

Kevin Hoagland and Mike Pung examine the gold that settled in the top tray of a Gold Cube during the filming of an episode of Gold Trails on the Cimarron River near Ripley, Okla. The Cube has become a celebrity in its own right. Photo by Paul Southerland

hether you're prospecting streamside or in the desert, you're a big operator or ocean dredger in Alaska, chances are you've either operated a Gold Cube yourself or seen one being used as a super concentrator.

The Gold Cube has made more than a few cameo appearances on several gold prospecting TV shows, including GPAA-produced Gold Trails, and Discovery Channel's Gold Rush and Bering Sea Gold, said co-inventor Mike Pung. Dakota Fred and Parker Schnabel have both used the Gold Cube, and Pung has caught glimpses of it in the Hoffman camp on Gold Rush.

Though you won't find it on Hollywood Squares or the Walk of Fame, the lowly Gold Cube has earned a star-studded reputation among gold prospectors. The Cube has become a celebrity in its own right.

"Dakota Fred bought one and he used it quite a few times. We've got pictures of him holding up a tray with a bunch of gold in it and everything right there in his cleanup on Porcupine Creek," Pung said. "And then, Parker Schnabel bought one because he saw Fred using one."

Because prospecting equipment, like power tools, is often a brotherly game of the-bigger-the-better one-upmanship, Schnabel wasn't about to be outdone by his rival. So, he more than doubled the height of his Gold Cube stack.

"He bought six more trays, so he got a 10-stack," Pung

said with a laugh. "They showed it outside his cleanup shack one time ... and then, more recently, anytime you see pictures of him in the 'COOL BUS'. (Schnabel has a school bus and he duct taped over the 'S' and the 'H' to make it read '_C_OOL BUS'.) He is using that for his cleanup shack and you'll see the Gold Cube in the Cool Bus once in awhile," Pung said.

The Cube is lightweight, compact, easy to set up, and-most importantly-known to catch fine gold. Normally, it consists of a stack of three or four trays that give the Cube its shape, but some prospectors have doubled down on it-proving that more is not always better. You see, almost all the gold is found in the first and second trays, rarely in the third tray, so there is really no advantage to using more than a four-stack. It was a lesson Schnabel had yet to learn.

"Yeah, he used a 10-stack when he was up there at the Big Nugget Mine ... I tried to talk him out of it, but he gets his mind set on something and that's the way it's going to be. He was hardly getting any gold at all past that third separator tray," said Pung, adding that the young reality star is now "down to a four-stack."

"On Bering Sea Gold, Emily Riedel has a Gold Cube which has been shown a couple of times during cleanup, Pung said. And Steve Riedel, her father, has also used it.

Vernon Adkison, another miner on the show, was also filmed using the Gold Cube.

Mike Pung operates a Gold Cube mounted with a Gold Banker while mining the black sands on the beach at Lake Superior in Michigan. Photo by Paul B. Southerland



"He had the top tray completely full of gold. So, that was pretty cool. That was a glory shot there, so I was proud of him!" Pung said. "And, I've seen the Kelly brothers use one ... Scott Meisterheim-he's used one. In fact, he has commented on it being the greatest piece of cleanup equipment out there."

Speed and gold retention

So, why are so many of the gold miners on reality TV shows using the Cube?

"Well, all these guys are pressed for time and they have about as much in concentrates as a small-scale prospector has in material to run all a day," Pung said. "What would normally take about eight hours of cleanup with a gold pan is reduced down to about an hour with the Gold Cube, so it saves them a heck of a lot of time. Anybody with a lot of concentrates, anybody with a dredge or anybody running a big operation views the Gold Cube more as a cleanup tool."

But for many "recreational" prospectors and small-scale miners, the Cube is often the main tool they use to run material in the field, Pung said.

"On the beaches, where there's fine gold and heavy black sands, that's their primary equipment. Most other pieces of equipment won't get that fine gold out of heavy black sand; they just load up and off it goes," he said. "But, the Gold Cube can process the black sands and hold the gold like no other machine can."

Hence the slogan, "Cube it or Lose it!"

"The Gold Cube becomes the primary piece of mining equipment when all you have is fine gold," Pung said.

What he means by "fine gold" is not the purity of the yellow metal, of course, but the size of the gold particles.

