Saltfork Craftsmen
Artist-Blacksmith Association
April 2011

This is a cross made by Gerald Franklin and entered in the “Trade Item” swap at Terry Jenkins meeting in March.

President's Notes

Gerald Franklin

By the time this issue of the newsletter gets to you, the ballots for the Board of Directors election will have been counted. For the first time in Saltfork's sixteen-year lifetime, Mike George will not be on the board. He has served us well since the club started and is taking the opportunity for a well-deserved break. Bill Davis has also asked for a break so he didn't run again. Thanks to both of these hard workers for their years of great service.

We have had some good meetings since the weather started warming up. It seems like many folks are glad to get out of the house and do some good forging and visiting. For the most part, I've noticed very good participation in the Trade Item program. The hosts are making good choices in their Trade Item selections and the members are going all-out in supporting the program. If you haven't been contributing to the Trade Item pool, I encourage you to do so. The program is strictly voluntary and the neat thing that I've noticed in the past is that the items on the tables represent a good cross section of the collective skills of our club.

I saw our Librarian, Tony Cable at a meeting recently. He was carrying a box in one hand that held our complete DVD library. He is getting more and more requests for loans so his efforts in streamlining the library are generating interest. I would caution prospective borrowers, though, to not let your desire to view this material overload the time available for you to view it. There is a LOT of material on these DVDs and it can take a lot of time to get through it.

Our annual State Meeting and Picnic is coming up on April 16th at Byron and Carol Doner's place in Norman. Make plans to attend. It should be a good affair.

There are still some meeting dates up for grabs for the remainder of the year so contact Diana Davis to sign up for one or two.

Lost Tools

Gerald Franklin

I can't find a couple of tools that I think got mis-directed at the last conference. The first is a scroll wrench (dog wrench) and the other is an adjustable bending fork. The dog wrench is forged from a single piece of steel and has a simple ring on the end of the handle. It is not painted. The adjustable bending fork is made from two lengths of 1" angle with 5/8" pegs welded on. The set is painted orange and the two pieces are held together with a large "safety pin" made from #9 wire.

Please check your toolboxes, particularly if you were one of the several folks who were good enough to loan tools for the conference. If you have either of these items, please call me at 580-467-8667. Thanks.

It’s picnic time….April 16th

This year the picnic will be held at Byron and Carol Doner’s home in Norman, Okla. Like in years past, the club will be providing the main meat but all the other dishes will be provided by those attending. Those that can are asked to bring a side dish or desert to go along with the meat. This year Byron said he was going to see about some fried chicken and maybe some other kind of meat to go along with the chicken.

Dining will be outside so you will need to bring a lawn chair to sit on.

There will be a forging contest again this year so bring your favorite hammer. Those that wish to participate will be given a length of 1/2” square material that you will then make into a spoon. There will be a time limit of 10 minutes that starts at the end of the first heat. When finished, the spoons will be judged and the prize awarded and pictures taken.

Directions:

From I-40 east: at Choctaw Rd. Go south until the road ends at Alameda, then west 4.4 miles.

From I-35: go east on highway 9 about 7 miles to 60th Ave S.E.. Then north 2 miles to Alameda then east .6 miles.

House is two story with columns and old sailboat in yard, on south side of road. (radio tower 3 drives east can be seen for miles) Byron’s cell 405-650-7520

Address; 6520 Alameda, Norman Ok.

Meeting dates:

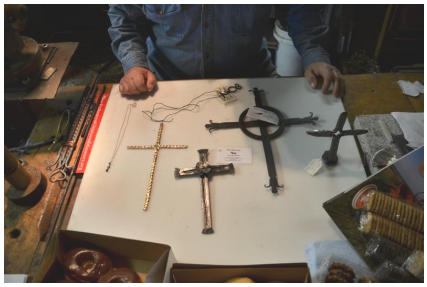
January 15, 2011
Host: Bill Davis
Phone # 580-549-6824

February 19, 2011
Host: Gerald Franklin
Phone #: 580-252-6002

March 19, 2011
Host: Terry Jenkins
Phone # 405-476-6091
Trade Item: Cross
Lunch: Sack Lunch/ On your own

April 16, 2011 (ANNUAL PICNIC)
Host: Byron Doner
Phone #

May 21, 2011
Host: Bo Hall
Phone # 405-485-2690
Trade item:



June 18, 2011
Host:
Trade items

July 16, 2011
Host: Terry Jenkins
Phone # 405-476-6091
Trade item: Fork

August 20, 2011
Host: Richard Simpson
Phone # 405-334-7413
Trade item: camp item

Sept. 17, 2011
Host: Bob Kenemar
Phone #:
Trade item: hook or hanger

October 15-16, 2011
SCABA Conf. Perry, Okla.

