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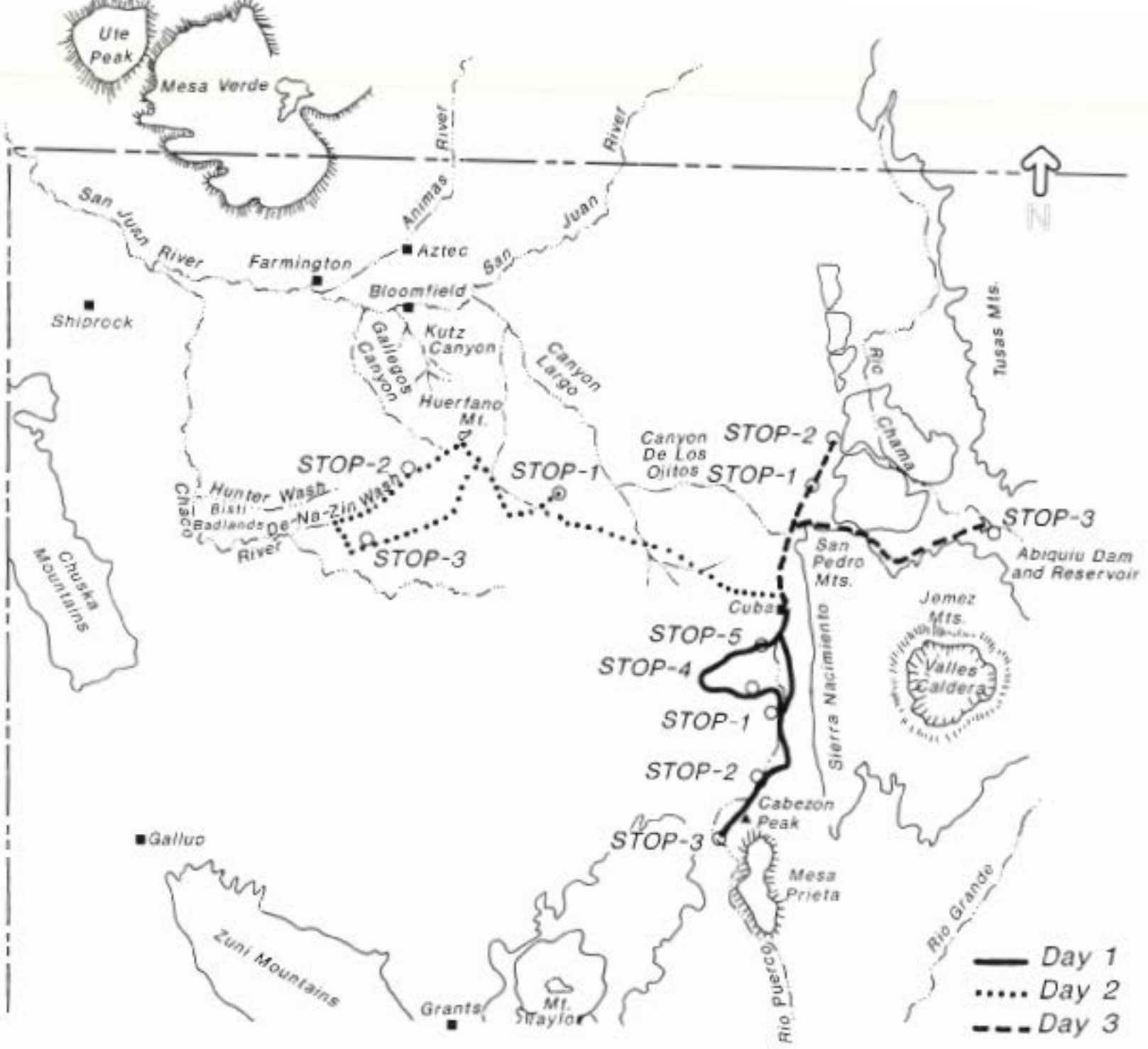
NMGS has decided to make peer-reviewed papers from our Fall Field Conference guidebooks available for free download. This is in keeping with our mission of promoting interest, research, and cooperation regarding geology in New Mexico. However, guidebook sales represent a significant proportion of our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

