

MINING UTAH'S HERITAGE
The Story of Mining in Utah

TEACHER'S RESOURCE

INDEX

Mining History

Do You Know the History of Utah Mining?

How Many Cultures Built Utah?

Famous People in Utah Mining History

Mining Ghost Towns in Utah

Did You Know ? ? ?

Mining and Mineral Resources

Significant Utah Minerals

Summary of Utah Mineral Industry Activities by County

Map Unit - Nonrenewable Mineral Resources of Utah

Did You Know ? ? ?

References

DO YOU KNOW THE HISTORY OF UTAH MINING?

Mining has gone on in Utah for a long time. Native Americans, Mexicans, and Spaniards mined before the arrival in 1847 of the Mormons, who were the first white settlers. Right from the first, Mormons mined a little. They dug for coal to heat their homes. They mined iron to make farm tools, pots and pans, and nails. They used lead to make bullets.

Mining really began to develop in Utah after the transcontinental railroad, which stretched across the country, was finished in 1869. The railroad meant that large amounts of minerals could easily be shipped to market and sold. Mines sprang up all over Utah. You can still see old mines everywhere. For instance, they are in Big and Little Cottonwood Canyons and in the Oquirrh Mountains near Salt Lake City; near Park City; at Mercur west of Salt Lake; and at Silver Reef in southern Utah by St. George.

By the turn of the century mining was a major industry in Utah, second only to agriculture. Silver was the most important early metal. Gold and zinc and lead were also mined a lot. In the 1890's coal mining became important, mainly in Carbon County near the towns of Helper and Price. In the early twentieth century copper mining became very important. Later on uranium began to be mined.

Mining had a big impact on Utah. It provided many jobs for people. It helped Utah's population grow. It brought people from all over the world to Utah. Some of them worked in the mines. Others ran grocery stores and restaurants and other businesses in mining towns. Mining made a few people rich. Money from mining helped build mansions, skyscrapers, and hotels. Many of the mansions on Salt Lake City's South Temple Street, including the Governor's Mansion, were built with mining money. As mines were discovered, towns sprang up around them. Many towns in Utah started as mining towns. Today Alta is a world famous ski resort. One hundred years ago it was a mining town. It had over one hundred buildings and five hundred people, and mines were everywhere in the mountains around it. Some mining towns, like Alta, and Park City, still exist today. Others did not last very long and became ghost towns.

Ghost towns are places where no one lives anymore. There are hundreds of ghost towns in Utah. Silver Reef is one of them. It is in the mountains near St. George. About one hundred fifteen years ago people heard that silver had been found there. In a few months more than one thousand miners and their families had moved there. Soon Silver Reef had a main street with a general store, a blacksmith shop, a dance hall, a school, a church, and a hospital. All the food and everything else the people needed was hauled in on wagons from nearby towns and farms. After silver ran out, the mines closed, and people began to move away. It was not long before the busy boom town became a

ghost town like it is today. Now only a few buildings are left to show us what used to be there.

HOW MANY CULTURES BUILT UTAH?

The first people to live in Utah were Native American Indians. They have lived here for about 12,000 years. It was a long time before other people began coming here. The first were Spanish explorers from Mexico. Later fur trappers looking for beaver explored Utah. Permanent settlement by white people began in the summer of 1847 when members of the Mormon church arrived in the Salt Lake Valley. Three of the people in the first group of Mormons were black men.

At first most of the immigrant miners were young, single men. Not very many women or children came to begin with. Most of them did not speak English. Most of them did not belong to the Mormon church. Often they lived in neighborhoods with people from their own country. There were restaurants that sold food from their native lands and shops that sold clothing and other things from their homeland. They had newspapers written in their own language. They had their own churches. In Salt Lake City there was a Chinatown, a Greektown, a neighborhood for Italians, one for Japanese people, and another one for Armenians. Most of them thought they would work a while and save some money. Then they would go back home to their native land and get married. Some of them did return, but many stayed, worked hard, married here, and began raising families. They and their children and grandchildren are an important part of Utah's history. They have helped make Utah a good place to live.

MINING HISTORY

FAMOUS PEOPLE IN UTAH MINING HISTORY

Jesse Knight came to Utah in 1850 at the age of five. His family was poor and his life was hard. Jesse Knight went into debt to dig the Humbug mine in the Tintic District and struck a rich lode of silver. Knight had an uncanny knack for finding silver, which earned him the nickname "Mormon Wizard" and made him a millionaire. Soon after the Humbug find he struck silver at three other mines. In 1896 Knight founded the town of Knightsville for the workers at his mines. Standards were high at Knightsville. It was the only mining town with no saloons or gambling. Knight's miners were called the Sunday School Miners because they weren't allowed to work on Sunday. In 1912 Uncle Jesse Knight started the Spring Canyon Coal Company mine in Carbon County and built the town of Storrs.

