



Secretary: Marlea Sheridan

Editor: Penny Esplin

**DATE: April 6th, 2012**

**Our March meeting was cancelled due to snowy weather conditions.**

**SHORT AND SWEET FROM THE PREZ:** I love snow but to have the only snow and ice fall on our monthly meeting was a drag. No end of excitement at my house with over 7 inches of snow and the power out. After talking with our officers we decided to cancel our meeting to ensure everyone's safety. As far as I can remember this may have been the first time ever that we cancelled a meeting.

We need volunteers to present or put together a program at one of our meetings. Many of you have prospecting skills or know of someone that does let's get them on board to share with the Diggers this year. The same goes for group outings.

Possible programs for this year include Gold Dredge Mining on Okan Creek Banlung, Ratanakiri Provence, Cambodia by Joe Greene; Gold Dredge Mining the Se San River, Oyadao, Ratanakiri Provence, Cambodia by Claudia Wise; and don't make me present Effects of Suction Dredging on Mercury/Seleniums Antagonism to Mercury by Claudia Wise. Fun and informative presentations but Joe and I can't cover every meeting I need some others to step up.

Delmon is working on a group trommel outing possibly in June if conditions are favorable. I need someone to lead a rockhounding and metal detecting outing this summer or fall. We may be able to talk Gibby, a member that lives in Newport, Oregon, into an outing...he is an expert on fossils and his collection is museum quality. It would be great to have him as our guest speaker at one of our meetings, as he is both interesting and knowledgeable. Or maybe even lead us on an outing!

Summer is dredging season and most of us will be running our own operations, but we should be able to find a time available to have a group experience. Please bring your ideas to our next meeting.

In the meantime, happy prospecting! Claudia

**Events/Outings during March:** The GPAA Gold and Prospector's Show (March 24<sup>th</sup> and 25<sup>th</sup>) had a record turnout this year. So many familiar and friendly faces were there enjoying the many interesting facets of the show. Sunday, March 25<sup>th</sup>, was the last day

and when the final drawings were held for the major raffles, including the ½ pound of gold drawing, which someone from Ohio won. Don Esch won the 3 day gold adventure trip to Wine's Camp, congratulations Don! Don Esch is a local miner and member of Willamette Valley Miners.

Ken Orndorff let us put Millennium Digger membership applications on his table at the GPAA show and I think we may have picked up a few new members there. Thank you Ken for your assistance.

While at the Gold Show, Claudia called our attention to the booth where the "GOLD CUBE" was being demonstrated. She said she used one while in Cambodia, and was quite impressed. Within a very short time observing this demonstration, needless to say, Walt and I were sold! And we ordered one!

"In one hour, it can take the gold out of 1,000 pounds of material and Super Concentrate your gold down to a cup!" The Gold Cube can process thousands of pounds of material and reduce it to ounces in minutes, not days.

All those heavy 5 gallon buckets of concentrates that we've hauled home (and are still sitting around taking up space), we can now "Super Concentrate" all that black sand down to where the gold really is, and without losing any. The Gold Cube can retrieve your gold from rivers, beaches, black sand and clean-up concentrates, on site or at home. With a 12 volt bilge pump, the Cube can recirculate water or pump it directly from the river.

Anyway, we plan to bring the "Gold Cube" to our next Digger's meeting for a demonstration, so we can all see just how it works. -Penny Esplin

**Upcoming Events/Outings:** "For our May outing/meeting, Ferman said we could all go to his place for our meeting. He suggested we watch prospecting videos on his new big screen TV and have a BBQ! He will also demonstrate his expertise in METAL DETECTING and teach us the finer points on how to use our own detectors. Ferman is our club's "Master Metal Detector". It will be an honor to take him up on his insight and invitation. -We will discuss this at our next meeting in April.

**Next month's Letter is: "A"**

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## Club News, Articles, etc.:

### **UPDATE-EOMA'S CASE AGAINST DEQ SUCTION DREDGE PERMIT**

*Guy Michael*

One would think we could just go to court and show that National Pollution Control (NPDES) permits, that invite third party lawsuits, and come with huge fines for every aspect of dredging, are the wrong permit for our benign, in-stream mining activity. But this is not how the legal system works.