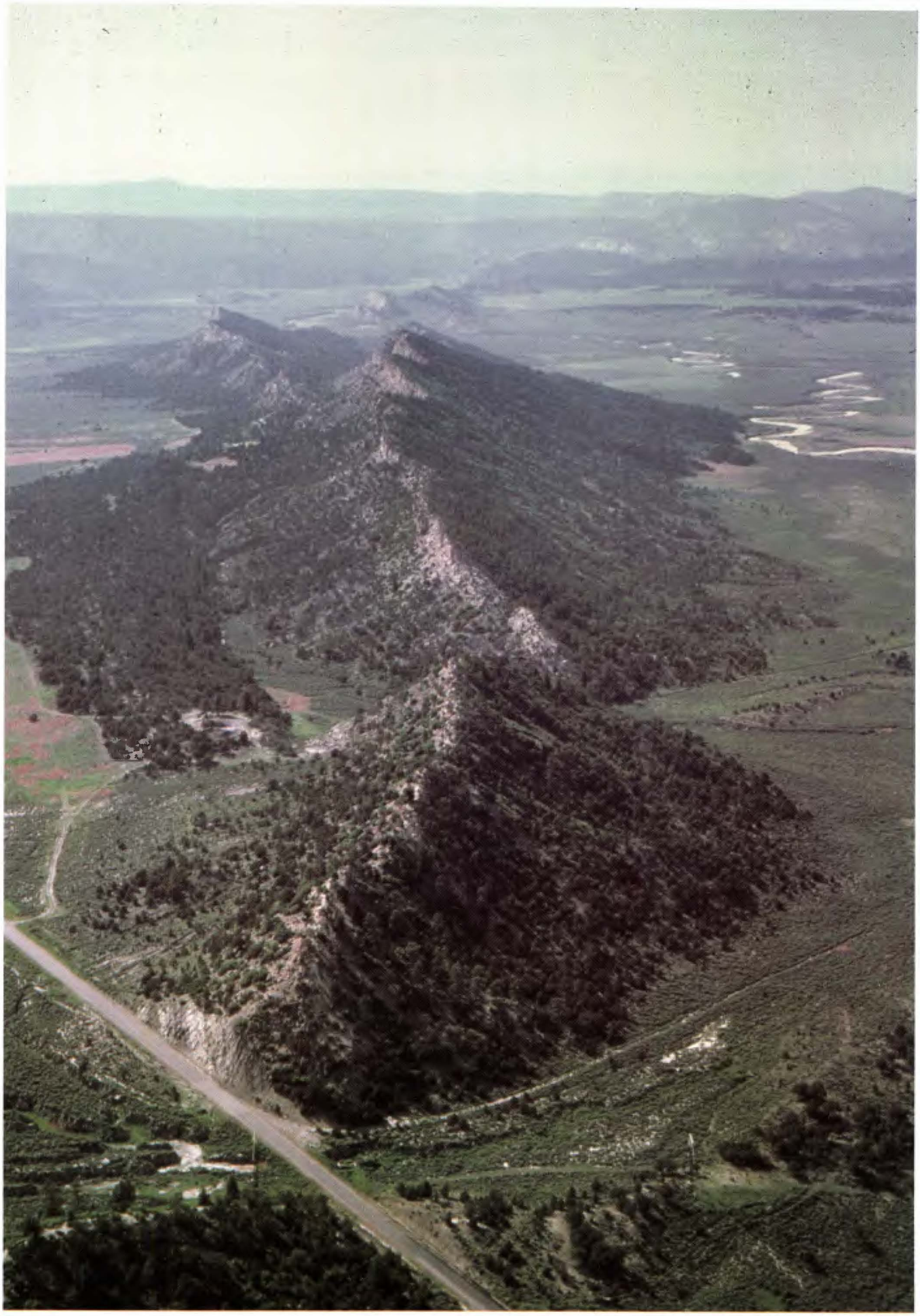
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Ute Peak
Mesa Verde
Animas River
San Juan River
San Juan River
Farmington
Aztec
Bloomfield
Shiprock
Gallegos Canyon
Kutz Canyon
Canyon Largo
Huerfano Mt.
Tusas Mts.
Rio Chama
Canyon De Los Ojitos
STOP-2
STOP-1
STOP-3
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Bisti Badlands
De-Na-Zin Wash
Chaco River
Chuska Mountains
San Pedro Mts.
Abiquiu Dam and Reservoir
Jemez Mts.
Cuba
STOP-5
STOP-4
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Valles Caldera
Sierra Nacimiento
Cabezon Peak
STOP-3
Gallup
Mesa Prieta
Rio Grande
Zuni Mountains
Grants
Mt. Taylor
Rio Puerco
N
Day 1
Day 2
Day 3



