VIRGINIA DIVISION OF GEOLOGY AND MINERAL RESOURCES

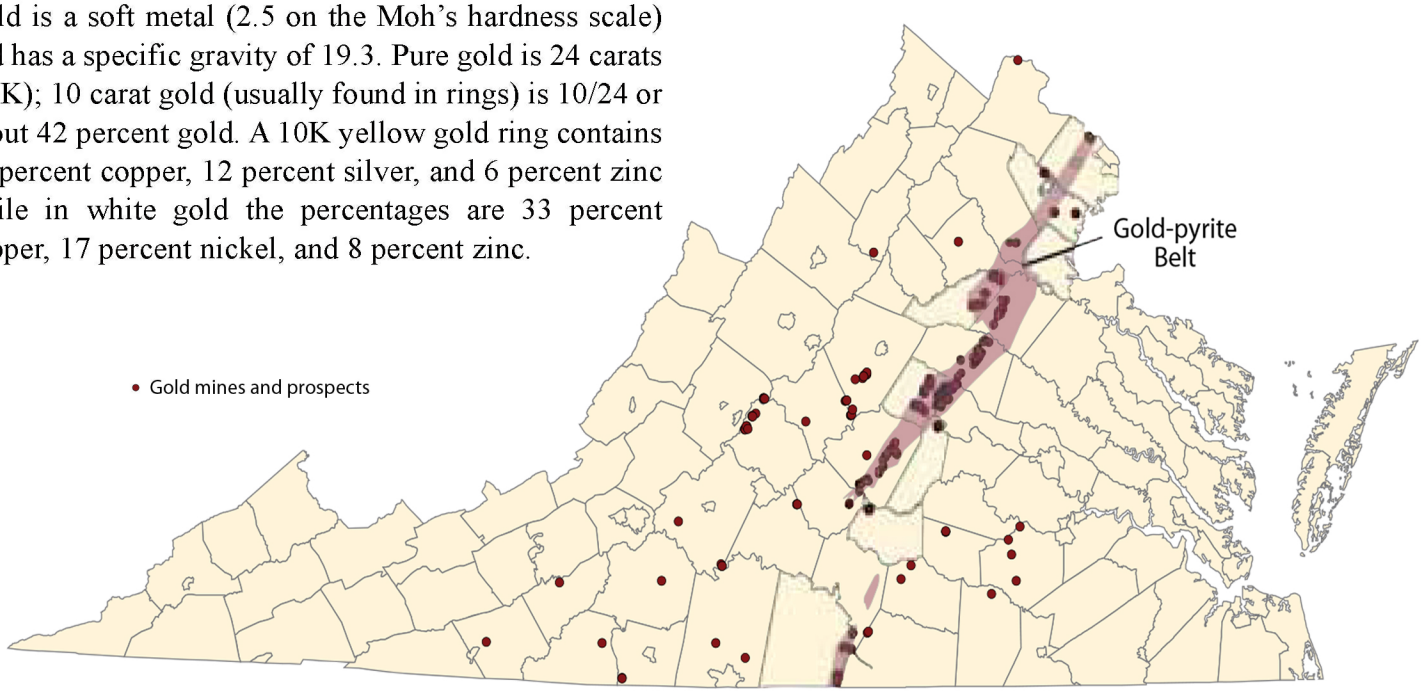
GOLD

Virginia Department of Mines Minerals and Energy

Virginia was one of the first gold-producing states in the nation. The earliest printed reference to gold in the State was in 1782, when Thomas Jefferson reported on a gold-bearing rock, weighing 4 pounds, that was found on the north side of the Rappahannock River about 4 miles below the falls. As of May, 1995, the Division of Geology and Mineral Resources has documented 301 gold and silver mines, prospects and occurrences in Virginia, with the majority of them in the gold-pyrite belt (see map 1). About 100,000 troy ounces of gold were produced in Virginia from 1804 through 1947, when gold was last produced in the State.