November 19, 2011
Host: Bill and Diana Davis
Phone #: 580-549-6824
Trade item:

December 17 2011
Host:
Trade item;

Meeting Notes

The March South Central meeting was held at Terry Jenkin's shop in Blanchard on March 19. Due to a countywide burn ban, we weren't able to set up any forges outside the shop but Terry had a couple of gas forges and his coal forge fired up inside the shop. Byron Doner also brought his induction forge so there were plenty of forging opportunities.

Attendance was good. I counted thirty-two people but somebody else counted thirty-five so let's say thirty-five. Any way you slice it, we had a good turn out. There were even folks who made the drive up from Dallas.

Ken Doner showed up with his professional photographer's eye and provided some nice photographs for the newsletter and Ron Lehenbauer was there with a load of tailgating items. Ron builds some pretty neat single burner gas forges that are sure worth the money. At least, I think they are worth the money since I bought one a few months ago. If you are in the market for a small gasser, get in touch with Ron.

The trade item was a cross and there were a half dozen good examples. It always surprises me how many different versions of a relatively simple item like a cross show up on the trade item table. I guess that's one of the main points of the trade item program.

I left about 3PM and there were still folks working hard at the forge. I guess this, above all else, is the mark of a successful meeting – people working late.

The meeting in April will be hosted by Byron Doner at his home in Norman. This meeting is being held as our Annual Picnic. Lunch is going to consist of Fried Chicken. Those attending are asked to bring side dishes and deserts that will complement the meat. Look for more info on the ANNUAL PICNIC PAGE

NORTH EAST REGIONAL PAGE

Meeting dates:

January 8, 2011
Host: Gary Gloden
Phone # 918-321-5015
Trade item; made from horseshoe

February 12, 2011
Host: Gerald Brostek
Phone# 918-687-1927
Trade item. Valentine

March 12, 2011
Host: Dan Cowart
Trade items: Spoon

April 09, 2011
Host: Omar Reed at Ft. Gibson
Trade items:

May 14 2011
Host: James Maberry
Phone #: 918-636-7773
Trade item; cooking utensil

June 11, 2011
Host: Mike Krukoski
Phone #:918-789-2484
Trade item: **Garden Tool**

July 9, 2011
Host: Clayton Hall
Phone #918-605-6241
Trade item; **Kitchen tongs**

August 13, 2011
Host: Bill Kendall
Phone# 918-742-7836
Trade item

Sept. 10, 2011
Host: Dan Cowart at Pawhuska, Ok
Phone # 918-440-0653
Trade item: Leaf

October 2011
State conference

November 12, 2011
Host: Matt Goyer
Phone # 918-272-8424
Trade item:

December 10, 2011
Host: Charlie McGee
Phone #: 918-245-7279
Trade item: ladle

The March NE Regional meeting was hosted by Dan and Pat Cowart at their home near Wann, Oklahoma. We didn't receive any report for this meeting. Hope everyone had a good time.

The April meeting will be hosted by Omar Reed at the Fort Gibson Historic site. Omar has hosted several meeting at this location in the past and it is always a great place to tour. There is a lot of History in this place that dates back to the time when the frontier was being settled by both whites and Indians alike.

Omar usually tries to have some kind of meal so bring a side dish or desert to add to what Omar provides. There are several large trees to set up under for shade. Check with Omar about forges as some of the state is in a burn ban and even thought that part is not officially in one, the Fort may be discouraging open fires.

Fort Gibson, Okla.