Low-angle aerial photograph of Cretaceous Mesaverde Group hogback on eastern edge of San Juan Basin, near Gallina. (Photograph by Larry N. Smith)

San Juan Basin IV

Editors
SPENCER G. LUCAS
BARRY S. KUES
THOMAS E. WILLIAMSON
ADRIAN P. HUNT



New Mexico Geological Society
Forty-third Annual Field Conference
September 30–October 3, 1992



Aerial view of dendritic pattern of badland erosion in the Fruitland Formation in Hunter Wash. Photograph taken the morning of 13 April 1992. Copyright © Paul L. Scaley, 1992.

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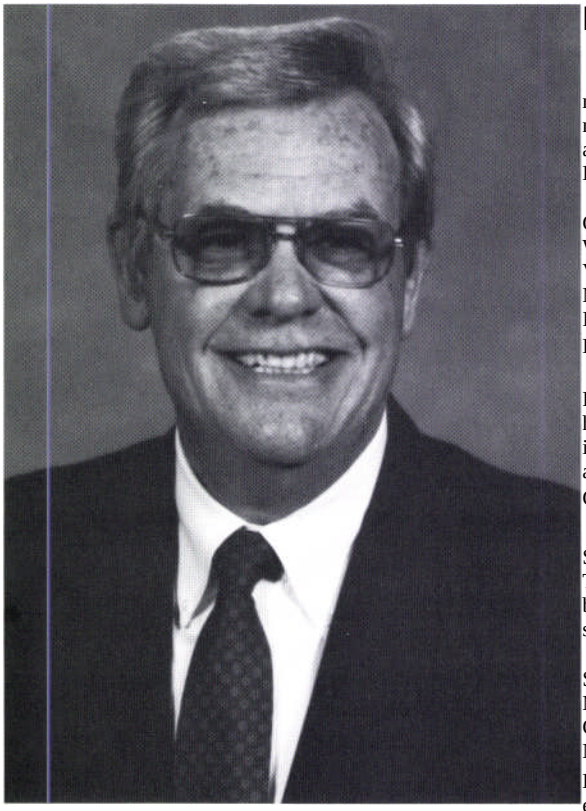
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Edward C. Beaumont

DEDICATION

SJB (San Juan Basin) and ECB (Edward C. Beaumont) are almost synonymous. For more than 45 years, Big Ed has been breaking rocks, drilling test holes and blocking out mineral deposits in the San Juan Basin and adjoining areas. Thus it is highly appropriate that this guidebook to the east-central and south-central part of the basin honor Ed's practical geologic work in the region.

Ed grew up in Fresno, California, and received his B.A. in geology from Pomona College in 1946, with studies mildly interrupted by service in the Army Infantry during World War II, from 1943-1945. Then, "go East, young man"; he came to New Mexico and with Vincent C. Kelley as his major professor at the University of New Mexico, he earned his M.S. in 1948, his thesis being a correlation of logs and cuttings of four oil tests in the SJB. In 1947 he worked as a summer hire for the U.S. Geological Survey with Al Zapp, out of Durango, Colorado, and Billings, Montana.