Tom Kitchar, President of Waldo Mining District has been designated as the person to collect all of the scientific studies available on suction dredging, and I am helping him in this work. We have been reading and evaluating each of these studies, to determine if it is pertinent to our lawsuit.

Pertinent studies will be provided to DEQ, since the agency does not appear to be aware of the effects of suction dredge mining. The studies we are finding back up our assertion in our complaint that suction dredging does not damage the stream habitat and "may even help it".

We have found studies supporting our case that were conducted by EPA, the Corps of Engineers, and the Siskiyou National Forest Service. Oregon was one of several states that paid for some of these studies, yet since the studies support our case, the State appears to have forgotten about them.

We recently received four disks from the National Environmental Defense Counsel (NEDC) which they say support their request for standing (that is, they assert that they have substantial interest to file a case). This is interesting, since to our knowledge, none of them have had a permit, nor have any of them had property damaged by suction dredge mining from the issuing of the permit.

I just finished reviewing the first disk, which had about 350 to 400 documents, I actually lost count. Most of it was old copies of the BLM LR2000 information of just about every mining claim in Oregon and who owns that claim. There is no doubt that NEDC is studying who has claims and where these claims are located. There were also documents pertaining to each miner who has received an individual suction dredge permit.

The work is tedious, but it is necessary to complete all these reviews and submittals before our case can be tried in a court of law. There are two trials, to which, we are preparing for. First, we won the right to intervene in the NEDC case; here we allege that they have no standing. The second is our case against DEQ's decision to issue an illegal permit and it is issued based wrongly, because the facts show in the studies, the activity does not damage the streams habitat.

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# Treating Gold Ores by Amalgamation

Circular No. 27, March, 1987

by Richard R. Beard, Mining Engineer

Text of a presentation given at an Ehrenberg, Arizona miner's seminar.

<http://mines.az.gov/Publications/circ027amalgam.html>

## **Introduction**

The variations of the amalgamation process are as diverse as are the ores that are treated or the metallurgists who treat them. In this talk I will try to cover a little of the history, the hazards, and the theory of amalgamation. I will then try to show how this experience and theory can be applied in a practical way to the extraction of gold from its ores by describing examples of a couple of ancient but still viable devices. No attempt will be made to give you a cookbook type method since each ore will demand slightly different details. What I hope to do is provide a basic starting point that can be adjusted as necessary.

## **Historic Background**

Amalgamation is one of the oldest methods of extracting gold from its ores. According to Herbert Hoover, in a footnote to his translation of Georgius Agricola's *De Re Metallica*, the amalgamation of gold possibly dates from Roman times. The extraction of silver by amalgamation is generally attributed to the Spanish in Latin America in the late sixteenth century even though Biringuccio describes the fundamental principals of the "patio process" about a half a century earlier.

The amalgamation of gold ores as described by Agricola in *De Re Metallica*, which was published in 1556, is essentially the same as modern practice. The only changes are in the machinery employed and the sources of power to grind, mix, and separate. The use of water wheels and of goats in a squirrel cage to provide power to wooden machines are just not too common any more. However, although the chemical and physical processes are more clearly understood by more recent authors, the actual "hands on" instructions are remarkably similar and *De Re Metallica* can still be used as a reference.

## **Safety**

Before going any further into the subject of amalgamation, I will say a few words about the hazards of working with mercury. Like most things in our environment it is safe enough if it is treated with due respect and reasonable precautions are observed. However, the effects of mercuric poisoning are cumulative and it can do considerable damage if mistreated over a long period of time.

Mercury can be absorbed through the skin or inhaled in vapor form. Gloves should be worn whenever it is handled. Be sure that you are in a well ventilated area if there is any possibility of vapors forming. Avoid breathing any of the vapor at all costs.

### **Theory of Amalgamation**

The physical and/or chemical characteristics that make amalgamation work are not clearly understood to this day. However, it is known that if clean mercury is brought into contact with clean gold, the gold is wetted and "drawn into" the mercury. This results in a solution of gold in mercury or an alloy of gold and mercury called amalgam. After the mercury has gathered in the gold it can be removed by dissolving it in nitric acid or by driving it off as a vapor by heat. The gold will remain behind.