"I call fine gold anything that is 20 mesh and smaller, and that's where the normal sluice box starts having troubles," Pung said.

For greenhorns unfamiliar with the term "mesh," it means the number of holes per linear inch in a screen or classifier.

"Once you start getting down below 20 mesh, if you're not using the Gold Cube, you're blowing out most of your fine gold," Pung explained. "You are keeping all the big stuffno problem there - but you're losing a lot of fine gold."

In places where the gold is smaller than 20 mesh, the Gold Cube becomes even more



invaluable as a mining tool.

"If it's 50 mesh and minus and you are using a sluicebox, you're losing most of that gold if you're running continuously all day," Pung said.

The gold bug bites

Pung's interest in gold prospecting began quite unexpectedly when his mom, Peggy, and her husband, Bill Morey, called him in the spring of 2006 and asked if he and his wife, Pam, would like to go on a trip of a lifetime to the Klondike that summer.

"My mom called and said, 'Mike, we're going to Alaska and Canada. Do you want to go along?"

Before jumping the gun and forwarding his mail to the Gold Rush Trail, Pung went online to research various kinds of prospecting and small-scale mining equipment they would need to bring.

"We were going gold prospecting that June, so I started doing some research earlier that spring to see what kind of equipment was out there before we went. I had no idea what we needed," he said. "I was a newbie to gold prospecting."

I was doing a lot of surfing on the Internet. I was on eBay and I saw Gold-N-Sand, a product being sold by Steve "Red" Wilcox.

"I contacted him and we exchanged a couple of emails."

North to Alaska

"We came across on the highway out of Dawson City, Yukon. That night we stayed in Chicken, Alaska. At the campsite, they had a mound of dirt from their mine, and you could pan all you wanted. I panned for gold. I got hooked and got the fever," Pung said. "Mom gave me a pan, and I still have that pan ... I learned how to pan like a girl because my mom taught me," he said with a laugh.

It wasn't long before the fever broke and Pung realized separating the gold from the black sands isn't as easy as it looks on TV. There had to be a better way. And, with that thought in mind, he set out to build a better mousetrap—or in this case, a better gold trap.

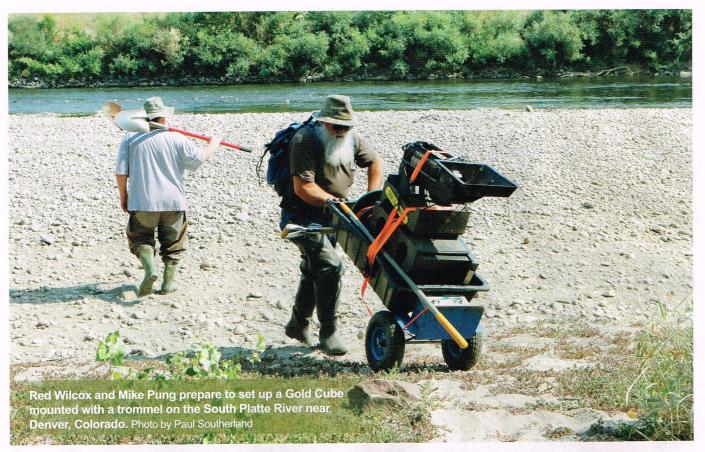
Dynamic duo

When Pung returned from the Klondike and Alaska, he called Wilcox and the two of them agreed to meet.

"I told him 'I'm going to be in Colorado. Do you want to go out prospecting some time?' He said, 'Sure!' Everything just fell into place. Once we met and realized we were like-minded, we hit it off," Pung said. "I've been there for two of his daughters' weddings and we're like brothers from different mothers."

Besides sharing a passion for prospecting, the duo shared a common enemy: blacks sands.

"I now had hands-on experience and I knew that getting the gold out of the black sands was a real pain,"



said Pung. "The real reason we came up with the Gold Cube was our nemesis—fine gold. Red's was the gold in Clear Creek and the Platte River in the Denver area and Buena Vista—all that ground-up really, really small gold—and mine was the gold on the shores of Lake Superior in Michigan."

A star is born

Like any great invention, the Gold Cube was born through much struggle and strife.

"I would throw ideas at him, and Red would build the prototypes. The only one that I built was CubeZilla—that big wooden one," said Pung, who is a woodworker by trade.