Ed joined the USGS in the summer of 1948, working for the Fuels Branch, first in Farmington, then Gallup, with a final move to Albuquerque in late summer of 1949. And he has been a Duke City booster since then, except for two stints at USGS headquarters in Washington, D.C. In 1958, the USGS closed its Albuquerque Fuels Branch office. Ed, a naturalized New Mexican, remained, becoming a consulting geologist, the P.I. of Edward C. Beaumont, Inc.

Ed met his wife, Caroline, in early 1948 at UNM and married the Gallup native in September. Son John, now in Annapolis, was born in 1949, Ted (petroleum consultant in Tulsa) in 1951; Cindy, now in Annapolis, in 1954; and Bill, their Navy Lt. Commander, born in 1956, is now in Rota, Spain with his wife and three sons—Ed's grandsons. Bill served in Desert Storm, adding a few gray hairs for Ed.

Farmington, Gallup, Grants and Cuba often have been Ed's field headquarters for his SJB work, with Gallup especially favored. There is a western song titled "Gallup, New Mexico"; interestingly, the only time Ed and Caroline have heard it was on a Carboniferous field trip of the 7th Internationaler Kongress des Karbons from a jukebox in Nassfeld, Austria.

Ed's early work in the San Juan Basin was during his ten years with USGS, emphasizing areal geology and the stratigraphy of coal, oil and gas deposits in northwest New Mexico, northeast Arizona and southeast Colorado. Cooperatively with Charles B. Read, Carle H. Dane, Julian D. Sears, Robert B. O'Sullivan and Charles A. Repenning, Ed completed geologic mapping of most of the New Mexico part of the Navajo Reservation. USGS reports on the nature and distribution of the coal-bearing strata in the SJB resulted, as well as a revision of the Upper Cretaceous nomenclature with Dane and Sears. With Bob O'Sullivan, Ed introduced Utah Construction and Mining Co. (now B.H.P.-Utah International, Inc.) to the vast strippable coal deposits of the Navajo mine.

Ed has been a leader and constant pillar for the New Mexico Geological Society: a Charter Member in 1946; First Vice President, 1953-54; President, 1959-60; and Honorary Member, 1975. He has written or co-authored papers and road logs for NMGS Guidebooks I, 2, 9, 12, 19, 25, 30, and this one. and served on many NMGS field conference and other committees. He also has been leader and guidebook author for two Geological Society of America Coal Geology Division field conferences in the SJB.

Ed is active in the American Association of Petroleum Geologists (District Representative, Founding Member, Energy Minerals Division, Secretary Treasurer EMD), Geological Society of America (Fellow, active in Coal Geology Division), American Institute of Professional Geologists (CPG 112, Charter Member and President of the New Mexico Section, 1966), Albuquerque Geological Society (Charter Member; Vice President, 1967), SEPM and Sigma Xi. And he has promoted geology as a distinguished member of the large Albuquerque Rotary club (past-President), as Adjunct Professor in geology at UNM and a member of the Board of Directors of the Caswell Silver Foundation at UNM.

Ed's transformation to a consulting geologist in 1958 gave New Mexico many economic benefits, as he blocked out coal resources of the San Juan mine, Bisti, South liospah, Star Lake, Gallo Wash and Lee Ranch mine areas, and in editing a resource map of SJB strippable coal (NMBMMR Resource Map 19). With John W. Shomaker and others, he was P.I. for reports for NEPA on low-sulfur coal resources of the SJB; with Shomaker and William R. Speer on coal resources of SJB prepared for the office of State Geologist/Energy and Minerals Department; and with Gretchen Hoffman and others, reports on the quality of coal throughout New Mexico. His article "A procedure for determining strippable coal reserve," published in Coal Age in 1963, led to broad acceptance of his suggested parameters as the standard in calculation of proven coal reserves for Cretaceous units.

Published with coworkers, in NMBMMR and Geological Society of America reports, as well as the Compte Rendu of the Seventh International Carboniferous Congress, his stratidynamics of coal deposition in the southern Rocky Mountain region suggests guidelines to geologic events resulting in thick coals near Fruitland, Gallup, La Ventana and other localities. Ed's reports done with and for NMGS and NMBMMR are, in large part, contributions to New Mexico's economy, as well as practical scientific data.