The mill operator's problem is to get the gold and the mercury into intimate contact with each other. To do this he must:

- (1) liberate the gold particles from the gangue;
- (2) remove any coating which may be covering the gold;
- (3) keep the mercury clean and bright; and
- (4) bring the gold and mercury into intimate contact. Then he must allow the amalgam to coalesce, separate it from the pulp, and extract the gold.

Amalgamation generally works best on relatively coarse gold that can be liberated from the gangue and abraded clean without too much difficulty. Since mercury will not penetrate into minute crevasses or pores, the ore must be ground fine enough to expose the gold at the surface. If the gold is very fine, cyanidation is more effective and, in practice, a combination of amalgamation and cyanidation is usually employed. Gravity and flotation are also frequently used in conjunction with amalgamation.

Some of the things that tend to frustrate the millman's attempt to get the mercury and gold together are:

1. The existence of surface coatings or encasement of the gold in the gangue. Fine grinding and abrasion will usually solve this problem.
2. The presence of oil, grease, clay or iron and base metal sulfides may result in sickening or flouing of the mercury. Grinding in lime or some other alkali will usually prevent this occurrence.
3. The presence of carbon as graphite also sickens the mercury. In some instances it can be removed by flotation prior to amalgamation.
4. The presence of sulfides of arsenic, antimony or bismuth will cause flouing and sickening of the mercury. This usually makes the recovery of gold by amalgamation impractical.

There is some confusion about the meaning of the words flouing and sickening of the mercury. If the mercury will not wet or take up the gold or coalesce into larger globules it is said to be sick. Sickening is most likely caused by impurities in or on the surface of the mercury. The most common impurities are oil, grease, clay, manganese and iron sulfates, and base metal and iron sulfides. Flouing in the strict sense is the division of the mercury into extremely small globules. This gives it a white flour-like appearance. This is not bad in itself but the mercury seems to be more susceptible to sickening while in the finely divided state. Therefore, it does not coalesce but stays in a floured condition and is lost to tails. Any gold that it took up before becoming sickened is also lost to tails.

### **Mechanisms**

The traditional use of amalgamation involved the stamp mill and amalgamation plates. A variation using agitation tubs for amalgamation was described in some detail in De Re Metallica. Today, with the exception of a few traditionalists, the stamp mill has been replaced by the ball mill for this purpose. The mercury is fed into the ball mill with the ore and is then passed over prepared plates.

The plates, which should be of pure annealed copper, preferably at least 1/8 inch thick to prevent buckling, must be scoured with sand and lye to remove any coating or oxidation. The resulting bright metallic copper is then rinsed with clean water and washed with a 2 to 3% solution of cyanide if available. Next a mixture of sal ammoniac and fine sand in equal proportions containing mercury is scrubbed onto the plate and as much mercury as the plate will adsorb is added. After coating the plate should be washed again with clean water and rinsed with the cyanide solution. Keeping the mercury clean will be a problem until the plate builds up a good gold amalgam coating. To alleviate this problem the plates can be silvered by applying silver amalgam to the prepared plate.

The size of plate required will vary with the character of the ore and the size of the gold particles. If amalgamation is used exclusively they should be in the range of 10 to 12 square feet per ton of ore per day. If used in conjunction with cyanidation the area can be reduced to about 1.5 to 4.5 square feet. They should be placed at a slope of 1 1/4 to 2 1/2 inches per foot. The slope should be adjustable to correct for inconsistencies in the ore.

Once the plates are loaded, as indicated by the hardening of the amalgam, mercury is sprinkled on the surface to soften it and it is then scraped with a hard wood or rubber scraper. After the amalgam has been scraped off, mercury is once more added to the surface and the plate is returned to service.

A more practical device for the small miner, and particularly the placer miner, is the barrel amalgamator. This is simply a horizontal rotating cylinder in which the

slurry of finely ground ore and mercury are placed. The rotation brings the mercury into contact with the particles of gold. All the problems associated with flouring and sickening of the mercury must be guarded against as with plate amalgamation. This is nearly always a batch operation. A good rule of thumb is to use about 5 times the amount of mercury as there is gold in the batch. The addition of 3 to 4 pounds of caustic soda per ton of ore will help keep both the gold and the mercury clean. If necessary several rocks may be added to the batch to increase the agitation and the abrasion. A cement mixer with the lifts removed makes an ideal vessel for a small scale operation.

