Introduction

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Tom Schroeter (Roundup, 1999)

Objectives

- Learn characteristics of Carlin-type deposits
- Identify sediment-hosted, disseminated Au in B.C.
- Describe B.C.'s examples
- Target new regions for exploration

Background

- Inspiration came from Howard Poulsen (1996)
- Sediment-hosted Au deposits are tough to find
- Heap-leach technology → low grade deposits viable

Nevada's Deposits

- World's 4th largest Au producer
- Carlin-trend most prolific Au belt in North America, 60 Km long, ~40 deposits containing >100 million ounces Au
- Note there are several other trends

Genesis Open Pit

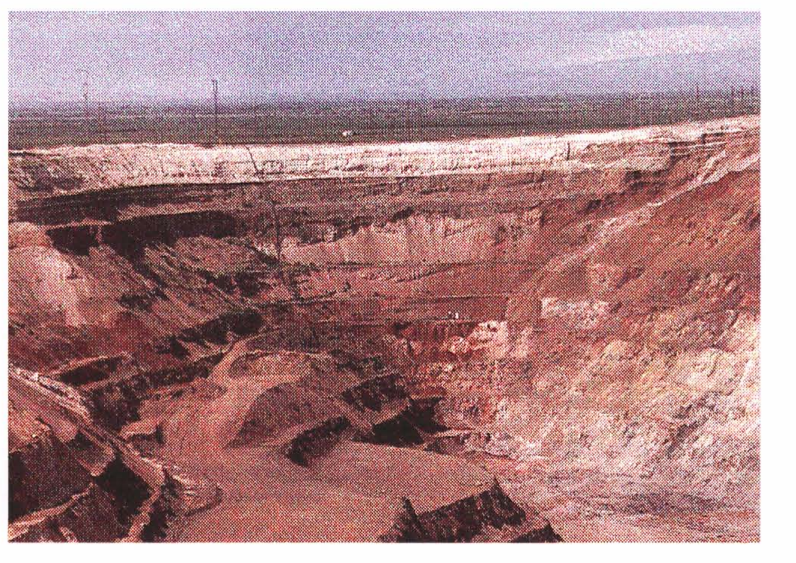
Deposit Characteristics

- Strong structural and lesser lithological control
- Sedimentary host rocks (commonly)
- Hypogene ore = micron to submicron Au within arsenical pyrite or pyrite
- Oxide ore = micron native Au in iron oxide or attached to clay
- Elevated Ag, As, Hg, Sb
- Low base metals
- Associated realgar, orpiment, stibnite