Daniel C. Jackling was an industrial pioneer, an inventor, a man of ideas and visions. He is known as the Prince of Utah Copper because in 1905 he discovered a way to get the copper from low grade ore that contained only small amounts of copper. Before this discovery, copper miners at Bingham Canyon tunneled into the mountain following the richest veins of ore. This was dangerous and very difficult. Jackling's process meant that the entire mountain at Bingham, which was made of low grade ore, could be mined from the top down. Jackling helped start the Utah Copper Company. Its mine at Bingham Canyon became the world's largest. He went on to develop 14 other major copper properties and is memorialized by a statue in the Utah State Capitol.

The Walker Brothers: Matthew, Rob, Sharp, and Fred, came to this country from England. They arrived in Salt Lake City in 1852 and soon went into business selling supplies to miners and settlers and shipping freight. The first ore shipped out of the Utah Territory was shipped by the Walkers in 1868. That same year a miner showed them some promising ore samples from a prospect near Alta. Already successful merchants, they got into the mining business. The brothers bought a quarter interest in the Emma Mine, which turned out to be a bonanza. Their fortune made, they turned to banking in 1871. The Walker Bank Building built in 1912 is still a prominent part of the Salt Lake City skyline.

Thomas Kearns was born in Canada in 1862. As a young man he roamed around the West, working in mines in Deadwood, South Dakota, Tombstone, Arizona, the Tintic District of Utah, and Pocatello, Idaho, before settling in Park City in 1883 at age 21. There, together with his partner David Keith, he made a fortune at the Mayflower and Silver King mines. Kearns was a millionaire by the age of 38. He was appointed to the U.S. Senate and served from 1901 to 1905. He and David Keith bought the Salt Lake Tribune and both are represented by stately homes on South Temple

Street and buildings on Main Street in Salt Lake City.

MINING HISTORY

FAMOUS PEOPLE IN UTAH MINING HISTORY

Early Spanish Explorers Long before the Mormon pioneers settled in Salt Lake City, the Spanish explored parts of Utah. In 1776 Fathers Dominguez and Escalante set off from Santa Fe in search of a route to California. They never found it, but they did draw the first map of Utah. Some reports say they found coal on their journey. Other Spanish explorers traveled on the Old Spanish Trail in southern Utah. Today there are many rumors and legends of lost Spanish mines from this early period.

Col. Patrick E. Conner was a U.S. Army Colonel (1820-1891) who established Fort Douglas in 1862. The 750 troops under his command were California and Nevada Volunteers, brought to Utah to put down the Indian raids on the Overland Stage Route. Many of these men had been miners in the California Gold Rush. Col. Conner urged his troops to explore the mountains for gold and silver. Conner's men made many of the early gold and silver discoveries in the Oquirrh and Wasatch Mountains. He established the first mining district and the first mining town of Stockton. Conner left the army in 1866 and returned to Utah to mine.

Samuel Newhouse was called the "Father of Copper Mining in Utah." Already a millionaire from Colorado mining ventures, in 1896 Newhouse and Thomas Weir formed the Highland Boy Gold Mining Company to mine gold in Bingham. While mining gold they came across a rich body of copper ore. The copper ore turned out to be more valuable than the gold. In 1898 Newhouse built the first smelter for copper in Utah. He also established the Little Wall Street at Exchange Place in Salt Lake City.

Charley Steen was a geologist who showed that all the Utah mining fortunes were not made in the 1800's. After World War II there was a tremendous boom in the demand for uranium. Thousands of people swarmed over the West hoping to strike it rich. Searching through the southern Utah desert with a Geiger counter, Charley Steen found a fabulously rich uranium deposit near Moab. He named his mine Mi Vida, which is Spanish for "My Life."

Charles Strevell and Fred Sweet formed the Independent Coal and Coke Company the Kenilworth Mine, which was the first major mine not controlled by a railroad.

MINING HISTORY

MINING GHOST TOWNS IN UTAH

1. Alta- Salt Lake County

Alta was first recognized as an area with outstanding mineral resources in 1864. By 1871 a town had developed with almost 200 houses and businesses, and a population of over a thousand. By 1895, the boom had subsided and only a few people remained. Today the riches of Alta are the deep snows and resorts that bring tourist dollars to Utah.

2. Antimony - Garfield County

3. Basin - Grand County

During the peak mining boom of the 1890's, 80 goldminers lived in the little town of Basin on the side of Mt. Waas, east of Moab. By 1918, the town was empty.

