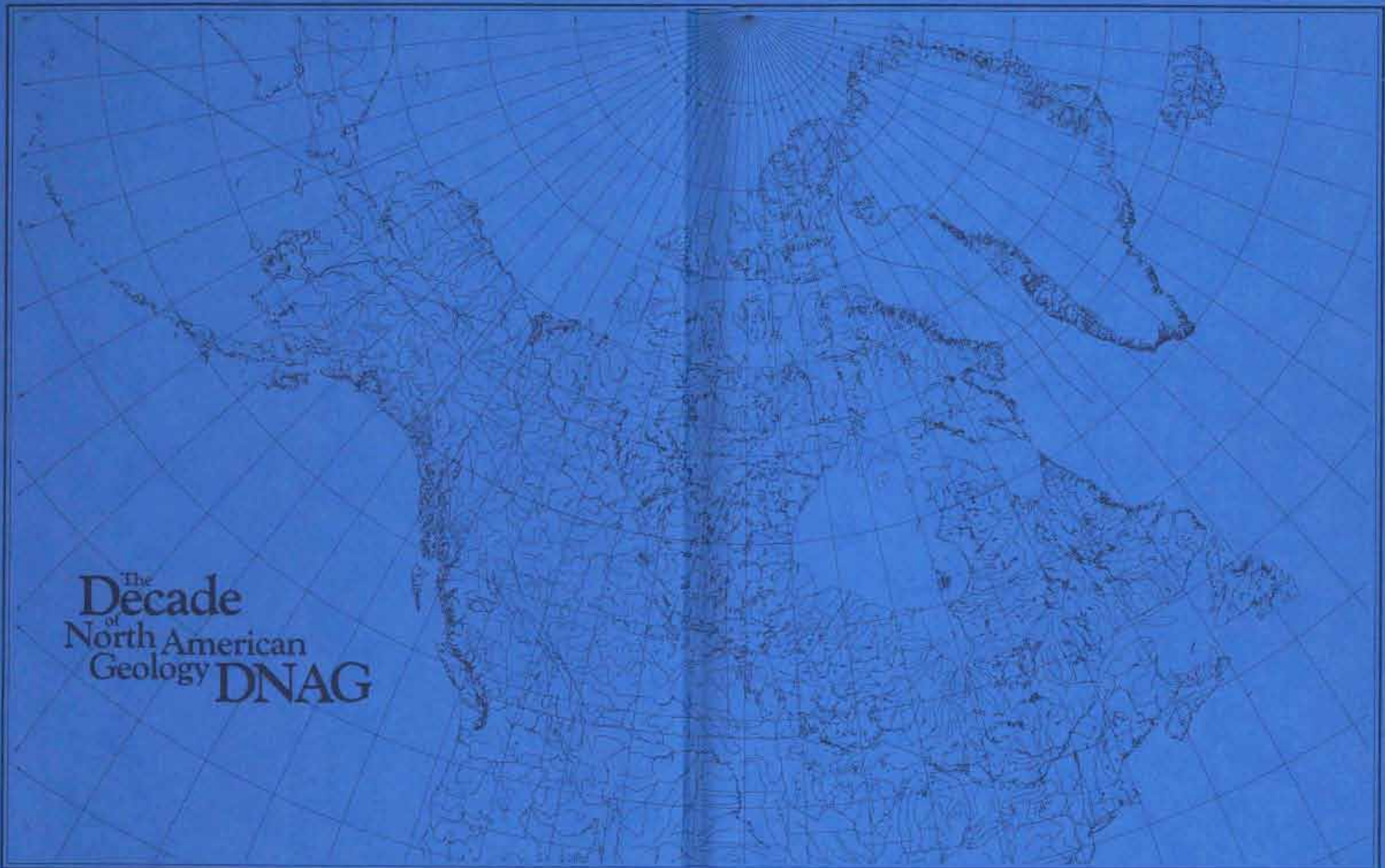


SEDIMENTARY COVER— NORTH AMERICAN CRATON: U.S.