NORTH WEST REGIONAL PAGE

January 22, 2011
Host:
Phone#
Trade item;

February 26th, 2011
Host: Mandell Greteman
Phone # 580-515-1292

March 26, 2011
Host: Dorvan Ivey
Phone #:
Trade item; letter opener

April 23, 2011
Host: Mandell Greteman
Phone # 580-515-1292
Trade item**: Grilling tool**

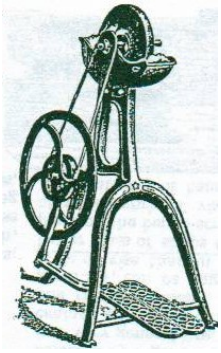
May 28, 2011
Host:
Phone #:

June 25, 2011
Host:
Phone #:
Trade item**;**

July 23, 2011
Host: Tom Nelson
Phone #: 580-862-7691
Trade item: camp fire trivet
Lunch: brown bag/on you own
Special program: hot wagon tire setting (10:00 am)

August 27, 2011
Host: Gary Seigrist (Elk City Route 66 Museum)
Phone #:

Sept. 24, 2011
Host: Ron Lehenbauer (Fairview Thrashing Bee)
Phone #:
Trade item; Fire tool



October 2011
State conference

November 26, 2011
Host:
Phone #:

December 24, 2011
Merry Christmas

The meeting for the NW Region was hosted by Mandell and LaQuitta Greteman at their home in Foss, Oklahoma.

It started out cold and foggy but cleared up and turned out to be a great day. There were 23 members present.

Mandell had the forge going when the first ones showed up. We had hot coffee and donuts to start the morning off. Thank you Gary for the donuts.

Planes for lunch consisted of brown beans and Chili or Fritos pies, ice tea and coffee with lots of great deserts for everyone to enjoy. I would like to thank everyone that brought deserts.

The trade item was any forging tool. As you can see I do believe everyone had a great time. There was a lot of forging and ideas exchanged.

We would like to thank everyone for coming. Our next meeting will be in April. Hope to see everyone then.

Mandell and LaQuitta

SOUTH EAST REGIONAL PAGES

January 1, 2011
Host:
Phone #:

February 5, 2011
Host: Eddie Horton
Phone #: 580-873-2634
[Cancelled]

March 5, 2011
Host: Eddie Horton
Phone #: 580-873-2634

April 2, 2011
Host:
Phone #:

May 7, 2011
Host: Bill Phillip
Phone # 918-200-4263
Trade item: steak turner

June 4, 2011
Host:
Phone #:

July 2, 2011
Host:
Phone #:

August 6, 2011
Host: Bill Phillip
Phone #: 918-200-4263
Trade item: rabbit head

Sept. 3, 2011
Host:
Phone

October 1, 2011
Host: Bill Phillip
Work day for conference
Tool box

November 5, 2011
Host: open
Phone #:

December 3, 2011
Host:
Phone #

The monthly meeting was hosted by Eddie Horton at the Fort Towsan Historical site. Here are some views of the meeting.

2011 Salt Fork Conference Tool Box

Item	Donor	Estimated value
Box	Don Garner	$1,000.00
Hardware for toolbox	Byron Doner / Bill Kendall	priceless
Cross peen hammer		
Straight peen hammer		
Rounding hammer		
Tongs		
1/4 V-bit		
3/8 V-bit		
1/2 V-bit		
3/4 V-bit		
1/4 flat		
3/8 flat		
1/2 flat		
3/4 flat		
Scrolling		
Side grip		
Pick up tongs		
Fire Tools		
Shovel		
Rake		
Poker		
Hot cut hardy		
Twisting Wrench		
Treadle/Hand Hammer tooling		
Set of punches and holder		
Center Punch		
Chisel, Large		
Chisel, small		
Chisel, hot slit		
Slitting chisel		
Hold down		
Flat wire brush w/handle		
File, flat bastard cut w/handle		
File, half round w/handle		
Set of monkey tools		
Rivet backing tool		
Rivet setting tool		
Hacksaw		
Bolster plate		
Square		
Dividers/Compas		
Scribe	Bill Kendall	$10.00
Bending forks		
Spring swage/fuller		
Flux spoon	Jim Carothers	
Flux, Iron Mountain	Jim Carothers	
Metal folding ruller 24" or 72"		
Soapstone	Diana Davis	
Ball tool (round blunt nose punch)		
Hook ruler		
Finish wax		
Nail Header	Diana Davis	
Dual Caliper		
	Total Value to date:	$1,010.00

Its time to get started on the tools for the SCABA tool box. Here is a list of the donated items from last year. Please decide what item/s that you would like to donate and let Bill Kendall know ASAP.