GOLD'S NATURAL PROPERTIES

Gold is a soft metal (2.5 on the Moh's hardness scale) and has a specific gravity of 19.3. Pure gold is 24 carats (24K); 10 carat gold (usually found in rings) is 10/24 or about 42 percent gold. A 10K yellow gold ring contains 40 percent copper, 12 percent silver, and 6 percent zinc while in white gold the percentages are 33 percent copper, 17 percent nickel, and 8 percent zinc.



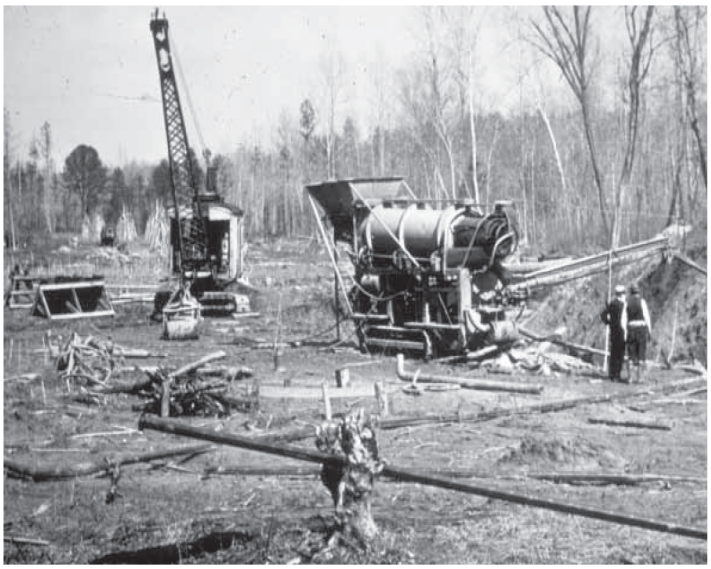
Gold, which is very malleable, is usually golden yellow in color and has a metallic luster. It is found as free gold in quartz veins, it may occur in pyrite (FeS2) or "fool's gold" and it may occur alloyed with other base metals in massive sulfide deposits. When these gold deposits are weathered, they sometimes produce grains, flakes, and even nuggets of free gold that upon erosion may accumulate as placer deposits in stream beds.

HISTORY OF GOLD MINING IN VIRGINIA

The first lode deposit was discovered in Virginia in 1806 at the Whitehall mine, located 1.5 miles (2.4 km) northwest of Shady Grove Church in the western part of Spotsylvania County. The first gold-mining company incorporated in Virginia was the Virginia Mining Company of New York. This company intermittently operated a lode deposit in the Grasty tract along Mine Run in Orange County from 1831 until 1934. From 1831 until 1910, no less than five companies conducted mining operations in this general area during several periods of substantial activity.

Early in the 1800s gold in Virginia was extracted from shallow saprolites (deeply weathered near surface lode deposits) and from placer deposits; recovery was mechanically simple and labor was inexpensive. Handshoveling, panning, sluicing, and dredging were utilized without any further processing to recover the gold. It was estimated that in 1837 a profit-making gold mine had to yield a dollar for every bushel (about 100

pounds) of rock processed; the cost of mining 100 pounds of rock in 1837 was about 30 to 35 cents. As the more accessible deposits were exhausted, deeper lode or vein deposits were investigated. Gold mined by underground methods was costly to produce because shafts and drifts had to be constructed and since the ore was generally in hard rock, it had to be pulverized before recovery processing began. From 1830 until the beginning of the Civil War, lodes in quartz veins were actively mined. Production averaged nearly 3,000 ounces annually in the decade 1840-1849.



Dragline in operation in the early 1930s, Collins placer gold mine, Goochland County.

The California Gold Rush of 1849 had a negative effect on gold mining in Virginia as miners moved west, gold production in Virginia declined. The downward trend in production continued through the Civil War years and no production is reported for 1864. Production was low, but steady, from 1870 to 1910. From 1912 to 1934 only a few tens of ounces were mined annually and active gold mining almost ceased because of higher production costs and gradual depletion of known reserves.