The Geology of North America



The
Decade
of
North American
Geology **DNAG**



**The Geology of North America
Volume D-2**

***Sedimentary Cover—
North American Craton: U.S.***

Edited by

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1988

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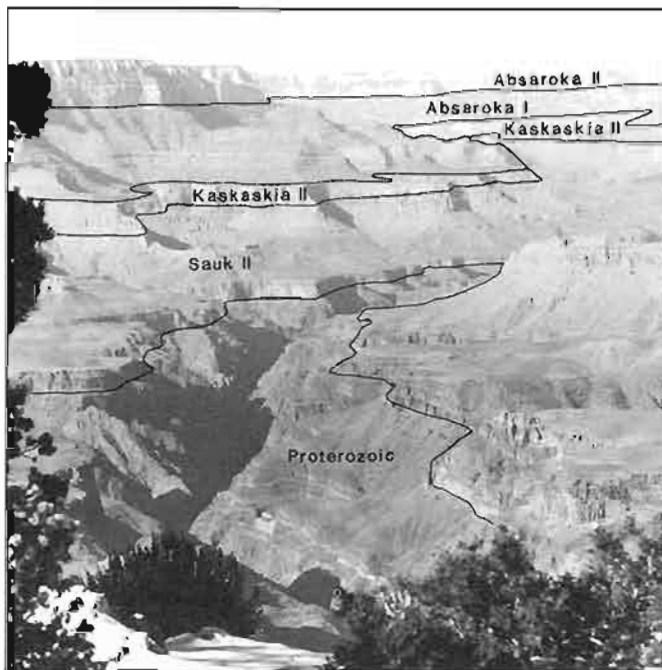
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Front Cover: Grand Canyon, Arizona, view north from south rim, showing Proterozoic rocks of the inner gorge overlain by cratonic cover rocks of the Sauk, Kaskaskia, and Absaroka sequences. Photo by Lee Gladish.

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**K. S. Johnson, T. W. Amsden, R. E. Denison, S. P. Dutton,
A. G. Goldstein, B. Rascoe, Jr., P. K. Sutherland, and
D. M. Thompson**

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**K. S. Johnson, T. W. Amsden, R. E. Denison, S. P. Dutton,
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D. M. Thompson**

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W. A. Thomas

Preface

The Geology of North America series has been prepared to mark the Centennial of The Geological Society of America. It represents the cooperative efforts of more than 1,000 individuals from academia, state and federal agencies of many countries, and industry to prepare syntheses that are as current and authoritative as possible about the geology of the North American continent and adjacent oceanic regions.

This series is part of the Decade of North American Geology (DNAG) Project, which also includes eight wall maps at a scale of 1:5,000,000 that summarize the geology, tectonics, magnetic and gravity anomaly patterns, regional stress fields, thermal aspects, seismicity, and neotectonics of North America and its surroundings. Together, the synthesis volumes and maps are the first coordinated effort to integrate all available knowledge about the geology and geophysics of a crustal plate on a regional scale.

The products of the DNAG Project present the state of knowledge of the geology and geophysics of North America in the 1980s, and they point the way toward work to be done in the decades ahead.

In addition to the contributions from organizations and individuals acknowledged at the front of this book, major support has been provided to the editors of this volume by the Department of Geological Sciences, Northwestern University.

A. R. Palmer
General Editor for the volumes
published by the Geological
Society of America

J. O. Wheeler
General Editor for the volumes
published by the Geological
Survey of Canada

Foreword

This volume is part of the harvest from seeds planted in late-1970s meetings of the Society's Centennial Committee under the chairmanship of Richard H. Jahns. Actual germination waited until a workshop was held in Norman, Oklahoma, bringing together interested parties in mid-1982; guidance was provided by Charles J. Mankin, Peter R. Vail, and this reporter. At this stage the planned volume was tentatively titled "The Midcontinent" or "The Continental Interior"; both are useful in identifying the subject areas to be covered in the U.S., but neither is particularly apt for application to a planned Canadian companion volume. In consultation with James D. Aitken both books adopted *Sedimentary Cover—North American Craton*, to be followed by subtitles designating the U.S. or Canada.

