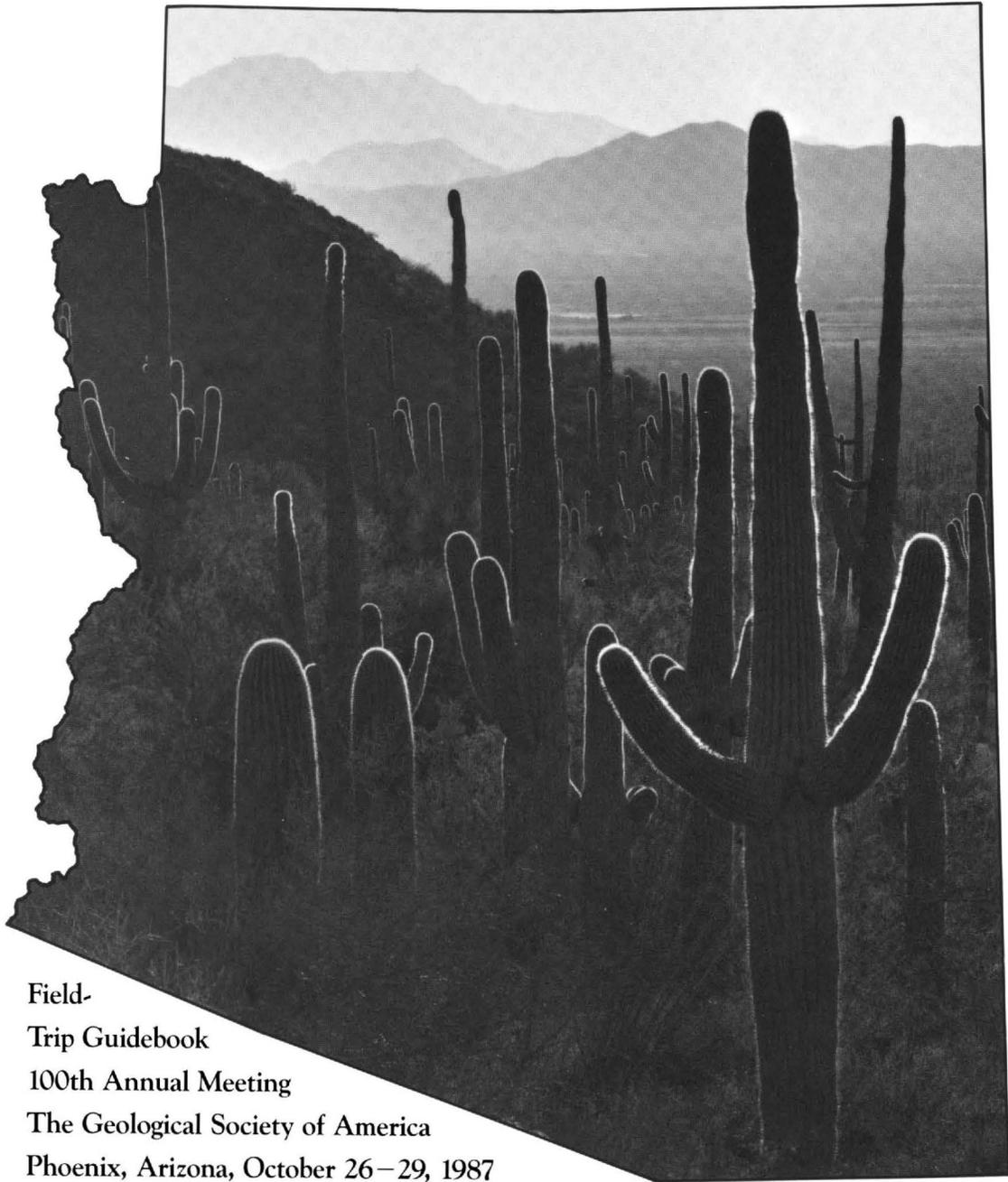


Geologic Diversity of Arizona and Its Margins: Excursions to Choice Areas



Field-
Trip Guidebook
100th Annual Meeting
The Geological Society of America
Phoenix, Arizona, October 26–29, 1987

ARIZONA BUREAU OF GEOLOGY AND MINERAL TECHNOLOGY

The Arizona Bureau of Geology and Mineral Technology was established in 1977 by an act of the State legislature. Under this act, the Arizona Bureau of Mines, created in 1915, was renamed and reorganized and its mission was redefined and expanded.

The Bureau of Geology and Mineral Technology, a division of the University of Arizona administered by the Arizona Board of Regents, is charged by the legislature to conduct research and provide information about the geologic setting of the State, including its mineral and energy resources, its natural attributes, and its natural hazards and limitations. In order to carry out these functions, the Bureau is organized into two branches.