4. Coalville - Summit County

In response to Brigham Young's order to find coal to fire the industrialization of Salt Lake City, coal was discovered in the 1850's in Coalville. Problems with the transportation of the coal over the mountains to Salt Lake City, though, kept Coalville from developing into a major mining center. A thriving agriculturally based community today, remnants of old, abandoned coal mines still exist throughout the area.

5. Deer Creek - Utah County

Located where the canyon got too steep for the narrow gauge railroad that went up American Fork Canyon, Deer Creek was a terminal town. Wagons transported the ore and bullion down from Forest City for processing in charcoal kilns. There were warehouses, stockpiles, offices and a few homes. Deer Creek was located in the vicinity of where the spillway of the Tibble Fork Reservoir is today.

6. Dragon - Uintah County

Gilsonite was discovered in the 1860's. The Black Dragon Mine was developed in 1888, and the town of Dragon was located about a mile and a half away on the railroad route that supplied the mine.

7. Eureka - Juab County

Eureka, along with several other towns in the Tintic Mining District (Mammoth, Silver City, Homansville) was a major center of mining activity. Many fabulously rich mines (the Eureka Hill, Bullion-Beck, Gemini, Centennial-Eureka, the Ridge and Valley and the Chief Consolidated) were developed that honeycomb the earth beneath the town. By 1910, Eureka was the ninth largest town in Utah. J.C. Penney built his second department store in Eureka and there were churches, schools, theaters and hotels.

8. Frisco - Beaver County

Frisco, in the southern San Francisco Mountains, where the Horn Silver Mine was located, was known as the wildest town in the Great Basin, with 23 saloons. Founded in 1876, the town really grew in 1880 when the Utah Southern Railroad was extended from Milford to Frisco. 6,000 people lived there from 1880 until 1885, when the entire mine caved in. By 1920, after millions of dollars of ore had been mined, the town was vacant.

9. Gold Hill - Tooele County

Gold Hill not only had gold mines but rich veins of silver, lead, cooper, tungsten, arsenic and bismuth. Founded in 1889, in 1917 when the railroad came in, over 3,000 people lived in Gold Hill. The town had square blocks and named streets and, for a little while, even boasted a doctor. A few people still live in Gold Hill today.

10. Hale - Carbon County

Not much is known about Hale, except that it was located on the Rio Grande Railroad tracks, two to three miles downstream from Scofield Reservoir.

11. Ibex - Juab County

Ibex, located in the Drum Mountains, was home to 200 miners from about 1903 to 1917. A few businesses were established (saloon, restaurant, cabins, general store) and less than \$50,000 worth of ore was taken out of the area. Another town named Ibex, located less than 50 miles away in Millard County, was an agricultural town with a post office, boarding house and several homes.

12. Joy - Juab County

Named for Harry Joy, an engineer from Michigan, who later founded the Packer Motor Company in Detroit, Joy was a supply town for ranchers and miners. Founded in 1879, it had a café, a store and several homes. Joy was not vacated completely until 1946.

13. Hiawatha - Carbon County

Incorporated in 1911, Hiawatha was a company town owned by the United States Fuel Company. The company built a recreation hall, homes, stores, schools, churches and a hotel for visiting dignitaries. Many of the homes had lawns, shrubs and trees. During the 1940's, 1,500 people lived in Hiawatha, but now with the drop in mining activity, Hiawatha is virtually a ghost town today.

14. Mammoth - Juab County

Just over the mountain from Eureka, Mammoth was a town of 3,000 during the period 1900-1910. Four hotels, a hospital, lawyers, dentists and newspaper were all part of Mammoth. The ores were so rich that over \$100,000 worth could be carried out of the mines in one carload.

15. Mutual - Carbon County

The last area to be developed in Spring Canyon, Mutual was built

as a company town in 1921. Coal was mined until the mid 1950's. The walls of the Mutual store are still standing.

16. Ophir - Tooele County

The mineral deposits of the Oquirrh Mountains were discovered by soldiers in 1865. By 1870, a rush was on and Ophir came into existence. By 1877 there were 6000 residents, but the boom was over by 1880 with most of the people moving on. Originally gold was the sought-after mineral but silver, zinc, and copper became the mainstay. Ophir has recently experienced a rebirth, becoming something of an artist's colony, and a currently has a population of 100.

17. Park City - Summit County

Hardly a ghost town today, the thriving resort town of Park City's population in 1957 was less than 1000. Established in 1878 by soldiers from Ft. Douglas who had been sent in to quell the Mormon uprising, by 1884 it had a population of 4800, growing to 6000 by 1900. Park City had it all: large hotels, restaurants, department stores, an opera house, library and a hospital. It was the third town in Utah to have a telephone exchange. The longest running weekly newspaper in the state, the Park Record was started in 1881.

