

Minerals, Lands, and Geology  
for the Common Defence  
and General Welfare,  
Volume 4, 1939–1961



This Douglas C-53D (N19924), crewed and operated by the U.S. Geological Survey (USGS), was photographed while surveying the Painted Desert, southwest of Cameron in northeastern Arizona. The aircraft's magnetic detector is shown deployed at the end of a 100-foot cable. The edge of the Coconino Plateau occupies most of the distant background in the photograph. At the U.S. Atomic Energy Commission's request in 1947, the USGS resumed ground studies and mapping of uranium-bearing sandstones on the Colorado Plateau to extend the work it completed there during 1939-44. USGS and U.S.

Navy crews began aeromagnetic surveys in Beechcraft and Catalina aircraft in 1944. The C-53D and its crews commenced aeromagnetic surveys for the USGS in 1949. The U.S. Air Force transferred a Douglas C-47 (N19950) to the USGS in 1955, as the USGS increased its aerial surveys of radioactivity. The C-53D, restored to its original Skytrooper configuration for the Allied invasion of Normandy in 1944, is now in an aircraft museum in Sacramento, California. (From *Scientific Monthly*, v. 78, no. 6, June 1954, cover 1 and caption on p. 364.)

# Minerals, Lands, and Geology for the Common Defence and General Welfare, Volume 4, 1939–1961

By Mary C. Rabbitt and Clifford M. Nelson

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UNITED STATES GEOLOGICAL SURVEY

A History of Geology in Relation to the Development of  
Public-Land, Federal Science, and Mapping Policies and the  
Development of Mineral Resources in the United States  
From the 60th to the 82d Year of the U.S. Geological Survey

U.S. DEPARTMENT OF THE INTERIOR  
SALLY JEWELL, Secretary

U.S. GEOLOGICAL SURVEY  
Suzette M. Kimball, Acting Director



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## Foreword

Volume Four of the history of the U.S. Geological Survey (USGS) records a pivotal interval of transformation for the United States and the agency. The years from 1939 to 1961 were dominated by the Nation's engagement in major conflicts that included World War II, the Korean war, and the cold war. It was also a time of great national sacrifice, rapid expansion of industrial capacity, spectacular scientific and technological advancement, and international leadership. Mary Rabbitt and Clifford Nelson record and evaluate the important role of the USGS in supporting the Nation's efforts in war and peace at home and abroad. The agency assessed strategic mineral and energy resources, and, in some cases, managed their production from Federal lands. The USGS used improved photogrammetric methods to update and extend its topographic and geologic map coverage and provide critical information for the management of surface-water and groundwater resources. The agency also began using automated methods in recording and storing its data and producing its products. But the national need for the USGS to use its capacity to deliver applied science did not prevent the agency from investing in and delivering wide-ranging advancements in fundamental earth science. The authors also highlight many examples of the USGS' rapid development or adaptation and use of new instrumentation and methods that included airborne magnetometers and radiometers, advanced seismometers, stereoscopic plotters, the Orthophotoscope, and geophysical logging and geological sampling from deep wells.

Through the combination of USGS Pick and Hammer Club "poetry" and quotes from Members of Congress and Department of the Interior and USGS leaders, Mary Rabbitt and Clifford Nelson provide insight into the perspectives of the working scientists, managers, advisers, and politicians on issues ranging from science priorities and organizational structure to the varying degrees of the agency's effectiveness and efficiency. By doing so, the authors have provided current and future generations with a better understanding of the people and the actions that have molded this part of the history of this remarkable institution.

Mark D. Myers  
Director, U.S. Geological Survey  
2006–2009



## Preface

This is the fourth volume in a series about the history of the U.S. Geological Survey (USGS) begun but not finished by Mary Priscilla Collins Rabbitt (1915–2002). Educated at Radcliffe and Berkeley, Mary Collins served as assistant seismologist to Harvard’s L. Don Leet before being detailed to the Office of Scientific Research and Development for work at Oak Ridge, Tennessee, on the seismology of nuclear and other explosions. In 1947, she married USGS geologist John C. Rabbitt and, during the next year, joined the U.S. Coast and Geodetic Survey’s Seismology Branch in Washington, D.C. Mrs. Rabbitt transferred to the USGS in 1949. There she was responsible for the quarterly publication *Geophysical Abstracts* and then served as Assistant Chief in the Geophysics Branch led by James R. Balsley, Jr. After John Rabbitt died in 1957, she succeeded him as the Geologic Division’s Staff Assistant for Publications. In 1966, William T. Pecora, the 8th Director (1965–71) of the USGS, appointed Mary Rabbitt as his staff assistant in the Director’s Office. When you have time, Pecora said, also start looking into USGS history. Building on the article the Rabbitts cowrote for *Science* for the agency’s 75th anniversary in 1954, her new research led in 1969 to a preliminary analysis of the career of John W. Powell, the second Director (1881–94), and in 1974 to a brief informal history of the agency.

