HISTORY OF MINING IN ARIZONA

Editors
J. Michael Canty
Michael N. Greeley
HISTORY OF MINING IN ARIZONA

EDITORS
J. MICHAEL CANTY
MICHAEL N. GREELEY

PUBLISHED BY

MINING CLUB OF THE SOUTHWEST FOUNDATION
TUCSON, ARIZONA

CO-PUBLISHED BY:

AMERICAN INSTITUTE OF MINING ENGINEERS
TUCSON SECTION

SOUTHWESTERN MINERALS EXPLORATION ASSOCIATION
TUCSON, ARIZONA

TUCSON, ARIZONA
SYMPOSIUM ORGANIZED
BY

CHAIRMAN
J. MICHAEL CANTY
CIMETTA ENGINEERING & CONSTRUCTION CO., INC.
TUCSON, ARIZONA

CO-CHAIRMAN
MICHAEL N. GREELEY
ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES
TUCSON, ARIZONA
PREFACE

The eleven papers contained in this book were presented by their respective authors at the 1988 Symposium on The History of Mining in Arizona in conjunction with the 1988 Annual Meeting of the Society of Mining Engineers (SME) held January 24—28, 1988 in Phoenix, Arizona. Also featured was an exhibit of historic mining memorabilia, minerals and photographs.

The symposium and exhibition were supported by many associations, various groups and individuals, both from within and outside the mining industry, many of whom are mentioned on the credits page. These participants have an interest in finding a "public home" for a collection of historic memorabilia and items that are so important to the heritage of mining in Arizona.

Credit must be given and gratitude expressed to all those involved in coordinating the 1988 Symposium on The History of Mining in Arizona.

David C. Ridinger, President
Arizona Mining Association
FORWARD

The History of Mining in Arizona Symposium became a reality because of a need to vitalize the general public about the significance of mining in the past and how it has been and still is a driving force behind Arizona—the territory and the state.

When we think about mining in Arizona, we probably think about towns, mines, railroads, miners, gold, copper, silver, beautiful rocks and more. Whatever we think of, it played a major roll in the history of Arizona Territory.

Where do we start? We start with the original explorers and then move on to specific topics and areas. But what area of Arizona Territory do we talk about? There are many well known mining camps. We decided on the largest primary gold district of Oatman, the largest silver district of Tombstone, the largest copper district of Clifton—Morenci and the largest lead/zinc district around Humboldt. We added one other area—Bisbee—because Bisbee had more by-product gold, silver and lead than the other areas and is one of the highest volume producers of copper.

The organizers are grateful to the authors and the organizations and people listed on the credits page and all who have participated in this project.

Being the first Symposium on The History of Mining, we hope that this will be the nucleus for many more.

J. Michael Canty
Editor
CREDITS

AIME—Tucson Section
AMIGOS
Arizona Department of Mines and Mineral Resources
Arizona Geological Survey
Arizona Highways Magazine
Arizona Historical Society
Arizona Library Association
Arizona Mining Association
Arizona State Parks
Bisbee Historical Society
Bisbee Mining and Historical Museum
Bufkin, Donald H.
Canty, Susan A.
Cimetta Engineering and Construction Co.
DeConcini, McDonald, Brammer, Yetwin, Lacy and Zimmerman, P.C.
Gold Fields Mining Corp.
Greeley, M. Katherine
Jerome Historical Society
Jerome State Historical Park
Manley Photography
Mining Club of the Southwest Foundation
Mohave County Historical Society
Myrick, David F.
Nevada Publications
Phelps Dodge Corporation
Sharlot Hall Museum
Society of Mining Engineers (SME)
Southwestern Minerals Exploration Association
Stan West Mining Corp.
Tombstone Courthouse State Historic Park
University of Arizona Library Special Collections
University of Oklahoma Press
WAAIME—Tucson Section
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface—David C. Ridinger</td>
</tr>
<tr>
<td>Forward—J. Michael Canty</td>
</tr>
<tr>
<td>Credits</td>
</tr>
</tbody>
</table>

**Chapter 1—Early History of Mining in Arizona; Acquisition of Mineral Rights, 1539—1866**  
John C. Lacy | 1 |

**Chapter 2—The Early Influence of Mining in Arizona**  
Michael N. Greeley | 13 |

**Chapter 3—Bisbee, Arizona’s Dowager Queen of Mining Camps; A Look at Her First 50 Years**  
Richard W. Graeme | 51 |

**Chapter 4—Big Bug Lead-Zinc District**  
Richard F. Pape | 77 |

**Chapter 5—History of the Clifton-Morenci District**  
William C. Conger | 99 |

**Chapter 6—History of Mineral Processing in Arizona**  
David D. Rabb and Clement K. Chase | 129 |

**Chapter 7—Life in a Boom Town—Oatman, Arizona**  
Karin Goudy | 153 |

**Chapter 8—A History of Placer Mining in Arizona**  
H. Mason Coggin | 177 |

**Chapter 9—History of Smelting in Arizona**  
Forrest R. Rickard | 191 |

**Chapter 10—Too Little—Too Much; Water and the Tombstone Story**  
Hollis Cook | 229 |

**Chapter 11—A Sequential History of Arizona Railroad and Mining Development, 1864–1920**  
G.W. (Jerry) Irvin | 253 |

**Authors Index** | 279 |
SELECTED MINING DISTRICTS IN ARIZONA