

# Ohio Geology Newsletter

Division of Geological Survey

## GOLD IN OHIO

The best results thus far known to have been attained in gold mining in Ohio, are reported from Warren County, where, in one day, gold to the value of \$6.00 was obtained by an outlay of \$10.00; a half dozen days' work being also thrown in.

Edward Orton, 1873



There is no topic in Ohio geology that creates public interest comparable to that of gold. Mere mention of the occurrence of gold in Ohio is sufficient to stir the curiosity of even the most geologically disinterested person. Perhaps the dream of financial security is at the root of the fascination with gold. "Gold fever" is the diagnosis for severe cases of infatuation with gold and it is a disease that can be traced far back into human history. It is an affliction that clouds judgment and leads to heartbreak. And Ohio, surprisingly, has experienced more than one epidemic.

As witness to the modern popularity of gold, the Survey receives a steady stream of inquiries about the occurrence of gold in Ohio. In fact, there is no other topic for which the Survey receives more inquiries from the general public. In early 1980, when gold prices skyrocketed to more than \$800 per ounce, the Survey received up to 600 letters each week after newspapers articles across the state identified the Survey as the organization responsible for such matters in Ohio.

## GOLD FACTS

Gold belongs to a chemical class of minerals known as native elements—those not in chemical combination with other elements. Gold, however, may be alloyed with other metals, particularly silver. Gold has a bright-yellow "gold" color and does not tarnish. It is a relatively soft metal and has the properties of malleability and ductility—it can be beaten into thin sheets or drawn into fine wires. In addition to these distinguishing properties, gold is extremely heavy, having a specific gravity of 19.3 in a pure state—almost 2½ times as heavy as an equal volume of iron. The standard weight measurement of gold is the troy ounce, which is equal to 1.097 avoirdupois ounces. The purity of gold is expressed in terms of fineness, where 1,000 represents pure gold, or by the karat, where 24k represents pure gold. Gold is commonly confused with a variety of similarly colored minerals, most notably pyrite and marcasite ("fool's gold"), chalcopyrite, and weathered mica flakes. Application of the criteria listed above is usually sufficient to differentiate gold from these minerals.

Gold has the industrially desirable characteristics of being chemically inert, highly reflective, readily alloyed with other metals, and an excellent electrical and thermal conductor. Owing to these properties, gold has been widely used in circuitry for computers and communications systems and in a number of other industrial applications.

The principal use of gold, however, is as a monetary standard; one-third of all gold ever mined—about 1.1 billion ounces—is in government vaults throughout the world. The largest consumer of gold for applied uses is the jewelry industry.

For many years the price of gold was officially regulated by the government and maintained at artificially low prices. In 1934 the official price for gold was raised from \$20.67 to \$35.00 per ounce. In 1975 the price was deregulated, providing citizens with the opportunity to legally own gold bullion. The sometimes widely fluctuating prices of gold on the world market are indicators of political and economic anxiety.

## GOLD IN OHIO

There have probably been gold seekers in Ohio since the arrival of the first European settlers, but there is little documentation of their activities in regard to gold before the mid-1800's. Since that time and continuing to the present, there has been a

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Owing to the length of the article on gold in Ohio, the Chief's Column, which normally appears in this space, is omitted from this issue of *Ohio Geology*.

*continued from page 1*

continued low level of interest in the occurrence of gold, with periods of frenzied activity. Surprisingly, however, there has never been more than casual scientific investigation of the occurrence and distribution of gold in Ohio and the literature on the topic is confined to newspaper accounts, brief treatment in the scientific literature, including early Survey reports, and a few articles in hobbyist magazines. Even in 1873, Edward Orton recognized the interest in this topic and the merit of systematic investigation. He wrote, "The occurrence of gold in the boulder clay [glacial till] and the gravels derived from it, is a matter of considerable theoretical interest, and seems never to have attracted the attention which it well deserves."

Gold originates in primary vein deposits that were formed in association with silica-rich igneous rocks. These veins are rich in quartz and sulfide minerals such as pyrite and were deposited by hot, mineral-bearing (hydrothermal) solutions that ascended from deep within basement rocks. Upon weathering, the chemically inert gold is washed into streams and is mechanically concentrated by flowing waters to form secondary or placer deposits.

All gold that has been found in Ohio is of the secondary or placer type. Gold-bearing veins (primary deposits) and igneous (solidified from molten material) rocks of any type have never been found at the surface in Ohio. There is an uninvestigated potential for the presence of gold-bearing igneous rocks at depths of 3,000 to more than 12,000 feet beneath the state, in what geologists call the Precambrian basement complex (see *Ohio Geology*, Summer 1984), but there is no evidence to suggest that these rocks could be the source of gold encountered in small quantities at numerous localities in Ohio.

