GUIDEBOOK SERIES
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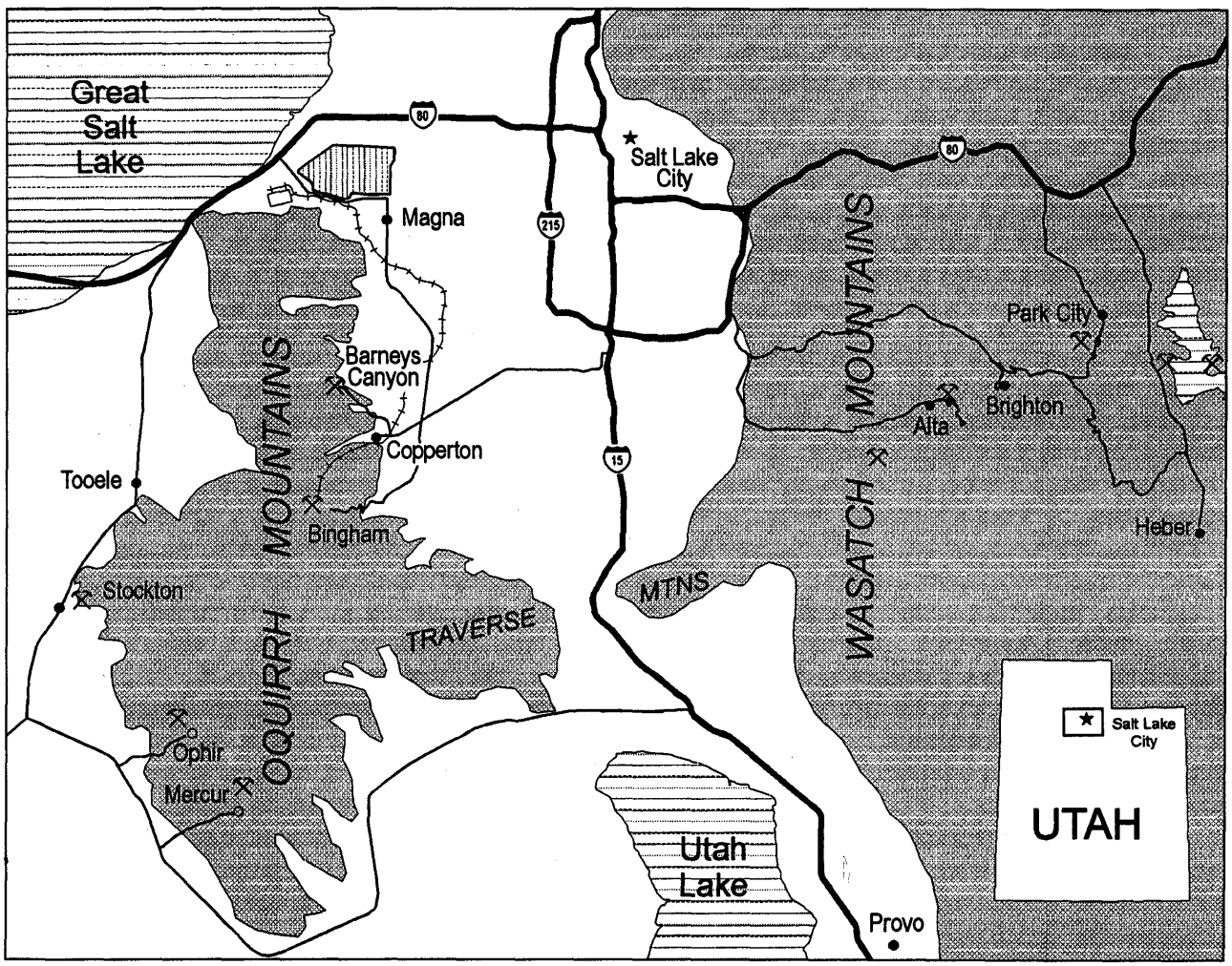
GEOLOGY AND ORE DEPOSITS OF THE OQUIRRH AND WASATCH MOUNTAINS, UTAH

