

Prospecting For

And

Instructions On How

To Finish Fire Agate Gems

In this booklet I will do my best to help the lapidarian who wants to start working with Fire Agates as well as those who only need a little help on just how to get started. In turn I will do all that I can to encourage the reader who is not a lapidarian to be able to start a lifetime hobby of it. I will also include as much information as I can possibly find on the subject through researching current books.

It has been said that knowledge is wealth. I have found that wealth is not found in monetary means alone. To me happiness is the ultimate wealth. Even if you never do work with rocks, it is nice to learn as we go through life. Who knows it could spark that tad bit of interest that would start you on the road to being a true rock hound for life. In turn be able to share the beautiful world of lapidary with millions of rock hound people around the world, who I feel in my world are among the finest people I have ever had the pleasure of knowing.

Sometimes in life it is just that little spark that sets off the interest in your mind that in some way will change your thinking for the remainder of your life. I wish that every child had the opportunity to go out with their parents hunting rocks together and finding the things that set us apart from the other animals on our planet.

I am going to do my best to give you as much information as I can find as well as tell you what I have learned in my life time about Agates as well as Fire Agates, from how and where to find, them as well as how to go about getting the best out of your stones.

Good Fire Agates are as impressive in their color display as fine opal, but far less expensive. It is also much harder than Opals. They are many times harder than any Opal. Also they will not absorb body oils or any other chemicals, detergents or other oils in our environment, as do Opals.

I owned the Deer Creek Fire Agate mine at Deer Creek AZ. near Safford in the early 70's. I saved lots of the agates in the rough so that when I retired I

might have stones to work as a supplement to my income as well as having stones to work as my hobby. I do love being a rock hound, and as a child I was raised in a family that hunted rocks on weekends and every time they had time.

My Father was a stonemason and built many homes out of native rock and stones from all over the state of Texas. I was born in a big 2-story home that my father built before 1936 in Brady Texas. My parents did not do any lapidary work but they were rock hounds and had a big collection in our yard. All the beautiful colors as well as the beautiful crystals always fascinated me.

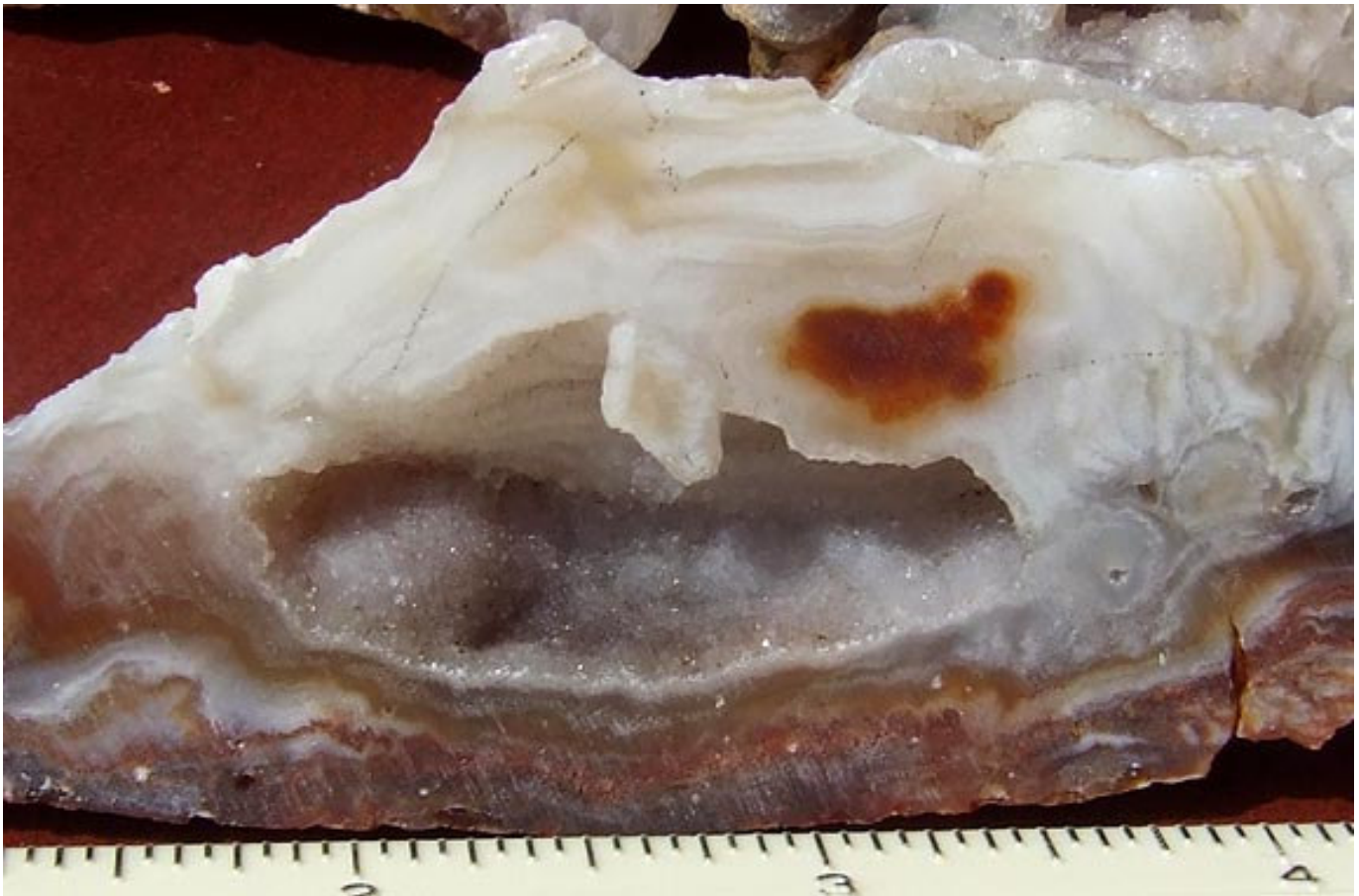
Cutting, grinding and polishing Fire Agates is one of the most rewarding things I have ever had the pleasure of doing in my life. It is to me more rewarding than opening up Christmas presents, there is such an element of surprise, not only in seeing the beauty of all the colors, but in the thought that you have opened up a window into the past and discovered the beautiful gem that nature made. Gems that have been in storage for millions of years just waiting for that someone to mine them out and go to all that trouble in order to let the world see them for generations to come.

It is nice to sell my stones so that I can continue to buy the diamond tools and equipment needed to keep on cutting and grinding my stones as long as my health will let me. I live on a limited budget and I simply cannot keep going with out selling my stones. I am 71 now and I am compiling this information with the hopes of informing people of the fact that Fire Agate exists also with hopes of selling enough stones to be able to continue my work. I will start off by giving a copy of this to anyone who will simply ask for it.

We have taken several photos, as I go through the stages of sawing, grinding and polishing. As they say a picture is worth a thousand words.

I hate not to share with the younger generation what I have learned in my life about Fire Agates, it has not come without mistakes, as I did not have any one to help me in any way.

I can only hope that with this information there will be many stones opened up for the world to enjoy because of my efforts. I have a good retirement income so I am not doing what I do for money; it is for my happiness and contentment with and for my self as well as hoping to help others to find what I have found, the JOY of working with Fire Agates.



#1. In this first picture I have sliced a nice big Fire Agate in two vertically, in order to show the reader the many parts that make up the complicated structure of a Deer Creek Fire Agate.

You will notice the spacing in between the dark layers and clear to white layers, this will let you see that nothing is flat and or regular in any given area. Although I do finish many of my stones with a flat top it is not at times advisable to do so. This picture is your window into your stones structure so it will prove valuable to you if you do finish Fire Agates. Many times the bottom of a finished stone will look like the finished top except for the fact that everything is concaved in the colors that appear in reverse. There is lots of Chalcedony to saw off in order to ever start grinding on the stone. I do not advise working a stone of this size until you have worked out the challenges of the smaller stones, you will gain confidence in your self very fast after your first few stones. Fire Agates like this one that are carved are beautiful and creative, the fire adds so much to a carving.



