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GEOLOGIC SETTING OF THE TUSCARORA MOUNTAINS

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Reprinted from "Bulk Mineable Precious Metal Deposits of the Western United States" Guidebook for Field Trips

Early Paleozoic - 505-360 million years

During Early Paleozoic, the edge of the North American continent lay in what is now western Utah. Westward, the ocean floor became progressively deeper as the continental shelf gave way to the continental slope just west of the present Tuscarora Mountains. Sedimentation characteristics across Nevada reflect the progressively deepening environment to the west.

Sedimentation west of the craton during Early Paleozoic can be divided into four lithologic provinces reflecting the differences in sedimentation across the miogeocline and eugeocline. The easternmost province, consisting of carbonates and to a lesser degree of quartzites, is known as the carbonate and quartzite province. The carbonates get significantly siltier on the western edge of the shelf until they grade into the transitional assemblage consisting of siltstone, shale, limestone, siliceous argillite, and knobby chert. For simplicity, this assemblage has been termed the shale and limestone province. Cherts in this province were formed in the eugeocline and are typically cleaner than those found upslope. Farther west, significant additions of quartz sand and basalt resulted in the chert, shale, quartzite, and greenstone province.

The area now known as the Tuscarora Range would have been situated on the western edge of the shelf where the carbonate and quartzite province received a significant influx of silts and clays. This zone is best exemplified by the Roberts Mountains Formation, host of the Carlin deposit. Laterally fluctuating facies boundaries resulted in more massive limestone above (Popovich) and dolomite below (Hanson Creek).

Middle Paleozoic - 360-300 million years

Tectonic models suggest that during the Middle Paleozoic, an island arc collided with the edge of the continent causing an upwarp, known as the Antler Highland, between the present town of Elko and Winnemucca. The Antler orogeny, as the event is called, culminated in the Roberts Mountains thrust which telescoped the entire sequence of lower Paleozoic sediments by rafting the siliceous sediments ninety miles eastward over contemporaneous carbonates. Erosion of the highland both before and after thrusting resulted in clastics being deposited to the east and west.

Late Paleozoic - 300-245 million years

During Late Paleozoic detrital material eroded from the Antler Highland formed thick deposits in the adjacent foreland basin to the east. Eastward, the detrital deposits thin, become finer grained, and shelf carbonates become more abundant. Four depositional environments are recognized across Nevada during Late Paleozoic. From east to west, they are (1) carbonate province, (2) carbonate-terrigenous detrital province, (3) conglomerate and carbonate province within the Antler Highland, and to the west of the highland (4) the siliceous volcanic province.

The Tuscarora Mountains are at the interface between the carbonate terrigenous detrital province and the conglomerate-carbonate province within the Antler Highland. Only local veneers of calcareous matrix conglomerate outcrop in the Tuscarora Mountains. Several miles to the east, however, at the Carlin tunnels, the clastic wedge has thickened considerably and is a part of the carbonate-terrigenous province.

Mesozoic - 245-66 million years

Granitic stocks and dikes intruded the Tuscarora Mountains during the Mesozoic. Prominent stocks in the area include: (1) The Goldstrike stock which is granodiorite locally grading to quartz diorite and diorite and has been radiometric age-dated at 121 + 5 million years. (2) The Big Six stock is diorite to quartz diorite and has not been age dated. (3) A granite outcropping on Richmond summit has been radiometric age-dated at 102 + 2 million years. (4) A granodiorite dike in the north wall of the Main Carlin pit has been age-dated at 128 + 4 million years.

Most of the Mesozoic dikes have intruded along previously existing high-angle faults that offset rocks of both the upper and lower thrust plates. This brackets the age of the early high-angle faulting as post-Roberts Mountain thrust (Early Mississippian) and pre-igneous intrusion. Several ages of rejuvenation along many of the faults further complicates the picture.

Cenozoic - 66 million years to present

Cenozoic in the Great Basin is a time of active tectonism, including volcanism, crustal extension and accompanying high heat flow, as well as high-angle faulting that would form the basin and range province.