It has been a long-accepted theory that the placer gold in the state originated in the igneous rocks of Canada (Canadian shield) and was transported to Ohio during one or more episodes of Pleistocene glaciation. This theory has support because Ohio gold is always found in association with glacial deposits in the glaciated portion of the state or in outwash deposits formed by meltwater from the glaciers. In addition, gold-bearing areas of Canada lie north of Ohio, more or less in line with the projected paths of the southward flow of various ice sheets. As indicated in previous *Ohio Geology* articles on diamonds (Fall 1982, Winter 1985), the bedrock geology of the state is not known as yet in detail, particularly in glaciated regions. Consequently, other origins of Ohio gold remain remote possibilities. However, until such alternative observations are forthcoming, the Canadian origin of Ohio gold remains the most viable explanation.

There was some speculation in the last century that at least some of the Ohio gold was derived from the erosion of Paleozoic sedimentary rocks, most notably the Black Hand Sandstone (referred to as the Waverly Conglomerate in early geological reports). The theory was that the gold had been eroded from the Canadian shield and deposited with this

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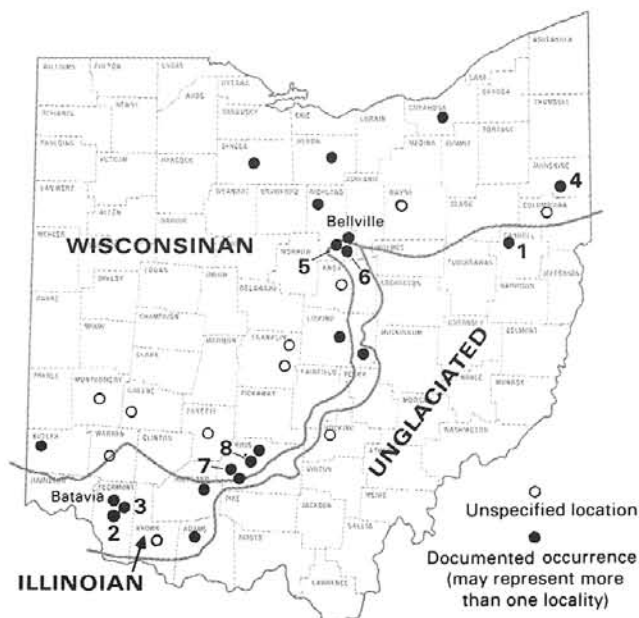
sandstone during the Mississippian Period (345 million years ago). No gold has ever been found in this sandstone and geochemical-reconnaissance studies of gold concentrations in Paleozoic rocks of Ohio and adjacent areas in the north-central United States seem to discount this theory.

It has been widely and frequently stated that gold can be found in small quantities throughout the glaciated portion of Ohio (about two-thirds of the state). The statement is true in a general context, but it cannot be verified on the basis of documented occurrences. The accompanying diagram depicts the locations of Ohio gold mentioned in the geological literature, in newspaper accounts, and locations furnished to the Survey by hobbyists from throughout the state. Two aspects of this map are striking. First, gold is widely distributed in Ohio and most reported occurrences are in the zone of Illinoian and Wisconsinan end moraines—areas which mark the farthest advance of these ice sheets. Secondly, there is a surprising lack of reports in west-central and northeast Ohio. Of course, at this preliminary stage of data gathering, this distributional pattern may be more apparent than real and may reflect the tendency of most prospectors to concentrate their activities in areas that have been previously successful.

Another widely held view of gold prospectors that appears to be discounted by the map is that gold is found only in Illinoian glacial deposits. Some of the occurrences appear to be from deposits of the younger Wisconsinan ice sheet. It should be noted that the highest concentrations of gold appear to be associated with the Illinoian deposits. This observation may be a reflection of either higher initial concentration of gold or a secondary concentration of the chemically stable gold in these highly weathered deposits.

Ohio gold is reported to be extremely pure, on the order of 22 karats, indicating that only a small amount of silver or other metal is alloyed with it. Almost all gold recovered is in the form of tiny, flattened flakes only a millimeter or so in diameter. Less common are pieces the size of a wheat grain and decidedly rare are nuggets or flattened pieces as large as a pea. The largest diameter gold fragment from Ohio of which I am aware is a flattened piece nearly ½ inch in maximum diameter. All of these fragments characteristically show rounded and abraded edges.