In January, 1934, the fixed-price of gold was established by Executive order at 35 dollars per troy ounce, up from its previous price of $20.67 per troy ounce. The higher price resulted in the reopening of several of the larger gold mines, but these were closed again between the late 1930s and early 1940s. This was due to the ruling during World War II that mines producing only gold would be closed because of the war effort. Gold was last produced in 1947 as a by-product at a lead and zinc mine in Spotsylvania County. Government restrictions on the price of gold were lifted and the price of gold was allowed to fluctuate on the open market beginning in the late 1960s. As a result, worldwide gold production rose slightly.

MINING METHODS

In the late 1970s and early 1980s gold production in the United States began to escalate due to the refinement of cyanide leaching technology developed by the U.S. Bureau of Mines in the 1950s. The Bureau investigated the use of activated carbon instead of zinc to precipitate gold and silver from clay-contaminated cyanide solutions. This method of cyanide leaching requires an ore grade of 0.08 ounce per ton or more to justify construction of a plant.

Another technique to decrease the cost included crushing the ore to approximately 1-inch size. The ore is then heaped in a pile and a leach solution is sprayed over the top of it. The solution permeates the pile and dissolves the gold and silver. The solution, collected at the base of the pile is stripped of precious metals with activated carbon. This new technology allowed more ore to be processed at less cost and thus ore of lower grade could be worked economically. Heap leaching technology has led to the working of some waste piles, tailings, and working of some ores, which are as low as 0.03 ounce of gold-silver per ton. Many of the new operations are lower grade deposits that have been unsuccessfully mined in the past. Recent innovations has led to the use of large mobile conveyors (1500 feet) with the ability to produce heap leach piles 3000 feet in diameter and 60 feet high. Silver production has also increased as a by-product of increased gold production.

Because of the development of these new gold extraction techniques, interest continues in the Gold-pyrite belt in the Virginia Piedmont province and the mineralized areas in the Blue Ridge province; metal-mining companies are evaluating various properties. A recent geologic and precious-metal study in Rockbridge County contains new analytical data to guide detailed exploration. An old gold mine near Kentucky, in eastern Pittsylvania County in southern Virginia has recently been permitted. At this mine, free gold is present in quartz veins which intrude metamorphosed volcanic-sedimentary rocks.

BASIC PANNING STEPS

1. With a shovel, dig as deep as you can in the bottom of a stream or as close to bedrock as possible.

2. Fill your pan nearly full of sand and gravel, removing all stones (marble size and larger) by hand.

3. Place the pan under the water and get all of the material wet, mixing it by hand.

4. Begin to shake (rotate) the pan from side to side, giving the heavy minerals, including gold, a chance to settle to the bottom of the pan.

5. Shaking the pan for several minutes to allow the heavier material to settle to the bottom of the pan. Place the pan in a slow-moving current and tip the pan to the front, causing the lighter material to be washed over the front of the pan and carried away by the current.

6. Continue to rotate the contents of the pan and wash the lighter material over the front of the pan; add water as necessary. After washing a while, only a black sand will remain. This black sand usually consists of ilmenite, rutile, garnet, magnetite, and possibly gold. Pieces of gold that are large enough can be removed by tweezers; smaller pieces may be found with the aid of a microscope.

REMEMBER!! Always get the landowner's permission BEFORE panning!

PANNING FOR GOLD

Mainly because of the increase in the price of gold in the late 1970's, there has been been a renewed interest in gold panning. Many creeks and tributaries that drain the old mining areas have yielded small colors (approximately 6,000 pieces to an ounce) of gold. Byrd Creek and its tributaries in Fluvanna and Goochland counties are popular choices as are Mine Run and Wilderness Run in Orange County, Big Mountain Branch in Halifax County, and Gold Mine Branch and Tongue Quarter Creek in Buckingham County. Mines in and around these branches were productive in the past; a 9-pound nugget and several 1-ounce nuggets have been reported from Tongue Quarter Creek, south of the Morrow Mine, in Buckingham County. Several small nuggets have been found in this vicinity over the last few years.