#2. In this picture you will see mostly the type of country rock that is from the area of Deer Creek in Arizona. Every mining area has a slightly different type of country rock and no 2 are the same in comparison. Some people go to extreme measures of removing this material with Acid that is a total waste of time, as well as not necessary or good for our Environment. It takes fuel to make acid and the process puts acid into our atmosphere, KISS. (Keep It Simple Stupid) You can either saw the soft stuff off or grind it off. You will know when you hit the Agate, as it is so much harder.

The sawing and trimming is very fast as well as simple.

I have trimmed most of this type thing off of my stones, as I do not want to sell junk country rock, I only leave the Chalcedony, as that is up to the cutter to leave the part that he or she wishes.

Personal preference is one thing but learning the proper way to finish Fire Agates is another thing.



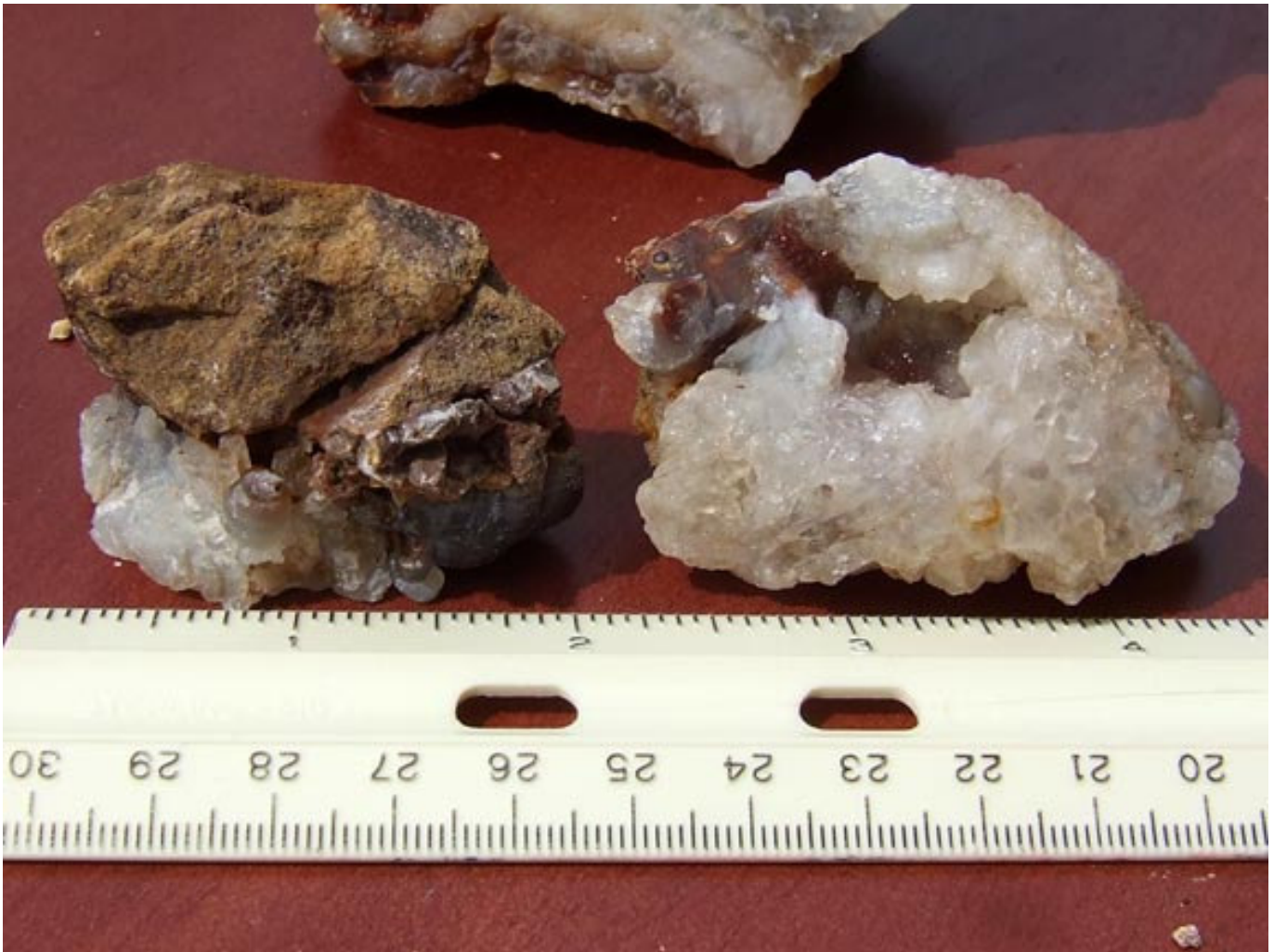
#3. In this photo you are looking down on an unusually large Deer Creek stone that came from a large cavern that was lined with a coating of beautiful sparkling gems as well as beautiful Quartz crystals. This will let you see just how hard it might be to follow all of the contours with Diamond Burs. I have this gem in my personal collection. Some of nature's creations I refuse to destroy.

I have several small things just sitting around that I enjoy looking at and I will be glad to take pictures of some of them to send to you if you wish.



#4. In this picture you will notice that the pieces are of a manageable size and that all of the stones from Deer Creek have a distinctive white top and either a small amount of country rock on the bottom or at least a dark bottom. NOTE: When I refer to the bottom, it may have been the top of the stone when it was in a cavity being formed.

I must say that is a little tricky to saw off these tops and I sometimes do not attempt it as I do not want to take a chance on cutting off the top of a stone and rendering it a wasted Gem on my part. Many times I simply whittle off a little all over the stone in order to appraise it and decide just where I think the fire starts, as well as how it might lay. This will come as second nature after a few stones; every cutter has his or her style after only a few stones. Being afraid to start is OK, as that will help you to go slow and not mess up a beautiful Gem.



#5. In this picture I show the top of the stone on the right side covered with clear to white Chalcedony, on the left is the bottom which still has a lot of country rock still attached. This is a very soft material compared to the Chalcedony, so it can be either sawed off or simply ground off. I grind it off and it takes only a second as it grinds like a piece of cake. Some people put their stones in a big tumbler and let it take the soft parts off using only water and a drop of detergent this is fine and you do not have to worry about going too long as that can not happen. It would take months to damage the agates in this way. I truly doubt it they could be damaged. Although the layers in the Fire Agate vary in hardness's I have found that if it is a soft layer you do not want it any way. Several times in my life I have had stones separate along fault lines where a soft layer did not bond to the layer above or below and this fault zone was so soft that it washed off like dry powder. This I believe was due to a gap in time between steam events forming the stones or a time of super heated dry steam such as occurs in power plants today.



#6. This is a small stone that I was grinding down with a Diamond Burr as the fire was so irregular and of such a beautiful color that I had to go slow and follow the contours of that color.

Many of the color layers are so thin that it is of no use to try to save them, these I refer to as ghost colors as they are never a clear clean color.

I never do this type work with out my visor as well as a dust mask, I try to keep the stone cool with a tad bit of water and this in turn truly cuts down on the dust.

I love carving but I simply do not do it except where I think I need it. At my age sitting and carving is truly hard on the old body not to mention the fact that I had major back surgery 4 months ago, so I am simply not up to it. Although I must do it enough to clean up my many stones as they go through the polishing processes, I only do it when I must.



#7. This is a larger stone that would of taken lots of time to get it in this shape; if I were to have done it by hand with my diamond burrs but this stone actually separated in a soft fault layer and is now ready for 3 weeks in the tumblers, in 3 different grits and then to polish for another week or two. You can use up lots of diamond burs and take so many hours of grinding to get one into this shape.

This is one of the reasons that I take so much time to analyze a stone before I jump in and start sawing or cutting.

Nature did this one for me. If you look at lots of finished stones as I do you will discover one from time to time that the lines of color are evident on the finished stone as the colors are of different hardness's. Look a lot and cut or grind just a minute and look again. It is so easy to go too far and impossible to back up.