18. Rains - Carbon County

Founded in 1915 by L.F. Rains, a famous opera star, the town of Rains was closely associated with Mutual. About 500 people lived in this typical company town which had over 60 homes. Mining one of the thickest coal veins in the state, the Carbon Coal Company produced 2000 tons a day until the mid 1920's.

19. Rolapp - Carbon County

Five miles northwest of Castle Gate, the town of Rolapp was founded by Frank Cameron in 1915, who sold out his interest in 1917 to Henry Rolapp, hence the name. It had population of 200, which increased to 350 in 1940. The mine was sold to the Royal Coal Company and the town's name changed to Royal, too.

20. Scofield - Carbon County

All through the 1870's coal mines were developed up and down Pleasant Valley. Scofield, named for Charles W. Scofield, was established in 1879, with 900 people living there in 1890. On May 1, 1900, an explosion at the nearby Winter Quarters Mine killed 200 men. Gravestones marking the graves of miners killed in the explosion can still be seen in the Scofield Cemetery today.

21. Sego - Grand County

Founded in the early 1900's by Harry Ballard, the Thompson canyon coal mines were developed by the American Fuel Company. The town there was called Neslin named after Richard Neslin, the general manager of the mine. When he was fired in 1915, the name was no longer appropriate and the town took the name of Sego, after the Utah state flower, which grew everywhere up the canyon.

22. Silver Reef - Washington County

Silver ore was discovered in this unlikely sandstone formation in 1866 by John Kemple, and the town of Silver Reef was established in 1876-77. Many businesses, a Catholic church, a brewery, both Masonic and Oddfellows Halls and a Chinatown with over 250 residents, all flourished in Silver Reef during the peak years around 1880.

23. Spring Canyon - Carbon County

Spring Canyon is the name of both a coal mine and the canyon that lies due west of Helper in which over 10 separate coal mines and towns were located. The Spring Canyon Coal Mine founded in 1912 by Jesse Knight, and the town associated with that mine was called Storrs, named after George A. Storrs, the mine superintendent. After 1924, the town became known as Spring Canyon. A thousand tons of coal a day were mined for years, until about 1946 when demand dropped. A few people lived there until 1969.

24. Standardville - Carbon County

Standardville was a model company town developed by F.A. Sweets in 1912. Standardville had steam-heated apartments, a hospital, a butcher shop, recreation hall, tennis courts, and the homes were landscaped with lawns and trees. The town was at its heyday during the 1920's and 30's but didn't become a ghost town until the 1960's.

25. Stateline - Iron County

Only a mile from the Nevada Stateline, Stateline had several stamp mills and served as a freight center for traffic between Milford and the eastern Nevada mines of Pioche and Delamar.

MINING HISTORY

DID YOU KNOW ? ? ?

That the railroad from Springville to Winter Quarters was called the "Calico Road" because the workers who built it were paid with bolts of fabric?

That the first coal mine in Utah was near Cedar City? In 1851, Peter Shirts claimed a reward for locating the nearest coal source for the Pioneer Iron Company. The coal was hauled by oxen to Cedar City for use in smelting iron ore.

That a reward of \$1,000 and a team of oxen was offered by the Territorial Legislature in 1854 for the first discovery of a profitable seam of coal within 40 miles of Salt Lake City? Coal was found in Coalville but the reward was not given because the coal was more than 40 miles away.

That the town of Helper got its name from the extra engines, or "helper engines," kept there to pull trains up the steep Price Canyon to Soldier Summit?

That the Great Salt Lake is the last remnant of the ancient Lake Bonneville, that once covered the Salt Lake Valley?

That the Bingham Copper Pit is the largest open pit mine in the U.S.

MINING AND MINERAL RESOURCES

SIGNIFICANT UTAH MINERALS

Utah has abundant mineral deposits and in the past their exploitation has been an important part of the State's economy. As Utah's economy becomes more diversified mining seems less important, but it is the mineral industry that provides the raw materials and energy to sustain the economy.

Mining, as an industry, provides millions of dollars in economic benefits each year. Much of this benefit, especially payrolls and taxes, is received by the counties where mining actually occurs. The large metropolitan areas provide services and supplies for mining and benefit that way.

Minerals affect every aspect of our lives. They are necessary to transport our food and to build our homes. But ores are becoming harder to locate and more difficult to extract. Add to this the cost of meeting government regulations, taxes, inflation, and one fact becomes clear: MINING IS EXPENSIVE.

To understand mining industry economics, there are many elements to consider. Although different minerals fall into different categories, all mining operations must deal with fluctuating market prices and high exploration, development and operating costs. The cost must be measured against the industry's contribution to the state. Mining brings in tax revenues, jobs, wages and associated industries. Striking a balance between regulations and profits is necessary if Utah's mining industry is to continue to produce valuable mineral resources for the nation and provide economic benefits for the state.