For testing or for extremely small scale purposes a copper pan can be silvered and used in the same manner as the copper amalgamation plate.

There is other equipment available for the amalgamation of gold but they are variations of the two basic types (1) passing the gold bearing slurry over silvered copper plates or (2) adding mercury to the gold bearing slurry and then retrieving the resulting amalgam.

Forgive me but I must bring up my favorite subject; the one thing that is most often ignored! Everything that goes into the process must be weighed, sampled, and assayed. Everything that comes out of the process must be weighed, sampled, and assayed. Otherwise the millman will be operating in ignorance and will have no chance at all of improving his process or technique.

### **Gold Recovery**

After the gold has been taken up by the mercury the amalgam must be collected. The gold on the plates is scraped off as previously described. That still in the slurry must be brought together into larger globules and separated from the slurry. Gravity separation is usually employed. Sluices, jigs, tables, wheels, pans or any other gravity device can be used.

The excess mercury can be removed by squeezing it through damp chamois or canvas leaving a hard lump of amalgam. The remaining mercury can then be removed by retorting or by dissolving it in dilute nitric acid.

Because mercury vaporizes at a much lower temperature than gold it can be driven off by heat leaving the gold behind. In the retort the mercury vapors are captured and condensed so that the mercury can be reused. When using a retort the temperature should be increased gradually until the mercury begins to flow into the receiver, then backed off slightly and maintained until distillation ceases and then increased to a dull red finish. If heated too rapidly the amalgam may splatter and clog the outlet which could result in the explosion of the retort.

If a retort is not available, the mercury and silver can be removed by placing the amalgam in hot dilute nitric acid. One part acid to three parts water is the proportion that works best. The mercury and silver are dissolved leaving the gold. This solution can then be used to "silver" copper plates or pans or, if economics and convenience so dictate, it can be discarded.

### Summary

To summarize, I want to once more stress the importance of the proper care in the handling and use of mercury. The wearing of gloves and the adequate ventilation of all work areas are simple precautions that can prevent serious health problems.

I also want to caution you. Don't get lost in the details and mechanics of the process and forget the fundamentals. Always keep in mind the fact that the whole process depends upon getting clean, bright mercury into contact with clean gold. Anything that promotes this simple concept is good and anything that restricts it is bad.

I sincerely hope that this talk has given you enough information about amalgamation to make you want to learn enough to make it work for you.

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## **Greetings from ICMJ!**

I realize it may be a long way for some of you to travel, but I just wanted to let you know about the 2012 Gold Prospecting & Mining Summit we are hosting at the Eldorado County Fairgrounds (Placerville, California) in May. We're trying to reach out to those groups who may not receive our Prospecting and Mining Journal and may not know about this upcoming event.

The 2012 Gold Prospecting and Mining Summit will include two days of instruction by our writers on how to find gold PLUS over 80 vendor booths featuring the latest equipment, from pans and detectors to trommels and concentrating tables.

We will also have two days of Hands-on Classes at a privately owned 80-acre mining property. There will be a commercial placer operation running, so attendees can see how to properly set up this type of operation as well as opportunities for power sluicing and metal detecting. Attendees get to keep any gold they find.

The Summit will be held on May 12-13, with the added Hands-on Classes on May 11 & May 14. If you would like some flyers for your next club meeting detailing the Summit complete with lecture schedules, information on the Hands-on Classes, and even lodging options and directions to the Summit, please send me an email letting me know how many flyers you'd like and the physical address



we can mail them to. More info about the event is available on our website at [www.icmj.com](http://www.icmj.com)

Thanks and hope to see you there!

Melanie Harn

ICMJs Prospecting and Mining Journal

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## **Hoard of Roman coins found near Roman Baths in Bath, United Kingdom**

22 March 2012

<http://www.bbc.co.uk/news/uk-england-somerset-17480016#TWEET111273>



**The coins were found close to the Roman Baths**

More than 30,000 Roman coins were found by archaeologists working in Bath in 2007, it has been revealed.

The silver coins are believed to date from 270AD and have been described as the fifth largest UK hoard ever found.

The coins are fused together and were sent to the British Museum. Conservators are expected to take at least a year to work through them.

