1987 NMGS Fall Field Conference Guidebook.*

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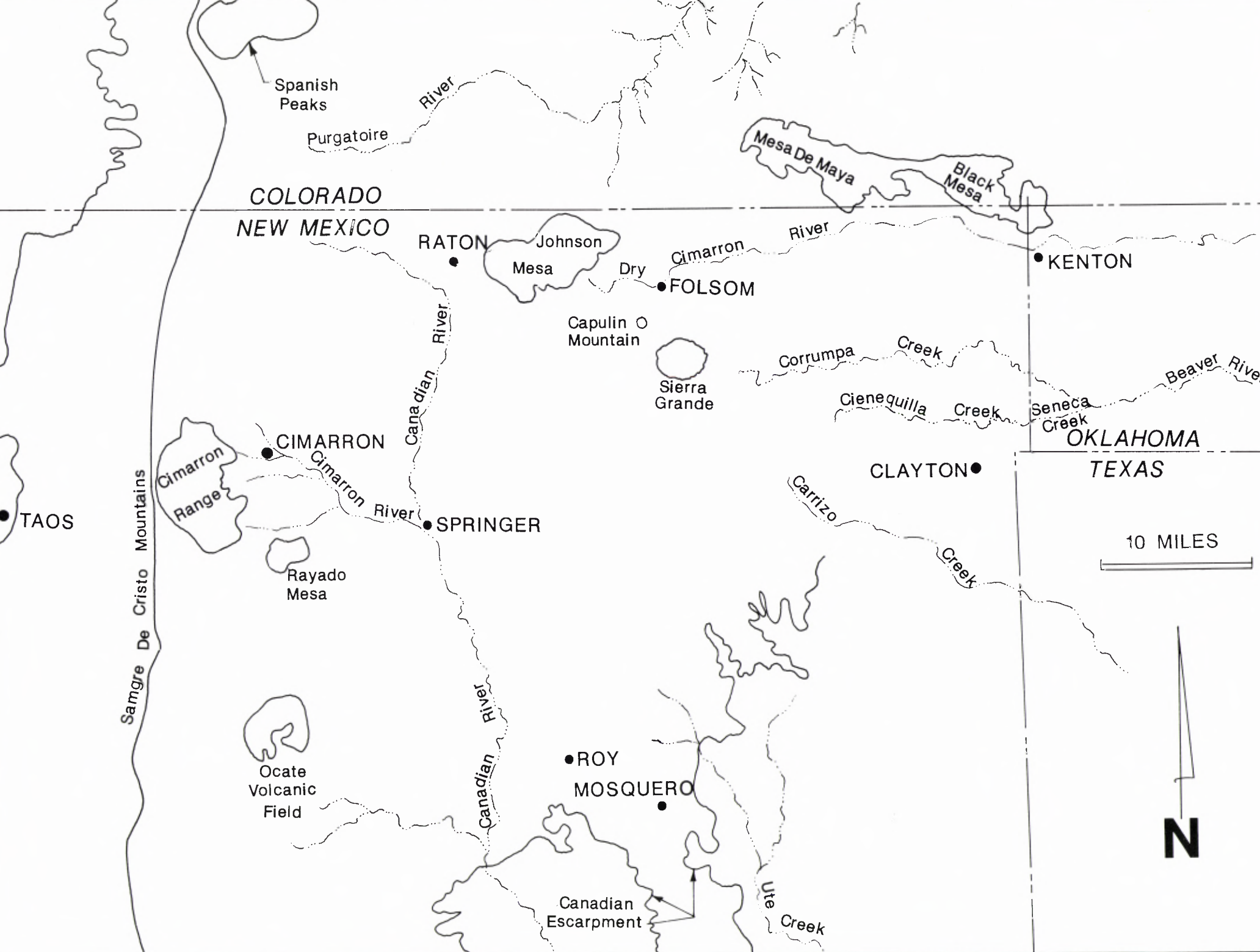
NMGS has decided to make peer-reviewed papers from our Fall Field Conference guidebooks available for free download. This is in keeping with our mission of promoting interest, research, and cooperation regarding geology in New Mexico. However, guidebook sales represent a significant proportion of our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

**Editors**

SPENCER G. LUCAS

ADRIAN P. HUNT



New Mexico Geological  
Society Thirty-eighth  
Annual Field  
Conference,  
September 24–26,  
1987



## DEDICATION

The 1987 New Mexico Geological Society Guidebook is dedicated to Stuart A. Northrop and Vincent C. Kelley, both Professors Emeriti in the Department of Geology, University of New Mexico. The contributions of both men to our understanding of New Mexico geology and to the New Mexico Geological Society are well-known and impressive. It is particularly appropriate to honor them this year, as 1987 marks Vin's 50th year at UNM, and 1988 will be Stu's 60th—among New Mexico geologists, unprecedented lengths of service to their state and institution.