Exploitable mineral commodities are scattered over the entire state. Few areas have no mineral resources. In general, Utah minerals can be divided into three groups. One, energy fuels, includes coal, oil shale, tar sand, uranium, and oil and gas. Another is metallic minerals: beryllium, copper, gallium, germanium, gold, iron, steel, magnesium, silver, vanadium and uranium. Finally, there are the nonmetallic materials: asphalt (native), gilsonite, cement, clays, graphite (synthetic), gypsum, lime, phosphate rock, potash, salt, sodium sulfate, stone, sulfur (recovered) and sulfuric acid.

ENERGY FUELS: A slow but steady increase in mineral fuel values, dominated by coal production, ended in the late 1920's, when the country was struck by depression. This was when petroleum products began to be imported into Utah. In the late 1940's, Utah came into its own as a petroleum and natural gas producer. As the price of petroleum products increased in the early 1970's, the Intermountain electrical power generating industry largely returned to coal for fuel. Uranium began to be mined in the late 1940's also. Uranium production has declined drastically since

the latter part of the 1970's because of concerns of accidents at nuclear generating plants.

METALLIC MINERALS: Utah has always been an important producer of gold, silver, copper, lead, and zinc. Iron has been mined from southwestern Utah. Utah's metallic mineral industry has declined in recent years because of foreign competition, bad economic conditions, substitutes, and environmental regulations imposed on the smelters and blast furnaces that process the metals. Present production levels of lead, zinc, and iron are significant. Silver production has gradually declined since the 1920's, and since 1980 the present recession has forced a decline in gold and copper production.

NONMETALLIC MATERIALS: Even though the total value of non-metallic minerals produced each year remains a small percentage of Utah's total mineral value, its dollar value continues to climb. Production of clays, fluorspar, gypsum, lime, pumice, salt and potash, dimension stone, crushed stone, and sand and gravel, is valued at 75 to 100 million dollars annually. These minerals are converted to construction materials or used directly as such by construction industries (bricks, cinder blocks, wall board, road-bed material, cement, refractory materials, fill, ornamental and decorative stone, etc.) or by the chemical and fertilizer industries (potash, water softeners, table or animal salt, gypsum, phosphate, flooring, etc.).

OIL & GAS: Utah became a commercial petroleum-producing state in 1948 when the Ashley Valley Field in Uintah County was discovered. The first hydrocarbon production in Utah occurred in 1891 north of Salt Lake City in the Farmington Bay area when natural gas was discovered during the drilling of a water well. In 1907, oil seeps prompted drilling near Virgin, Washington County. The Virgin field became the first oil producing field in the state, although it was not considered a commercial find. Drilling in the Mexican Hat area, San Juan County, in 1907 produced what was then considered a "gusher". These two discoveries, the Virgin and Mexican Hat fields, brought about Utah's first oil "boom" which lasted until 1913. Probably the most important gas discovery in the state was in 1952 in the Natural Buttes Field, and the most significant oil discovery was in southeastern Utah in the giant Aneth field in the Four Corners area of San Juan County in 1956. The Aneth field was considered to be the largest producing oil field in the Rocky Mountain area in the early 1960's. Utah now ranks 10th in the nation in oil production.

COAL: Coal is the product of accumulations of organic materials such as leaves and plants in swamps and flood-plains that were subjected to pressure over long periods of time. Coal may have been found in Utah by Father Escalante in 1776, who was searching for any easy route to the Pacific Coast missions, but from an economic standpoint the important discovery was in about 1849 and 1850 when early Mormon settlers found coal in the Sanpete Valley.

By the end of 1850, because President Brigham Young offered prizes for finding coal and iron near Salt Lake City, coal was found in abundance.

In January 1854, the Utah Legislature, realizing the needs of Salt Lake City for a more efficient fuel than the timber from the surrounding mountains, offered a reward of \$1,000 to any resident who would open a vein of coal not less than eighteen inches thick within forty miles of Salt Lake City and where it could be profitably mined. In 1863 a mine was opened near Coalville. Early Utah uses of coal were domestic, foundry, forge, and small iron ore smelting. Modern demands for coal are for power generation and foreign markets for steel production.

BERYLLIUM: The world's largest known beryllium deposits are in Utah. Beryllium is a metal that possesses unique properties that are useful in the construction of nuclear reactors, and in airframes for aircraft and space capsules. About three-fourths of the beryllium used is alloyed with copper to make hard fatigue-resistant and non-rusting springs, diaphragms, tools, and other devices. Beryllium oxide combines high electrical resistance, high thermal conductivity, and a high melting point (4658° F), which makes it a very useful refractory material. The discovery of beryllium in 1960 at the multi-million dollar deposit at Spor Mountain, Juab County and in 1962 near Gold Hill, Tooele County rank Utah as the leader in production of beryllium in the United States.