A campaign has now been started at the Roman Baths to try to raise £150,000 to acquire and display them.

The size of the find is not as large as the Frome Hoard in April 2010 when more than 53,500 coins were discovered by metal detectorist Dave Crisp near Frome in Somerset.

The coins found in this hoard date from a similar time and are thought to be the largest ever discovered in a Roman town in the UK.

Roman Baths spokesman Stephen Clews said: "We've put in a request for a formal valuation and then hope to buy the coins to display them at the baths.

"At the time there was a lot of unrest in the Roman Empire so there may be some explanation for why the coins were hidden away.

"The find is also unusual as it was discovered by professional archaeologists as opposed to an amateur using a metal detector," he added



## **Archaeologists show off priceless gold haul**

<http://www.thelocal.de/national/20120223-40919.html>

Published: 23 Feb 2012



**For the first time archaeologists are showing a 1.8-kilo haul of gold they found while performing excavations around a gas pipeline last year.**

The bracelets, rings and other objects have been stored at Lower Saxony's State Conservation Office since they were found in April 2011 near the town of Syke, while engineers prepared for construction of the so-called Nord Stream pipeline.

The haul includes 117 objects, the most recent of which appear to date from the Middle Bronze Age, around 1,000 years before Jesus' birth.

Investigations have revealed that the gold likely came from Central Asia, although researchers are still unsure how it ended up in Europe.

“Why this gold find was put into the ground is still unknown,” state archaeologist Henning Haßmann told *Die Welt* newspaper.

According to *Die Welt* daily, the gold was found by an excavation engineer analyzing the construction site with a metal detector.

After it was removed by researchers, high-tech techniques, including x-rays and computer programmes, were used to analyze it. Officials are still trying to nail down a precise date and place of origin.

While activists have complained that construction of the Nord Stream pipeline – which stretches from Russia to Germany and will be fully completed later this year – is damaging to the environment, it is proving to be a boon for archaeologists.

In August 2011, researchers found Stone Age objects while performing excavations and they are currently investigating other sites.





Archaeologists are studying more excavation sites as pipeline construction continues.  
Photo: DPA



The more than 100 pieces consist of everything from bracelets to rings.  
Photo: DPA



Archaeologists in Lower Saxony are, for the first time, displaying a priceless gold haul found during the construction of a natural gas pipeline last year.

Photo: DPA

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## Bribes hold back Chinese in Australia mining: WikiLeaks

SYDNEY — Chinese mining interests in Australia are being held back because they believe they must pay bribes to get what they want, according to a former senator quoted in emails released by WikiLeaks.

The private email is one of a huge number from the US-based global intelligence company Stratfor that the whistleblowing organisation began publishing Monday.

The assessment, titled "Insight -- China/mining", said that Chinese firms were unable to overcome a corruption mindset when doing business Down Under.

"Where foreign companies do get access to tenements, they always seem to lose out because the mining sector in China is one of the most corrupt sectors of all," the unnamed former senator reportedly said.

The email is dated mid-2010, just months after Australian mining executive Stern Hu was jailed for 10 years in China after a Shanghai court convicted him of taking kickbacks worth millions of dollars from Chinese steel firms and stealing corporate secrets during 2009 iron ore talks.

The incident damaged ties with Beijing, Australia's biggest trading partner and a major investor in its vital resources sector.

In the email, the senator said corruption was widespread in China.

"Ironically, this corruption is one of the impediments to Chinese interests not having accumulated even greater stakes in the resources sector in Australia," he reportedly said.

"They simply cannot get it in their heads that the rule of law applies to mining projects in Australia.

"They refuse to believe that they have a right to receive a mining lease subject only to complying with relevant environmental permitting conditions.

"They think you have no credibility unless you tell them they need to bribe someone!!!"

The email did not name the former senator but said he was "well-connected politically, militarily and economically" and now worked in private industry helping foreign companies with mergers and acquisitions.

WikiLeaks on Monday began publishing a huge tranche of emails from Stratfor dating from July 2004 to December 2011 in a move the anti-secrecy website said revealed the "private lies of private spies."