Great Basin volcanism during the Cenozoic can be divided into three age groups that also appear to mark boundaries of significant changes in type and location of the volcanism. Volcanic rocks between 43-34 million years were dominantly andesitic to rhyolitic flows deposited in an east-west band in the center of the state. Volcanism between 34-17 million years shifted slightly south, and silicic tuffs were the dominant rock type. Volcanic rocks between 17-6 million years ago are either basalt or represent a bimodal assemblage of rhyolite and basalt. Volcanism younger than 6 million years is very local.

Seventeen million years ago represents a time of significant tectonic change across the Great Basin. The shift to basalt and bimodal volcanism corresponds in time with a shift to crustal extension and the initiation of basin and range faulting. The present topography of the Great Basin is due to the basin and range high-angle faulting which continues to this day. Movement along these faults has been considerable. Structural relief between the lowest part of bedrock under the valleys to the highest peaks in the adjacent mountains is generally from 6,000 to 15,000 feet.

Cenozoic tectonics are of special importance to the development of the gold deposits in the Tuscarora Mountains. Gold deposition has two requirements:

a source of gold and a source of heat to drive the hydrothermal cells which deposit the gold. The source of gold is generally accepted to be the sediments themselves. Either Cenozoic volcanism, which is well represented in the Tuscarora Mountains, or regional high heat flow could have served as possible heat sources. Following gold deposition, basin and range faulting uplifted the range, exposing it to weathering and erosion. It is postulated that between 1,000 and 3,000 feet of erosion brought the gold deposits within reach of detection and mining. In 1962, following Ralph Roberts description of the alignment of mineral deposits along the margins of windows in the Roberts Mountains thrust plate, Newmont Exploration geologists found the Carlin mine. New deposits are still being discovered.

STRATIGRAPHY OF THE SOUTHERN TUSCARORA MOUNTAINS

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PALEOZOIC ROCKS

Eastern Assemblage

Hamburg Dolomite - The Hamburg Dolomite is considered to be Middle to Late Cambrian, based on fossil data at the type location in the Eureka district (Nolan, et al., 1956). In the Lynn Window of the Tuscarora Range the thickness of the dolomite is estimated at 244 meters (Evans, 1980). The Hamburg Dolomite is a blue gray, thinly to thickly bedded, locally massive, very fine to coarse grained dolomite. Distinctive, but less common, textures of the Hamburg Dolomite are thin ellipsoidal white dolomite seams ("blue bird texture", Roen, 1961) and minor intercalated very thinly bedded quartz clast siltstone beds.

Pogonip Group - The Pogonip Group unconformably overlies the Hamburg Dolomite and is considered to be Early Ordovician age. The approximate thickness is 600 meters. Lithologic differences of the Pogonip Group in the Tuscarora Range from the Goodwin Limestone, the Ninemile Formation and the Antelope Limestone in the Eureka District have prevented adaptation of the formation rank units. The lower unit consists of blue gray, massive, medium to thickly bedded, fine grained limestone with intercalated silty laminations. The lower unit of the Pogonip Group is marked by irregular, white to gray, chert nodules. The thickness of the lower unit is approximately 370 meters. The upper unit consists of a medium blue gray, thinly to thickly bedded, fine grained, fossiliferous, sandy dolomite. The upper unit is approximately 230 meters thick.

Eureka Quartzite - The Eureka Quartzite unconformably overlies the Pogonip Group and is considered to be Middle Ordovician age. The formation may vary from approximately 120 to 210 meters thick. The Eureka Quartzite consists predominantly of white, massive to thickly bedded, fine to medium grained, vitreous to sugary quartzite, with lesser amounts of interbedded white, gray and black; thinly to thickly bedded or locally friable quartzite. The quartzite is composed of very closely packed, well sorted, subrounded to well rounded, medium to coarse sand sized quartz grains with quartz cement. Locally the upper portion of the formation contains gray, sandy dolomite.

Hanson Creek Formation - The Hanson Creek Formation unconformably overlies the Eureka Quartzite and is age dated as upper Ordovician through Lowest Silurian. The formation is approximately 150 to 185 meters thick. In general the Hanson Creek Formation consists of dark gray to black, fine grained, thinly to thickly bedded dolomite. The basal unit also contains lenses and seams of black chert. The upper unit contains less chert and is, in general, lighter colored, more thinly bedded and coarser grained. Also present in the upper unit are intercalated, dark blue gray, thickly bedded, fossiliferous, dolomitic limestones. The top of the formation is identified by interbedded, thickly bedded, light gray, sandy dolomite and dolomitic sandstone. Fossils contained in the formation are crinoid stems, horn and chain corals, brachiopods and conodonts.