Nature formed these Gems in layers over the millennia and in such thin layers that it is now up to you to decide as to how you wish to remove the layers so that you might enjoy their beauty.



#8. In this picture you can see that I am slowly grinding away the top of the stone, also you can see the bottom with the brown that is on every stone that I have ever cut. I hold every stone with my fingers so I just have to be careful. This 8" Diamond wheel removes the Chalcedony truly fast. My finger nails also as I get too close to it. So as I say, Go slow, Look A lot, Grind a little. I have never tried to grind and cut Fire Agates indoors; I have always done all of my work out side except finishing up work. I need the sun to help me see where to start as well as to stop. I love working out side so that helps to keep me happy as well as healthy.

When my fingers get so thin that the pain is hurting too much I then must wear those pesky exam gloves like doctors use.

I need to feel the stones so that I have complete control of them, I know that no one will ever cut and grind as many as I do, so you will not have to be concerned about thin fingers, as I must.



#9. Here, I have stopped to trim off some of the rough sides before I saw off the rest of the Chalcedony, or at least some of it. As I have said I only saw off when I know I can do it with out going into the area of fire. I sometimes grind down on one small area so as to find the area or layer of fire, so that I can then decide whether or not to go ahead and saw off a little or simply go ahead with my grinding away slowly. Patience is the key to success.



#10. In this view I am taking out an area of Chalcedony, that I must hand remove with my Diamond burrs, then smooth up and make ready for the next step. I worked on this one for some time then decided to leave some of the Chalcedony, for if I took it all out I would in fact cut the stone in to two pieces, I like it as it is.

I will take another picture of it when it is finished and out of the polish so you can see how it turned out.



#11. As you might see in this view I am keeping my burr a little damp in order to cut down on the dust that can kill your lungs in a short time. You can see here that I have decided to leave the Chalcedony and clean it up so as to compliment the Gem when it is finished.



#12. Taking out the milky Chalcedony can in places take many hard hours of grinding out and being careful not to grind out too deep.



#13. This is a large chunk that was a bottom and a side of a cavity where it was formed. It is clear that the 2 grew together and must be sawed in two in order to take the tops off and get down to the area where the colors begins on both sides. There are times that you will loose one of the two when you saw them apart, it is a decision you must make when you separate them like this.

If I were in doubt I would grind them down slightly on all sides until I could make an intelligent decision. If you go slowly you will not mess up. I have my self at times but then I have done several thousand stones in the past 30 + years.

If, you do mess up one of my stones please if you wish send it to me and if I cannot salvage it, I will send you a fresh stone to work. And I will pay the postage on it. Only a man with rocks in his head will make you a deal like that.



#14. Sawing the 2 apart. As you can see this is an out side job.



#15. Here you can see a little color in both halves but the true colors are deep down through the Chalcedony, and more near the bottom. This is now the top of both of these stones. This is where the serious grinding begins.



#16. The stone on the left is the bottom of one half where as the one on the right is the top of it with the Chalcedony not yet removed.

These two stones are quite large for a typical Deer Creek stone; most are half this size or smaller.

The one on the left was formed inside a smooth walled cavity and it broke out slick on the back side and has little to no country rock attached, just the slightest bit of grinding on this stone will reveal the bottom of the Fire Agate and might show a reverse side of the Fire. I have mounted pendants with stones that had fire on the front and reverse fire on the backside. They are truly beautiful and must be mounted so that both sides can be appreciated.

I am constantly looking for small stones that are alike enough that they will make a set of earrings.

Although there will never be any 2 stones alike they are at times the same in color and size, although not in shape.



#17. These are a few of the stones that are just out of the polishing stage. We try to have either a penny or a dime in our pictures so that you can automatically get a fast accurate idea of the stones true size. Also we will take more photos of a stone if you wish.

If anyone ever buys any thing from us and is not happy with it we will be glad to refund their money if you simply return the stone or the Gem.



#18. This is an old picture of our beautiful old air compressor that I dearly loved and the nice new backhoe that we bought to help remove some of the large amounts of over burden. All of this was just before our First oil crunch and the price of fuel went up and our sales in Lapidary Journal went down. It was the beginning of the end.



#19. This is another picture of my wonderful beautiful air compressor and some family members picking up the beautiful rough stones. We thought it would last forever. Nothing does.



#20. As you can see this is a family affair. Mr. Vernon Hicks from Boerne, Texas. Who now lives in Brownwood, is by the truck. I could never have gotten the mine opened up with out his help. WE are trying out our new old drill on a big rock as well as the antique Zepher air compressor, with the Buda engine.



#21. This is my self and my son Gary and our wonderful loving Faithful companion, Lobo.

As you can see the stones in the bucket are all small stones, we did come across a few large cavities that were lined with agate and that broke out in larger pieces. Some were as large as a basketball and I did not own a camera in those days.



#22. This is my storage bin; the weather has no effect on the stones other than wash them at times. These were mined over 30 years ago. As you can see most are rather small stones, which was typical of Deer Creek stones.

After this picture was taken I went through the stones one at a time out in the sun and separated them into 3 classes and I put them up for sale, as I cannot in my lifetime cut and grind them all.

I have put aside several that I will do myself as I have time.



#23. Gosh what a motley group of Gems. This is a few of the different stones that have been in the polish, I inspect every one to make sure that there are no flaws in them before the next polish stage. Some are customer's stones so I take pictures of theirs, so I do not get them mixed up.



#24. This is another batch of stones. It takes hours to check them all.



#25. This is my wife Suzanne doing a little grinding in our Shop.

It is nice on nice days, but bad on bad days.

I try to cut and grind from 6 to 10 hours on summer days but we still work all winter on good days. Suzanne is the brain of this out fit.

It will be nice when she retires from her everyday job.



#26. This is Suzanne showing off her handy work. The rocks in the background are building stones we hauled in from a neighbors ranch near by. It is nice to have our solar powered light to work by, that my friend, is saving. We plan on having our home on total solar in a few years.



#27. Suzanne had to cut open a small Geode. She loves getting out of the house; She works a regular job 6 Hrs. a day.



#28. Yes, Suzanne can work Fire Agate and play a little.



#29. This is Leon, doing a little sawing. The lake is in the background but I am having too much fun to go fishing.



#30. This is my workbench.

My wife and lots of other people think I am crazy and have rocks in my head but I love opening up my presents so much that I will stand out in the cold with cold water running over my hands so that I can get a look at that next window into the past. The only thing I regret is that I can not share this pleasure with so many young boys and girls who do not have parents that can take them out into the rock hunting world and get close to our real world and not only discover it's beauty but in doing so discover themselves.

My grand parents came from England where my great grandfather was a stonecutter as well as a stonemason for the King. So the love for rocks is by nature in my blood. Although I am retired and now 71, I am still sawing and grinding and working with Fire Agates almost every day and I still truly love it.

The morning that I saw my very first truly fine Fire Agate stone mounted in a ladies Gold ring, I bought it. It was on a cold morning in a little town in Arizona. I had to ask the man at the rock shop, "Where did that stone come from?" He said, "Deer Creek, here in Arizona." I thought I must come back to Arizona some day to see this mine myself. We were on our way to a new job in northern Nevada as I had taken a job as Mill Superintendent and was in the process of moving my family to Mountain City, Nevada.

I have loved prospecting for gold as well as any thing else that either looked beautiful or was valuable so this was only another chance to prospect another area and get well paid to work in that area. Gosh how nice it is to be paid to move all over the world and be able to do my prospecting and be on vacation with my family at the same time.

My mind never quit thinking of the mine in Arizona, I wanted to go look at the mine to see what it looked like and see if by chance, I might buy some rough stones to work out myself, as I had all of the lapidary equipment to finish the stones.

Well as it turned out in a few years I was once again in Arizona so I went to the mine to see first hand, and where and how the stones were mined.

Well it is a long story, I managed to buy the mine and with the help from an old friend we opened the mine and started our wonderful adventure. Looking back to that time, I can see now how much fun it was and what a wonderful time of my life it was.