There is little available information on concentrations of gold in Ohio's glacial sediments in terms of ounces per ton. An informal standard of richness of a panning site is commonly



Reported occurrences of gold in Ohio. Numbers correspond to locations listed in table below.

#### SELECTED GOLD PANNING SITES

The following localities, some of them generalized because of lack of specific data, have been reported to produce gold. The numbers correspond to locations on the map above. Please ask permission from the landowner before panning.

- Carroll County**  
1 -Sandy Creek, no specific locations
- Clermont County**  
2 -Stonelick Creek, adjacent to Anstaett Road, north of Owensville  
3 -Brushy Fork, north of Owensville
- Mahoning County**  
4 -Middle Fork of Little Beaver Creek, about 1 mile east of Salem
- Richland County**  
5 -Deadman's Run, adjacent to Bellville Road, north of Bellville  
6 -Wildcat Hollow, 1 mile west of Butler
- Ross County**  
7 -Buckskin Creek, south of Humbolt  
8 -Paint Creek and its tributaries

expressed in terms of flakes per pan. At most locations, the flakes-per-pan index is in fractional numbers, as even an experienced gold panner may manage only a few flakes in several hours of panning. The occurrence of several flakes per pan can be considered highly productive, and I am aware of only three localities in Ohio that are reported to be capable of producing these results upon occasion: Stonelick Creek in Clermont County; Deadman's Run in Richland County; and a locality on private property along a tributary of Paint Creek in Ross County. An experienced gold panner reported 57 flakes or "colors" in one pan from the Deadman's Run location; however, this was an unusual concentration and probably could not be repeated with regularity.

Reports of such concentrations are misleading in terms of potentially profitable recovery of this placer gold. Dredging and hydraulic mining of placer deposits is profitable in some areas of the country with concentrations of only 0.01 ounce of gold per cubic yard of gravel. However, these are very large deposits in which the total quantity of gold is sufficient to justify use of expensive, high-volume dredging equipment

and where the quantity of water available is sufficient to carry out the operation. It is unlikely that most Ohio localities would have deposits of sufficient size with a high enough concentration of gold to justify such an operation. It should be kept in mind also that a high flakes-per-pan index at most localities is the result of a modern stream concentrating gold from a much-less-rich outwash or till deposit. Reports of high concentrations of gold are probably highly biased by a single pan of sediment that was taken from a small concentration localized by a stream feature such as a large boulder.

There is a potential for some Ohio gold to be recovered profitably, depending upon the current price of the metal, as a by-product of processing of sand and gravel from outwash or kame deposits. Gold will accumulate in dewatering screws at sand and gravel plants, and at least one Ohio sand and gravel company examined the possibility of secondary gold recovery when gold reached an all-time-high price in 1980. If an efficient technique of gold recovery could be employed that would not slow down the primary function of sand and gravel production, there is a possibility that some outwash deposits in the state could furnish small amounts of gold.

Most modern Ohio prospectors pursue gold for the enjoyment of the scenery and for thrill of occasionally finding a flake or two of this metal. It is probable that some of them entertain the daydream of finding enough gold to allow minor modification of their lifestyle. Most, however, are realistic enough to realize that they will never recover enough gold to pay for the gasoline necessary to get to the panning site. This pragmatic approach has not always been the case, however, and a few of our Ohio ancestors spent a portion of their lives chasing the dream of fortune.

#### EARLY PURSUIT OF GOLD IN OHIO

The earliest records of serious prospecting for gold in Ohio indicate that this activity began at about the mid-point of the last century and continued unabated, except perhaps for interruption by the Civil War. Some of the most ardent Ohio gold seekers were reported to be "49er's," down but not out from their lack of success in the gold fields of California. That Ohioans were infected with gold fever as was much of the rest of the country is recorded by newspapers of that era in which a weekly list was published of "men who have left for the California gold field in the past week." The gold fever must have lingered with these men after they returned to Ohio and they were able to apply their expertise in panning and sluicing to Ohio deposits. It is probable that at this time nearly every stream in the state was visited by a prospector. At least a few of these occurrences of gold were recorded by Survey geologists J. S. Newberry, E. B. Andrews, and Edward Orton in their Survey reports on various parts of the state. Two areas of Ohio stand out from this era because of both the intensity and length of activity: Bellville in Richland County and Batavia in Clermont County.