After retiring from the USGS in 1978, Mary Rabbitt wrote the first three volumes of “Minerals, Lands, and Geology,” which were published during 1979–86 as USGS special books, an unnumbered and intermittently issued quarto-sized series. Volumes 1–3, long out of print and out of stock, are now available online; see the entries in the Notes and References Cited herein for the Web versions. Two awards honored Mrs. Rabbitt’s scholarly contributions to the history of the USGS and of the earth sciences—the History of Geology Award, conferred in 1984 by the History of Geology Division of the Geological Society of America, and the Department of the Interior’s Distinguished Service Award, presented in 1988. The History of Geology Award was renamed the Mary C. Rabbitt Award in 2005 by the Geological Society of America’s History of Geology Division (now the History and Philosophy of Geology Division) also to acknowledge her posthumous financial contribution to the Division.

This fourth volume about the history of the USGS, like the earlier three, is based primarily on published sources and is intended as a framework for more detailed studies that use the results of extensive searches of unpublished documents. As coauthor, I revised and extended Mary Rabbitt’s partial typescript, retained most of her chronological divisions, and added new sections and chapters. Providing coverage of the years between 1939 and 1961 at a level equivalent to the depth presented by Mrs. Rabbitt in her initial three volumes required successively longer chapters that reflect the growth of USGS missions, funds, personnel, and operations during World War II and in the subsequent cold war. Staff increased sixfold and funds increased ninefold during those nearly 22 years. I hope that readers will not be able to distinguish between the parts of this volume written by Mary Rabbitt and those modified or newly written by me.

Many of my colleagues within and outside the USGS aided the preparation of volume 4. USGS seismologist James F. Devine, the former Assistant Director

for Engineering Geology and now the Senior Adviser for Science Applications, provided encouragement and moral support in his staff capacity in the Director's Office. Charles C. Groat, the 13th Director of the USGS (1998–2005), and Mark D. Myers, the agency's 14th Director (2006–2009), enabled me to complete volume 4. Maureen A. Booth, Chief Reference Librarian at the Department of the Interior's Library, was my skillful and indefatigable guide to scholarly resources available online. Carmen O'Neill, on the staff of the USGS Library at the National Center in Reston, Virginia, provided access to printed sources via interlibrary loans. Jenny M. Stevens, USGS librarian in Denver, provided links to digital images in the photographic collection after it was relocated. The late Dallas L. Peck, Chief Geologist and subsequently the 11th Director (1981–93) of the USGS; the late Eugene C. Robertson, also a career geologist with the USGS; and the late Hatten S. Yoder, Jr., Director Emeritus of the Carnegie Institution of Washington's Geophysical Laboratory, read and constructively commented on initial versions of several early chapters, as did Ari Hoogenboom, professor emeritus of history at the City University of New York's Brooklyn College. The later versions of each chapter in this volume benefited from critical and constructive reviews by Alan L. Bain, former Archivist of the Smithsonian Institution; Marc Rothenberg, former editor of the Smithsonian's *The Papers of Joseph Henry* and now the National Science Foundation's Historian; and the late E-an Zen, geologist emeritus at the USGS and adjunct professor emeritus at the University of Maryland. Bain and Rothenberg also reviewed the volume's body proof.

Richard L. Huffine, Director, USGS Library Program, and Kevin T. Gallagher, Associate Director, USGS Core Science Systems, authorized the financial support required to publish volume 4 in the style and format of the preceding three volumes. Katharine S. Schindler, supervisory publishing specialist at the USGS National Center in Reston, managed the volume's production by four skilled members of the agency's Science Publishing Network. Elizabeth E. Good (technical editor), benefiting from a review by John R. Keith (scientist emeritus), edited the entire volume. Jeannette M. Foltz (graphics specialist) designed the template and processed the text and illustrations, the latter scanned by Patricia H. Packard (graphics specialist) from images photographed and published before the advent of digital cameras. Angela E. Hall (Web specialist) prepared the files for Web posting. Jenna Nolt and Christine Schorfheide, at the USGS Library in Reston; Holly Reed at the National Archives and Records Administration Still Picture Branch in College Park, Maryland; and Michael J. Brodhead, at the U.S. Army Corps of Engineers' Office of History in Alexandria, Virginia, also provided scanned images. I greatly appreciate all their efforts on behalf of the volume, but my colleagues are not responsible or accountable for its contents.

Some of the USGS employees mentioned in volume 4 played major roles in research and management in the years after 1960. This volume's text, however, does not try to anticipate these and other future developments beyond what those and other persons suggested or the technology promised before 1961. Some captions describe events after that year. Earth science nomenclature and other technical terms in the text are used in the context of the times when they appeared in publication and do not necessarily reflect subsequent or present usage.

Clifford M. Nelson

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