Stu arrived in New Mexico from Yale University in 1928 to become chairman and one-half the Geology Faculty at UNM. In 1937 he hired Vin Kelley, who had just received his doctorate from Caltech, to replace the recently deceased Robert Ellis on the faculty. Northrop remained as chairman until 1961, becoming Dean of the Graduate School for one year and then Research Professor until his retirement in 1969. Kelley followed Northrop as chairman, retiring in 1970. Thus, for 42 years, Stu and Vin guided the UNM Department of Geology as it grew from a faculty of two to 12, moved into a new building (now named Northrop Hall), entered the age of high-tech instrumentation and large-scale grant funding and incorporated within it the Institute of Meteoritics. These men also guided the studies of dozens of undergraduate and graduate students, many of whom have achieved prominence at academic institutions, the U.S. Geological Survey and in industry.

Stuart Northrop's multifaceted contributions to New Mexico geology are chiefly in the fields of mineralogy, paleontology and New Mexico's earthquake history. His "Minerals of New Mexico," first published in 1944 (with a second, revised edition in 1959), remains the standard reference work on the subject. Work with colleagues in the U.S. Geological Survey in the 1940's and 1950's resulted in stratigraphic studies and geologic maps of the Nacimiento-Jemez area, Las Vegas basin and eastern Colfax County. He brought together in several publications information about New Mexico's fossil record, including a summary of the entire record (1962) and a bibliography (with the present writer, 1981). As an editor Stu is without peer, and he lent his talents to the NMGS in editing or coediting Guidebooks 12 and 17 and Special Publications 5 and 6. He also wrote a history of the Society through 1968 (Special Publication 2), served as President in 1949–50 and was elected an honorary member in 1962. On a personal note, Stu generously shared his considerable knowledge of New Mexico's fossils with a young paleontologist newly arrived in the state in 1974, a kindness that this acknowledgment can only inadequately repay.

Vin Kelley's accomplishments were summarized in a biographic profile included in NMGS Special Publication 6 (1976), a volume of papers honoring his contributions to New Mexico geology. Although Vin never worked in northeastern New Mexico, he studied the geology of most other parts of the state, and it is fair to say that no person has contributed more to our understanding of New Mexico geology. He has written extensively on economic geology (especially iron deposits), the tectonics of the Colorado Plateau and the regional geology of southeastern and east-central New Mexico. His studies of the Caballo Mountains (with Caswell Silver, 1952), the Sandia Mountains (with Northrop, 1975) and the Albuquerque basin (1977) are illustrative of Vin's more than 150 publications, which typically combined a wealth of detailed field observations with careful synthesis of the structural and stratigraphic histories of the areas under consideration. As one of the founders of the NMGS, Vin served as its first president (1947–48), was general chairman and editor of the first NMGS field conference guidebook (1950) and was elected to honorary membership in 1955. Both Stu and Vin continued their research and writing long after "retirement," and even into the 1980's, with 80th birthdays approaching, were contributing papers and road logs to NMGS guidebooks. Vin compiled two of the seven area stratigraphic sections for the New Mexico Highway Geologic Map, published by NMGS in 1982.

A brief summary cannot possibly do justice to the range of Stu and Vin's accomplishments. Beyond the details of their publications, service to the Society and other dry biographic facts, are more subtle but equally important personal qualities. They were teachers in the broadest sense—eager and happy to pass their knowledge on to others, instilling their own high scientific standards and desire to "learn from the rocks" in several generations of students and numerous colleagues. Their influence on our understanding of New Mexico geology cannot be calculated; it is profound and will be long-lasting. Thus, in a spirit of gratitude and respect, we dedicate this 38th New Mexico Geological Society Guidebook to Stuart A. Northrop and Vincent C. Kelley.