#### BELLVILLE

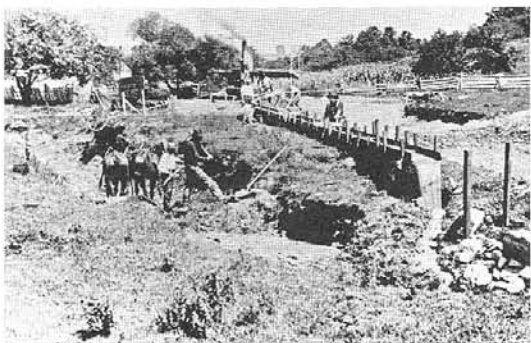
The earliest, widely circulated reports of gold in Ohio came from Richland County near the community of Bellville. The initial discovery is credited to Dr. James C. Lee in 1853. Lee had gold-mining experience in California and discovered flakes of gold in a small south-flowing tributary of the Clear Fork of the Mohican River north of Bellville. This stream is known locally as Gold Run or Steltz's Run but most commonly is referred to as Deadman's Run, a moniker acquired about 1840 when a local resident drowned in rain-swollen waters that washed

away a bridge as he was crossing it. Little has been recorded about Lee's further pursuit of gold, but it marked the beginning of sometimes intense activity that would continue in this area for nearly three-quarters of a century.

The gold fever that swept the country after California discoveries at Sutter's Mill in 1849 was rampant in the 1850's and for several decades beyond. Dreams of fortune die hard and it was reported that nearly every stream in Richland County was scoured by treasure seekers soon after Dr. Lee's discovery was announced. A. G. Thompson, in the 1850's, discovered gold in Wild Cat Hollow, near Gatton Rocks, just west of Butler. Thompson said little about the quantity of gold recovered, but silence, which is as an effective fuel for imagination as is braggadocio, led to considerable speculation. Residents of the area claimed that Thompson paid his taxes and settled debts with the gold he panned. It was also reported that Thompson's wife, Anna, and her niece were able to recover enough gold from Wild Cat Hollow to make a ring.

It wasn't long until procedures more efficient than a pan and shovel were employed in the attempt to extract gold. In 1858, Peter Masters constructed sluice boxes on a farm owned by John Gearhart. Apparently this was not a paying operation but it was sufficient to infect Masters with gold fever, as he headed for higher stakes in California, where he remained until his death in 1879.

About 1890, enterprising prospectors, reasoning that if some gold is found at the surface, then greater quantities must occur at depth, began the first of several shaft and drift mines in the Bellville area. The initial operation was a horizontal tunnel beneath what is now Ohio Route 13. This tunnel collapsed soon after its construction and, unfortunately, Caleb Grice, a Civil War veteran, and his horse happened to be passing across it at the time. There is no report of injuries to Grice or his horse, but apparently not enough gold had been recovered to warrant reopening of the mine. There is also a report that a West Virginian named Tims sank a shaft on the Bill Long farm west of Bellville to a depth of 47 feet, but, because of water problems, the shaft was abandoned.



*Sluice operation along Deadman's Run, north of Bellville, Richland County, in 1905. Photo courtesy of Bellville Village Hall.*

In 1905, a sluice was constructed near the mouth of Deadman's Run and several men were employed in its operation. Newspaper reports indicated that gold was being taken out in paying quantities, and one nugget worth \$2.50 was witnessed being extracted from the sand. The gold must not have been present in paying quantities because this operation, as had its predecessors, folded.

Also in 1905, two vertical shafts were begun by Jimmy Swaner in a small valley on the east side of Deadman's Run. The maximum depth of these shafts was reported to be 30 feet.



*Entrance to the Swaner mine east of Deadman's Run, north of Bellville.*

A strong flow of water led to the abandonment of these workings. Whether or not any gold was recovered by Swaner was not recorded. These shafts are now marked by deep, conical pits at the bottom of which are visible rotten timbers that supported the now debris-filled mines.

During this half-century of relatively intense pursuit of gold at Bellville, there emerged stories of mining-camp flavor, including reports of stock swindles and a characterization of the miners as both hard working and hard drinking. The favorite watering hole was Lucy McSherry's Dew Drop Inn, established in 1874. Lucy, of whom it was said that she was "several times a mother ere she was a wife," opened the Dew Drop with \$500 obtained from the father of one of her children. Apparently, this was payment for escape from marriage vows. There was local debate as to whether the Dew Drop or the search for gold was the most popular activity for the miners.

There was also a report of phony stock in the Bellville mines being sold in Pittsburgh and of a "swindler from the east" who spat tobacco laced with gold dust on the wall of a mine in order to induce stock purchases. Apparently, the swindler left after reaping a small harvest.