COPPER: Copper has a high electrical and thermal conductivity along with high tensile strength, ductility, malleability, and corrosion resistance. The early history of copper production in Utah was in the Bingham (West Mountain) district. Copper was discovered in Bingham Canyon in 1862 by John Lowder. Copper ore has been mined from the Bingham pit since 1907, starting with steam shovels to remove the waste rock above the ore. Smaller amounts of copper have been mined throughout the state over the years from Brigham City to St. George, and from the Nevada state line to the Colorado state line. At the end of 1987, Utah ranked third in the nation in copper production.

GALLIUM AND GERMANIUM: The main use of gallium is in electronics for semiconductor applications. Germanium is used in lenses and windows designed for infrared sensing and identification systems as well as fiber optics and electronics. Germanium is mined in only two places in the Nation, in Utah and in Tennessee. The production of Gallium is only in Utah, located west of St. George in the Tutsagubet mining district near the southern end of the Beaver Dam Mountains.

GOLD: Gold most commonly occurs as a native element associated with quartz or metallic sulfides. Gold played little part in the early development in Utah. The settlers were more concerned with establishing a viable community and did not deliberately seek gold. Not until 1863, some 16 years after the settlements were

established in the state, were the first gold ores discovered in lower Bingham Canyon. Within the next year, the major Utah gold mining districts were located. These include the Cottonwood-American Fork in 1866, the Tintic in 1869-70, and the Park City in 1870-71. Other mines have been opened in Camp Floyd, San Francisco, Ophir-Rush Valley, Stateline, and Clifton (Gold Hill). In most deposits in Utah, gold is a byproduct of ores mined principally for copper, lead, silver, or zinc.

MAGNESIUM: Because of the demand in aluminum alloys an increased use of die-cast magnesium components, demand for magnesium remains strong. The Nation's second largest magnesium plant is located on the south arm of the Great Salt Lake at Rowley, Tooele County. Magnesium is recovered from lake brine concentrated in 40,000 acres of solar evaporation ponds, processed into magnesium chloride, and electronically separated into magnesium metal.

MOLYBDENUM: There is little substitution for molybdenum in its major applications as an alloying element in steels, cast irons, and nonferrous metals. In 1916 some molybdenum was mined near Alta, Salt Lake County and near Gold Hill, Tooele County. Significant production began in 1936 as a byproduct recovery from the copper ore at Bingham. Utah is one of the five states in the Nation where molybdenum is mined.

SILVER: Nearly half of the silver produced in the Nation is consumed by the photography industry, with a fourth of silver going to electronics. Lead, zinc and silver are closely associated in ores in Utah. Some silver was produced prior to 1870, partly for the placer gold found with the silver. Most of the lead, zinc, and silver deposits of Utah are located in the western half of the state. The importance of Utah as a producer of silver is demonstrated by the fact that through 1960 Utah was the second-ranking state in the Nation in output of silver. At the end of 1987, Utah ranks in the top five silver producing states with 6 percent of the Nation's production.

VANADIUM-URANIUM: The major uses of vanadium are in special engineering, structural, and tool steels as an alloy to control grain size, impart toughness, and inhibit fatigue. Other domestic uses are in nonferrous alloys and chemicals. Uranium is used as fuel for nuclear reactors, testing, research, propulsion, and weapons. Minor amounts are used in chemicals, ceramics and electrical industries. In Utah, mining of the vanadium-uranium deposits in sandstone began in the early 1900's with sporadic activity continuing through the 1930's. Initially the ores were mined primarily for radium which occurs in all uranium ores. All of the productive vanadium-uranium deposits in Utah are in the southeastern part of the state. Today only small amounts of uranium and no vanadium are being produced.

ASPHALT (NATURAL): Rock asphalts are bitumen-impregnated porous rocks, such as sandstone and limestone, containing from a few percent to as much as 13 percent bituminous substances. After

crushing, it is used primarily for paving, and for mastic for flooring, roofing, and waterproofing. Asphalt occur in three locations in Utah, near the town of Sunnyside, Carbon County; southwest of Vernal, along the southeast flank of the Uintah Basin; in Uintah and Grand Counties. At the Asphalt Ridge deposit near Vernal, the asphalt is mined and placed on roadways without the need for any crushing or refining of the materials.

