Place: **Union Hall**
Meyers Street
Next to Campus Life
In Kettle Falls

THE PANORAMA GEM & MINERAL CLUB

Time: 7:00 PM
Third Tuesday
Each Month
(Jan.-Nov.)

The Panorama Prospector

May 2006

Panorama Gem and Mineral Club Minutes April, 2006

Joe Barreca (Secretary pro tem)

Four new members joined the club at our April meeting. Mike and Fran Davis came here from Tennessee (and already volunteered to bring cookies to the next meeting!) Steven Fox is a geologist and teacher from Echo Nevada. Rita Cordrey comes from dinosaur country (Wyoming) and Maureen Wallace came from Moran Creek.

Johnie Pitman reminds us that the club has a library of field trips, how-to books and magazines, and newsletters from other clubs. Also we are still running a silent auction for that spiffy new vibrating "tumbler" every meeting. It's almost time to pick a winner.

Sylvia reported that the club has $5381.07 in its coffers and that the club made $1193.5 from the rock show. Some of that went to the grand prize stone elephant won by Teres Estes at the show and the second prize, a malachite bear, claimed by Marcia Perkins. The show seemed to be bigger than years past and better by most accounts. Part of the credit goes to Linda Wolf who arranged for busing for 13 classes of 24 kids each to and from the show. Dianne Lentz suggested that we send Linda a Thank You card and we all agreed.

After the show, Ann Berger, member and vendor donated $100 to the scholarship fund. Thank you Ann! We will be getting applications for scholarships May 1st and the trustees will review them.

Rex announced a trip to the "green rock" (Jim McGraff) quarry. (People had a great time there April 23rd and brought back rocks of all kinds.) We need more ideas for field trips. Bring them to the May meeting.

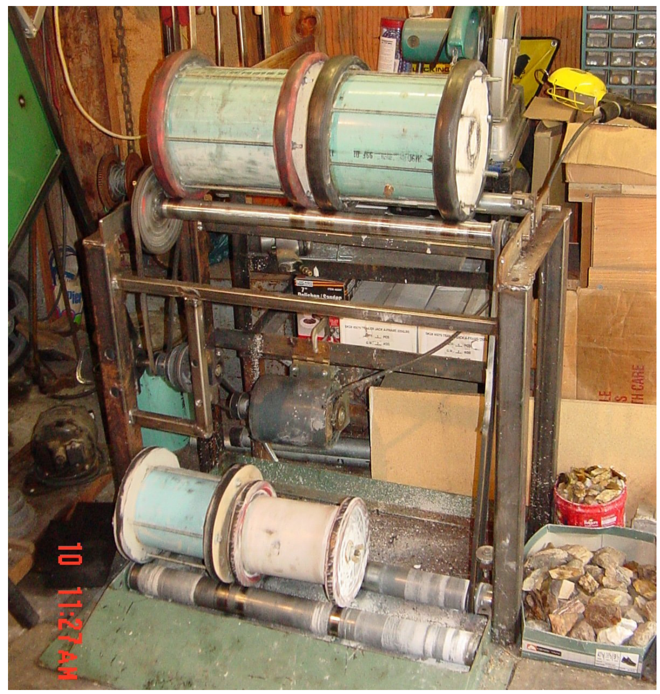
The North Idaho rock club has a show June 3rd and 4th.

A couple of Ice Age Flood tours were announced, one through Diane Rose. Then we watched a DVD about the floods on the club's new DVD player that we voted to buy. It was very good. Thanks Johnie!

Joseph Barreca brought up the idea of having a web page for the club. We decided to think that over for a meeting or two.

Do It Yourself Lapidary Equipment

By Joe Barreca



Like a lot of rock hounds, Mike Latapie doesn't have loads of money to spend on equipment. Unlike a lot of us, he doesn't let that stop him. The mechanics of this rock tumbling setup are run by an electric motor stepped down with pulleys. They drive two sets of rollers linked with a drive belt.

Take a close look at these tumblers. They are made out of big pieces of plastic pipe. Mike glued one end to a plywood disk. Several pieces of threaded rod hold another plywood disk on the other end. A rubber sheet on the inside of the disks makes a water-tight seal. More rubber sheet on the outside of the disks provides traction on the rollers. A nice touch are little plugs tapped into the sides of the cylinders to add water and grit without taking them apart.

But the tumbler savings are peanuts compared to making your own rock saw. A new rock saw costs around $2000. Mike made one for $300. $120 of that was for the blade. The rest was ingenuity, listening to old timers and tinkering with the details.