When I returned to Arizona I asked around and found out where the Deer Creek mine was located and I went to the mine and found a young man and his

wife camped out at the mine. They were working the mine by hand while their baby slept under the shade of a juniper tree.

Their old truck looked as if it might not be able to make it back to town. The young man had a few rough chunks of rock that he told me was Fire Agate I asked, "And just how do you know that?" He replied, "Well you see the brown color on the bottom of them?" I said, "Yes." He said, "That is the first Iron that the steam brought up from the volcano and deposited it here." I asked, "Are you a Geologist?" He smiled and said, "No, but I have been mining Fire Agate with my hands long enough to know how it is formed." I found out later that he had mined in Mexico where his wife was from, that he was working this mine on the shares for a man in Tucson, Arizona, and that the mine was in fact for sale as the man was getting old and wanted to sell the mine.

Well my heart skipped a beat, as that was music to my ears. All that I could think of was gosh I would love so much to be just as he was, on my hands and knees digging for my beautiful stones. But I knew I could not do it as I had my first responsibility and that was my wife and son. I knew if there is a will, there is a way, so now all I had to do is find that way.

Well as it turned out we sold our home and land in Texas and bought a camper and moved to a ranch down by the dry riverbed closest to a road where my son could catch the school bus. The rancher who owned the land was so nice and he let us camp out free of charge, he also said that there were way too many deer on his ranch, and it would be fine for us to shoot one whenever we were in need of meat.

My friend Mr. Vernon Hicks, who was a truly good mechanic as well as a wonderful person, along with his wife Lola and son Paul joined us in our venture. It was summer time and the children were out of school for the summer.

We found a very old Zephyr air compressor with a Buda engine that had been discarded and set back in the rear of an old mining equipment junkyard. This old faded out yellow monster was the beginning of the happiest days of my life. Gosh what a beautiful old machine it was. We managed to make a deal on it and yes we got it running. Then as luck would have it that beautiful warm summer day in Arizona we also located an old air hammer as well as some old air hoses and a box of antique drill bits and away we went. Gosh what happy days they were! I had quite a chore of getting permits for dynamite and then building a dynamite storage box that was Federal and state approved.

The mine was up in the foothills of a beautiful range of mountains and to me it was one of the most beautiful places on earth. I was not only at work; I was at home in my own little beautiful world. This was beyond a doubt one of the most beautiful times of my life.

It has been over 34 years now and the thrill of cutting into a new Fire Agate that I mined back then is just as exciting today as it ever was.

My little world had fallen into place but like all dreams in life things happened that I could not stay, so I sold my interest in the mine but before I did I asked a friend to please store up several pounds of rock for me and someday I will be able to work them when I retire. He was a schoolteacher and was not a miner as I was and did not move all over the country like I did.

I now have the time to open up my sleeping dream and be able once again to look inside my dream rocks. I am in the process of writing this "How To" book, manual or what ever you might like to call it on Fire Agates, so I can share it with the world.

I know it is one of the least prospected minerals in the USA, and world as far as that goes. It is one of the hardest stones to cut and grind successfully than any other type of agate. I know from experience that it is much easier to mine than gold, as the reclamation permits for a gold mine in this age are all but impossible to get.

I know after working for different Mining companies that it cost millions just to get all of the permits before you ever break ground on a new Gold mine. Where as a Fire Agate mine is in no way bad for the environment and it is very easy to acquire a mining permit for a Fire Agate mine.

There are not many mines in Arizona that I know of except on the Indian reservation near Peridot, Arizona. They will not allow mining on the reservation, except by the Indians and the chief will not allow machinery on their land.

Even then all of that mining is done by hand and by Indians. By hand and in hard volcanic rock, that is a slow process and with very little production.

Fire Agate is formed in and around volcanic activity which the entire western US, is such an area. There are also lots of volcanic remnants in the mid west and in the east with lots of good different agates, so I know there must be Fire Agate out there some place besides Arizona, California and Mexico. I believe if people knew how to prospect for Fire Agates you would

see mines opening up all over this country as well as the world producing lots of beautiful and different colors of Fire Agates.

There are hundreds of kinds of agates world wide but Fire Agates have only been found in the US and Mexico to date, but we all know the world is covered with volcanic activity so it is only reasonable to state that there are lots of undiscovered Fire Agate Deposits.

World wide, people do not get out like they did only a few years ago and spend time in Nature. There is a problem with people staying in their homes or in their cars and not getting out like we did years ago. You hardly ever see a family out looking for rocks as a family outing. Also I have noticed a sharp decline in rock hounds, and active rock clubs as the older generations die out.

If you want to be aware of what to look for while out in the country I will do my best to give you an idea of what to look for and how to test your stones to see if you do have a potentially beautiful Fire Agate, just waiting for you to open it up for the world to see and enjoy for thousands of years.

Fire Agate is so hard and so tough that it will be a beautiful shiny stone after hundreds of years. Opal is a hardness of #5 where as Fire Agates are a #7 in hardness and will cut glass. Diamonds are a #10 in hardness.

Looking for Fire Agate does not take any special tools at all but I do and will advise you of what I think are things that you need to put on your priority list.

I will start off with a Good hat for your head, then a canteen full of good fresh water and a compass as well, it is very advisable to do your best to go with a friend or family member. Always tell someone where you will be going and when you will be coming back. I have prospected by myself for years but it is not a good idea and it is so much more fun with a friend.

I was lucky in the fact that I took my family when I went prospecting as often as I could when they were at home. I am in better physical shape and in much better health in general than most men half my age; I contribute it to my lifetime of working and playing out in the open air. You do not have to live in Arizona to go prospecting; you can find lots of public lands where it is not only legal but also lots of fun in almost every state. I have walked over 7 miles a day, many days up hill and down through canyons looking for what ever, and as a by product I found my good health as well as lots of truly beautiful stones that I have cut and polished.

When you are out prospecting and you see a rock that has some part of it a nice white color and it looks out of place it could possibly be an Agate of some kind. I have picked up agates out in the desert that have turned to a soft white on the out side as they have been out in the desert sun for thousands of years.

So when you are out looking, look at any stone that looks out of place or looks in any way different than the other stones.

The next thing to check is the hardness and that can usually be determined by its texture. If it is slick and shiny it is usually a hard stone. If the stone has a color in it along with white then there is a better chance that it might be an agate.

If it has definite colors banded through it then it might be a nice banded agate. But if the bottom just has a brown color there is a chance it is a Fire Agate especially if you are in a known Fire Agate area. The brown is the bottom and the white is the top, the only way you will know for sure is to either grind or cut the white top off. I can tell you now if you go slowly you might be in for a pleasant surprise.

I normally like to grind the bottom down a little or cut some of it off in order to remove the bulky host rock that has no agate in it, if it has not been weathered out from the host rock long enough to have worn clean.

The main things on grinding or cutting Fire Agates is to GO slow and do your best to grind or cut horizontally with the bottom. I can tell you after grinding Fire Agate now for over 30 years I have cut too deep and ground too far in and lost several truly nice stones and they all were lost by me getting in a hurry and going too deep, too fast.

I have found that as the layers of minerals were laid down that it was as if it were laid down on top of a pile of marbles or small BB like round objects, some of them were formed on just plain dirt where as most were formed in cracks in-between solid hard rock. The layers are like the skin on an onion.

Also I have found that some of the layers were not bonded to the previous layers and would separate as if they were carbon copies of the layer below. In many finished stones you can see the lines in-between the colors, as they are not all the same in hardness, I have found that many different agates are of different hardness's. In my opinion Fire Agates are more prone to hardness change with color change than any other type of Agate. Although it is not true in all agates, I have never found soft and hard places in Agates such as Brazilian Agates with areas of changing colors.

In Fire Agates the many different layers that were laid down were laid down in different time periods and with different amounts of silica in solution and this in turn might have been interrupted periods of time as much as years or much longer time periods which accounts for the many different hardness's in layers as well as the contaminates such as iron and other trace minerals in the hot steams.