Barry S. Kues



Stuart A. Northrop



Vincent C. Kelley



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## PRESIDENT'S MESSAGE

Welcome to northeastern New Mexico and to the thirty-eighth annual Fall Field Conference of the New Mexico Geological Society. The Society is indebted to Adrian Hunt and Spencer Lucas for their hard work road logging, soliciting papers, cajoling authors, writing papers, editing papers and compiling the final guidebook. Spencer Lucas also became managing editor for the Society this year. The Society thanks all the contributing authors for their articles. Jim Olsen and Ed Heffern deserve thanks for taking care of logistics for this field conference. Thanks also to the UNM Geology Department and registration chairman Cornelis Klein. The conference scholarships for students by the Los Alamos Geological Society and by the geoscience departments are greatly appreciated. The Society thanks Welex and Schlumberger for their services.

A very successful Annual Spring Meeting was held in Socorro with the able leadership of Ron Broadhead and Gretchen Roybal and registration chairman Bill Chavez. Thirty-seven papers were presented and two students won best-paper awards.

The Society awarded \$7,000 in scholarships to students, as well as publications to outstanding graduating geoscience majors and two State Science Fair prizes. The Society's \$1,000 fellowship was named the Frank E. Kottlowski Fellowship in honor of his long-continued strong support of geology in New Mexico and support of the NMGS. The Society's scholarship endowment continued to grow despite changes in the economy. The Society is honored to manage the Wellnitz Scholarship fund and to distribute awards to geology students at New Mexico's universities. Donations by members in memory of Bob and major support by Beverly Wellnitz has substantially increased the fund. The first Wellnitz award was made this year. The Wellnitz's long support of the Los Alamos Geological Society and the NMGS has helped generations of students of New Mexico's geology.

This year has seen several changes of behind-the-scenes volunteers who carry out largely thankless but vital functions for the Society. Orin Anderson, Bob Bieberman and Jiri Zidek have been conscientious workers for years. We owe them our sincere thanks for jobs well done and for helping to break in their successors. During the past five years as Publications Chairman, Orin has overseen record sales of Society publications, including the geologic highway map and several well-received guidebooks. He kept stock of all publications, sold them at meetings, monitored an advertising campaign in national journals and put together numerous mail-outs to NMGS members and surrounding geological societies. Orin is training Richard Chamberlin to take over as Publications Chairman. Bob Bieberman has been archivist for the Society for many years but soon will retire from the Bureau of Mines and Mineral Resources and wanted to break in new record keepers. Bob also served as Society representative to the AAPG, a job that Ron Broadhead has begun. Orin Anderson and I will take care of Society archives. Jiri Zidek has been Managing Editor for the past three years and has spent many long hours getting guidebooks ready for publication. He also suggested many ways of advertising our books and maps nationally. Spencer Lucas has taken over Jiri's tasks. The Society is indebted to these inveterate workers and appreciates the same dedication of their successors. The Society is also grateful to members of the Scholarship Committee, Nominating Committee and Field Trip Committee. Continuing to help with Society business are Jill Collis, secretary, and Norma Meeks, publication sales distributor. Year after year, our Society continues to have great field trips and guidebooks due to the efforts and goodwill of all of our members. If you're not involved, volunteer and get involved! There are plenty of one-year and multiyear tasks on various committees.

I look forward to seeing you again next year at the 1988 Fall Field Conference in Las Cruces.

David W. Love, *President*

## EDITORS' MESSAGE

Since 1950, the New Mexico Geological Society has conducted an annual field conference focused on the geology of some portion of New Mexico and/or an adjacent state. Thirty-seven field conferences later, thousands of miles of road logging and thousands of pages of text have left untouched very little of New Mexico's geology. Ironically, one of the few areas not touched by the New Mexico Geological Society, the high plains of northeastern New Mexico, was one traveled by so many of the state's earliest settlers. The wagon trains on the Cimarron cutoff of the Santa Fe Trail traversed a landscape dominated by the volcanic peaks and flows that represent the easternmost Cenozoic volcanism in the United States. Camps were pitched in the river valleys and canyons where the exposed bedrock holds the key to understanding the relationship of Mesozoic geologic history in the Southern Rocky Mountains and on the High Plains.

In 1846, Adolph Wislizenus provided some of the first geological observations on northeastern New Mexico, entering the state near the present site of Clayton and heading toward "the Rabbit Ears" (Rabbit Ear Mountain). The field conference documented in this guidebook will begin, 141 years after Wislizenus, at Clayton, and fills one of the few remaining gaps in the New Mexico Geological Society's coverage of the geology of New Mexico. This guidebook, with its heavy emphasis on Mesozoic stratigraphy, sedimentology and paleontology, contains many original contributions to the geology of northeastern New Mexico, and we believe is a fair reflection of existing knowledge of this area. Solid coverage of geohydrology, a topic of great interest in an area so greatly affected by the "Dust Bowl" years, and an assortment of articles on economic geology, tectonics, Precambrian geology and volcanics, round out coverage of one of the last frontiers to be conquered by the New Mexico Geological Society.