Roberts Mountains Formation - The Roberts Mountains Formation overlies the Hanson Creek Formation with no apparent hiatus. The age of the formation is from late Llandoverian (Early Silurian) through Early Devonian. The formation is approximately 550 to 600 meters thick. The base of the formation is marked by dark gray dolomite and dolomitic limestone with black, swelling and pinching, very thinly to medium bedded chert lenses and pods. The formation consists of a monotonous sequence of laminated to thinly bedded, silty, medium dark gray, fine grained dolomite and dolomitic limestone. The upper part of the formation also contains medium dark gray, thick bedded, bioclastic, silty to sandy, fine to medium grained limestone. Fossils contained in the formation are brachiopods, corals, graptolites, conodonts and ostracods.

Popovich Formation - The Popovich Formation overlies the Roberts Mountains Formation with no apparent hiatus. The age of the formation is from Early Devonian through Late Devonian. The formation is approximately 400 to 460 meters thick. The formation consists predominantly of intercalated thinly to thickly bedded, fine grained limestone and laminated silty dolomitic limestone and intraformational breccia. Minor black chert seams occur near the base of the formation. The upper portion of the formation consists of a thick bedded limestone depositional breccia with large, subrounded to angular limestone clasts overlain by a gray thick bedded sandy limestone. Bioclastic fragments consist of brachiopods, corals, conodonts and ostracods.

Transitional Assemblage

Unnamed Limestone Unit - A large lithologic unit of predominately massive, gray, thinly to thickly bedded limestone and sandy limestone is found in the James Creek area. The upper portion of this unit contains (1) intercalated sandy, crossbedded limestone; (2) pebble sized, quartz and chert clast, calcite cemented conglomerate; (3) green to gray, very thinly to thinly bedded chert and dark gray to black shales.

Unnamed Intercalated Unit - A highly variable lithologic unit consisting of intercalated siliceous and carbonaceous rocks is in thrust contact above the unnamed limestone in James Creek. This unit has exposures from James Creek to Marys Creek on the south and Mack Creek on the west. The unit appears to grade into more typical Vinini Formation lithologies at Mack Creek on the west flank of the Tuscarora Mountains. The thickness of the unit is undetermined due to large amplitude isoclinal folding. Lithologic types comprising the unit are: (1) green to gray, very thinly to thinly bedded, translucent to argillaceous chert; with or without clay partings between beds or monroe structures; (2) green to gray, laminated, fissile shales; (3) light gray to black, thinly to thickly bedded, siltstones and mudstones; and (4) a distinctive limestone sequence. The limestone sequence consists of a gradational change from one of the other lithologies, usually chert, to sandy chert then limey sands then sandy limestone then a core of fine grained limestone and inverting the sequence back to chert.

Unnamed Conglomerate Unit - Another allocthonous block on Marys Mountain is in thrust contact above the unnamed intercalated unit. This unit is approximately 300 meters thick. The basal 20 meters consists of green translucent chert containing a thin marker bed of medium gray, coarse grained quartzite. Above this unit is approximately 34 meters of medium to very thickly bedded, chert, argillite and quartzite clast, chert matrix conglomerate. The next 65 meters consists of interbedded argillaceous matrix conglomerate and argillite. The remaining upper portion of the unit consists of interbedded chert, siltstone, argillite and porcellanite.

Western Assemblage

Vinini Formation - The Ordovician Vinini Formation can be subdivided into four units based on the predominance of either shales, cherts, conglomerate or quartzite. The thickest of the units is the lower predominately shale unit exposed on the east flank of the Tuscarora Mountains. This unit contains gray to black, laminated, fissile shale, green to gray thinly bedded chert, black to gray, laminated to thinly bedded siltstones and minor gray, thinly bedded sandy limestones. The chert unit is similar to the shale unit except that chert beds are more abundant. Above the chert unit is a unit consisting of interbedded chert, argillite, siliceous matrix chert pebble conglomerate and quartzite beds. The best exposures of the conglomerate unit are at the numerous headwater tributaries of the Boulder Creek. Both the conglomerate and quartzite can pinch out laterally over as little as 200 meters but usually extend thousands of meters. The upper unit is predominately white, coarse grained, rounded quartz grained quartzite and interbedded cherts.