Geological Survey Branch. Staff members conduct research, do geologic mapping, collect data, and provide information about the geologic setting of the State to (a) assist in developing an understanding of the geologic factors that influence the locations of metallic, nonmetallic, and mineral fuel resources in Arizona, and (b) assist in developing an understanding of the geologic materials and processes that control or limit human activities in the State.

Mineral Technology Branch. Staff members conduct research and provide information about exploration, mining, and metallurgical processes that are needed in the development of potential metallic, nonmetallic, and mineral fuel resources in Arizona. Guidance is directed toward the recovery and treatment of these resources by methods that are safe, efficient, and compatible with the environmental needs of the State.

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Arizona Bureau of Geology
and Mineral Technology
Geological Survey Branch
Special Paper 5
1987

Cover photo by Peter L. Kresan®

Preface

The 100th annual meeting of The Geological Society of America (GSA) was held in Phoenix, Arizona in October 1987. The occasion presented an opportunity for the organizing committee to provide, through 34 field trips, a comprehensive exposure of the geology of Arizona. Thirty-three of the field guides to these trips are included herein. Field-trip plans were made with two chief goals in mind: to provide to participants a sense of the discovery and momentum that attend geologic research and exploration in the Southwest during this, the close of the first century of GSA; and to underscore the quality of geologic exposures and the natural aesthetic appeal of the Southwest in general and Arizona in particular. It seemed very appropriate that the 100th meeting of GSA be held in the Grand Canyon State.

The coverage of trips contained in the guidebook is very broad. The extent of geographic coverage is revealed on the following page in the map that shows the road and river routes of the trips. Assuring geologic diversity is a goal for which GSA strives. A quick scan of the table of contents will disclose a spectrum of topics and disciplines: from the oldest and "hardest" of Precambrian crystalline rocks to megafaunal dung deposits barely 15,000 years old; from modern shoreline ecosystems in the Gulf of California to the messiest of sheared metasediments in western Arizona; from earth fissures formed through aggressive withdrawal of ground water to crossbedding in a dry Mesozoic environment, now represented by the Navajo Sandstone; from disseminated gold to disseminated copper to massive sulfide.

Structuring a guidebook that has so much geologic and geographic diversity is not straightforward. We arrived, however, at an organizational strategy that we hope readers will find useful. The design assumes that in the years ahead geologists and students seeking a broad overview of Arizona geology will follow several trips during regional excursions.

The guidebook is divided into four parts and four regions: northern Arizona, central Arizona, south-eastern Arizona, and western Arizona. Some trips in northern Arizona spill over into New Mexico, Utah, and Nevada; some trips in western Arizona spill over into Mexico and California. Within each region, the individual trips are arranged in a logistically sensible geographic order and in order of increasing geologic antiquity.

Several dominant themes emerge from a reading of the guidebook:

- (1) The value of clearly understanding present-day processes cannot be underestimated in interpreting geologic history and phenomena.
- (2) Developing a clear understanding of natural resources and processes greatly benefits society.

(3) A time of unparalleled importance occurred 12,000 years ago, when early man and large mammals roamed the Southwest.

(4) Metamorphic core complexes and their function remain both exciting and enigmatic.

(5) The stratigraphic changes across the hinge line from the Colorado Plateau to the Basin and Range are spectacular and insightful.

(6) Volcanic geology in Arizona is diverse, rich, and pristine.

(7) The Grand Canyon is, without question, grand and will always remain so.