In order to promote the box and make sales of tickets easier, we need to be able to take pictures of the box with as many tools as we can. *As soon you get your tool/s completed please ship them to Bill Kendall or get them to him some other way.*

We need as many of these tools as we can get to put in the box so please make your decision quickly. The selection is first come first served.

Many of us attend meetings/conferences conducted by other clubs and if we take good pictures and tickets of the box with us we can make the opportunity to win this box available to others outside our club.

Call Bill Kendall today….

The following pages were reprinted with permission from the Hot Iron Sparkle. The article was written by its editor.

Interview With Peter Ross – Wrought Iron

We had a several meetings at Peter Ross' shop where he discussed working with iron and the various processes for making iron and steel. I thought the audience was really interested with the topic. Consequently, I went to Peter's shop and interviewed him to find out a little of what he knows about iron. I didn't think up enough questions so I have augmented some of the interview with a little research. My source of this research was pretty much confined to Wikipedia on the Internet.

Peter makes reproductions of 18th century hardware, tools, locks, and utensils for clients who what items of the colonial era. Many of his customers are willing to pay the 50% premium to have Peter use wrought iron instead of low carbon steel.

Editor: I was wondering where blacksmiths in colonial America got their iron. Did they smelt iron ore themselves?

Peter: In the period before 1800, a tremendous amount of iron was smelted in the colonies. Almost every one of the colonies had supplies of iron ore and became producers and exporters of iron. I don't see much evidence that blacksmiths would do smelt iron themselves. Blacksmiths made their own charcoal but smelting iron was a specialized skill. There were plenty of blast furnaces around to make cast iron with secondary processes to make wrought iron.

By the time of the Revolutionary War, iron production in the colonies exceeded the output of England. Two forms of iron were sold: one form was cast iron pigs for products like kettles, andirons, and wagon wheel bearings. The other form was wrought iron bar. In the 1700s and 1800s wrought iron was hammered, not rolled, so there was flat, rectangular, and square bar, but not round.

Editor: What can you tell me about iron production?

A little research first: Iron ore exists naturally (most abundant material on earth) and is in the form of iron oxide (iron chemically bound with oxygen). It has plenty of other chemically bound compounds, foremost of which are silicates. But, there are other impurities like sulfur and phosphorous.

The earliest production method, dating back about 3000 years used a bloomery. A bloomery is a lined furnace with pipes called tuyeres for the natural or forced (with bellows) addition of air. The boomery burned charcoal to heat the iron ore. Charcoal was also used as a pure source of carbon, which entered into chemical reactions to strip the iron ore of its oxygen. The carbon and oxygen exited as carbon dioxide. The reaction was never hot enough to actually melt the iron ore but some of the impurities, called slag, did melt and run out of the furnace. Because the iron did not actually melt into a liquid phase, the carbon did not diffuse into the iron. Iron from a bloomery did not contain carbon. When the process was complete, the iron was removed from the furnace in the form of a bloom, which was a porous mass of iron and the remaining slag. This slag, mostly a compound of silicon and oxygen and other impurities filled the voids in the iron. Afterwards, the bloom was reheated and hammered to drive out most of the molten slag. The resulting product would be hammered into a bar of wrought iron. What is important to note is that not all of the slag is removed and filaments of this material remain within the iron bar. These filaments form a grain in the wrought iron. This grain gives wrought iron similar characteristics to the grain in wood. Like working in wood, working wrought iron requires one to strongly consider this grain. This grain does not exist in steel made today.

A bloomery makes a relatively low volume of iron. Early bloomeys produced about 1kg.. to 15 kg. per batch. Later, when water wheels were used to power the bellows, a maximum of 300 kg. were produced with each batch.

The blast furnace, around during colonial times supplanted the bloomery because it could produce large volumes of product. There are some indications that the Chinese had blast furnaces about 7000 years ago. The blast furnace does not make a useful product. It's output is a material called pig iron. Because it operates at temperatures high enough to melt the ore, it produces iron with dissolved carbon. The carbon content can as high as 6%. This material is much too brittle for use. Pig iron is further refined to make cast iron (2.5% to 4% carbon), wrought iron, or, today to make steel.