I have used diamond burrs at times to follow these color seams so as to keep the color that I wanted and I had to remove the thin blanket of other colors that I did not want. It is a simple reverse of what nature did.

It is very tricky to not grind too deep as you also lose a thin layer as you go through the many stages of polishing. I normally start off with my #80 Diamond burrs then drop down to my #120 grit burrs then I run them in my tumblers with #80 grit for one week. Then hand touchup where needed and run them another week in #220 grit, then take them out again and hand touch where needed. Then I run them another week in #600 grit with Quartz sand. Next I run them in Cerium Oxide for the last week. I always find that a few stones must go another week or 2 after that in order to accomplish the shine that I demand.

It is also truly important to do your best to keep going in on your cutting and grinding as flat as you can until you determine where the fire is and how it lays. I might grind down the top for a while then the bottom if I see that I cannot find where the fire is.

Not all agates from a Fire Agate area have fire, and lots of the ones that do have are not all good either. No one can look inside a rock and tell if it will have good fire or not. When I am out in the field or at the mine and I pick up an agate that is clear or has no color on the bottom side I throw it away as it may be a beautiful stone for someone doing carvings but I am not into that so I leave it for them to find.

Now that I am retired I still stop and check out lots of streambeds both wet and dry, also lots of ranchers in the southwest do not mind for you to prospect and pick up rocks on their ranches. All they ask is for you to ask first, and be sure to close all gates and do not throw out trash. Some of the finest agate comes from ranches in Montana as well as lots of other states and I know that there must be Fire Agate in places other than the known places where we find it now.

Agates being so much harder than their host rock erode out through time. Given enough time the harder pieces gravitate down into streambeds and washes. As these different sizes of hard Agates tumble they are ground down to the point that there is little or no mother rock still attached.

It is not too hard to walk up dry streambeds as well as streams and look for hard smooth shiny rocks that might be some kind of Agate. I have found that in the deserts of the southwest it is hard to find a place where there is not some kind of Agates just laying out in the desert that have eroded out of the mountains over the millennia. I love this type of Agate as they too are so beautiful and you never ever see any two that are alike. I will insert several maps in this booklet that will get you started if you are in one of the areas that I personally am familiar with. Some of the areas that I will show on the maps might be under claim by now so you should see if any one is working a claim in that area. Most of the areas that I will mark are just Agate areas not Fire Agate areas, except below the Deer Creek mine where I have found some truly nice stones, the river bed down in the flats can come up on a rise very quick and if you see a rain cloud to the east it might come up.

If you do not have the lapidary tools to test your finds there is a rock club or Gem and Mineral club in every city that can help you in determining what you have and even cutting it for you but they may ask for a small charge to cover the wear on the Diamond saw blade as well as the fact that it costs money to operate the rock saws Etc.

If you either find some Fire Agate or just find some beautiful interesting rock and you do decide to saw them or simply grind them it would be so much better if you try to at least visit a rock club. If there is not one in your area then you should as I stated earlier get some helpful books from your library and acquaint your self with some of the basics. I have a yard full of pet rocks that do not require my attention but are there for me to remember a time in my past.

Many people at some point attach the rock that they are working on a dop stick so as to give your hands something to hold on to and also to keep your hands farther from the diamond saw blades or grinding wheels, I have in the past used this method but I simply go too fast when I am working Fire Agate as I go through so many stones in a days time. And I feel as if I have better control with my fingers on the stone.

Formation of Fire Agate

Fire Agate is a layered stone as I have mentioned but the layers are small enough that light entering them forms interference colors known as (fire), which is dictated not only by the amount of reflection ability but also the amount of the trace minerals present when the stone was formed.

The gem is thought to be formed when hot water saturated with colloidal silica and iron oxides as well as other trace minerals invades cavities in country rock and begin to cool.

I believe that is not so. Rather than the theory of hot water I believe the Agate in Deer Creek mine was formed by super heated steam rather than water, as I have come across many beautiful cavities that were full of stalactites and stalagmites with the stalagmite being directly under the stalactite, which could have only formed in that manner if it were steam condensing and not hot flowing hot water.

I know that Chalcedony with iron oxide begins to grow on any available surface (the iron oxides as well as other trace minerals in solutions gives the basic brown color to the gem). As the solutions began to precipitate and grow, layers of silica and iron oxides along with other trace minerals in the steam deposited minute layers day after day, year after year until the steam no longer carried minerals in it, in sufficient amounts to cause colors in the chalcedony.

Then depending on the relative level of those elements in solutions and underlying conditions, these alternating silica, iron oxide and trace minerals formed the layers (Schiller layers) that in turn would cause the brilliant fire in the gem.

As iron oxide and other trace minerals ran out in the solution, colorless chalcedony continued to grow as long as the steam kept coming up through the cracks in the earth carrying with it enough silica to build up the clear to white chalcedony. This is what covers all Fire Agates from the Deer Creek mine. It is what must be sawed or ground off to reveal the area where the colors begin to show.

Cutting Fire Agate essentially reverses nature's process by cutting, grinding and polishing away the thin layers, following natural contours, until you are happy with that color and shape. It is so easy to go too far so it is so much better to stop short of what you might like and go through some of the polishing process and only then decide if you are happy with your stone.

One layer too far and the stone is going to let you see what is in the next layer which might be much prettier than the layer that you were striving to save, or you might have gone too far and the stone has nothing left but dull brown rock. I am hoping that by your reading all of this you will find a beautiful stone that will be a true Gem to enjoy for eons. There will never be 2 stones alike and when the stones are mined out there will never be any more formed, at least not in the foreseeable future as the conditions on earth are not very favorable today as they were in the primeval early stages of our planets formation.

I have never worked with Agate from Mexico but I can plainly see that there is a noticeable difference, at least in the finished stones.

Colorful agates and other chalcedonies were obtained over 3,000 years ago from the Achates River, now called Dirillo, in Sicily.

Fire Agate is in very thin layers of color and is a microcrystalline variety of quartz (silica), chiefly chalcedony, characterized by its fineness of grain and brightness of color. Although agates may be found in various kinds of rock, they are classically associated with volcanic rocks but can be common in certain metamorphic rocks.

When working with Fire Agate you must grind down from the white top and check every minute or less that you are not grinding through the colors. If you find a color but it is just not what you want then go ahead and slowly and evenly grind down and as flat as you can.

Some people stop at this point and continue with Diamond burs and follow the contour of the stones colors. This is a wonderful way to finish Fire Agate and is a very rewarding way. It is very time consuming way but some stones must be finished in this manner to fully appreciate the way the foundation and the stone was before the agate started being deposited on it, some of the agate was deposited on just plain dirt and rock on the cracks and crevices and some was deposited on stalactites and or stalagmites that were laid down in the crevasses before the hot gases and super heated steam started laying down the many minerals that formed the super fine layers of silica to form the Fire Agates. I have dug into small caves that were lined with agate and I had no camera to record the beautiful sight but I can tell you that it looked like the photos of caves that you see today like Carlsbad Caverns in New Mexico. The reason that some Fire Agates do not have colors is the fact that the minerals that formed that specific stone had different mineral composition and it may have color down deeper as there was a much different mixture of trace minerals

at the time that layer was deposited. The super heated gasses and steam that were present at the time that the layers were laid down and deposited dictated the colors that we see today.

Many of these gems are found in Kingman Arizona, to Needles, California area around the Colorado River, with sources of Gem Quality Fire Agate located within the traditional homelands of the Apache - Nde Nation. Various deposits range to the south from Slaughter Mountain into present Mexico and West North West along the California and Arizona borders although I have not myself found any and I do not know any one who has. Mineralization occurred as a result of volcanoes creating hydrothermal activity or super heated waters carrying mineral rich solutions forming the botryoidally crypto crystalline iridescent agate throughout vents of cones. World-class quality, rarity, and spectacular uniqueness as phenomena gemstones fail to fully describe this truly breathtaking and beautiful occurrence of nature. Displaying the spectrum of pure color with durability of agatized silica creates a highly desirable, and precious gemstone. Man has historically sought agate to this day trading in worldwide markets recognizing Fire Agate as a desirable gem, gaining popularity achieving the highest values of the agate species. Demand has elevated the stone beyond collector status as one of a kind jewels with an international following.