CEMENT: Finished Portland cement is used in residential and nonresidential construction and accounts for nearly three-fourths of the consumption in the nation. Cement is produced in three locations in the state, at Leamington, Millard County; at Devils Slide, Morgan County; and at Salt Lake City, Salt Lake County. An experimental pre-cast seawall was erected along a 1,200 foot stretch of I-80 on the Great Salt Lake near Black Rock, 20 miles west of Salt Lake City. Seventy-six pre-cast concrete slabs, 8 feet high and 16 feet long, and concrete rods for support of the concrete slabs were constructed in southwestern Utah at Elsinore, Sevier County.

CLAYS: Nearly half of the clay produced in Utah is used as filler in paper, with other uses in rubber, dinnerware and pottery, tile, firebricks, foundry sand, and absorbent uses. Bentonite clay is used for drilling mud, adhesives, animal feed and waterproof sealants. A brick producer in Salt Lake City uses clay to make brick resembling a cinder block in a tunnel kiln which is supposed to be the largest kiln in the western hemisphere.

GYPSUM: The major uses of gypsum are for the manufacture of wallboard and joint compound used by the building industry. Other uses are for fire-proof doors, plaster and agricultural gypsum. Gypsum is mined at the mouth of Salt Creek Canyon, east of Nephi, Juab County and northeast of Sigurd, Sevier County. Utah has one of the largest gypsum resources in the nation at nearly 2 billion tons of material.

LIME: The major uses for lime are for steel furnaces, water treatment, construction, sulfur removal from stack gasses, and paper and pulp. Lime is produced in Utah 35 miles south of Delta, at the base of the Cricket Mountains, Millard County; 35 miles northwest of Grantsville and at Grantsville, Tooele County; and at Kennecott's Utah Copper Division, Genstar.

MAGNESIUM: Uses of magnesium are as a dust suppressant for roads in industrial areas and in the sugar beet processing industry. Utah is the second largest producer of magnesium in the Nation. Magnesium is obtained from the brine of the Great Salt Lake west of Ogden, Weber County and from subsurface brine of the Bonneville Salt Flats on the western edge of the Great Salt Lake Desert, near Wendover, Tooele County.

SALT: The chemical industry uses about half of the salt produced in the manufacturing of chlorine and caustic soda. Other uses

of salt are highway deicing, general industrial, agricultural, food processing, and water treatment. Solar salt is produced in Grand, Salt Lake, Tooele, and Weber Counties. Salt from brine is produced in Grand and Sevier Counties, and from an open pit mine at Redmond, Sevier County.

SAND AND GRAVEL: The major uses for sand and gravel are in construction, with nearly half of the production used in concrete, highways, bridges, dams, waterworks and airports. Sand and gravel are produced in nearly all counties of the State from small pits for personal use to large commercial operations.

SODIUM SULFATE: The uses of sodium sulfate are in soaps and detergents, pulp and paper, and glass. Utah is one of three states in the Nation to produce sodium sulfate. The total recovery of sodium sulfate in Utah is in Weber and Tooele Counties from the evaporation of brine from the Great Salt Lake.

STONE: Almost two-thirds of the stone produced in Utah is used as construction aggregate with the remainder used for cement, agriculture, and metallurgical processes. Crushed limestone, dolomite, sandstone, quartzite, volcanic cinder and scoria were produced at 35 quarries in 16 counties in the state. The leading county is Box Elder, followed by Juab, Tooele, Morgan, and Salt Lake Counties. Dimension stone is quarried in Box Elder County.

SULFUR: The major use of sulfur is in the production of fertilizers. Sulfur is recovered in Utah as a byproduct of the refining of petroleum.

SULFURIC ACID: Utah ranked third in the Nation in 1985 in the production of sulfuric acid as a byproduct of copper production in the cleaning of the stack gasses for environmental controls along the Wasatch Front near Salt Lake City.

MINING AND MINERAL RESOURCES

SUMMARY OF UTAH MINERAL INDUSTRY ACTIVITIES BY COUNTY

Utah is truly rich in minerals, only three counties had no major mining activities in 1984.

NAME OF COUNTY	ORIGIN OF NAME	1984 MINING ACTIVITY
Beaver	Fur-bearing rodent	Sand and gravel
Box Elder	Box Elder trees	Sand and gravel, clays, silver
Cache	French - to hide	Sand and gravel
Carbon	Abundant coal	Coal, and gravel
Daggett	Ellsworth Daggett	
Davis	Daniel C. Davis	Sand and gravel
Duchesne	French - Du Chesne	Oil and gas, gilsonite, sand and gravel
Emery	George W. Emery	Coal, sand and gravel
Garfield	James A. Garfield	Sand and gravel
Grand	Grand River	Potassium salts, salt
Iron	Iron ore	Silver, sand and gravel, gold
Juab	Ute - flat or level	Sand and gravel, gypsum, silver, gold, lead, copper
Kane	Thomas L. Kane	Sand and gravel
Millard	Millard Fillmore	Lime, sand and gravel, beryllium
Morgan	Jedediah Morgan Grant	Cement, sand and gravel
Piute	Indians - Pah Ute	
Rich	Charles C. Rich	
Salt Lake	Great Salt Lake	Copper, gold, cement, silver, sand and gravel, molybdenum, salt, lime
San Juan	San Juan River	Vanadium