Overlap Assemblage

Unnamed Coarse Clastics - In the Marys Creek area coarse clastics of undetermined age lie in angular unconformity above the unnamed intercalated unit. These rocks consist of loosely consolidated, sandy to cobbly, angular to subrounded multilithic clasts, calcite cemented conglomerates.

MESOZOIC ROCKS

Igneous Intrusives

Several small stocks and associated dikes occur in the southern Tuscarora Mountains. These intrusives range from quartz monzonite to granite of late Jurrasic to Early Cretaceous age. The quartz monzonite Gold Strike Stock has been dated as 121 $\pm$ 5 m.y. (Hausen, 1967) and a granite stock in the southern Lynn Window has been dated at 106 $\pm$ 2 m.y. (Evans, 1980).

The intrusives consist of white to gray, fine to medium grained, hypidiomorphic granular granite to quartz monzonite. The quartz monzonite tends to be more porphyritic than the granite, containing euhedral potassium feldspar crystals.

Igneous Extrusives

Rhyodacite flows and pyroclastics lie above the rocks of the siliceous assemblage. No radiometric age determinations are available, however, the rhyodacite is considered to be either Cretaceous or early Tertiary. A volcanic autobreccia can be found at the base of the flow in some places. The flow also contains ash fall tuffs and welded ash flow tuffs. The upper portion of the flow consists of black, gray and maroon aphanitic rock with abundant white zoned plagioclase phenocrysts and minor layers with hornblende, pyroxene, biotite and quartz phenocrysts.

CENOZOIC ROCKS

Igneous Rocks

Igneous rocks of Tertiary age consist of dikes, flows and pyroclastics. The dikes range from granodiorite to quartz latite. The dikes consist of creamy-white to gray, fine grained to aphanitic rock. The quartz latite is porphorytic with abundant plagioclase laths and minor biotite, hornblende, pyroxene and rounded quartz phenocrysts. Radiometric age dates of the two dike rocks are nearly equal at about 36 to 38 m.y. (Evans, 1980). The flows and pyroclastics consist of rhyolite and rhyolitic welded ash flow tuff with angular lithic clasts in the lower portion of the unit. These volcanics are layered visicular and vuggy. The age of the flows and welded tuffs are 14.2 $\pm$ 3 m.y. (Evans, 1980).

Sedimentary Rocks

Carlin Formation - The Carlin Formation consists of Early Pliocene sediments in the Carlin basin (Regnier, 1960) located on the southeast flank of the Tuscarora Mountains. The formation is composed chiefly of poorly consolidated, muddy, tuffaceous sandstones and siltstones interbedded with angular to rounded, pebble to boulder conglomerates. Accessory lithologies are vitric tuff and ashes, which can be lacustrine, diatomite, limestone and limey shales.

Unnamed Relict Sediments - Relict, dissected, poorly consolidated to indurated, basin trapped sediments and fanglomerates are located on both the east and west flanks of the Tuscarora Mountains. Remnant portions of these sediments are found high up the drainages of Bell and Boulder Creeks. Portions of these sediments may be correlative to the Carlin Formation because of the similarity of lithologies. The sediments consist of tuffaceous sandstones and siltstones, gypsum sands, and rounded to angular, pebble to boulder conglomerates.

Recent Sediments - Several types of recent and active surficial sediments are present in the Tuscarora Range. These unconsolidated sediments consist of stream alluvium, alluvial fans, slopewash, landslide deposits and mine waste material.

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HISTORY OF MINING ALONG THE CARLIN TREND

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The history of prospecting and mining along the Carlin Trend has a long and sometimes colorful past. The first recorded account of prospecting along the trend occurred in the Maggie Creek (Schroeder) mining district in the 1870s (Roberts, 1967). These first workings included small placer operations along Maggie Creek in the Maggie Creek Canyon and shallow diggings on Schroeder Mountain. Due to poor recoveries, harsh environmental conditions and inadequate perennial water supplies, early prospectors quickly abandoned their quests for gold in the district.