I will put in a few maps of places that I know still have a few nice Fire Agates that have eroded down the old river channels as well as small tributaries coming down from the old mining areas. It would be advisable to join a rock club in your area as well as areas where you wish to visit and prospect in. You will find out that these people are not only ready to help in any way they can but that these people are among the most wonderful people you will ever have the pleasure of meeting.

Even though you may not find a beautiful Fire Agate on your trips out in the hills you can buy any number of good Agates so that you can start up a hobby. It is so wonderful and fun, you can work with rocks and stones and gems and minerals all of your life no matter your age. There are lots of good used lapidary units of every size and condition that you can buy at garage sales as well as newspaper ads. I have also seen these units for sale on line through the Internet. I will also include in this short book my home telephone # and ask that if you need help in finding or finishing Fire Agate, if you will call me after 2 PM central time I will do my best to help you. My wife works at home and must use this telephone in her work from 7AM to 2 PM so please call after 2

PM. You can always email me any time and I can get on my computer and help you as much as I am able.

Every library has books on rocks of the world. None that I have found are on the "How To" of prospecting, dealing with, identifying or grinding Fire Agates. Some of the books have short section on grinding, but none seem to be complete for how to grind a Fire Agate. If Fire Agate were as popular as Opal, I would sell out all of my stones that I have in one day. My fingers are sore and cracked and split and bleeding at times but I want to finish up all of the agate that I have while I am able, and it is the most enjoyable thing I can do with my time. My wife Suzanne knows how to cut, grind and finish Fire Agate but it is not a love affair to her as it is to me. Her life is her job and her daughter. Some of my earliest fond memories of being with my mother are memories of her saying, "OH, I found a beauty!" while out hunting for rocks or Indian arrowheads. We hunted the deserts of New Mexico, West Texas and Nevada as my father worked in the mines in Nevada during the war and my mother and I sifted the sand looking for small Indian arrowheads. We lived in a tent near to an old Indian camp where there was a cold-water spring. Gosh, Childhood memories are worth more than gold.

My research has revealed this list of facts. Sometimes you will find quartz-like inclusions growing inside of a Fire Agate. The sprays of needles are inclusions of saginite. These multicolored sprays are highly prized and sought after as rare specimens by mineral collectors, and not found in all Fire Agates. I have discovered that many times the small dots in a finished stone are in fact the end points of saginite crystals.

I do not try to shape the stones; I simply let the stones tell me how they must be shaped. Don't try to force it into any particular shape - if you are uncomfortable with anything but symmetrical shapes or intend to cut only calibrated sizes for standard mountings, you will find working with and finishing Fire Agate a very frustrating job. It doesn't adapt easily to this style of cutting unless you don't mind wasting a lot of color and being satisfied with whatever color happens to be left if any, after you make a predetermined shape out of one.

Sometimes this style of cutting is unavoidable, but if you let the area of best bright color define the edges of the finished stone, you will end up with a much more pleasing and a much more valuable stone.

Often, stones that showed only minimal color and brightness in the gold layers are capable of being turned into extremely brilliant multicolored gems, by having the patience to stick with the grinding.

There is no feeling more exciting than to start seeing a beautiful new bright color coming out from it's millions of years of hiding, just waiting for you to unveil it for the first but not last time since the day it stopped being formed.

Sometimes you win, but more often you lose, if you have reason to suspect that multiple or brighter color layers could be present in the underlying layers it is well worth the time it takes to go slow and see but if you are happy with what you see by all means stop. Some day in the future you may wish to go back and look a tad bit further into your beautiful stone as it will for sure be patiently waiting for you.

We sell lots of our very best stones to jewelers who in turn build beautiful mountings, I know that you can find Fire Agates on the internet from Mexico, that were ground by true artisan's that have learned by cutting and grinding until they knew what they were doing. The only way to truly become good at it is to do it. I am hoping that through reading this and going slow you can and will become truly good at working with Fire Agate with out having to go through mountains of stones to learn to be a true Artisan.

I have looked up the true meaning of Artisan and it states that it is: A skilled worker who practices some trade or handicraft, I believe it should also say that it means a person who truly loves and enjoys that trade.

I wish that I could send a copy of this to every child in the world so as to help them in some way to enjoy the Joy of Gems and Minerals and just plain rocks. Rocks and stones have been the corner stones of our buildings for countless of thousands of years. It was the early cave people who first started working with stones; it would only be fitting to have them as a part of a child's foundation of life.

Fire Agate is found only in the US, Southwest and Mexico and wasn't brought into commerce until after World War II. This, combined with the fact that it's one of the most difficult opaque materials to cut properly, keeps it scarce and mostly unknown to the general public. Most people today never even heard the words Fire Agate. Good Fire Agates are as impressive in their color display as fine opal, but far less expensive, no one ever made a Fire Agate a doublet or triplet.

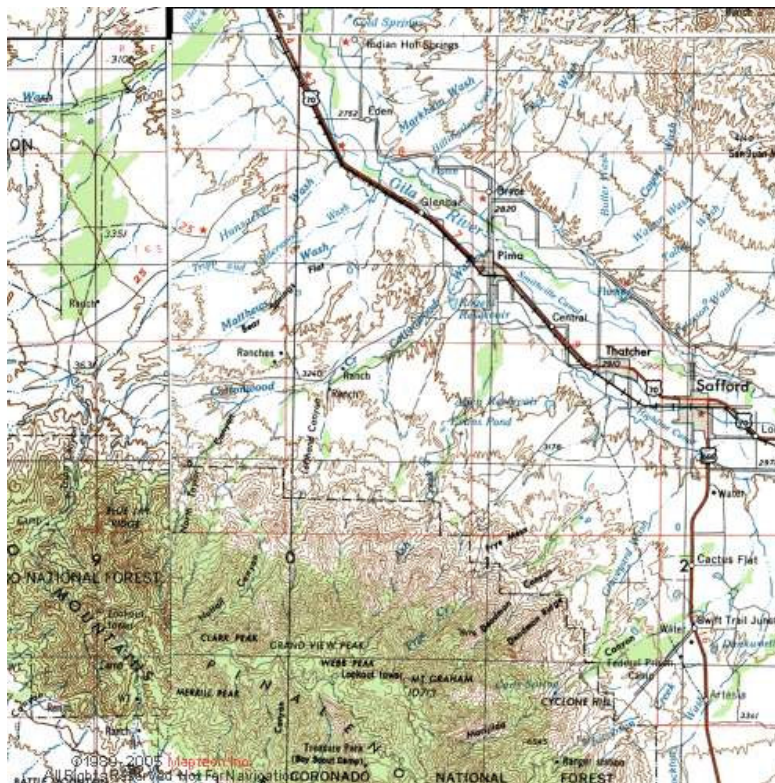
The stone was given its name by Theophrastus, a Greek philosopher and naturalist, who discovered the stone along the shoreline of the river Achatos sometime between the 4th and 5th century.