Edited by David A. John and Geoffrey H. Ballantyne



Guidebook Prepared for Society of Economic Geologists Field Trip
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PREFACE

The Bingham, Little and Big Cottonwood, and Park City mining districts of Utah lie along an 80-km-long east-trending belt that is one of the most productive mineralized belts in the world. Since the discovery of silver ores in Bingham Canyon in 1863 and in the Park City area in 1869, the Bingham mining district in the Oquirrh Mountains and the Park City mining district in the central Wasatch Mountains have been the two largest metal producers in Utah. The Bingham Canyon porphyry copper deposit ranks as one of the world's largest metal deposits with past production totaling more than 15 million tons of copper and 19 million ounces of gold, and substantial reserves remain. The manto vein deposits in the Park City mining district produced more than 250 million ounces of silver and significant quantities of gold and base metals from 1869 to 1978.

Ore deposits in the Oquirrh and central Wasatch Mountains are genetically associated with mid-Tertiary igneous rocks that formed along an east-trending belt, originally termed the Bingham-Park City uplift by Butler (U.S. Geological Survey Professional Paper 111). This belt trends across the major faults that bound the north-trending Oquirrh and Wasatch Mountains. The Bingham-Park City belt is marked by an Archean-Proterozoic discontinuity, facies changes in Paleozoic sedimentary rocks, aeromagnetic anomalies, alignment of mid-Tertiary intrusions, and alignment of mining districts. Tilting of late Cenozoic fault blocks that comprise the Oquirrh and Wasatch Mountains reveals igneous rocks and ore deposits that formed over a wide range of paleodepths along this belt.

This guidebook provides an overview of the geology and descriptions of major ore deposits in the Oquirrh and central Wasatch Mountains. Particular emphasis is placed on the Bingham-Park City belt, although the Melco and Mercur gold mines that lie north and south of the Bingham, respectively, are also described. The guidebook contains 15 professional papers and road logs for three one-day field trips. It also includes, as Plate 1, a 1:62,500 scale geologic map of the Oquirrh Mountains, the first detailed geologic map of the range.

The guidebook begins with a summary of the tectonic and metallogenic framework of the Oquirrh and central Wasatch Mountain, by R.D. Presnell. Research papers follow that focus on the petrology, emplacement history, and geochronology of igneous rocks in the central Wasatch Mountains (John et al. and Vogel et al.), and in the Oquirrh Mountains (Waite et al. and Deino and Keith). D.A. John presents a summary of mineral deposits in the central Wasatch Mountains. Melker and Geissman interpret new paleomagnetic data for igneous rocks in the Oquirrh Mountains. New descriptions of ore deposits in the Oquirrh Mountains include Phillips et al., Ballantyne et al., and Harrison and Reid, on different aspects of the Bingham mining district; Gunter and Austin, on the Melco sediment-hosted gold deposit; and Kerr, on the Mercur gold deposit. Chesley and Ruiz present Re-Os dates for molybdenites and Parry et al. present a discussion of sericite-clay mineralogy and new radiometric ages for the Bingham Canyon porphyry copper deposit. Krahulec presents a history and summary of production from the Bingham (West Mountain) mining district.

ACKNOWLEDGMENTS

An SEG field trip to the Oquirrh Mountains was first proposed by Robert Schafer, and Marco Einaudi subsequently persuaded us of the merits of a combined Oquirrh and Wasatch Mountains field trip.

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Many reviewers provided reviews, and their efforts substantially improved the quality of the guidebook. Reviewers included Jamie Conrad, Marco Einaudi, Phil Fikkan, Jon Hagstrum, Ken Krahulec, Steve Ludington, William Parry, Julia Reid, and Paula Wilson.

