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GENESIS OF DISSEMINATED GOLD DEPOSITS OF THE CARLIN TYPE

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Similar features of 11 disseminated gold deposits of the Carlin, Nevada, type, suggest a common origin: deposition at shallow depths from hydrothermal solutions that boiled at one stage. All deposits (Nevada: Carlin, Cortez, Gold Acres, Blue Star, Bootstrap, Getchell, Pinson, Preble, White Caps, and Northumberland, Utah: Mercur) show: exceedingly fine grained ore minerals; organic compounds in or near ore; fault zones with dikes; oxidized above unoxidized rocks; fine-grained silicified rocks and surface jasperoids; and argillic alteration. Visible gold and gold-bearing quartz veins are rare. As, Sb, and Hg occur with gold and in surrounding halos; some deposits show visible As, Sb, and Hg minerals. Tl persistently occurs in high-As ores. Most deposits show late cross-cutting veinlets of gangue sulfides, quartz, barite and calcite. Ubiquitous pyrite formed before and during ore deposition. Host rocks for ore commonly are thin-bedded carbonaceous silty limestones. High-angle faults intersecting silty limestones are the important ore controls.

Shallow deposition is evidenced by: fine-grain size of ore and gangue minerals; presence of As-Sb-Hg-Tl element suite, typical of some hot springs deposits; ore-gangue mineral suite typical of shallow epithermal deposits; and the presence of relatively unstable hydrocarbons. The former presence of gas-boiling water interfaces is suggested by boundaries between altered and unaltered rocks and between oxidized and unoxidized rocks. Gold and the associated elements were deposited by ascending hydrothermal fluids, which also promoted some argillic alteration. Oxidation and additional argillic alteration happened in waning stages, when the gas-water interface lowered itself into previously mineralized rocks.