In the blast furnace, iron ore, fuel (charcoal until the early 18th century, now coke), and limestone (calcium carbonate) are added to the top of the furnace. As the material falls down through the furnace it is heated until it melts to a liquid. Air is forced into the bottom and rises through the material. When the molten material reaches the bottom, it consists of slag and pig iron (pure iron with dissolved carbon). The limestone has converted the slag to a liquid material that is heavier than the pig iron so sits below. This separation allows the pig iron to be drawn off leaving most of the slag behind. Besides large carbon content, pig iron also has fairly high silicon content (up to 3%). Wrought iron from pig iron made in a blast furnace still contained slag. Actually, the slag was desirable or even necessary, as pure iron was not strong enough to be very useful. You either wanted steel, or iron with slag included

The pig iron can be reheated and mixed with scrap iron to lower the carbon content to become cast iron. Impurities such as sulfur and phosphorous are also reduced in this process.

Pig iron was also further refined to make wrought iron in a process that heated up the pig iron with air. The oxygen in the air combined with the dissolved carbon to make carbon dioxide. The first main process for this was done in what was called a Finery forge. Here, charcoal was used to remelt the pig iron. The resulting, carbon free product was removed as a bloom, much like the product from a bloomery. In fact, the bloom was similar: porous iron with slag within the pores. It was handled in the same way, heating and hammered to produce a bar with filaments of slag.

In the latter 18th century, the Finery forge was replaced with a process called Puddling. In the Finery process you did not dare use coke or coal to melt the pig iron because the impurities in the coke or coal would become part of the iron. The puddling process used what is called a reverberatory furnace. Here, the fuel and the material to be heated, or melted, did not come into contact with each other. The fuel produced hot gases and radiant energy. Thus, coke or coal could be used in the puddling process - a much more economical process. The result was large puddle balls, which were hammered out to redistribute the slag and form the wrought iron bars – much like the blooms from a bloomery or finery forge. The puddle furnace was used until it was replaced by the Bessemer process. The Eiffel Tower was made of "puddle iron".

The Bessemer process could have resulted in cheap wrought iron, but instead, it was such an economic improvement, it made it possible to make cheap steel. If you had cheap steel, you did not need cheap wrought iron. The Bessemer converter was placed right next to the blast furnace and took it's output of molten pig iron. The equipment consisted of a crucible lined with refractory material. Air was pumped in at high volume. The pig iron was oxidized at temperatures high enough so that all impurities and carbon and silicon were converted to their oxides and left as vapor or solid slag. The oxidizing reactions added to the heat keeping the batch molten. Measured amounts of carbon and other alloying materials, like manganese, silicon,

and vanadium were added back to make steel of the desired carbon content and with the desired properties. The great economic advantage of the Bessemer converter is the speed of the process. Steel made from the Bessemer converter costs about one sixth as much as when made from previous processes. Now, even the Bessemer process is obsolete. It replaced with the electric arc furnace.

Editor: Back to my discussion with Peter about iron was produced. Remember, I asked Peter about iron production.

Peter: A bloomery is a smaller alternative to the blast furnace. They are thousands of years old and some were still commercially operated well into the 20th century. I know people near Brasstown whose grandparents ran bloomeries to make a little extra money during the depression. Upper New York State was a tremendous area for Bloomeries – also working well into the 20th century.

Editor: Why was pure iron (without the slag) not made and used?

Peter: The processes of the time could never get the slag out because the batch of iron ore would never become molten. Later on, the blast furnace, which makes pig iron, could get the batch molten because the addition of carbon lowers the melting point. Furnaces and bloomeries were not capable of separating out pure iron because the batch is mixed in with the fuel. Now we can make pure iron if we wish, but wrought iron (containing slag) and steel is much stronger than pure iron. Pure iron is made today and used in such industries as electronics and the electrical industries. The core material in transformers, motors, and electrical generators are iron. They don't have to be structurally strong just magnetic.

Editor: Steel has existed for quite a while. How was it made? Did it have slag like wrought iron?