There are three main parts to a rock saw:

1. The basin box and canopy
2. The cutting wheel assembly and
3. The rock carriage.

Mike welded up the saw box out of sheet metal and angle iron. It includes a shelf on the left side that anchors the pillow blocks and bearings underneath it. The hinged canopy is made of Plexiglas. Supposedly the Plexiglas would let you see what is going on inside. In practice, it is covered with oil immediately. The real view is through a hole on the left side.

Although the arbor that holds the saw blade needs to be rigid for a clean cut, the blade itself is somewhat flexible. It doesn't break easily, but it will veer off if it doesn't make a square groove to start with. Mike used a 1 horse electric motor that turns at 3450 RPM to power the 16" blade in this saw. 2" pulleys transfer power to the arbor. The blade bolts down to a 3/4" threaded end and sits against a shoulder on the 1" shaft. The weight of the motor and a spring provide tension on the drive pulleys. The sealed pillow blocks keep oil from coming through the side.

The platform that holds the rock is also very simple. It slides on steel bushings along two steel rods. A couple of bolts and wing nuts hold the bar that clamps onto the rock. A wound steel wire pulls the rock against the saw with a weight, (in this case and old flat iron) providing even tension. When more tension is needed, he clamps more weight on with a pair of vice grips and a tin can.

The rock platform has another set of bushings and rods at 90 degrees to the cut. A nut welded to the bottom of the platform allows a threaded rod to adjust the depth of the cut. After one cut, pull the carriage back, crank the rod 2 or 3 full revolutions and you are ready to take another slice. The rock in the picture was mostly clear quartz and amethyst. Sparks from the cutting blade lit it up from the inside while it was being cut. Mike reached in to hold the slab as the cut was finished so that it didn't fly off.

We used a light machine oil for this run. Mike is getting regular rock cutting oil for the next. The oil fills up with grit quickly and needs to be cleaned out often. A drain plug on the cutting box would make this easier. Luckily, the wheel will pick up plenty of oil as soon as there is an inch or two on the bottom of the blade, so you don't need a lot at once.

After grinding off the rough edges, Mike gets a polish with a series of disks of decreasing grit and some buffing. He sprays water while they grind. (End)

Leaching Gold Ore

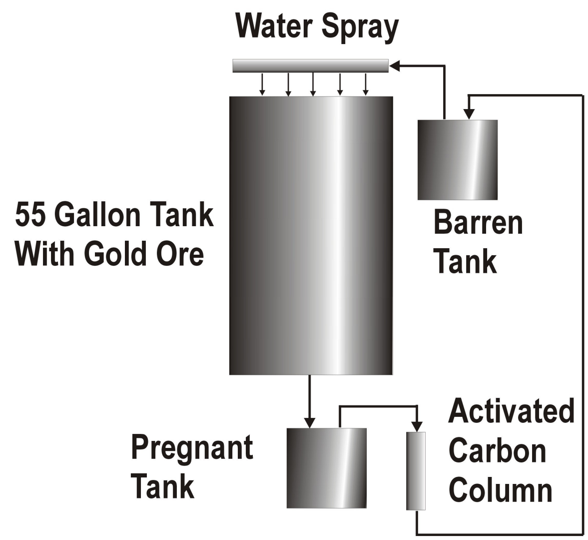
By Bob Bristow

Having a gold mine doesn't do you any good unless you can get the gold out of the ore. Since my mine had approximately equal values of gold and copper, the best way to get the gold was to concentrate the gold and copper minerals, send the concentrate to a smelter, and let them extract the gold along with the copper. However, a minimum smelter shipment is 100 tons and meant I would have to be in full production before the first shipment. If I could extract the gold by itself, I could work into production gradually and get a little money while I was at it. This article is about my research into using a leach method to extract gold.

Before attempting any method, I read all of the books and articles I could find on gold extraction. The US Bureau of Mines (USBM) had recently published articles on what they claimed was the only practical modern method. (They claimed to have invented it, but in reality, they only improved on an old, old method.) They named it the Merrill-Crowe Process and it involved dissolving the gold with cyanide, running the gold/cyanide water through activated carbon, removing the gold from the carbon with alcohol, and finally, electroplating the gold onto stainless-steel foil. Most miners simply call it "heap leaching." The big open-pit mine at Carlin, Nevada, was using this method. At Carlin, long, slim, shallow trenches were dug to hold 10,000 tons of course ore. These trenches were lined with heavy rubber blankets. Ore was heaped up on the blankets and a pipe spray system mounted over the whole thing. The trenches sloped slightly down so that the water collecting on the rubber would drain down into two ponds. The first was the "pregnant" pond where the water and gold solution could be held until it was pumped to the second pond. In between the ponds, the water was pumped through a series of carbon-filled tubes. The water in the second barren pond was tested for cyanide content and pH value and cyanide pellets or lime was added as required. The water was then pumped back up and sprayed onto the ore heap.