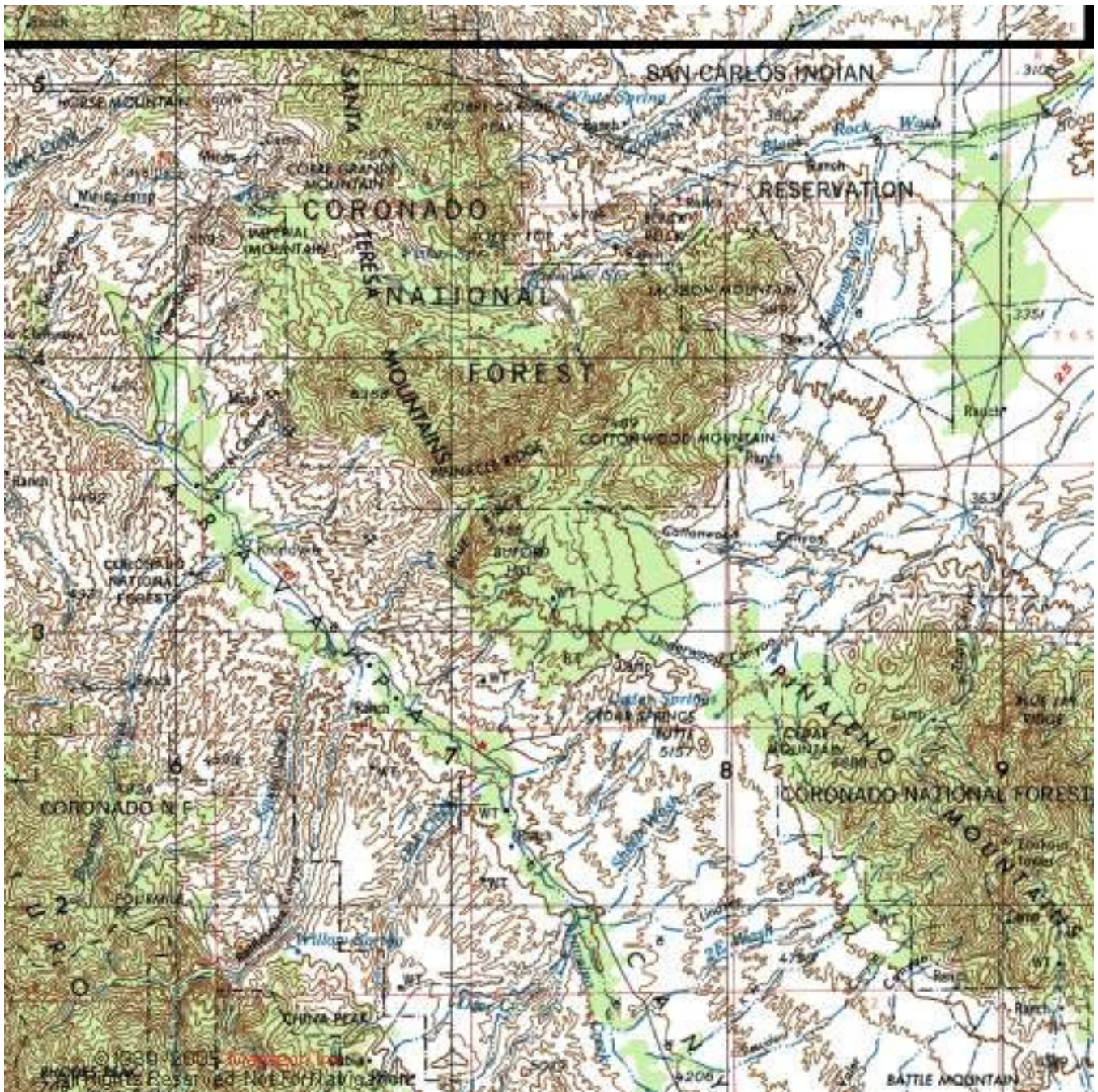
In many traditions agate is believed to cure the stings of scorpions, bites of snakes, soothe the mind, prevent contagion, still thunder and lightning, promote eloquence, secure the favor of the powerful, and bring victory over enemies. Persian magi are also known to have prized agate rings in their work and beliefs.

Some followers of Pagan religions also believe agate is a crystal whose powers can be used for love, mental clarity, and good luck.

Shia Muslims often wear an agate ring on the right hand, the stone engraved with the name of Allah, Ali, or the names of the other eleven Imams. It is known as "aqaq" or "agag" in Persian.

Toughness relates to a material's ability to resist breakage from forceful impact. The toughness of natural diamond has been measured as 3.4 MN m^{-3/2}, [9] which is good compared to other gemstones, but poor compared to most engineering materials. As with any material, the macroscopic geometry of a diamond contributes to its resistance to breakage. Diamond is therefore more fragile in some orientations than others. Agates will keep their shine well and are scratch resistant.





On page #40 you can see Safford AZ., in the far right hand corner. I put this map in so that you could see where we are in relation to the map on this page, 41. If you look at the Aravaipa River on this map you will see that it is in the Aravaipa canyon, there is a small road coming in over the mountain, through the pass. It is a long up hill road and all loose gravel but it is maintained. When you come to the river road you must either go down to Klondike, AZ., or left and back to the Tucson highway. This river road comes to an end when the river cuts through a narrow rock cut that has a game trail through it for mile

after mile, if you are a true hiker this is the one for you as it is a nice long, flat walk but you can not get out if it rains so be aware. There is agate all the way down this canyon from where it starts to where it ends. The most Fire Agates are in the area below Deer Creek. There is lots of thick brush in places that I do not attempt to go into, as there are so many nice clean gravel areas to search in.

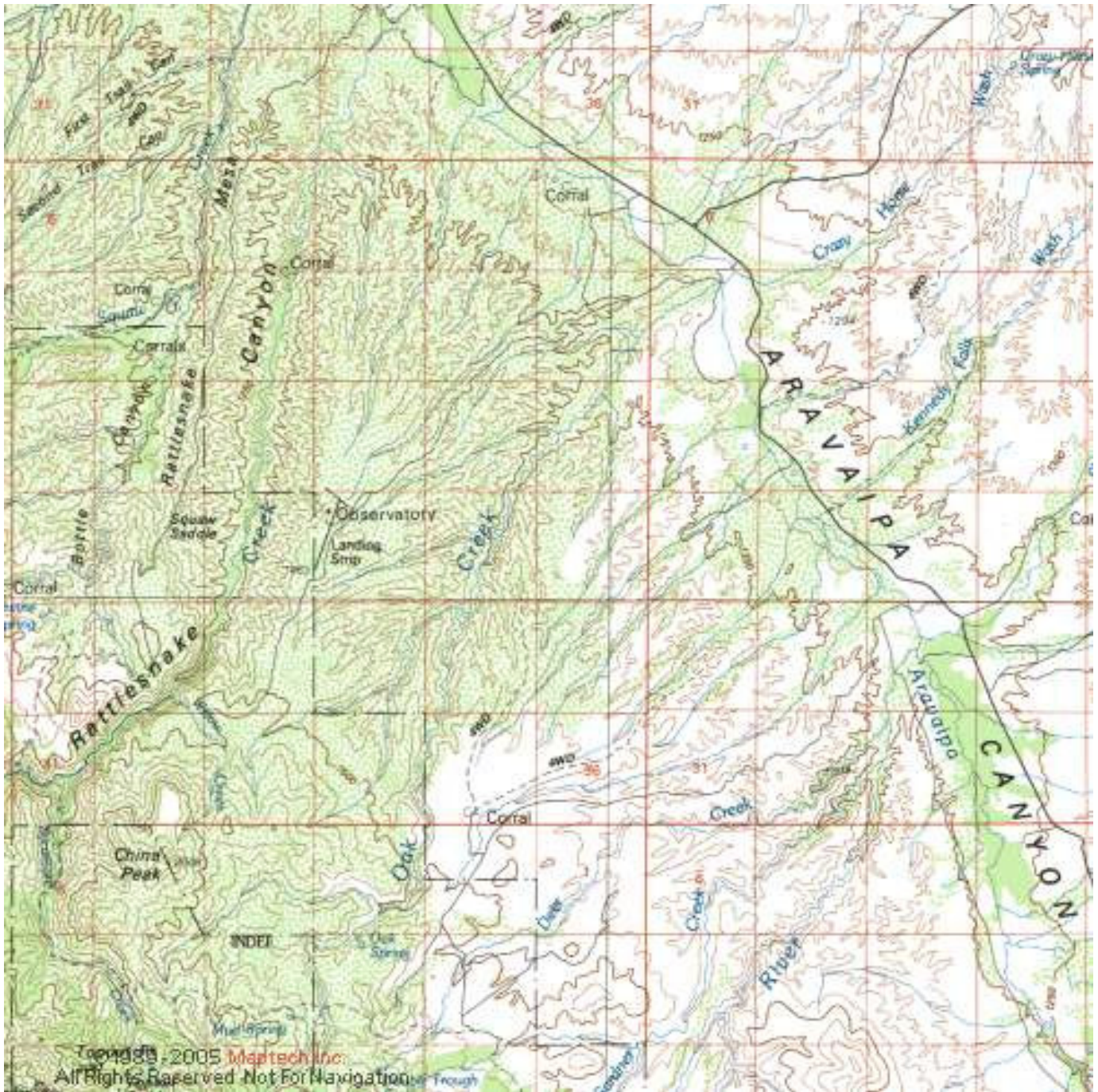
I suggest that you stop at every ranch house and ask if you might walk the riverbed in that area, even if you do not think it necessary, they might give you some ideas of where else to look. The road up from the T that goes to Deer Creek is a good road for some distance, then the last part is, or was back when, a 4X4 road that had good clearance. I do not know if the mine is under claim now but you can find out from the Arizona Bureau of Mines.