Wilcox built all the plastic prototypes with design and engineering input from Pung.

"He would do things one way and I would do things the other and we would butt heads a lot," Pung said.

But, like necessity, brotherly bickering is often the mother of invention.

"When we get together, we start solving a problem. It's like a husband and wife bickering, but it's creative ... very creative, and it works," Pung said. "One of the funniest things Red always says to me is 'Mike, don't believe everything you think.'"

After all was said and done, a star was born. The first Gold Cube came off the production line on Nov. 27, 2010 and was sold about two weeks later — Dec. 10 to be exact.

So, who bought the very first Gold Cube?

"Well, it's between four guys, and I tell them all they are second because I don't remember which one was first," said Pung.

Patent perfect

Just as any gold miner would stake a claim after striking gold, Pung and Wilcox didn't waste any time patenting their invention.

"We have two patents. We've got a design patent and we've got the utility patent, and both patents have been issued," Pung said.

The Gold Cube is now sold all over the world. The main manufacturing plant is based in Oklahoma, where the Cube trays and stands are manufactured, while Wilcox makes the Gold Banker in Colorado, and the trommels are made in Montana.

A thousand pounds an hour

The Gold Cube is designed to handle up to 1,000 pounds of material an hour.

"It can take a thousand pounds of dirt per hour and reduce that material down to a cup and a half of concentrates," said Pung. "So, if you put a cup and a half in there you are going to end up with a cup and a half. But, if you shovel a half ton of dirt into it, you will still end up with a cup and a half. The longer you run it, the more it's going to concentrate. It's not the number of buckets you have to monitor. It's the weight of the material."

For example, 1,000 pounds of regular gravel amounts to about 16 to 18 buckets, whereas the black sands along Lake Superior are much heavier, so 1,000 pounds of material may fit in only four or five buckets, he said.

How it all works

Though it looks simple, the Gold Cube is a feat of physics and engineering, and does the job it was intended to do - separate the gold without losing it all in your tailings like the Gold Rush era old-timers did using crude sluice boxes, rocker boxes and drywashers.

"Remember, if you're using 1800s technology, you're going to get 1800s results," Pung said.

The Gold Cube is efficient, lightweight and because it uses only a 12-volt battery and a 3-amp bilge pump, it's super quiet—perfect for a relaxing day of prospecting at the beach or in the desert. It is also relatively inexpensive compared other small-scale mining equipment on the market.

To understand how the Gold Cube works, imagine a fine gold particle, 19.3 times heavier than the moving water that suspends it. So, the trick is to use the water to separate the lighter material from the heavier, through stratification or layering.

"The low pressure zone behind a riffle is called an eddy which rolls horizontally, and the vortex churns vertically like a tornado," Pung said. "What happens is the vortex churns the material, separates the lights from the heavies and the gold sinks to the bottom, because that's what gold does," Pung said. "And, when it sinks to the bottom, it's going to stay there until something heavier—which some platinums are—wants to displace it. As gold sinks to bottom of a vortex pocket that's already full, it will displace something equal to its size. The Gold Cube and the vortex technology basically operates on a replacement system, so when you've got something heavy it sinks and something else has to get kicked out, so heavier just keeps replacing lighter material The longer you run it, the heavier that pocket is going to get. And, once it is completely full, it's going to have to find another pocket because that pocket is full of gold. Not a bad problem to have."

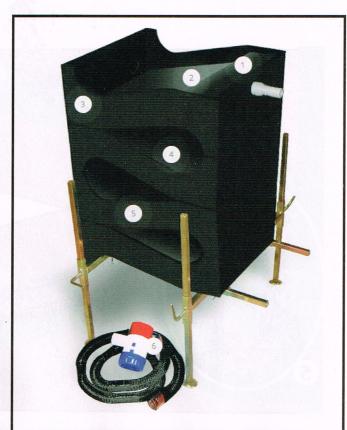
Shape of gold

Deciding whether to go with a three-stack or a fourstack Gold Cube depends on the type of gold itself.

"The shape of the gold is going to determine exactly what you need," Pung said. "The flatter something is, the more it acts like a kite. Kiting is when the gold is so flat, it catches the water, flips, and then sails over the waves. The flatter the gold, the more you'll require a four-stack."

The rounder the gold, of course, the faster it's going to sink and stick.