Peter: Most modern steel does not have slag but older steel did. Going back to the 1700s, there were three basic qualities of steel. The lowest quality was Blister Steel. This was made of wrought iron that was carburized by packing it with layers of charcoal and baking in a furnace in an oxygen free environment. The process was also called Cementation and it described how you add the carbon to the iron, through packing and heating, not through melting. The iron did not get molten, just quite hot. Carburization does not remove the slag. The drawback of blister steel was it did not have even quantities of carbon throughout the bar. Essentially, it absorbed carbon on the surface like today's case hardening process. Structures of Blister steel can be found dating back a couple of thousand of years ago. It can be found in columns in the Greek Parthenon.

The next best quality of steel was called shear steel. This started as blister steel, but the rods were cut up and welded back together. This is similar to making a Damascus billet. And like Damascus, the billet was drawn out again. If this process was repeated, it was called double shear. This method of making steel was particularly popular in England.

In the mid 1700s a process called cast steel was used. Blister steel was put into a crucible and melted. Once molten, the ingredients would mix equally throughout making the carbon content uniform. The steel was poured into an ingot mold to cool. The ingot would be hammered or rolled out into a bar.

Ironically, in the 18th century, steel was considered to be a purer form of iron. It was thought something was taken away from iron to make steel. Actually, it is the reverse as carbon is added.

Editor: Why couldn't steel be made directly in a blast furnace? Why not just try to make pig iron with lower carbon content to begin with?

Peter: In the open blast furnace it was not possible to accurately control the carbon content. Also, it was difficult to know the characteristics of the product you made. With the materials of the day, it would have been difficult to even do a spark test. Therefore, it was easier to just remove all of the carbon from pig iron than to try to control the carbon content. There was very little demand for steel, in volume, due to the extra cost of conversion. Probably 98% of iron ore was made into cast iron or wrought iron.

Steel was used mostly for tools – anything requiring a sharp edge. It also was used for its abrasion resistance and in making springs. Early firearms used very little steel. In a flintlock, there are two steel springs and the face of the frizzen is steel . Barrels were made of iron, not steel.

During the second half of the 18th century the Bessemer Conversion process allowed steel to be made more economically. The process started with pig iron. This process allowed the slag to be removed and the amount of carbon removed from the pig iron to be controlled. The carbon content could be judged by the appearance of the flame issuing from the converter. The Bessemer process was mostly used to make high volumes of relatively low carbon steel for construction purposes. High-grade tool steel still was made using the cast steel process.

The Bessemer converter still starts with pig iron. It could stand right next to a blast furnace so the pig iron from the blast furnace could be dumped right into the Bessemer converter. A main improvement of the Bessemer converter was that the slag found in wrought iron and early steel was not present in the final product. The Bessemer process was able to melt the material and the freed slag would rise to the top of the batch where it could be mechanically removed.

Actually, the blast furnace removed nearly all of the slag. What is left winds up in the wrought iron, but is still a small percentage of what was in the ore originally.

Editor: How could you improve the quality of the iron?

Peter: Wrought iron has included slag filaments in it. The bloom of wrought iron, from a bloomery is a ball about one foot in diameter of iron and bubbles of slag. When you take that big ball out of the bloomery and roll or hammer it into a long bar, say 1" square, all the bubbles of slag get stretched out in length to become filaments. In some batches of iron, you could get bigger pockets of slag. One of the ways to make a better grade of iron was to make the pockets of slag uniform in size and distributed evenly throughout the bar. You could use the process similar to improving blister steel: cutting, stacking, and welding and drawing out again. This was done well into the 20th century. The first run was sometimes called muck bar or direct rolled. Then you could have a single, double, or even triple refined iron, each describing a bar that had gone through cutting, stacking, welding and drawing out once, twice, or three times. The better iron worked more predictably and lessened the chance of the bar splitting open at one of those slag pockets. Of course, the more you refined the bar, the more the iron bar cost.

Editor: Today, can you tell the grade of iron just by looking at the grain?

Peter: I tell by working it. If I see a bar lying in the scrap yard, I can't tell how good it is. There are a couple of tests though. You can cut or saw it halfway through then break or bend it cold and see how it tears. You look to see whether the fibers of the slag stick out.
You can also work it hot by punching a hole near the end and seeing if it tears, you are looking to see if the stress of punching and stretching will make it tear.