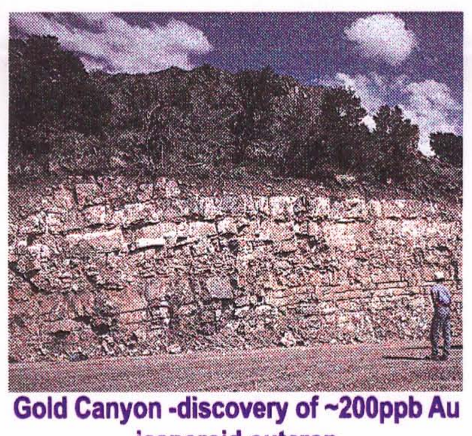
West Archimedes

Jerritt Canyon - Alchem Pit

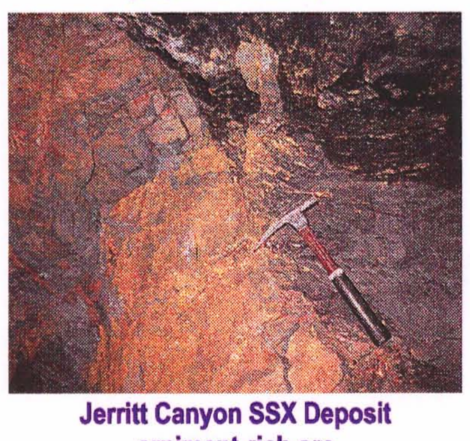
Post-Betze



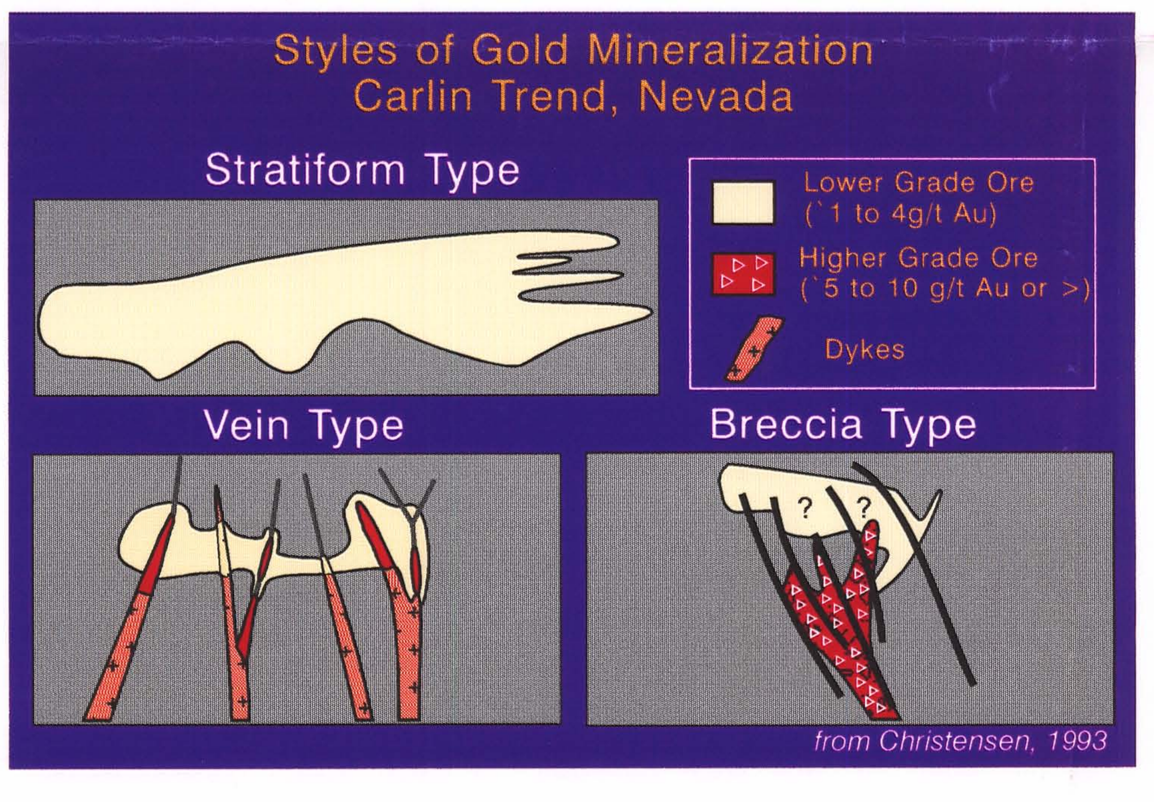
Lone Tree



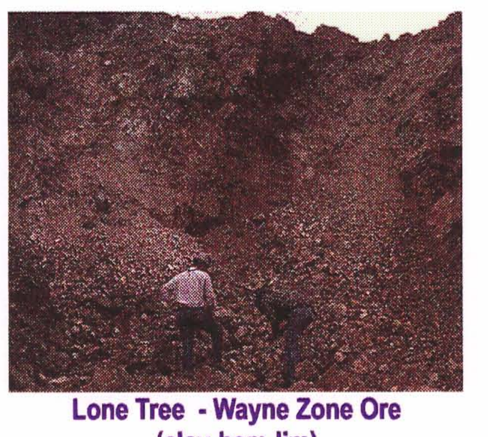
Gold Canyon -discovery of ~200ppb Au jasperoid outcrop