The non-profit group, Central Virginia Gold Prospectors, promotes the hobby of gold prospecting in Virginia. The group is open to all who are interested and regularly holds meetings in central Virginia. For more information, visit the group's web site: http://cvgp.net/

It should be stressed to hobbyists and gold-panners that before attempting to collect any material on private property an individual should make himself or herself known to the landowner and obtain permission to proceed.

The following companies have assayed for gold and silver for the Division of Geology and Mineral Resources. Other companies that perform assays are commonly listed in professional journals such as Geotimes and Mining Engineering.

Cone Geochemical, Inc.
810 Quail Street, Suite 1
Lakewood, Colorado 80215
(303) 232-8371

Jacobs Assay Office
1435 South 10th Avenue
Tucson, Arizona 85713
(520) 622-0813

SELECTED GOLD-RELATED PUBLICATIONS

Good, R. S., 1991, Gold mineralization, and tin, base metals, and thorium anomalies at Yankee Horse Ridge, Irish Creek tin area, Rockbridge County, Virginia: Virginia Division of Mineral Resources Publication 112, 41 p.

Good, R. S., Fordhm, 0. M., and Halladay, C. R., 1977, Geochemical reconnaissance for gold in the Caledonia and Pendleton quadrangles in the Piedmont of Central Virginia: Virginia Minerals, v. 23, n. 2, p. 13-22.

Linden, M. A., Craig, J. R., and Solberg, T. N., 1985a, Mineralogy and chemistry of gold in the Virginia district, Halifax County, Virginia: Virginia Minerals, v. 31, n. 2, p. 17-22.

Spears, D. B., and Upchurch, M. L., 1997, Metallic mines, prospects, and occurrences in the Gold-pyrite belt of Virginia: Virginia Division of Mineral Resources Publication 147, 73 p.

Sweet, P. C., 1971, Gold mines and prospects in Virginia: Virginia Minerals, v. 17, n. 3, p. 25-33.

_____, 1975, Road log to some abandoned gold mines of the Gold-pyrite belt, Northeastern Virginia: Virginia Minerals, v. 21, n. 1, P. 1-9.

_____, 1980a, Processes of gold recovery in Virginia: Virginia Minerals, v. 26, n. 3, p. 29-33.

_____, 1980b, Gold in Virginia: Virginia Division of Mineral Resources Publication 19, 77 p.

Sweet, P. C., and Trimble, David, 1982, Gold occurrences in Virginia, an update: Virginia Minerals, v. 28, n. 4, p. 33-41.

_____, 1983, Virginia gold-resource data: Virginia Division of Mineral Resources Publication 45, 196p.

Sweet, P. C., and Lovett, J. A., 1985b, Additional gold mines, prospects, and occurrences in Virginia: Virginia Minerals, v. 31, n. 4, p. 41-52.

Sweet, P. C., 1991, Precious-metal mines, prospects, and occurrences in Virginia - An update: Virginia Minerals, v. 37, n. 1, p. 1-6.

_____, 1992, Exploration for precious metals in Virginia: (Abs.): Geological Society of America, Southeastern section program, vol. 24, no., 2, p. 69.

_____, 1995, Update on unreported occurrences of gold-silver in Virginia: Virginia Division of Mineral Resources Virginia Minerals, v. 41, n. 2, p. 9-16.

_____, 1997, Gold in Virginia: Brochure (revised), Virginia Division of Mineral Resources, 2 p.

Prepared by Palmer Sweet; revised 04/2007.

Division of Geology and Mineral Resources
900 Natural Resources Drive
Charlottesville, Virginia 22932
***Sales Office**: (434) 951-6341*
***Geologic Information**: (434) 951-6342*
http://www.dmme.virginia.gov/dgmr/divisongeologymineralresources.shtml