If you feel that you have layers of poorly distributed slag, you can rectify that by doing what is done to refine iron, namely: fold, weld, and draw out the bar several times.

There are two other conditions that can affect the quality of iron: One is a hot shut and the other a cold shut. A hot shut is a condition where there is too much sulfur in the bar (perhaps the bar was made of high sulfur scrap). When you work the bar hot, it tends to crack. A cold shut is just the reverse; it cracks when you work it cold. This is caused by too high a phosphorous content. You can't do anything about those two conditions.

Editor: Please describe the wrought iron bar you find today

Peter: It varies tremendously. Because there is such a limited supply of iron, it forces you to be less and less particular. Because a lot of iron made in the first half of the 20th century was manufactured for its corrosion resistance (for fire escapes, water tower strapping, and silo hoops) manufactures were not too concerned about how it would forge. You could buy hot shut or cold shut iron much cheaper. So, if you were not concerned with forging, that would be what you would buy. Today, this describes a lot of the iron you find.

Editor: What are your sources of iron?

Peter: I look around to find people who have salvaged something.

Editor: Do you try to find out what has been salvaged?

Peter: No I don't, because I do not find much of a correlation between what was salvaged and the quality of the iron. For example, some say wagon tires are a good source of iron. Some of this iron is exceptionally good and some exceptionally bad. Some is not even iron, but steel.

Editor: How far back was iron recycled – adding old new iron to new a new batch?

Peter: As far back as the end of the 18th century when the puddling furnace was built. You could throw in cast or wrought iron and it reduces the batch to wrought iron. It decarburizes the batch. It uses the same principle as the Bessemer converter except it is built differently. One of the fascinating points about the puddling furnace is that the pig iron melts at about 2500 deg. F, but as the carbon is drawn off, the melting point increases so the batch solidifies into a semi-solid lump. You can pull the lump out of the furnace with a pair of tongs and it can be hammered and drawn out.

Another way to recycle scrap was to pile up scrap bar, heat it to a welding temperature and weld it together under a big hammer. That was the normal way to make big forgings such as anchors and crankshafts for steam engines.

Recycled iron is part of the dilemma of purchasing iron. It could have been made of scrap and that scrap determines the quality of the iron. For example, I have used wrought iron that worked beautifully but had one corner that was something else, perhaps steel that was welded in.

Editor: Can you use the same techniques working with wrought iron as you work with steel?

Peter: The slag is a drawback because when you have grain in the material, like wrought iron it no longer has the same characteristics in all directions and it is difficult to machine. You have to think about it like a piece of wood. Wood is not as easily machinable as a material that is equally strong in all directions. Wrought iron is the same: not as strong in all directions.

Working with wrought iron takes a different set of skills. Most blacksmiths today have learned their techniques around mild steel. You can't use these techniques indiscriminately with iron. For example, you

can't cut sharply across the grain to make a corner to set a shoulder. The piece will break at that spot. If you hit half off/half on your anvil with steel you can do this at the anvil's sharp edge. You can't do this with wrought iron. You must use a rounded edge.

Editor: How do you make a nice sharp right angle bend in wrought iron if you are making something like a frame?

Peter: You do that by upsetting or welding two pieces together. If you upset wrought iron too much and get even a slight hot shut at the inside corner you will lose about 2/3 of the strength at the corner. In working with steel you can get away with a lot that you can't with wrought iron. So keep a radius.

Editor: How do you draw wrought iron out to a fine point?

Peter: Heat the bar to a welding temperature, which is hotter than for mild steel. This welds the strands of iron together and the slag acts as a flux. This means that as you are drawing out to a point you are forge welding as you go along. Welding heat for wrought iron is a couple of hundred degrees hotter than for steel.

The grain direction determines if you can make something out of one piece or not. For example, if you need an "L" shaped piece you will have to forge weld two pieces together. If you could cut an "L" shape out of wrought iron plate, you would have grain running the length of one leg (good) and across the other leg (bad) of the "L". You do much more forge welding with wrought iron. You have to weld pieces together to get the grain running in the proper direction to maintain overall strength.

Editor: Is it easier or harder to forge weld iron, do you have to worry as much about cleanliness of the fire?