"If you have fine three-dimensional gold, you're

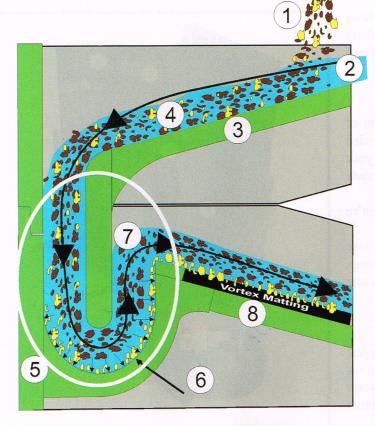


(1) Water diffusion takes 1,100 gallons per hour inlet and spreads it evenly over the slick plate. (2) LDPE slick plate is an excellent surface to start the first stage of separation. The lightest material rushes ahead of the heavies. (3) The G-force separator uses gravity and water force to separate the material. The gold has a hard time here and lags behind the other materials. (4) The Vortex mat needs water force and angle to become an active "self-cleaning" collector. Because the material is separated before meeting the mat, the vortex action is possible on the heaviest material - gold! (5) Ninety percent (or more) of your gold will be caught in the first tray, and the second and third trays will grab the rest.

probably never going to see any gold past the first two or three inches of the very first tray unless you've completely loaded it up with gold. It's gonna find someplace to sit ... It's hydrodynamics," Pung said. "If you've got three-dimensional gold closer to the source, you know that all you're going to need is a three-stack because the first tray is going to catch most of the gold."

May the G-force be with you

When running the Gold Cube, remember that the G-force is with you, working to separate the fine gold



G-FORCE SEPARATOR

How the G-force separator works inside the Gold Cube: (1) No. 8 mesh or smaller gold-bearing material is added to the water flow (2) on the slick plate (3). The slurry (4) drops into the G-force separator (5). The slurry accelerates around the bottom of the trough and centrifugal force helps move gold outward (6). As all the material leaves the G-force separator, high volume water carries the lighter material up and away (7). The gold is then dropped into the beginning of the vortex mat (8). This process is repeated in each of the Gold Cube's separation trays.

from the lighter material. In the G-force separator, where the Gold Cube trays drop down and around, the water whips around the bend. The fine gold becomes heavier and is moved to the outside edge because of centrifugal force. The gold drops to the bottom and starts scooting up that wall. And, as it leaves the G-force separator, it hits a lip just before it gets to the vortex mat.

"That edge right there is the only eddy in the entire system. We needed a low-pressure zone to pull the gold in front of the mat so that is the only eddy," Pung explained.

With a sluicebox, you are trying hard to get the gold underwater, but in the Gold Cube, the gold doesn't have a choice; it goes underwater, under that gate and the low-pressure eddy exiting the G-force separator sucks the gold right up in front of the mat. The gold has nowhere to go except into the matting.

"We've gotten gold so small the human eye can't see it," Pung said. "A healthy human eye can see only 250 mesh and larger, and we've found gold two and three times smaller than that with our centrifugal force in the Gold Cube and vortex action."

Cubing 98 percent of the gold

To give you an idea of just how efficient the Gold Cube really is, Pung and Wilcox claim that in one field test their invention recovered 98 percent of the gold.

"Our claim is based on one test and the finest gold that I have ever found," Pung said.

To test the Cube, the duo scraped bands of black sand

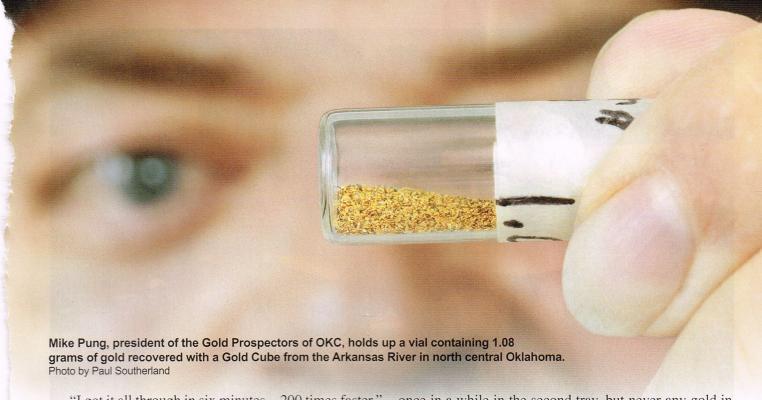
from the Lake Superior beach and filled a five-gallon bucket, which weighed in at more than 200 pounds of material.