There is still much interest and pride among Bellville residents concerning the gold-rush days although most, if not all, realize that the quantity of gold in the vicinity is quite small. Some estimates place the total value (at controlled prices) of gold obtained from the Bellville diggings at not more than \$50. Although Survey geologist M. C. Read, in his 1878 report on Richland County, noted that the gold was derived from glacial deposits and that the quantity was small, those infected with the Bellville gold fever continued their pursuit of the "rich vein."

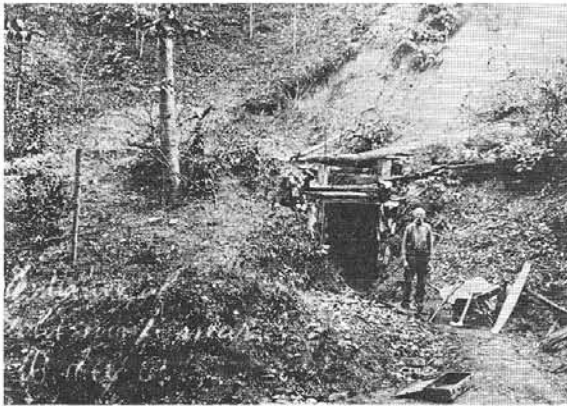
Deadman's Run and other streams in the vicinity still provide small amounts of gold for modern-day prospectors who are presumably not deluded by the same dreams of a rich strike. There has not been an intensive scientific investigation of the Bellville gold but Stanley M. Totten, in a 1973 Survey report on the glacial geology of Richland County, indicated that gold-bearing gravel along Deadman's (Steltz's) Run overlies the Butler Till of Illinoian age. A few flakes of gold have been reported to have been found directly in this till, suggesting that it is indeed the source of the Bellville gold.

## CLERMONT COUNTY

Gold was first discovered in Clermont County in 1868 on the farm of Robert Wood, near Elk Lick, on the banks of the East Fork of the Little Miami River. This site is now located on the north shore of William H. Harsha Lake at East Fork State Park.

Captain J. W. Glass, reported to be a chemist and assayer with experience in the California gold fields, along with several other individuals, organized the Batavia Gold Mining Company, which was incorporated with the state and headquartered at Batavia. The venture was authorized to issue \$50,000 of capital stock with shares to be sold for \$100 each. Considerable public interest was aroused locally and in Cincinnati and hundreds of people were reported to have flocked to Batavia, both out of curiosity and to seek their fortunes. Captain Glass and his associates constructed a large sluice at an expenditure of nearly \$3,000 but it was destroyed by a flood soon after being put in operation. It was reported that \$20 in gold was recovered before the disaster. The sluice was not rebuilt and the Batavia Gold Mining Company folded.

The dream of finding the Mother Lode did not die quickly nor completely in Clermont County, and in 1872 the Stonelick Valley Mining Company began a tunnel on the farm of A. J. Turner in Possum Hollow, north of Batavia. After a 35-foot penetration into the hillside and an expenditure of \$100, this short-lived venture was abandoned.



John Allen at the entrance to his gold mine along Cabin Run Creek, Clermont County, circa 1920. Photo courtesy of Rodney Davis.

In the 1920's, John Allen operated a drift mine on Cabin Run Creek in an area known as Bear Hollow. This site is on the north side of present-day William H. Harsha Lake, not far from the sluice constructed by Captain Glass in 1868. This mine was intermittently active until sometime in the 1930's. Allen's mine was apparently the one referred to by Herman Wuestner, University of Cincinnati geology professor, in his 1938 report on minerals in southwestern Ohio. Wuestner indicated that the miner was reported to have made a fortune at this mine but died without revealing where the money was hidden. Wuestner added, "The fact is, however, that he may have died of starvation as there could not have been enough gold to make mining profitable."

The Allen mine, which is now collapsed according to George Rooks, manager of East Fork State Park, was driven into a thick deposit of Illinoian glacial till. It is apparent that Allen and other propagators of gold mines in Clermont County clung to the notion that the small quantity of gold in the till and the slightly higher concentrations in local stream beds draining these tills were derived from a primary deposit or vein located at some depth. These miners were either unaware of, or perhaps more likely chose to ignore, the accurate and blunt pronouncements of Survey geologists Andrews, Newberry, Orton, and Read in the 1860's and 1870's as to the glacial origin of Ohio gold.



John Allen and Dr. Bragdon at the Allen mine along Cabin Run Creek, Clermont County, circa 1920. Dr. Bragdon was reported to have practiced medicine until the age of 103. Photo courtesy of George Rooks.