NAME OF COUNTY	ORIGIN OF NAME	1984 MINING ACTIVITY
Sanpete	Saint Peter	Sand and gravel, gypsum, clays
Sevier	Sevier River	Coal, sand and gravel, gypsum, salt, clays
Summit	High mountain area	Coal, clays, sand and gravel
Tooele	Aztec - bulrush plant	Gold, salt, lime, sand and gravel, magnesium compounds, clays, silver
Uintah	Uinta Utes	Oil and gas, gilsonite, phosphate rock, asphalt, sand and gravel
Utah	Ute Indians	Sand and gravel, clays, silver, copper, gold
Wasatch	Ute - low pass	Sand and gravel
Washington	George Washington	Sand and gravel
Wayne	William E. Robinson	Coal
Weber	Weber River	Salt, potassium salts, sodium sulfate, magnesium compounds, sand and gravel

MINING AND MINERAL RESOURCES

MAP UNIT - NONRENEWABLE MINERAL RESOURCES OF UTAH

(See maps in *Mining Utah's Heritage* pages 8 and 24)

- What information can be found by using these maps?
- The maps on this page are political and product maps. Explain why.
- What is a nonrenewable natural resource?
- What nonrenewable natural resources are found in the southeast corner of Utah?
- Count the number of counties where coal can be found.
- How many counties are located in the oil shale and tar sand regions?
- What minerals are found in your county?
- What resource can be found in the capital city?
- Why don't we mine in downtown Salt Lake City today?

MINING AND MINERAL RESOURCES

DID YOU KNOW ? ? ?

What is the difference between a carat and a carrot?
A carat is a unit of weight for gemstones, a carrot is a vegetable.

Which weighs more, a ton of lead or a ton of feathers?
A ton of lead and a ton of feathers weigh the same, a ton is a ton.

Which weighs more, an ounce of lead or an ounce of gold?
An ounce of gold weighs more. A different system of weight is used to weigh precious metals. Gold has 12 troy ounces to the pound (Apothecary weight). Each ounce of gold weighs 480 grains. Lead has 16 ounces to the pound (Avoirdupois weight). Each ounce of lead weighs 437.5 grains. All grains weigh the same.

How deep was the ancient Lake Bonneville?
It was 1,100 feet deep when it overflowed into the Snake River Gorge in southern Idaho.

Which is the largest inland saltwater lake in the world, the Dead Sea (between Israel and Jordan) or the Great Salt Lake?
The Great Salt Lake. The Dead Sea covers an area of 404 square miles while the Great Salt Lake covers an area of more than 2,360 square miles.

What is the difference between a mineral deposit and an ore body?
A mineral deposit is a naturally occurring homogeneous solid, inorganically formed, with a definite chemical composition and an ordered atomic arrangement. (Occurs in nature as a solid substance made out of all the same material.) An ore body is a mineral or group of minerals that can be mined at a profit.

What are the different forms of hydrocarbons found in Utah?
Gas, oil, tar sand, oil shale, and gilsonite.

During what period of time did dinosaurs roam around Eastern and Central Utah?
As measured on the Geologic Time scale, the dinosaurs roamed around during Jurassic time, between 63 and 135 million years ago. Dinosaur bones in Utah are found in the Morrison Formation at Dinosaur National Monument and the Cleveland Lloyd Dinosaur Quarry.

Utah is the only state in the union which contains gilsonite resources.

Tar sand from Asphalt Ridge near Vernal is trucked from the pit and placed on county roads for asphalt without any refining of the tar sand.

The largest beryllium deposit in the United States is just west of Delta in central Utah.

One of the largest silver mines in the United States is located west of Cedar City in southern Utah.

Offshore oil drilling rigs like those used in the Gulf of Mexico have been used on the Great Salt Lake to drill for oil.

Coal mined in Utah is shipped as far away as Asia.

The second largest active fault system in the United States is located in Utah, the Wasatch fault extending from Brigham City south to Nephi.

Utah contains the largest reserves of tar sand in the United States. The deposits contain an estimated 19.4 billion barrels.

Utah is the only state in the union which contains gilsonite resources.

MINING AND MINERAL RESOURCES
SIGNIFICANT UTAH MINERALS

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