"Normally a bucket of dirt weighs about 40 pounds, but this stuff was extremely heavy, and would plug up every type of equipment I ever knew," Pung said. "In July of 2010, I went up to Lake Superior with our prototype of the Gold Cube—one that was adjustable so I could change the angles and all that stuff. And, I brought 18 other pieces of equipment—all standard equipment and a couple of prototypes—because I knew some people who wanted me to test their prototypes on the sand up there as well. So, I spent a week with these 18 pieces of equipment and I took 100 pounds—a half a bucket—of the black sands—and completely cleaned all of the gold out of it."

Then, Pung took 100 specks of gold, all between 50 and 200 mesh, and put them in the bucket of clean black sands. He allowed two hours, including unclogging and cleaning, to run material through each piece of mining equipment.

"I ran every single piece of equipment, trying to do my best for each one to capture absolutely as much gold as possible," Pung said. "They all caught at lease five out of the 100 specks. The best piece of equipment caught 37 pieces, so that's barely over a third, and it took the entire two hours to do it."

Then came the moment of truth when Pung ran the black sands through the Gold Cube.



"I got it all through in six minutes—200 times faster," he said. "So, I thought we'd see how many pieces of gold we got. We did a cleanup and we actually got 98 out of 100."

In order to find out how far down the stacks the gold traveled before it was trapped in the matting, the gold in each tray was counted separately.

"With that itty-bitty stuff, I would have normally expected to get 90 percent of the gold on my first tray and all the rest of it in the next two trays," Pung said. "Instead we got 60 percent, 29 percent and nine percent - 60 pieces in the first separator tray, 29 in the second and nine pieces in the third, so I recovered 98 specks of gold out of 100 in six minutes."

To test the limits of the Cube, Pung decided to push the material through twice as fast to see how much gold would be lost.

"We ran it through in three minutes and did another cleanup, and when we checked the bottom tray we had 13 pieces of gold," Pung said. "It took a couple of hours to pan out all that material to find the gold and get it all counted out."

In the end, the second run produced 98 pieces of the 100 pieces of gold. There were 55 pieces in the top tray, 30 in the middle separator tray, the 13 pieces in the bottom tray and two pieces were lost.

"We knew exactly the percentage with that test, so we can claim 98 percent recovery," Pung said. "People all over the world tell me when they pan the concentrates and get the gold out they can't believe how much they got. Many people tell me, 'I don't know why I have a three-stack because of all the gold is in the first tray. I never get any gold in the second or third tray. Every

once in a while in the second tray, but never any gold in the third tray.' I'm getting super reports about people capturing their gold."

The Gold Trails test

On an episode of Gold Trails, Kevin Hoagland pitted his panning skills against the Gold Cube.

"We had the same dirt," Pung said. "He panned through all the dirt and got all the gold he could possibly get in a little over an hour, and then he weighed it out. I think it was like 305 grains, something like that."

Then, all the gold and the dirt were remixed and run through the Gold Cube.

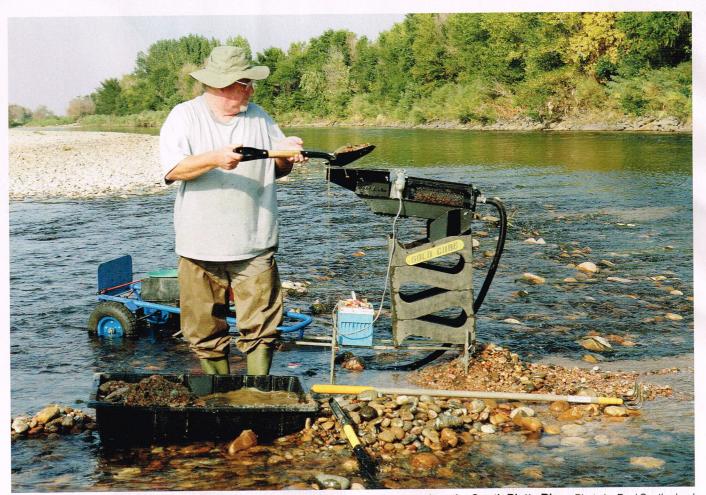
"I was running the same gold—the same everything and after five minutes we had the gold in the vial and we weighed it," Pung said "I had about 351 grains, so I got all the gold plus 40 grains more gold that he missed by panning, and in way less time."