Since the USBM said that all other methods were obsolete, I decided I had better try this one. I had read that at one time drug stores carried cyanide for poisoning rats and gophers. I tried one drug store and the druggist threw up his hands in horror and said, "You can't get cyanide! Only government-licensed agents can use cyanide." I next called a chemical wholesaler in Seattle. I asked, "Do you carry sodium cyanide?" His answer was, "Sure, how many 200-pound drums do you need?" So much for needing a government license. I went down the next day to get a sample of his cyanide. "I'm sorry, a truck load of sodium cyanide came in yesterday, but it all went out this morning. However, I'm getting another truck load Monday, and I'll hold out some for you." He explained that there were a lot of metal plating companies and they all used large amounts of either sodium or potassium cyanide.

Before starting testing using my sample of sodium cyanide, I did research on safety and how to safely dispose of the used cyanide. Luci was working at Boeing in a group that handled hazardous materials. One of the engineers looked up the government reports on handling and disposing of cyanide. I was surprised to find that sodium cyanide fumes have to be quite strong before they are hazardous. The report rated jet fuel fumes more hazardous than cyanide. (This was sodium cyanide. When mixed with acid, it becomes hydrogen cyanide and one whiff is deadly!) The disposal report showed how to bubble chlorine gas through cyanide wastewater. The chlorine converted the cyanide to salt and other non-harmful compounds.



One more step before beginning the tests. I had to be able to measure the strength of the cyanide before and after a leach test and I had to know how much gold was dissolved. I measured the cyanide strength with a small graduated beaker and a pipette. The cyanide water was carefully measured into the beaker. A chemical mixture was then added a drop at a time from the pipette until the cyanide turned purple. I weighed a small amount of cyanide and placed it in a known amount of water. I then ran the test to verify that it read the correct amount. The reading matched the amount I had calculated so I felt confident that I could measure cyanide strength. Measuring the amount of gold turned out to be simple. I put a beaker with a known amount of water with the cyanide and gold on a hotplate and let the water evaporate until only about a tablespoon remained. I then poured that into a cup containing assay flux and let it dry. The flux was then fire-assayed resulting in a small bead of gold and silver.

I was now ready to plan the testing. Figure 1 shows the test set-up I built. A drain was brazed to the bottom of a 55-gallon steel drum and a fine mesh placed over the drain hole. The drum was filled to within a few inches of the top with gravel-sized ore. The drain led to a storage tank for the "pregnant" water. When the water in this tank reached a certain level, a pump turned on and fed the water through an activated carbon column and into a tank where the water was recharged with lime and sodium cyanide. When the water in that tank (the "barren" tank) reached a certain level, a pump caused water to be sprayed on the ore. The fluid level switches were made with two old toilet bowl floats and a pair of micro switches. Submersible aquarium pumps were used for transferring the cyanide water. It was winter when I was ready to start testing. Knowing that most chemical reactions depend heavily on temperature, I called the USBM and asked what temperature they had used. The contact said, "Gee, we only ran tests during the summer in the desert so we didn't worry about temperature." I tried the author of another book and he didn't see why temperature should have **any** effect. During the testing, I wrapped the ore tank with resistance heaters and insulation to test the effects of temperature variations. The apparatus was turned on and run for several months.