Jerritt Canyon SSX Deposit orpiment-rich ore

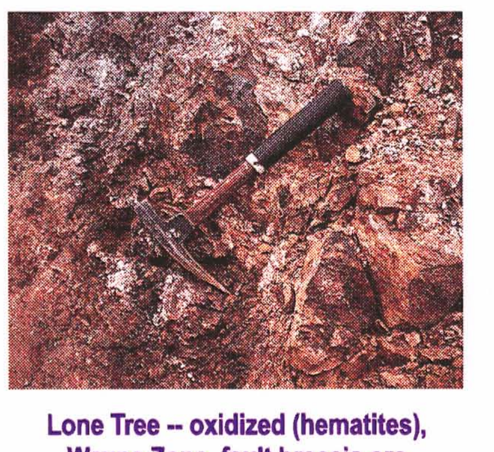


Lone Tree - yellow dust is ore

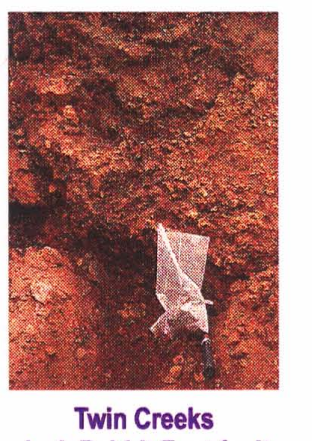


Lone Tree - Wayne Zone Ore (clay-hem-lim)

Lone Tree--along basin bounding fault

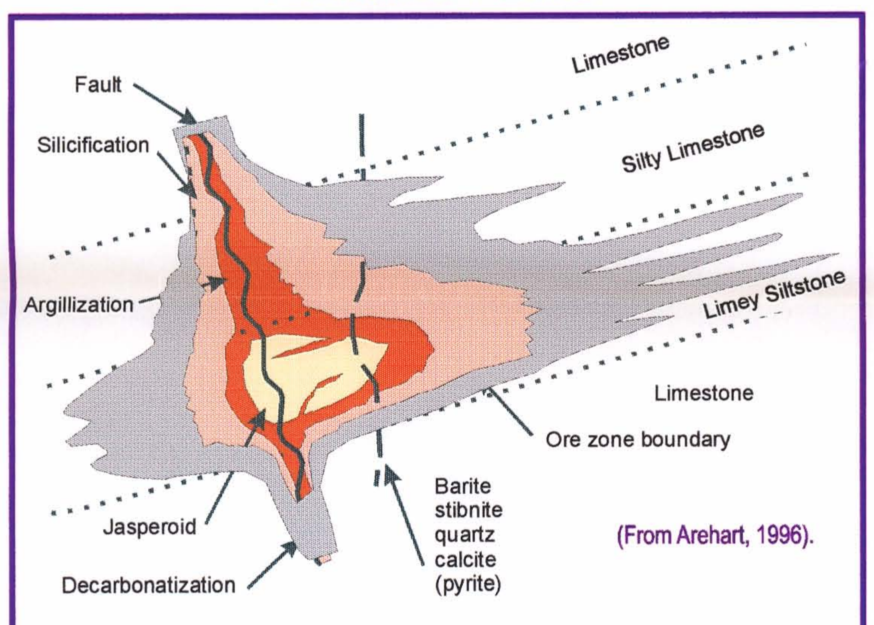


Lone Tree -- oxidized (hematites), Wayne Zone fault breccia ore



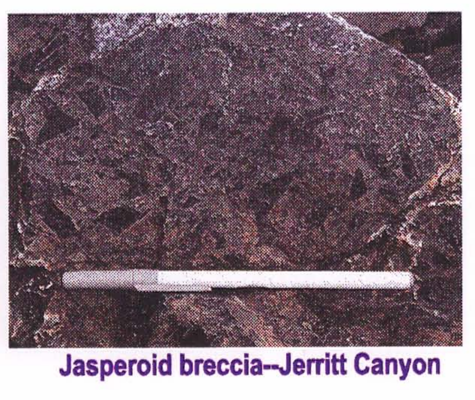
Twin Creeks Jack Rabbit Foot fault (high grade ore)

Alteration Facies



Cross-section through a sediment-hosted disseminated gold deposit showing major alteration features adjacent to a fluid feeder structure.