The next prospecting activity along the trend occurred nearly thirty years later in the early 1900s. Two different areas along the trend saw the location and staking of a profitable gold placer operation, a gold mine and a copper mine.

The first discovery of placer gold along the trend was made by Joe Lynn who, in 1907 located the Bulldog placer claims approximately 3.2 km (2 miles) northeast of the present site of the Carlin mine, at the head of Lynn Creek (Fig. 1). The richest gravels were located near the headwaters of the creeks and channels and contained coarse gold particles suggesting a proximity of the placers' source. Although the discovery of large nuggets was not an everyday occurrence, nuggets valued between $13 and $21 were discovered in the stream channels. Placer operations along the Lynn and Sheep Creek drainages reportedly yielded between 67.5 kg and 112.5 kg (150 and 250 pounds) of gold for an estimated total production through 1936 of $214,100.00 (Roberts, 1967).

The Big Six mine, a possible source of the Lynn Creek placer deposits, was located at the headwaters in 1907 by W. E. Barney. The mine site is approximately 2.4 km (one and one-half miles) northeast of the present site of the Carlin mine in the Lynn mining district (Fig. 1). Workings at the site consisted of an inclined shaft, several adits and other workings, totaling approximately 1,500 m (5,000 feet). Gold in the Big Six mine was taken from a fissure zone contained within allochthonous, western assemblage siliceous materials of the upper plate Vinini Formation. By

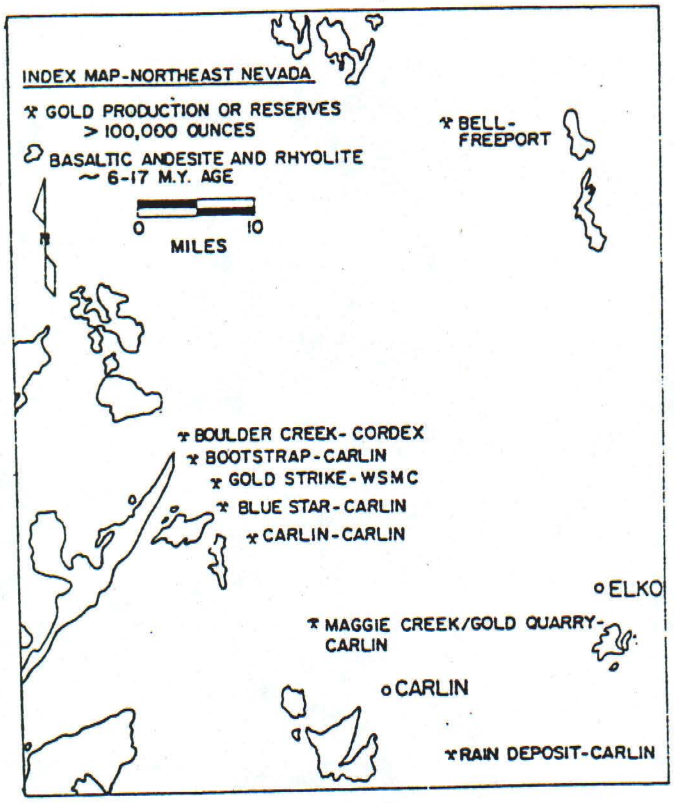

Figure 1. Index map showing location of mines and deposits along the "Carlin Trend".

1917 the Big Six Mining Company had built an amalgamation mill, which represents the first milling attempts along the trend. The company later sold the property to the Beaver Crown Consolidated Mining Company and since 1936 the property has continued to operate under various owners until the present time.

The Copper King mine, located 12.8 km (8 miles) southeast from the Big Six mine, in the Maggie Creek (Schroeder) mining district was also discovered in 1907. The Copper King mine is approximately 2.4 km (one and one-half miles) northwest of the present site of the Gold Quarry mine (Fig.