Meanwhile, other working groups were simultaneously preparing volumes on the Atlantic Continental Margin; the Appalachian, Ouachita, and Cordilleran Orogenic Belts; and on the Gulf of Mexico Basin, but no lines were established to define the outboard limits of the areas of responsibility of the cadre assembled to describe and discuss the craton. Averting a classic turf war, the authors of this volume abdicated responsibility for the Atlantic coastal province and for Paleozoic orogens (Appalachian and Ouachita) to the south and southeast, but the mountainous blocks that extended from the Ouachita foreland to the "Ancestral Rockies" in late Paleozoic time are clearly cratonic elements. By the same token, the elevation of blocks on the early Cenozoic Cordilleran foreland does not exclude the region from the pre-Cenozoic craton. Much of the Gulf of Mexico Basin and its sedimentary fill are demonstrably extracratonic; responsibility for coverage is relinquished without serious reservation even though it is difficult to rationalize a separation between Gulf Coast elements such as the Sabine Uplift or the Mississippi Embayment and the craton proper.

By the time the preliminaries of planning and execution were resolved, events conspired to reduce the governing troika of this volume to a single individual—the one who had signed on originally in a kind of emeritus/advisory capacity. Readers will note that the loss of adequate oversight and direction is not without cost. Perhaps the most serious deficiency is the brevity of treatment in description and analysis of regions between basins. Teams of investigators who volunteered (or were coerced) to prepare chapters on this and that area of the craton were largely drawn from the community of basin stratigraphers. Basins are where cover rocks accumulate in fascinating variety and where they are preserved most completely. Basins are also the places where fossil fuels, saline mineral resources, and ground water are most widely available, providing a drive for subsurface exploration and a motivation for concern by industry and state and federal agencies. Thus, it is not remarkable that contributors to this volume, who were identified and organized in terms of specific cratonic basins, have emphasized basin stratigraphy and tectonics, producing a corresponding shortfall in the attention paid to such elements as the Ozark Uplift, the Transcontinental Arch, or the Nashville Dome.

A further management deficiency is identifiable in the degree to which the authors of individual chapters fail to take into account the variations in interpretation and concept expressed in other chapters. This circumstance is the natural result of having all chapters in preparation simultaneously without adequate communication among the authors of the parts. Given a higher level of structure, the diversity of opinion would be balanced by inclusion of alternative views where controversy exists. Perhaps, when the Society celebrates its second Centennial, the successor to this volume will profit from this experience.

The authors and editors of chapters in this book were urged to keep in mind a target readership distinct from that normally addressed. With varying degrees of success we have tried to write for graduate students and for non-North Americans who have not matured with an osmotically acquired knowledge of the geography of this continent and who lack familiarity with our multitudinous stratigraphic names. At the same time, we hope that our words and plates and figures will be of value to geologists here and abroad who can profit from an introduction to a major part of this continent. To these ends we have attempted to keep the weight of stratigraphic terminology reduced to its elements and to include on tables and diagrams the position of each stratigraphic unit mentioned. Similarly, we have tried to hew to the principle that local place names employed in the text be identifiable on accompanying maps. Readers with a limited acquaintance with North American political geography will find it useful to have access to an atlas displaying the "lower forty-eight" states.

Not enough can be said in gratitude to the many men and women who contributed to this effort. A special appreciation is due to those authors whose manuscripts arrived on time and who have waited patiently for their laggard colleagues to complete their tasks. It must be said that this latter group was noteworthy for the absence of overt malice with which they accepted the abuse leveled against them. Thanks are gladly bestowed on the many reviewers who labored in anonymity to improve and refine the manuscripts represented here. And, of course, we must recognize the fact that many of the chapters of this volume were made possible by the cooperation of the U.S. Geological Survey and the several state surveys and bureaus who made available their people's data and time for this joint effort.

Finally, let it be acknowledged that none of this would have come to pass without the unremitting travail of A. R. Palmer, the science coordinator of the Society's Centennial Program. Pete has been an unfailing source of optimism where pessimism was the only rational mood; no detail has been too trivial for his attention, no wayward contributor too shirking to deserve a pep talk, and no aging editor too old to benefit from words of encouragement.

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