An additional Clermont County venture into gold mining occurred in 1933 and intermittently thereafter along Brushy Fork, a tributary of Stonelick Creek, north of Owensville. Robert Titus accidentally discovered gold along this stream where it passed through his farm. Titus, along with Kyle Moyer and Frank Lukemire, constructed a sluice that used a gasoline engine to both pump water from the creek and to turn three revolving pans. According to Herman Wuestner, this homemade device could process 1½ cubic yards of gravel in about 90 minutes. Wuestner indicated that gold recovered from this volume of sediment was worth about \$1.34 (at the pre-1934 price of \$20.67 per ounce). Other reports indicated assays of the stream gravel yielded values ranging from 10¢ to \$3.00 per cubic yard. Most of the gold was in the form of tiny flakes, although a nugget the size of a grain of corn was found. Considerable excitement was created by this venture and Titus was reportedly offered financial backing and outright purchase of his 40-acre farm for \$1,500 per acre. No commercial quantities of gold were ever produced from this deposit and most of the metal recovered was sold for souvenirs. Although optimism ran high, this venture did not last long.



Sluice operation of Robert Titus along Brushy Fork, Clermont County, in 1933. Photo courtesy of Robert Titus, Jr.

There apparently were other attempts to mine gold in Clermont County and there are reports of other shafts being sunk, including a small tunnel that was uncovered in recent years during highway construction on the east side of Ohio Route 132 north of Batavia. Roudebush, writing in an 1880 history of Clermont County, indicated that every ravine and gulch in the county had been examined by hopeful prospectors. Clermont County is still an active area for the pursuit

of gold and Stonelick Creek is probably one of the best, publicly accessible sites for gold panning in the state.

#### OTHER "STRIKES"

There were other less well documented and shorter lived gold rushes in Ohio but, unlike the Bellville and Clermont County areas, it is uncertain if any genuine gold was involved. James McMann of New Lisbon (now Lisbon) in Columbiana County wrote to the editor of the *Ohio Repository* in Canton in 1855 concerning gold found on his farm during the digging of a well. McMann related that he had recovered \$500 worth of gold and employed eight men in the digging operation. He indicated that he had been offered \$100,000 for his farm. McMann should have taken the money, as this gold mine was never heard from again. It is probable that McMann recovered "fool's gold."

Another flurry of gold activity occurred in 1898 at Malvern in Carroll County when gold was reported to have been found in Sandy Creek. A. L. Wartman was the organizer of the short-lived Shanty Hill Gold Mine. N. C. Lord, Survey chemist, examined the gold samples from this deposit and concluded that they were pyrite. Malvern is just south of the glacial boundary and Sandy Creek was a meltwater drainageway and consequently is filled with outwash deposits. Modern gold panners have reported finding a few flakes of gold in this outwash.

There are probably other, less notorious areas of the state that experienced gold fever during the period of hysteria that swept the country in the latter half of the 1800's. The Survey made repeated attempts to realistically portray both the source and the quantity of gold in Ohio; however, these attempts were mostly in vain. Survey bulletins published in the early 1900's were prefaced with a brief annual report, of which a portion was devoted to the Survey's public-service activity of frequently responding to rumors of gold discoveries in Ohio. This section concluded by saying, "The duty of dispelling illusions of this sort cannot be considered an agreeable part of the work of the Survey, but it is nevertheless of very direct benefit to the people of the state."

#### WHERE AND HOW TO FIND GOLD IN OHIO

For individuals who enjoy outdoor activity and the thrill of search and discovery, panning for gold is a fascinating hobby. Wet feet, cold hands, and an aching back and knees are the price of the reward, but these discomforts are quickly forgotten or ignored when "color" sparkles in the bottom of the pan. It is a hobby that does not require a considerable expenditure for equipment and many Ohioans can begin their search close to home.

The table on page 3 lists several localities, both specific and general, in Ohio that have been reported to produce small amounts of gold. However, nearly any stream in the glaciated portion of the state has the potential, at this stage of knowledge, to produce gold flakes. Prospectors should be explorers and try new areas. Do keep in mind that most areas in Ohio are on private property and permission should always be obtained before making a search for gold. Many landowners will not only grant permission but will probably be quite curious as to your discoveries.

Once a likely stream is selected, there are some principles to keep in mind when determining the best place to pan. Gold is extremely heavy in comparison to other rocks of equal size and will consequently be concentrated by stream waters, particularly during floods, in certain areas of the stream bed.

Because of its high specific gravity, gold moves along the bed of the stream (bedload) and will tend to drop into joints or other cracks. These crevices can be searched in shallow water with aid of a meat baster with which the gold-bearing sand can be sucked up from the joint.