1). Workings at the site consist of two adits, a two-compartment shaft 60 m (200 feet) deep with several hundred feet of laterals and several open pits and trenches. Copper ores averaging between two and seven percent and containing minor amounts of gold were mined from brecciated fault and shear zones in allochthonous, western assemblage siliceous material of the upper plate Vinini Formation. By 1913 three mines were active in the Maggie Creek (Schroeder) mining district and by years end had produced 120 t (134 st) of gold-silver-copper-lead ore with an average value of $97 per ton (Roberts, 1967).

The next notable discovery along the Carlin Trend occurred in 1918 at the site of the present day Bootstrap mine (Fig. 1). In 1918 an occurrence of stibnite, an ore of antimony, was discovered and mined. A load of the ore was sent to the railhead at Dunphy for shipment to a refinery but was never sent (Lawrence, 1963). The property sat idle until 1957 when Marion Fischer and Harry Treweek made an association between the antimony occurrence and gold. They made the first attempts to mine the property for gold.

In 1925 a barber from the railroad town of Carlin, Nevada, was exploring property west of the Big Six mine and found turquoise over an area that is now the Blue Star gold mine (Fig. 1). Not realizing the potential association between the copper bearing mineral and gold, he failed to claim the location and soon forgot about his discovery. It wasn't until four years later in 1929 when Lawrence Springer and Earl Buffington rediscovered the same location and attempted to mine the area for turquoise. The mine traded owners several times until 1935 when the Edgar brothers bought the property and mined for turquoise until 1954. The estimated total production from the mine up to 1954 was estimated to be in excess of $1.4 million dollars (Roberts, 1967).

Newmont Mining Corporation acquired the property in 1968 and after extensive exploration and development drilling programs delineated reserves of 1.6 million t (1.8 million st) at an average grade of 4.10 g/t (0.12 oz/st). Carlin Gold Mining Company began open pit mining operations at Blue Star in 1974 (Noble et al., 1977).

The thirties brought a resurgence of prospecting and mining activity along the Carlin Trend when hydrothermal barite occurrences were discovered in the Maggie Creek (Schroeder) mining district. The Maggie Creek Mine was located along the west side of Maggie Canyon where a 10 foot wide barite vein was mined. Total production from the mine was 9 Kt (10,000 st) of barite with a specific gravity of 4.2 (Roberts, 1967). Another barite occurrence on the southeast side of Schroeder Mountain was mined in the mid-thirties by the Industrial Minerals and Chemical Company of Berkeley, California.

Also during 1935 another significant discovery was made in the Maggie Creek (Schroeder) mining district. A gold anomaly located near the Industrial Minerals and Chemical Company's barite occurrence was discovered and subsequently staked by M. Burgun. At that time he submitted the property to Goldfields Consolidated Mines and Exploration of San Francisco, California, for examination. Based on surface mapping and sampling of the area they estimated that more than 1.8 Mt (2 million st) of gold ore existed on the claims. However, due to the price of gold at the time and the high cost of grinding required to recover the gold, the property was not acquired (Ryneer, 1986).

By the end of 1936 M. Burgun had recovered 54 t (60 st) of ore from the property that contained gold and silver assay values of 13 g/t and 27 g/t (0.42 and 0.88 oz per st), respectively.

Between 1933 and 1958 total production from the Maggie Creek (Schroeder) mining district was 26 kg (858 oz) Au, 136 kg (4,387 oz) Ag, 297,581 kg (656,058 lbs) Cu and 12,520 kg (27,603 lbs) Pb (Roberts et al., 1967).

In 1960 Ralph Roberts, then with the United States Geological Survey (U.S.G.S.), published a paper entitled "Alignment of Mineral Districts in North-Central Nevada." Upon reading Robert's paper Robert Fulton (who was Vice President of Exploration for Newmont Mining Corporation), Alan Coope and John Livermore (Newmont Geologists) decided that the search for a large, near-surface ore body should be concentrated near the "window" structures mentioned by Roberts (1960).