The claims in that area for the most part are quite small and with permission from the rancher who has the grazing rights, you can in places walk either up or down small dry ravines. I am not going to put any X's on these maps, as I do not want to ever get you into trouble for misguiding you. If you are in Safford on a weekday by all means go by the college and ask to see the Lapidary class, this is or was the place for info as well as the place to get to meet good rock hound folks.

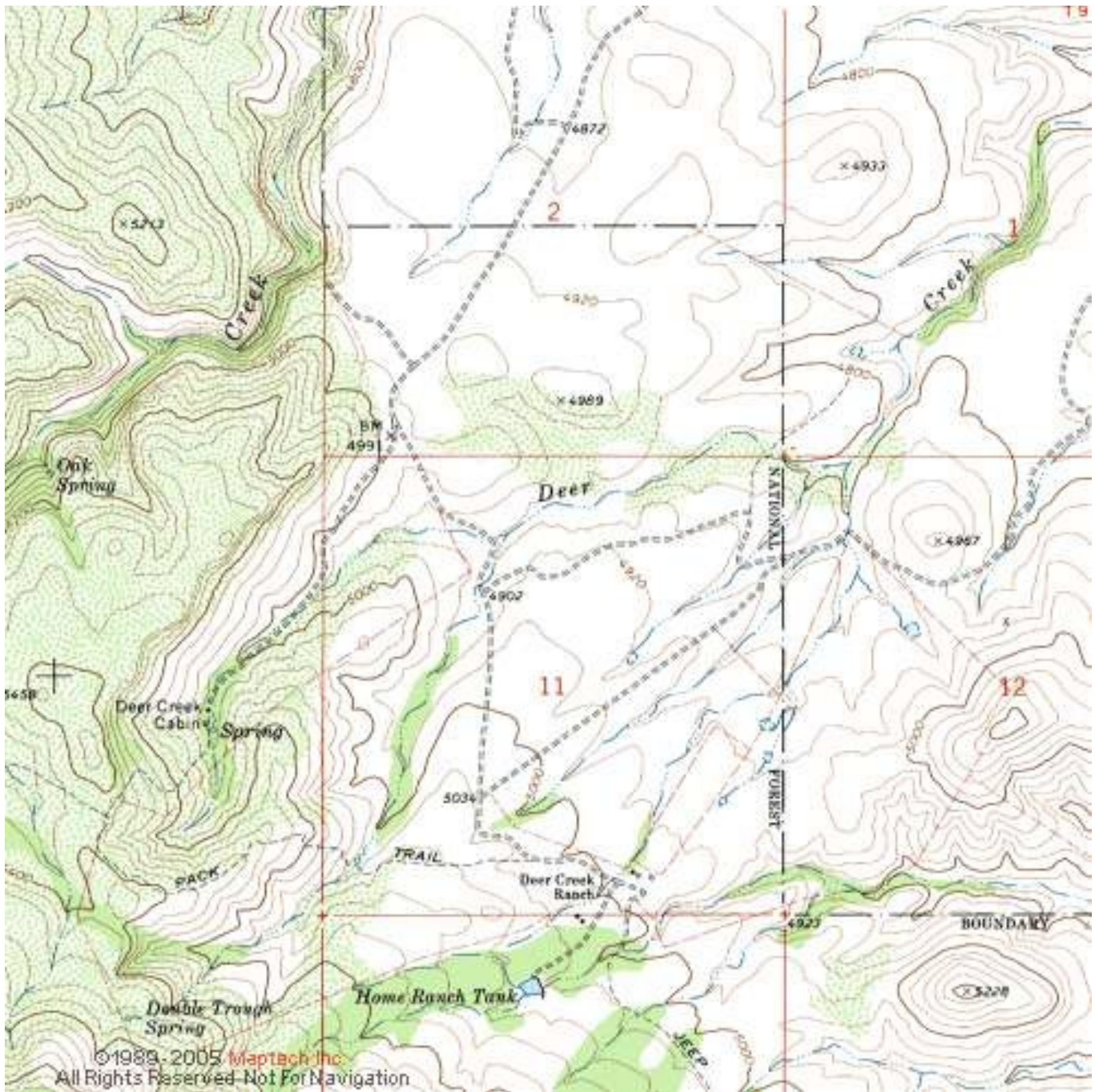
If you do go to the Indian reservation you might like to buy a hand full of Peridot's from one of the ladies who dig it out, the town stinks from all of the garbage but you will not have to be there long. Do NOT stop to look at rocks on the reservation as the Indian police will stop you big time, just a word of caution so as to save you from getting into trouble on your trip.

Rattle snakes in this area are big and small and fast, they are even a jet black and seem to all be mad at you for being in their area, so be aware as they seem to be under every rock or stick. Do not reach into or under any thing as they are in there out of the desert sun. They blend in so well that they are truly hard to see. If you go down the river you will come to some homes before the end of the road and the Walnut trees here might be the largest in the world. I know they are Giants and hundreds or maybe thousands of years old.

The map on page 43 will help you orient your self and with a good AZ. Map you will enjoy your trip. I truly hope that you will not only enjoy this trip but will find a treasure to take home along with your memories.



On page #43, if you look carefully you will see a small road going up to Deer Creek; it is well traveled but not truly maintained. From China Peak to Rattlesnake Canyon you will find Agates in every wash coming down from these mountains, most are worn down and are nice and clean. Oak creek is a big canyon that is good hunting also. When it rains or snows this is not the place to be as it is mud, and no fun at all.



The Mine is on this map but I will not put an X to mark it as I do not want to cause any person not even one small heart ache. Ask before you go and do not let, L-E-T, legality ruin a beautiful day.

Most people out here are happy carefree friendly people and we want to not change them, so please ask. They live out here; they do not like the freeway any more than you do, so please be considerate of them.

Gemological Data

Makeup: silicon dioxide
Luster: vitreous
Hardness: 7
Crystal structure: trigonal
Fracture: conchoidal to granular
Cleavage: none
Density: 2.61
RI: 1.53-54
Birefringence: 0.004

Hardness	Mineral	Absolute Hardness
1	Talc (Mg ₃ Si ₄ O ₁₀ (OH) ₂)	1
2	Gypsum (CaSO ₄ ·2H ₂ O)	2
3	Calcite (CaCO ₃)	9
4	Fluorite (CaF ₂)	21
5	Apatite Opal. (Ca ₅ (PO ₄) ₃ (OH-,Cl-,F-))	48
6	Orthoclase Feldspar (KAlSi ₃ O ₈)	72
7	Quartz (SiO ₂) Agate.	100
8	Topaz (Al ₂ SiO ₄ (OH-,F-) ₂)	200
9	Corundum (Al ₂ O ₃)	400
10	Diamond (C)	1500

Thank you for taking your time to read this, I sincerely do hope that you enjoy your time looking for natures beautiful bounties,

Leon & Suzanne Hughes

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