Gold will also concentrate at the upstream end of gravel bars, on the inside bend of meanders, or behind large boulders. There is a decrease in current velocity associated with these features and the heavy gold tends to drop out of the flowing water at these points. Coarse gravel associated with large boulders commonly produces gold flakes in favorable areas. Most successful gold panners attempt to sample this gravel as close as possible to its contact with underlying bedrock or clay.

Although a variety of shallow pans can be used to pan gold, those designed for such usage are much superior. The old prospector's pans were metal and such pans are still available; however, plastic pans are lighter in weight and have ridges along the inside lip of the pan that prevent gold flakes from being sloshed out. These pans are available from many rock and mineral shops and from various suppliers of treasure-hunting equipment. Various treasure magazines available on newsstands carry advertisements for this equipment.

Other helpful items of equipment include a shovel or scoop to dig into gravel, a screen of hardware cloth to remove large pebbles and debris from the gravel before it is panned, and a small vial or pill bottle in which the gold flakes can be saved. This vial or "keeper" is most efficient when partially filled with water. A knife point, tweezers, eyedropper, or an artist's paint brush work well to remove flakes from the pan for transfer to the keeper.

Panning techniques vary widely and each experienced panner develops a special technique. However, all the methods are variations on a theme and are designed to utilize two processes—sizing and gravity concentration. Fill the pan (after screening or removing coarse fragments, leaves, and sticks) about half full of sand and gravel and then submerge it beneath the water. Then begin kneading the material with your fingers in order to break up lumps of clay that can then be washed out. This step is important because gold flakes will adhere to the clay and can be washed out of the pan with lighter material. With the pan still submerged, begin agitating it back and forth with a rotary motion. This technique will size the material, causing the coarsest gravel to rise to the top. Scrape off the upper layer of gravel and discard this material. This procedure should be repeated several times.

The next step in the panning procedure uses gravity concentration and separates the heavy gold and other minerals from the much lighter fragments of quartz, feldspar, and rock fragments. Begin by agitating the pan with a rotary motion and with the lip of the pan tilted slightly forward. This can be done with water in the pan, but it need not be submerged. After a minute or two of this agitation, dip the lip of the pan below the water surface and, with a forward and upward motion, wash off the lighter weight, upper layer of sand. This procedure can be speeded up by scraping off some of this upper layer with the fingers.

After repeating this procedure a few times all that will be left in the pan will be a small amount of light-colored quartz and a heavy concentration of dark sand (composed primarily of magnetite, ilmenite, and garnet). By placing a small amount of clear water in the pan and giving it a gentle swirl, the dark sand will tail out across the pan. If any gold flakes are present, they should sparkle amongst the black sand. The above



Sandy Ludlum of Columbus examines sand and gravel in gold pan.

technique is a general guideline and, like most other activities, both speed and efficiency improve with practice.

For serious and dedicated prospectors there is a variety of equipment available that will increase both the volume and the efficiency of the concentration process. A sluice is an inclined trough across which are a series of ridges or baffles that trap gold and other heavy minerals from a mixture of sand, gravel, and water flowing down the incline. The lighter material is carried over the baffles by the water current. Portable sluices are available but they are expensive. Increasingly popular among serious gold prospectors are small, portable dredges. Some of these dredges weigh as little as 25 pounds and can be easily backpacked by one person to sites far off the road. Dredges are gasoline powered and utilize a long hose with which sediment can be sucked from the stream bottom, a flotation device, and a small sluice for concentrating the gold and heavy minerals. This equipment is also expensive.

#### PROSPECTS FOR PROSPECTING

As has been stated elsewhere in this report, there has been no serious published scientific investigation of the occurrence and origin of Ohio gold, although Edward Orton recognized the need for such studies more than a century ago. There has never been a strong economic impetus to such research because of the apparent low quantities of gold in Ohio's glacial sediments and certainly, until recent years, because of a fixed, artificially low price for this commodity. Indeed, geologists have avoided and purposely de-emphasized the interest in Ohio gold because of the public hysteria, misunderstanding, and questionable dealings that commonly accompany publicity on this topic.

Although scientific investigations of gold in Ohio would principally be academic, such information would be of value to our general understanding of the geology of the state and certainly would provide hobbyists with meaningful data in their search for prime panning localities. In addition, such

studies would provide a firm data base with which to dispel the occasional public misunderstandings about Ohio gold.

Is there any economic potential for gold in Ohio? The lack of available data prevents a firm and final answer to that question. Several factors are influential in such an evaluation: (1) the long-term price of gold, (2) the concentration of gold in a particular deposit, (3) the size of the deposit, and (4) an efficient means of gold recovery.