Beyond coal and/or the San Juan Basin, Ed has worked on helium in east-central Arizona and west-central New Mexico, uranium near Gallup, oil and gas of the Jornada del Muerto, coal in the Sabinas region of Coahuila, Madrid anthracite, Holbrook Basin potash, hydrology northeast of El Paso, phosphate in southeast Idaho, uranium in Wyoming, Mohave Desert region minerals, stratigraphy and structure near Tucson, oil shale in east-central U.S.A., Carbon Basin, Wyoming and Alton, Utah coal, and EISs for the proposed coal gasification project near Shiprock. Muchos trabajos buenos!

Practical, scientific, useful, all apply. But gregarious and loquacious were words coined for Ed. Whether at the Ranchers Club in the Albuquerque Hilton or a snack bar in Nageezi Trading Post, Ed knows most of the people, and they talk over prime rib or Navajo taco. And he is a narrator, a great storyteller, with many gems about early NMGS field trips. But he is "in his element" in the field, looking at rocks or at a drill site. Gretchen Hoffman and drillers on a recent core-drilling project nicknamed him "one-more-rod Beaumont" because he always wanted to drill one more drill rod so as not to miss significant cuttings or cores.

Combination field geologist, reasoning observer, skillful writer, enthusiastic speaker, and friend of many, we salute you, Ed, for your contributions to NMGS and to SJB geology. This is one of the greatest pleasures I've had trying to aptly praise you, a friend since 1953 when we helped lead the NMGS field trip to southwest New Mexico, and on to coaly sandstones at Tsaya, the GSA Sabinas coal trip, Queretaro hacienda, stratidynamics at Krefeld, El Rancho Hotel in Gallup, the bank-full Rio Chaco, and cooperative projects with amigos John Shomaker, Bill Speer and Gretchen. Muchas gracias.

Frank E. Konlowski

PRESIDENT'S MESSAGE

"Once more into the breach, dear friends" for our fourth field conference held in the San Juan Basin.

This year, as every year since 1950, the Society owes a debt of gratitude to the many hard-working people who have put together the field conference and the guidebook. Heart-felt thanks go to General Co-Chairmen Spencer Lucas and Tom Williamson, Guidebook Editors Spencer Lucas, Tom Williamson (do these men ever sleep?!) and Adrian Hunt; Managing Editor Barry Kues; Logistics Coordinators Jim Olsen and Russ Jentgen; and Registration Chairman Orin Anderson. This also seems an appropriate time to thank our past Publication Chairman, Richard Chamberlin, and the new one, Jim Barker, for their vital contributions. And, of course, the Society owes a continual debt to Charles Chapin and the New Mexico Bureau of Mines and Mineral Resources for their ongoing support of the Society and its activities.

In spite of the economic situation, your Society is on solid footing. Publication sales in 1991 were up from 1990, total assets increased during 1991, and we continue to sponsor scholarships via the Spring Meeting, by providing grants to undergraduate and graduate students, by awarding prizes at local and regional science fairs, and by bestowing the Kottlowki, Wellnitz, and Pipkin Fellowships to outstanding students at New Mexico's universities.

The 1993 Fall Field Conference will be held in southeastern New Mexico in cooperation with the West Texas Geological Society. This will be the first field conference in that area since 1954, so there should be much that is new and exciting, and I urge you to plan to attend.

I have thanked a number of people by name for their endeavors on behalf of the Society, but there are many others who, by generous contributions of their time and expertise, have helped to keep the New Mexico Geological Society the best there is, and we owe them thanks as well. It is a pleasure and honor to work with the unselfish and dedicated people we find, year after year, to keep things moving smoothly.

Finally, I hope you will all learn a lot and have a great time on this our 43rd consecutive Fall Field Conference. Happy rock-pecking.