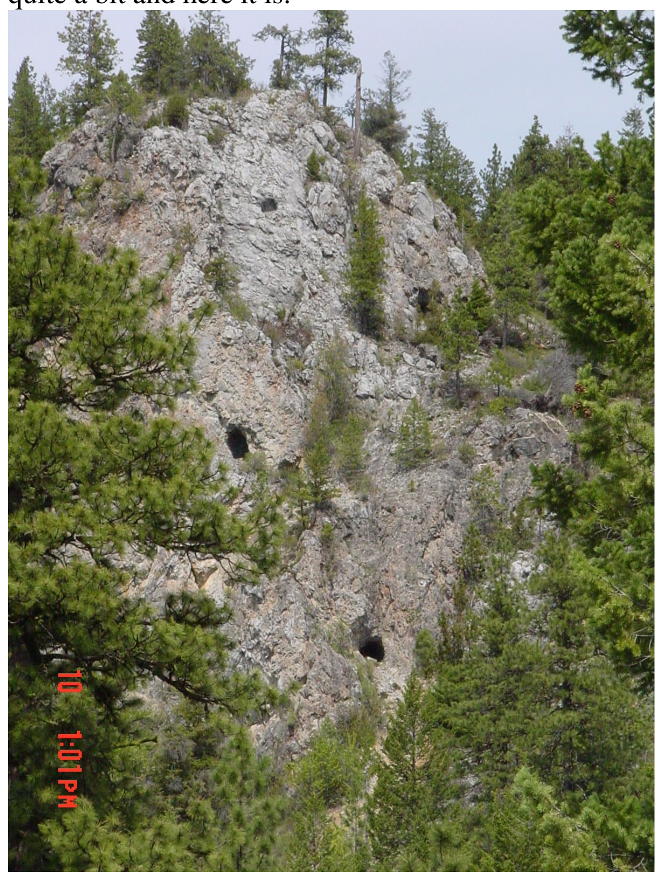
Everything went as planned except for two things. I had a hard time extracting the gold from the carbon. I could burn the carbon and then use an assay process to extract the gold and silver from the ash, but that was too slow and the expensive carbon was lost. I never could get the alcohol to work. I tried replacing the carbon columns with a zinc shavings tray. That worked well but the water rapidly became saturated with zinc ions. In the end, all of these problems didn't matter because there was a much bigger problem. The cyanide dissolved the copper as well as the gold. There was copper everywhere. The carbon columns soon jammed, the two holding tanks had a blue copper crust around the edges and on the bottoms, and I found a half-inch of blue copper mineral in the bottom of the ore drum. This was a handy way to extract copper, but since the cyanide cost about as much as the copper was worth, the approach was not viable. However, I did learn a lot and I was successful in plating small amounts of both gold and silver directly out of the cyanide solution.

The Neglected Mine

By Joseph Barreca

Field trips to established mines where you can drive up to the tailing pile and pick rocks immediately are good for rock clubs. But if you really want the feel of discovery that drove the gold booms, you need to discover some mineral veins for yourself. One way to do that is to re-discover old mines with no roads to them. Mike Latapie (I know, we're picking on him a lot this issue but a reporter can't pass up the chance to get two stories out of one trip) and I were looking through my Geologic Atlas of Stevens County last winter and found one near his place up on Onion Creek, called **The Neglected Mine**. If ever an old mine cried out for some attention from the local rock hounds, this was it.

We failed to find it that trip though Lord knows we tried. With the snow off the mountains, Mike went up again on his own and found lots of stuff, an old cabin, a vein of calcite crystals, some mine tunnels… He and Dave Paquette made their way up once after that and found even more calcite. That's the thing about making your own discovery, you need to share it or keep it a secret. So Mike has been sharing quite a bit and here it is.



The four holes in this cliff are the **Neglected Mine** (lead and zinc mostly). The top of the rock is 2000 feet above the valley floor. Mike drove his jeep up an old logging road for the first 750 feet. Then we took the "easy" route clinging to the face of the rock up to the knob that this picture was taken from at 3700 feet. It was a good place to get a perspective on the whole venture. Just below us to the southeast was the old miners cabin, well- not that old, it had round nails holding it together. Beyon that was the cliff where Mike found some nice calcite crystals that glow under UV light.

To the southwest was the valley floor and the Clungston-Onion Creek road.

This was also the "path" back down. The cliff with the mines in it was several hundred feet above the cabin to the northeast.

The calcite vein went up the face of the cliff just beyond the cabin. Water carved a series of holes and crevasses down the cliff that pack rats decided were excellent view property. Rusty bubbles of calcite crystals filled vugs along the watercourse.

Just north of this cliff is the "Spearhead". And behind that is another deposit of calcite with clearer crystals that don't respond as much to UV light.

The "Spearhead" shown here actually stands easily without Mike's help. The mines themselves did not have many rocks that were interesting. But someone worked very hard to blast those mines.

The lowest mine tunnel that we explored had some rail and an old stope where ore fell through a hole into mine cars on the track below. It was very solid rock. There were new red flags around the area so someone else is looking at it again. It was easy to see why it might be "neglected". If you have ideas about easier places to visit and collect rocks, we should really consider them and leave this mine alone.