Jasperoid breccia--Gold Bar



Jasperoid breccia--Jerritt Canyon

Acknowledgments

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Deposit Profile

TECTONIC SETTINGS: Passive continental margins with subsequent deformation and intrusive activity and island arc terranes.

DEPOSITIONAL ENVIRONMENT / GEOLOGICAL SETTING: Host rocks to the Nevadan deposits were deposited in shelf-basin transitional (somewhat anoxic) environments, formed mainly as carbonate turbidites (up to 150 m thick), characterized by slow sedimentation. These rocks are presently allochthonous in thrust fault slices and have been owerprinted by Miocene basin and range extension. There are Mesozoic to Tertiary felsic plutons near many deposits.

AGE OF MINERALIZATION: Mainly Tertiary, but can be any age.

HOST/ASSOCIATED ROCK TYPES: Host rocks are most commonly thin-bedded silty or argillaceous carbonaceous limestone or dolomite, commonly with carbonaceous shale. Although less productive, non-carbonate siliciclastic and rare metavolcanic rocks are local hosts. Felsic plutons and dikes are also mineralized at some deposits.

DEPOSIT FORM: Generally tabular, stratabound bodies localized at contacts between contrasting lithologies. Bodies are irregular in shape, but commonly straddle lithological contacts which, in some cases, are thrust faults. Some ore zones (often higher grade) are discordant and consist of breccias developed in steep fault zones. Sulphides (mainly pyrite) and gold are disseminated in both cases.

TEXTURE/STRUCTURE: Silica replacement of carbonate is accompanied by volume loss so that brecciation of host rocks is common. Tectonic brecciation adjacent to steep normal faults is also common. Generally less than 1% fine-grained sulphides are disseminated throughout the host rock.

ORE MINERALOGY [Principal and *subordinate*]: Native gold (micron-sized), *pyrite with arsenian rims, arsenopyrite, stibnite, realgar, orpiment, cinnabar, fluorite, barite, rare thallium minerals*.