As always, the completion of this guidebook and the organization of the accompanying field conference proved an exacting task incapable of completion without diverse assistance. Special thanks are due to Barry Kues, John Holbrook and Fred Trauger for their work on the road logs; to Mary Boone and Sharon Fisher for word processing; to Lisa Schlack and Randy Pence for artwork; to Wayne Lambert, Bob Eveleth and the USGS for photographs; to Jane Wells for arranging advertising; to the executive committee of the New Mexico Geological Society for their perspicacity; to Jim Olsen and Ed Heffern for logistics; and to Jim Cheek, Dave Spear and the other professionals at the University of New Mexico Printing Plant for another job well done.

Spencer G. Lucas

Adrian P. Hunt

## C O M M I T T E E S

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## FIELD CONFERENCE SCHEDULE

### Wednesday, September 23 Registration Day

5:00-9:00 p.m. Registration: Country Tavern, Clayton, New Mexico. 5:00-?  
Cocktail party: Country Tavern, Clayton.

### Thursday, September 24 First Day

7:30 a.m. Rendezvous at intersection of Locust Street and South First Street in Clayton. Registration for late arrivals will be held at first stop.  
7:45 a.m. Buses depart for first day's tour (lunch provided).  
6:30 p.m. Barbecue dinner at Clayton Lake State Park.  
9:00 p.m. Buses return to Clayton.

### Friday, September 25 Second Day

7:45 a.m. Buses depart from intersection of Locust Street and South First Street in Clayton for second day's tour (lunch provided).  
7:30 p.m. Dinner at Airpark Building, Clayton, New Mexico.  
8:30 p.m. Speaker: Dr. Robert J. Weimer, Colorado School of Mines.

### Saturday, September 26 Third Day

8:00 a.m. Caravan departs from intersection of Locust Street and South First Street in Clayton for third day's tour (lunch provided).

## CREDITS

**Front Cover:** Drawing of Steamboat Butte by Randy Pence from a photograph by S. G. Lucas.

**Front End Sheet:** LANDSAT false-color composite image of northeastern New Mexico, southeastern Colorado, western Oklahoma and western Texas; U.S. Department of Agriculture and Technology Application Center, UNM.

**Title Page:** Drawing of Capulin Mountain by Lisa Schlack.

**Back End Sheet:** Geologic map adapted from Dane, C. H. and Bachman, G. O., 1965, Geologic Map of New Mexico: U.S. Geological Survey, scale 1:500,000.

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Ute Creek, the longest tributary of the Canadian River in New Mexico, heads in the Raton-Clayton volcanic field between Raton and Clayton and flows 145 km southeast to join the Canadian River at Ute Reservoir northeast of Tucumcari. Two contrasting types of landscape make up its course. In its upper half the stream is on the Las Vegas Plateau underlain by Cretaceous sedimentary rocks and upper Cenozoic volcanic and sedimentary rocks. Its channel is typically narrow and rocky, and it flows through shallow canyons bounded by volcanic rocks or in broad open valleys. At the southern edge of the Plateau is the Canadian Escarpment (300 m high) which leads down to the Canadian Basin. The stream leaves the Plateau through Ute Creek Canyon, a major reentrant in the Plateau about 24 km long and 213 m deep. In its lower half, below Ute Creek Canyon, Ute Creek traverses the Canadian Basin, a broad lowland underlain by Triassic sandstone and shale and upper Cenozoic alluvium and eolian sand. The stream channel is typically wide and sandy and bordered by low alluvial terraces or low cliffs of Triassic sandstone. Valleys are wide and almost featureless except for scattered low cuestas and mesas. The photograph above, and those following at intervals throughout the guidebook, indicate the character of Ute Creek and its drainage basin at several points along its course. The photograph above is of the channel of Ute Creek about 5 km southeast of Gallegos and 29 km northwest of Ute Reservoir. View is S68°W upstream. The wide sandy channel is typical of Ute Creek in the Canadian Basin portion of its course. Salt cedar and cottonwood trees are present on the flood plain. The scarp in the distance (6 km) is the Canadian Escarpment. Camera station is in NE 1/4 sec. 31, T16N, R31E. Altitude about 1,234 m. W. Lambert photograph No. 86L91. 27 December 1986, 12:05 p.m., MST.