Relatively high concentrations of gold, as determined by panning on a sand and gravel bar in a small stream, are hardly indicative of the economic potential of an area. Tiny deposits such as this have been highly concentrated by stream action and the source sediment may be hundreds of times less concentrated. Most areas of the state from which gold can be recovered with some regularity appear to have deposits of very limited size—hardly large enough for commercial exploitation. The price of gold is notoriously fickle, which adds a considerable risk to heavy investment in expensive gold-recovery equipment. In addition to these factors, an adequate water supply is necessary and various zoning and environmental regulations must be considered.

It is probable that the only commercial possibility of gold recovery in Ohio would be at sand and gravel plants where large quantities of glacial outwash are processed. If an inexpensive and efficient means could be developed for secondary recovery of the small concentrations of gold in the sediments, it could be a paying proposition. However, one large sand and gravel company in the state, as mentioned previously, looked into the possibility of secondary gold recovery in 1980 when the price reached more than \$800 per ounce. They concluded at that time that it would not be a profitable venture.

These discouraging facts and observations are intended to convey realism to a subject that can quickly become distorted in the public eye. The principal value of Ohio gold is recreational and numerous individuals derive many pleasant hours of satisfying activity as weekend prospectors. Their rewards are monetarily low but high in the intangible commodity of enjoyment. Even skeptics experience a rush of excitement when a bit of "color" glitters in the pan.

—Michael C. Hansen

*We thank the numerous individuals who have provided us with information on gold occurrences in the state, old photographs of mining operations, and historical information on early gold activities.*

*The Survey welcomes additional information on any aspect of Ohio gold, including occurrences and historical data.*

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**QUARTERLY MINERAL SALES,  
OCTOBER-NOVEMBER-DECEMBER 1984**

Compiled by Margaret R. Sneeringer

Commodity	Tonnage sold this quarter <sup>1</sup> (tons)	Number of mines reporting sales <sup>1</sup>	Value of tonnage sold <sup>1</sup> (dollars)
Coal	8,444,481	234	268,515,459
Limestone/dolomite <sup>2</sup>	14,373,936	96 <sup>3</sup>	42,273,631
Sand and gravel <sup>2</sup>	10,661,239	203 <sup>3</sup>	31,441,457
Salt <sup>2</sup>	1,193,197	5 <sup>4</sup>	11,882,565
Sandstone/conglomerate <sup>2</sup>	594,515	21 <sup>3</sup>	5,484,434
Clay <sup>2</sup>	274,988	24 <sup>3</sup>	1,539,752
Shale <sup>2</sup>	1,420,718	17 <sup>3</sup>	1,280,637
Gypsum <sup>2</sup>	58,233	1	553,213
Peat	5,774	5	15,599

<sup>1</sup>These figures are preliminary and subject to change.

<sup>2</sup>Tonnage sold and Value of tonnage sold include material used for captive purposes.

Number of mines reporting sales includes mines producing material for captive use only.

<sup>3</sup>Includes some mines which are producing multiple commodities.

<sup>4</sup>Includes solution mining.

**1984 OHIO MINERAL SALES**

Compiled by Margaret R. Sneeringer

Commodity	Total tonnage sold in 1984 <sup>1</sup> (tons)	Number of mines reporting sales <sup>1</sup>	Value of tonnage sold <sup>1</sup> (dollars)
Coal	39,003,446	292	1,269,230,861
Limestone/dolomite <sup>2</sup>	36,547,983	115 <sup>3</sup>	122,205,264
Sand and gravel <sup>2</sup>	30,534,343	269 <sup>3</sup>	91,222,354
Salt <sup>2</sup>	3,824,776	5 <sup>4</sup>	35,844,802
Sandstone/conglomerate <sup>2</sup>	2,152,582	29 <sup>3</sup>	24,488,305
Clay <sup>2</sup>	867,781	35 <sup>3</sup>	4,921,116
Shale <sup>2</sup>	2,405,166	24 <sup>3</sup>	3,130,752
Gypsum <sup>2</sup>	212,392	1	2,017,724
Peat <sup>2</sup>	20,835	5	96,199

<sup>1</sup>These figures are preliminary and subject to change.

<sup>2</sup>Tonnage sold and Value of tonnage sold include material used for captive purposes.

Number of mines reporting sales includes mines producing material for captive use only.

<sup>3</sup>Includes some mines which are producing multiple commodities.

<sup>4</sup>Includes solution mining.

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