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## **What's real motive for fighting dredging?**

**John F. Swaim, Posted April 8, 2012 at midnight**

The Record Searchlight, Redding.com

<http://www.redding.com/news/2012/apr/08/john-f-swaim-whats-real-motive-for-fighting/>

While the well-funded lobbying efforts of the Karuk Indian tribe and others continue to perpetrate falsehoods concerning recreational mining in the streams of California, I have to ask a basic question: Why do they expend that kind of money and effort in order to stop the miners from exercising both their rights and their bodies while enjoying themselves?

Is it because of a deep and burning desire to protect and respect all creatures? Or is this yet another avenue chosen to ruin what all the rest of us have long enjoyed as both a hobby and a source of supplemental income? Or is it their desire to completely eliminate the economies of towns like Happy Camp, Callahan, Columbia and Downieville. As a life-long fish keeper, fish breeder, fisherman, and lover of all things aquatic, I choose to couple those passions with my degree in biology in order to make an informed decision on topics such as this, and here's what I know.

Given the rules already in place regarding fish habitat preservation, spawning season dredging abstinence, protections for exclusion of dredges from gathering pools and inflows of designated creeks as they enter the rivers, prohibition of dredging activities from sensitive stretches of rivers, limitations on dredge size, etc, we are indeed acting as conservators of the environment. The claims that dredging sucks up fish eggs is frequently cited but completely false — no dredging occurs when the fish are actively spawning. Previous and now recent scientific studies have verified the benefits provided by the de-compaction of stream bed gravels via suction dredging, releasing nutrients for the fish while creating new spawning beds and rejuvenating the existing ones.

As for the agitation and release of old mercury deposits by dredgers, I don't see much evidence for that. I know that some miners do capture small amounts of mercury on rare occasions in their sluices and dredge boxes and I know they don't dump it back into the stream as doing so would be the same as poisoning themselves.

If you would like to establish a depository for mercury, buckshot, boot nails, plastic, cans, bottles, and all other manner of scrap and trash that we miners do remove from our beautiful California streams, then tell us where to bring it. As for the politicizing of an outdoor recreational activity, I say shame on you, and I would like to remind the elected officials in Sacramento that we miners are all out here paying our taxes, and we tend to vote and we don't appreciate being run over by your self-serving political aspirations as they relate to suction dredging.

I may be classified as a non-native in Native American parlance, but as sure as water drips from the skies, this too shall pass, despite your best efforts to prolong the notion that we do not belong here. Hello, hunters, better watch out, they'll be coming after you next. Then what about all the trampling trail hikers, you dirty birds, you'll be next, then the boaters, snow skiers, rafters, then the fishermen. They'll get to us all eventually if we let them. Time to wake up and smell the coffee all you fellow outdoors loving folks. I am privileged to be living in California, mainly for the great scenery and recreational activities available to us all. I very much enjoy camping and prospecting. Any new regulations on tent size I need to know about? Every one of you needs to stand up with us miners before all of our activities are regulated out of existence. The storm is upon us.

It is now or never. Do something or forever be the one left standing on the shore, waving good-bye to all the pleasures and the life you used to live fully and live for. Stand with us, be American, be proud, get loud!

*John F. Swaim lives in Redding.*

**Our Next Club Meeting: April 26th, @ 7:00**

Visit our website at <http://www.millenniumdiggers.com/>

The Millennium Diggers Club is a group based in Keizer, Oregon, which is near Salem, Oregon. The club is for people that share an interest in searching for things of value. The club's charter is to provide members with a club that will help promote the hobbies of metal detecting, prospecting, rock hounding, and treasure hunting. Part of our yearly dues pay for mining claims that are available for all club members to use. We use club meetings to share information about locating gold, silver, coins, jewelry, gemstones, fossils and metal detecting. We plan club outings each month where we can help each other learn all aspects of our hobbies. This is a great family activity, bring the kids! Please feel free to drop in on one of the monthly meetings or outings.

**We meet the 4<sup>th</sup> Thursday of each month, 7:00 p.m, at:**

Clear Lake United Methodist Church

**920 Marks Drive**

**Keizer, OR 97303**

We meet in the church's Fellowship Hall; a real a nice meeting place complete with tables, chairs and a kitchen. The church is located across the street from the Clear Lake Fire Station. There's plenty of parking in the church's parking lot.