Gold Cube setup time

Setting up the Gold Cube for the first time is like setting up a tent-not so bad once you've done it a few times. In fact, the hardest part about setup is putting together the stand.

At one of the Gold Prospectors Association of America's Gold & Treasure Shows, Pung enjoyed doing an outdoors demonstration to simulate rolling up to a site, setting up the Cube, getting some dirt, cleanup and shutting it back down.

"It takes me about 10 or 15 minutes, and most of that time is getting the mats wet," he said. "You have to make sure your mats are wet all the way down to the bottom of the vortex pocket so they don't hold a bubble. If they hold



Gold Cube co-inventor Red Wilcox runs a Gold Cube mounted with a trommel on the South Platte River. Photo by Paul Southerland

a bubble, gold can ride right over the top of it. So, getting rid of the bubbles is really important. If you've got your mat wet and you are looking at it and it looks like there's a bunch of diamonds in there in the sun, those are bubbles and that's not where gold is going to sit ... There are 7,000 vortex pockets on that mat."

Getting rid of the tiny air pockets is as easy as putting your thumb over the end of a hose to create water pressure to force the water in deep while spraying the mats.

"When your mats looks black like they're supposed to and not with shiny bubbles, then you're going to have good gold retention," he said. "But, if you don't do that you will probably do better than a sluice box but you're going to lose some gold."

Before setting up the Gold Cube, Pung recommends spending at least 10 percent of your time sampling for gold to find the best spot. While you're searching, look for a good place to set up your equipment.

"Not only are you prospecting for gold but you're prospecting where you're going to set up," Pung said. "You don't have to worry about the angle of the rocks or anything like that because you are pumping, and you aren't worried about the water like with a river sluice. Those situations are taken away because I've always got

a tub with me so you can set up in the tub and recirculate."

Classifier, Gold Banker or Trommel?

There are two main accessories available that can be attached to the basic three-stack or four-stack unit—the Gold Cube Trommel and the Gold Banker.

The trommel allows you to shovel unclassified dirt and rock directly into the hopper. The trommel then tumbles and washes the material before it enters the Gold Cube trays.

The Gold Banker is placed over the Gold Cube and serves as a built-in classifier with a spray bar, which eliminates the need to classify material before running it.

Power supply

There are several ways to power the 3-amp bilge pump that comes with the Gold Cube whether you are prospecting in the field or running cons at home on your patio or in the garage.

In the field, Pung recommends a 12-volt deep-cycle battery that will power the Gold Cube for about two days—running both the trommel and the bilge pump.

Because the Gold Banker uses less power than the trommel, it is a better option for conserving your power





Left: The Gold Cube bilge pump is hooked up to an AC/DC converter. Right: Another power supply option. Photos by Brad Jones

supply. However, if your power supply is not an obstacle and you plan to run tons of material, then maybe the trommel is your best bet.

"If I'm only using the Gold Banker, I can run for about six days," Pung said.

So, if you are going out in the field for a week, you will either need to have a way to recharge the battery, bring two 12-volt batteries, or conserve power by using the Gold Banker rather than the trommel.

The Gold Banker is less expensive than the trommel. It weighs less and allows you to clean your material more carefully before it drops into the Gold Cube. For rockhounds, the Gold Banker is the way to go.

"You've never had a better way to look at rocks because they're clean and wet. I've found arrowheads, petrified wood, gems and all kinds of stuff in the Gold Banker, whereas in the trommel you really can't do that," Pung said.

For day trips, rechargeable jump starter kits will also work to power the Gold Cube. If you are running concentrates at home, an AC/DC converter will provide a consistent steady flow of electricity. Be careful to keep it away from the water, and pick up some extra converter fuses from your local hardware store.

The Gold Cube comes with a 3-amp bilge pump, which pumps approximately 1,100 gallons per hour or 18.6 gallons per minute. The thing to remember is that your battery rating amp hours need to be divided by three amps. For example, if your battery is rated for 90 amp hours, you will have about 30 hours of run time. If it's rated for 18 amp hours, you'll have about six hours of power.