John Cunningham, President

EDITORS' MESSAGE

The 1992 New Mexico Geological Society Fall Field Conference tours part of the San Juan Basin of northwestern New Mexico. This represents the fourth trip to this region in the 43 annual field conferences of the Society. However, unlike the preceding three trips to the San Juan Basin, this year's conference is headquartered in Cuba and focuses on the east-central part of the San Juan Basin, traversing an area largely untouched by preceding field conferences. Furthermore, the content of this year's trip and the guidebook differ fundamentally from those of earlier conferences. These differences stem from new ideas, discoveries and approaches, all of which have appeared since the NMGS last visited the San Juan Basin in 1977. Sequence stratigraphy, coal-bed methane and a terminal Cretaceous bolide impact that wiped out the dinosaurs were unknown or unheard of in the halcyon days of San Juan Basin III. Now, during San Juan Basin IV, these methods, exploration targets and ideas are part and parcel of the geological cutting edge that has always found its way into the San Juan Basin. Accompanying them are new interpretations of Laramide tectonics, new paleontology, new stratigraphy and sedimentology, and a host of other new information in other areas of geology presented in this Guidebook.

The Society owes many thanks to the authors of the road logs and papers that constitute this Guidebook. Every year, a different mix of geoscientists contributes review articles and research papers relating to the geology of a part of New Mexico, sufficient to fill 300+ pages. As a result, the New Mexico Geological Society Guidebooks collectively have become one of the best sources of information about the geology of the state. The breadth and detail of the information presented each year probably surpasses that published annually for any other state, and successive guidebooks provide a periodically revised and updated summary of the geology of the state as a whole. The members and Executive Committee of the NMGS deserve much credit for, and can take much pride in, supporting the annual publication of this unique series of books.

As editors, we not only extend thanks to the authors for their contributions, but also acknowledge the excellent efforts of the staff of UNM Printing Services, with whom we closely work. The long experience of the Printing Services staff in producing the Society's Guidebooks ensures maximum efficiency in translating submitted manuscripts and illustrations into a well-designed, attractive finished book. One person who will be missed among the team at Printing Services is foreman Dave Spear, who retired this spring after helping to see more than a dozen Guidebooks through to completion.

Spencer G. Lucas
Barry S. Kues
Thomas E. Williamson
Adrian P. Hunt

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1 9 9 2
FIELD CONFERENCE SCHEDULE

Wednesday, September 30—Registration Day

4:00-8:00 p.m. Registration at El Bruno's Restaurant and Lounge, Cuba, New Mexico.
5:30-9:00 p.m. Icebreaker.

Thursday, October 1—First Day

6:00-7:30 a.m. Breakfast at El Bruno's Restaurant.
7:45 a.m. Caravan departs from Cuban Cafe at the south end of Cuba for first day's tour.
12:00 noon Lunch provided at Stop 3.
5:30 p.m. Return to Cuba.
7:00 p.m. Barbecue.

Friday, October 2—Second Day

6:00-7:30 a.m. Breakfast at El Bruno's Restaurant.
7:45 a. m. Caravan departs from Cuban Cafe.
12:00 noon Lunch provided at Stop 2.
5:30 p.m. Return to Cuba.
7:00 p.m. Banquet at El Bruno's Restaurant.
8:00 p.m. Keynote speaker: Dr. Dag Nummedal, Louisiana State University.

Saturday, October 3—Third Day

6:00-7:30 a.m. Breakfast at El Bruno's Restaurant.
8:00 a.m. Caravan departs from Cuban Cafe.
12:00 noon Lunch provided at Stop 3.
3:00 p.m. Field conference ends at Abiquiu Dam.

CREDITS

Front Cover: Cabezon Peak, the largest of the Rio Puerco necks of the late Cenozoic Mount Taylor volcanic field, has its base in Upper Cretaceous marine strata. Drawn by Randy Pence from a photograph by Spencer G. Lucas.

Front End Sheet: LANDSAT false-color composite image of northwestern New Mexico and corresponding map of topographic features, highways and road-log routes (drafted by Dag Lopez, Department of Geology, University of New Mexico).

Back End Sheet: Stratigraphic column for Field Conference area (drafted by Dag Lopez, Department of Geology, University of New Mexico).

Filler Photographs: Paul L. Sealey, New Mexico Museum of Natural History.

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