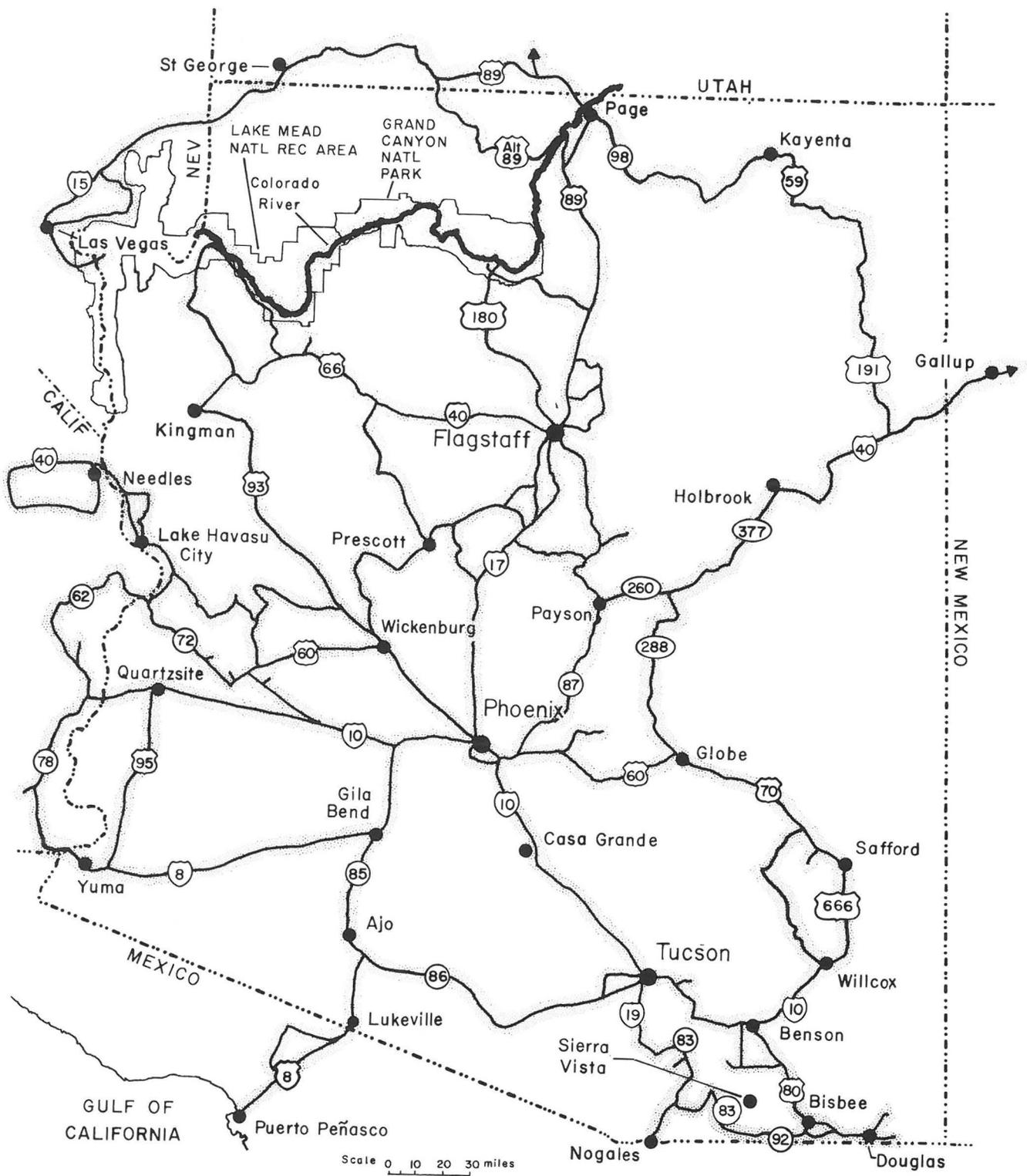
This guidebook would not have been possible without the substantial and careful work of the authors, who were operating throughout planning and preparation under tight schedules. Their promptness and attention to detail are truly appreciated. Kathy Ohmie at GSA Headquarters in Boulder, Colorado was very helpful and supportive in the planning, budgeting, and advertising of the trips. Kris Cetone, my administrative assistant at the University of Arizona, almost singlehandedly guided the flow of manuscripts and attended to countless details related to trip logistics, trip advertising, and guidebook preparation. Dan Brennan, Director of the Arizona Oil and Gas Conservation Commission, along with Margaret Klute of the Geosciences Department at the University of Arizona, arranged transportation for the trips. Jon Spencer of the Arizona Geological Survey also worked on transportation and spent countless hours preparing trip budgets, which required steady contact with leaders of the 34 trips. I cannot imagine that Jon would ever take on such an assignment again, but let me extend my deepest appreciation to him for carrying out such an important task so thoroughly and so professionally.

Manuscripts were edited not only by myself, but also by Jon Spencer, George Gehrels (Geosciences Department, University of Arizona), Ron Blakey [Geology Department, Northern Arizona University (NAU)], and Larry Middleton (Geology Department, NAU). Professional editing was rendered by Evelyn VandenDolder, editor for the Arizona Geological Survey. She spent countless hours carefully editing the manuscripts and bringing about parallelism in format. Special acknowledgment is given to Evelyn, not only for her editing role, but also for managing the preparation and publication of the guidebook.

Larry Fellows, State Geologist and Director of the Arizona Geological Survey, took on the responsibility and opportunity to publish the guidebook, and his early planning and budgeting laid a secure foundation for all that followed.

It is my sincere hope that the voluntary work provided by so many has led to a guidebook that will serve the geologic community for some years to come.

George H. Davis



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