Another way to supply power to the bilge pump is simply to hook your vehicle battery up to a battery charger that is plugged into a wall socket.

"You can get a battery charger, hook it up to your car battery and run it for weeks," Pung said. "You're never going to drain it."

Tub Flange System

One of the many challenges gold prospectors face in the field is dealing with clay or heavy mud and silt that can clog up equipment and pumps. The Gold Cube is no exception, but there are several techniques you can use to reduce or eliminate this problem.

One solution is to use what Pung calls the Tub Flange System, which separates and filters the water in different tubs to keep clean water entering the bilge pump.



An even flow of water will help to prevent material from slowing down and clogging up inside the Cube.

There is a good video of Pung connecting the Tub Flange System and putting it to work, as well as several other instructional videos on the Gold Cube website: www.GoldCube.net.

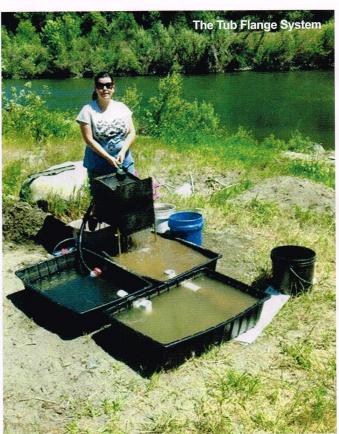
Environmental etiquette

If you are working in a stream or river and you're taking dirt from the water, then it's fine to let the material run through the Gold Cube and back into the stream. In this way, much like sluicing or dredging, there is no discharge but only incidental fallback. In other words, no new pollutants are added to the stream.

Now, if you were to dig above the water line, and move dirt to your Gold Cube below the water line, you would be adding silt and materials, which some states and government agencies have deemed is adding a new pollutant to a stream, even though Mother Nature moves much, much greater volumes of these so-called pollutants (a.k.a dirt) into the streams through rain, snow and floods. But to keep the agencies happy, your best bet is to use panning or mixing tubs to catch your tailings.

"I use a smaller tub inside the big water tub so I can lift the dirt out of there and just dump it into a pile off to the side ... and it's going to make my water last a lot longer." Pung said.

"None of the dirt and none of the water ever gets back into the river."



Removing mercury, lead from streams

If there happens to be mercury or lead in the dirt you're running, the Gold Cube, will trap these heavy metals just as it catches gold.

"It holds mercury at a higher percentage than a sluice box. They say two percent can get washed out the end of a sluice box or a dredge, and the Gold Cube performs even better than that. If it hits the Gold Cube, it's not going back into nature," Pung said.

Many prospectors carry two snuffer bottles—one for gold and one for mercury—and they also remove lead shot and old fishing weights.

"The most mercury that's come out of one Gold Cube cleanup that anybody has ever told me about was a quarter-cup. And that's just ridiculous," Pung said.

In that case, the mercury came from concentrates originating from the Valdez Mine in Alaska, he said.

"I guess the Valdez Mine was closed down because it was dirty, and these were some concentrates that were left behind," said Pung.

The miner was struggling to separate the gold from the concentrates because they were so dirty and so heavy. He ended up trying his luck with the Gold Cube, Pung said.

"He bought the Gold Cube and got all that mercury and nine ounces of gold out of one cleanup," he said.

Because the miner was skeptical that he had gotten all the gold in the first run, Pung suggested running the material a second time to make sure he had gotten it all. "So, he ran it all through again and got no mercury and no gold," Pung said.

Greatest success story

While most prospectors are weekend warriors hoping to hit the mother lode, a serious miner can produce several to many ounces of gold per day. At close to \$1,300 an ounce at current prices, it's big business.

The most successful account of gold recovered with the Gold Cube is staggering. On the Bering Sea off the coast of Alaska, one cleanup yielded 22.5 ounces or about \$30,000 worth of gold, Pung said.

"Minus a little spot about the size of a quarter, the first tray was solid gold, and the second tray was about a third of the way full of gold," he said. "They panned out the last tray and there was probably about a nickel's worth of gold. That's a pretty impressive because there was \$30,000 worth of gold in the first two trays and only a nickel's worth was at risk of being lost."