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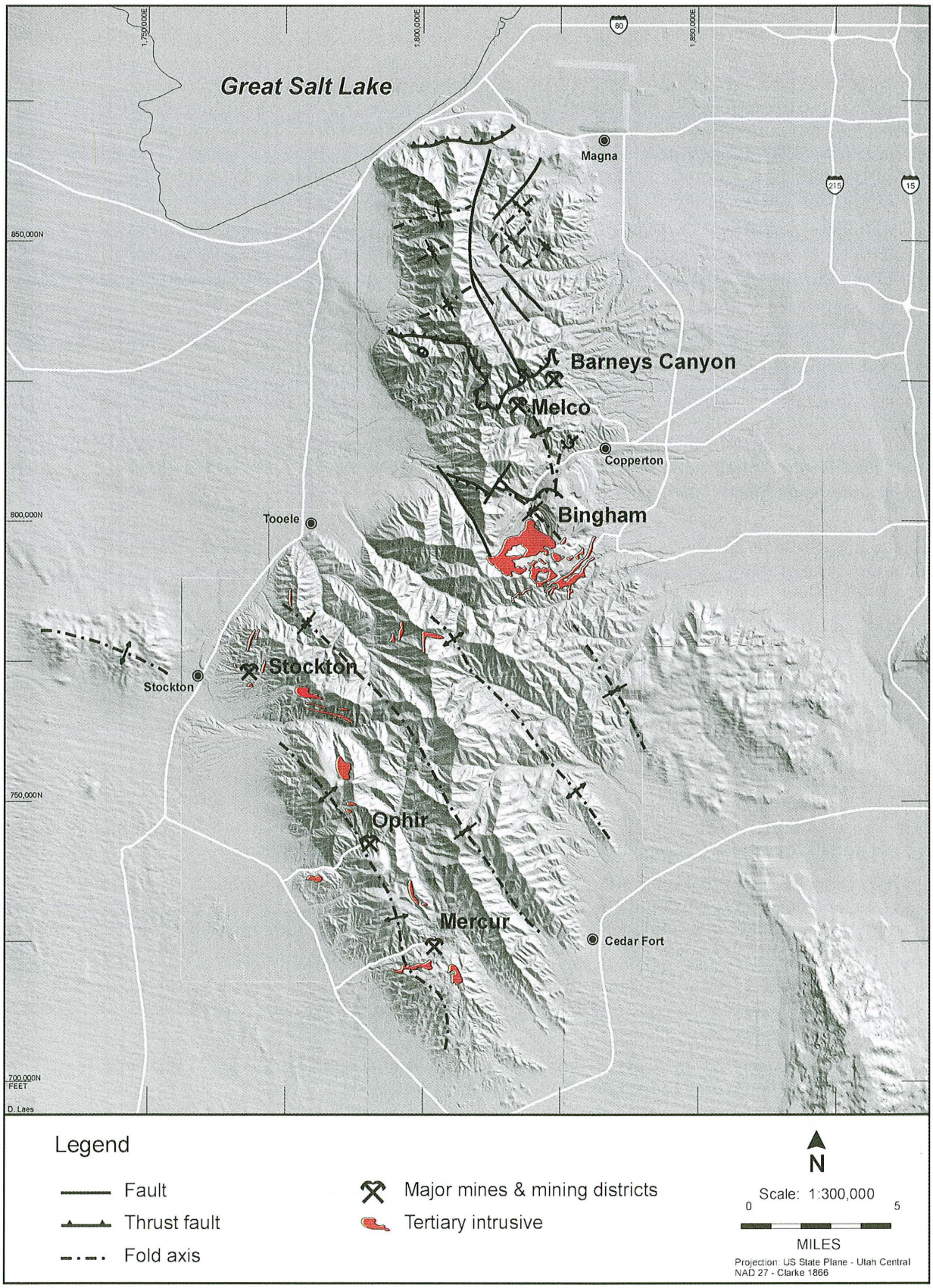
Geoffrey Ballantyne



Elevation model of the Oquirrh Range showing the ore deposits, intrusions, and major structural features.

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