Climax and Henderson Porphyry Molybdenum Deposits and The Leadville District, Colorado

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*Guidebook 43 page numbers (in the format Page XX) are included for convenience; original publication
numbers have been retained in these papers as well.

Additional reprints relevant to these field trips are listed on the reverse and included on the CD-ROM that
accompanies this field trip guide. All except two of the papers were published by the Society of Economic
Geologists (SEG).

The American Institute of Mining, Metallurgical, and Petroleum Engineers has granted permission for the
reprinting of Wallace et al. (1968) from the Graton-Sales volume. The Geological Society of America has
granted permission for the reprinting of Shannon et al. (1982) from its journal, Geology.
Reprinted Papers Included on the CD-ROM


——1995, The Climax-type molybdenite deposits: What they are, where they are, and why they are [Presidential Address]: Economic Geology, v. 90, p. 1359–1380.


The Climax and Henderson porphyry Mo and Leadville district carbonate-hosted manto deposits are within the Colorado Mineral Belt, a mineralized belt that contains the most productive porphyry molybdenum and some of the largest base- and precious-metal manto deposits in the world. Since the discovery of molybdenum-bearing stockwork veinlets at Climax in 1879, the Urad orebody in 1914, and Henderson in 1964, collectively these mines have produced over 2.9 billion pounds of Mo. In late 2009, Henderson produced its billionth pound of molybdenum and in 2012 Climax commissioned a new concentrator and is now producing ore from an open pit. Significant published reserves remain and for both Climax and Henderson that total 1 billion pounds of molybdenum metal. The Leadville district is noted for its long history of production having produced 3.1 million ounces of gold, 260 million ounces of silver and significant base metals since its discovery in 1860, research on carbonate-hosted Ag-Zn-Pb-(Au) deposits, and the founding of the Guggenheim mining fortune, including the formation of ASARCO, Inc. SEG Monograph 7 reported on much of the research on the Colorado Mineral Belt manto systems.

The Climax and Henderson porphyry molybdenum deposits are genetically associated with Tertiary rhyolitic and granitic stocks. They are complex igneous hydrothermal systems characterized by multiple intrusive and mineralizing events with average ore grades greater than 0.2% Mo. The orebodies are Mo stockwork veinlets that form dome-shaped masses centered on an intrusive stock.

The Leadville veins and mantos were formed by magmatic-hydrothermal fluids associated with the central intrusive body, the Breece Hill composite stock. Thermal and metal zoning have been documented in SEG Monograph 7. Stable isotopic data from fluids and ore-alteration minerals have been utilized to develop the model of ore formation.

This guidebook provides copies of the key previously published papers of Climax, Henderson and Leadville districts. This is a departure from the traditional SEG Guidebook format in that it does not contain new papers of the deposits. With the exception of the two Economic Geology papers by Seedorff published in 2004, very little geologic study has been performed of these deposits for the last 20 years. This is largely due to mine closures and depressed Mo metal prices. It is planned that with the recent stability in the price of Mo and the re-opening of the Climax mine, that mine geology programs and new research will lead to further understanding of these important deposits. In addition to the professional papers, road logs from Denver to Henderson, Climax and Leadville are included.

Ralph J. Stegen
Tommy B. Thompson
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Editor’s note: SEG Guidebook 43 includes some materials previously published in Guidebooks 2 (on Leadville) and 38 (Henderson and Climax) and Economic Geology Monograph 7 (Leadville), along with two short papers on the Leadville mining district and a combined road log. The current field trip guidebook has been revised from 2013, with an updated Preface and Road Log that reflects a departure point from Keystone, Colorado, venue for the SEG 2014 Conference.