Newmont initiated an exploration program in 1961, their first target for investigation was an area 2.4 km (one and one-half miles) southwest of the Big Six gold mine. Based on what they observed and their initial assay results for samples taken, they recommended the acquisition of 15.5 sq km (6 sq mi) of BLM and private land for further investigation. During this time Newmont also acquired mineral exploration lease agreements on the Maggie Creek and Blue Star properties. In

September of the following year Newmont began an exploration drilling program on the property southwest of the Big Six mine. In the third hole drilled, significant gold mineralization was intersected over a 24 m (80 foot) length. A program of 800 drill holes on a 30 m (100 foot) spaced grid delineated ore reserves of 11 million metric tons (12 million st) with an average grade of 10.97 g/t (.32 oz/ton), establishing the Carlin Gold deposit.

In May of 1962 Newmont Exploration Limited acquired leases on the Maggie Creek claims (Gold Quarry), located 12 km (nine miles) north of Carlin, Nevada (Fig. 1). Between 1962 and 1970 exploration drilling delineated 306 Kt (340,000 st) of gold ore at an average grade of 4.1 g/t (0.12 oz per st). During this time Newmont Exploration transferred the lease agreements to Carlin Gold Mining Company, a subsidiary of Newmont Mining Corporation.

In October of 1971, after nine years of development on the Gold Quarry lease property, Carlin Gold Mining Company discontinued the lease agreements. The leases were dropped due to discouraging results from metallurgical testing of the ore zones that indicated high grindability and low recovery factors.

The property was then acquired for approximately $8,000.00 by Roy Ash and Charles (Tex) Thornton, then owners of the T Lazy S cattle ranch headquartered in nearby Dunphy, Nevada (Guzzardi, 1982).

After XRF-XRD studies of the Gold Quarry drill cuttings by Don Hausen (Chief Process Mineralogist for Newmont) in 1972 suggesting possible open ends of mineralization, based on alteration and geochemical trends, the claims were reacquired.

Between 1972 and 1977 Larry Noble and Charlie Ekburg, Carlin Gold Mining Company geologists, mapped and sampled an area to the southwest of the Gold Quarry claims. Subsequent drilling of anomalous surface occurrences intersected mineralization that developed into the Maggie Creek mine.

During 1979 an exploration drilling program conducted by Carlin Gold Mining Company geologists 600 meters (2000 ft) south of the Gold Quarry lease property and 300 meters (1000 ft) east of the Maggie Creek ore body began intersecting significant gold mineralization. A drilling program of over 550 holes delineated ore reserves of over 130 million metric tons (144 million st) with an average grade of 1.68 g/t (.049 oz/ton), establishing the Gold Quarry deposit (Rota, 1986).

In 1979 a property located 27.2 km (17 miles) to the southeast of the Gold Quarry minesite was submitted to Newmont Exploration Limited for evaluation and possible acquisition (Fig. 1). The property was originally claimed by Turk Montrose as a barite prospect and was called the Rain claims. After evaluation of the property by Gale Knutsen, Newmont Exploration Limited; a reverse circulation and conventional drilling program, that to date includes the drilling of over 350 drill holes, was initiated. Latest published ore reserve estimates state the Rain ore body contains in excess of 6.3 million tons (7 million st) that average 2.84 g/t (0.083 oz/ton) (Knutsen & West, 1984).

In 1983 the Western States Mining Company notified Newmont Mining Corporation of possible potential of gold mineralization adjacent to their northern and eastern property lines within land owned by Newmont Mining Corporation (Fig. 1). The property was evaluated by Carlin Gold Mining and Newmont Exploration personnel and a drilling program was instituted. To date over 150 conventional and reverse circulation drill holes have been drilled on the property. Ore reserves for the deposit are currently in excess of 45,000 kg (1.5 million troy ounces) (Knutsen et al., 1986).

During the early months of 1984 Tyler Shepherd, then a Carlin Gold Mining Company geologist, mapped and sampled an area adjacent to the northern boundary of the Blue Star mine. Based on the results from the samples taken and the similarities of lithologies and structures that existed between the area and the Blue Star mine, he proposed the drilling of exploration holes on the project. The tenth hole drilled intersected a zone of significant gold values. Ore reserves for the deposit are currently in excess of 30,000 kg (one million troy ounces) (Knutsen et al., 1986).

During 1986, Newmont Gold Company is expected to produce approximately 12,000 kg (400,000 troy ounces).

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GEOLOGICAL SOCIETY OF NEVADA

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— NORTHERN CARLIN TREND
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— BIG SPRINGS

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