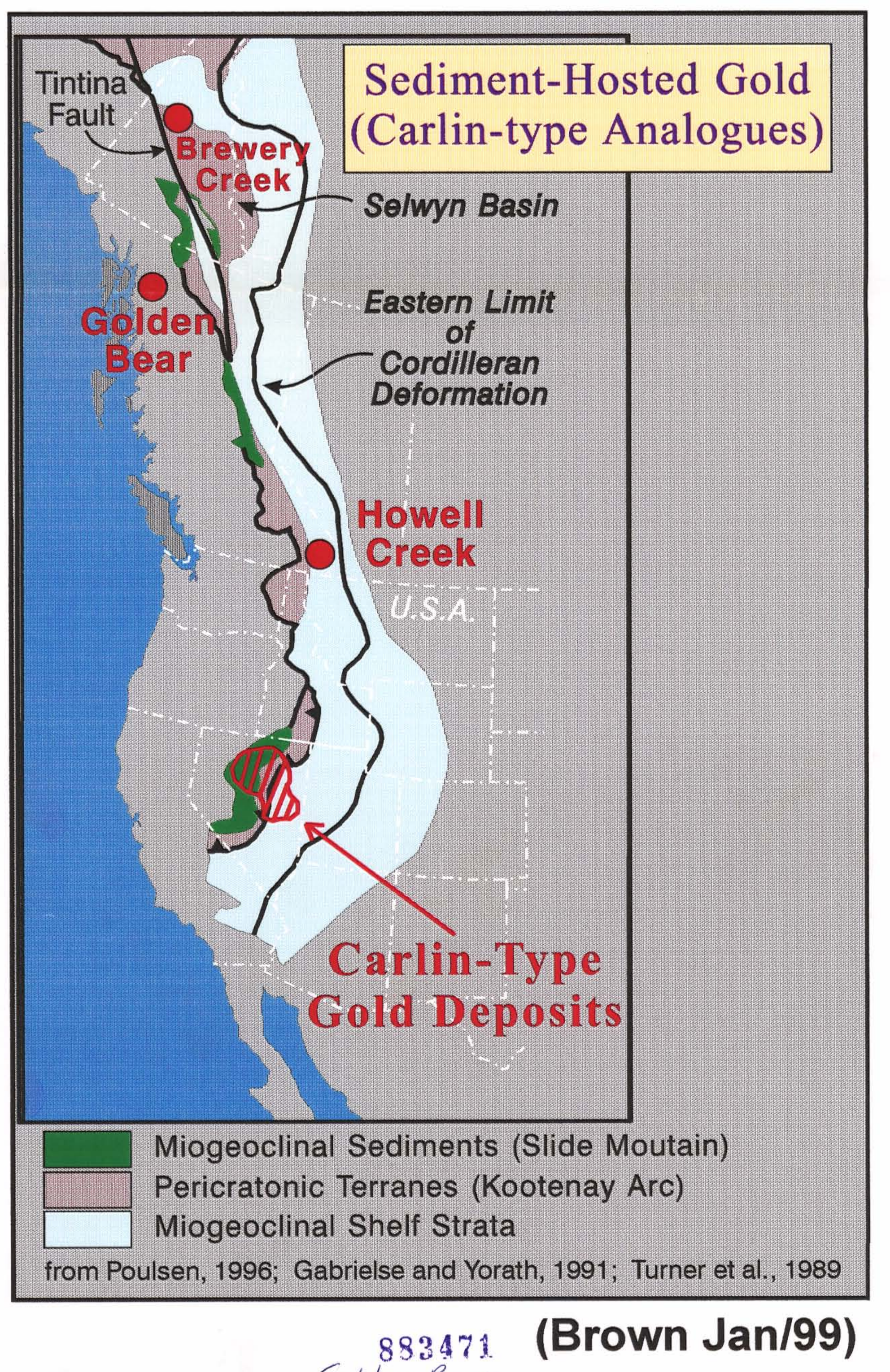
GANGUE MINERALOGY [Principal and *subordinate*]: Fine-grained quartz, barite, clay minerals, carbonaceous matter and late-stage calcite veins.

ALTERATION MINERALOGY: Strongly controlled by local stratigraphic and structural features. Central core of strong silicification close to mineralization with silica veins and jasperoid; peripheral argillic alteration and decarbonation ("sanding") of carbonate rocks common in ore. Carbonaceous material is present in some deposits.

WEATHERING: Nevada deposits have undergone deep supergene alteration due to Miocene weathering. Supergene alunite and kaolinite are widely developed and sulphides converted to hematite. Such weathering has made many deposits amenable to heap-leach processing.

ORE CONTROLS: 1. Selective replacement of carbonaceous carbonate rocks adjacent to and along high-angle faults, regional thrust faults or bedding. 2. Presence of small felsic plutons (dikes) that may have caused geothermal activity and intruded a shallow hydrocarbon reservoir or area of hydrocarbon-enriched rocks, imposing a convecting geothermal system on the local groundwater. 3. Deep structural controls are believed responsible for regional trends and may be related to Precambrian crystalline basement structures and/or accreted terrane boundaries.

from Schroeter and Poulsen, 1996



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Golden Bear

(Brown Jan/99)