Peter: You have to get the work hotter. The slag in the bar acts as a flux so you conceivably have a self-fluxing material. When you get up to a welding heat, the slag is molten and covers the iron keeping oxygen away.

Editor: Do you use other flux?

Peter: Yes! Use of flux though is not universal. While most American smiths use flux, most smiths in England do not use flux even for steel. I use the same flux for wrought iron as I use for mild steel.

Editor: How does iron work cold? How is it for filing?

Peter: Iron is a lot softer than steel. You can adjust things much easier cold in wrought iron than in steel. Because it is softer it tends to bend easier. It rivets nicely too.

Editor: How do you repair a historical piece of ironwork?

Peter: Riveting, brazing, or by peening.

Editor: Is there any difference in hammer control working with iron?

Peter: Since iron is softer than steel you don't have to hit it as hard. Since it has a higher melting point, you can get it hotter without burning it up. This makes the work softer still. The challenge is that you must be more precise in your forging. For example, when drawing out a bar, I watch a lot of smiths today who are going to draw out something and make it round. They draw it out square and start rolling the bar to make it round without making it octangular first. If you do that with iron, it will split. You must draw down

perfectly square. Don't let it get to be a parallelogram or rhomboid in cross section. Then hammer it to be octangular in cross section. Finally, you can hammer it round. Each step must be done very crisply. If you are sloppy in any of those steps you will cause cracks in the iron. It's often not a matter of the technique you use, but how carefully you use that technique.

We haven't talked about iron's corrosion resistance. Iron excels at resisting rust. Iron will often last a lot longer than steel. It develops a surface rust coat that becomes quite stable. It's not that iron does not rust; it's just that it doesn't wither away to dust. It also lasts a lot longer in water. I like to use iron for exterior hardware even if it will be painted.

Editor: Why would a blacksmith want to use wrought iron today?

Peter: For most people, there is no advantage at all. It's harder to find, it's harder to determine the quality of the raw stock, and it's more technically difficult to work. But for me, making historical pieces that would have been originally made of iron it makes perfect sense.

Editor: What premium do you charge for making something out of wrought iron?

Peter: It costs about half again as much to use wrought iron, so that is what I charge my customers. It's due to the time to procure the iron. When I get it, it is rarely the right size so I have to resize the bar. Actually making the object is rarely much different. Sometimes it is actually faster making a piece of iron because it is a softer material. There is just that added cost to get it to the starting point.

Editor: Do you ever get a shipment of iron that is unusable?

Peter: Yes, but my experience working in iron allows me to salvage stock that a beginner would not be able to salvage. My customers, who are familiar with historic ironwork specify wrought iron because they know the difference. They can see the grain in the finished work. They are more discerning than the typical customer. To them, it's worth the extra cost.

Many smiths may try wrought iron but do not continue with it. The biggest obstacle is that you have to relearn your technique. It's never great to hear that what you have been doing for 10 years is not god enough. But for those who really want to improve their technique, it can be a very enjoyable material because it is softer and it is beautiful to forge once you know how. But, you really have to learn how.

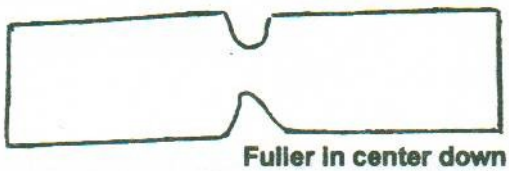
EDITOR'S NOTE: Lee Sauder of Lexington, Virginia has done extensive work with his homemade bloomery. He wrote an article in the July 1999 issue of ABANAs "The Anvil's Ring". You can see his unedited version of the article at: http://iron.wlu.edu/anvil.htm. He also has much more information on his website: http://iron.wlu.edu.

I thank my wife, Frannie, for proofreading this article. She hopes that newbie blacksmiths realize that when we talk about upsetting iron that we are not discussing its emotional condition.

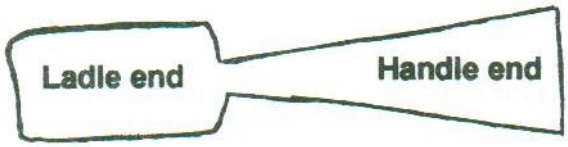
18th Century "Tasting Spoon"

By Marshall Beinstock

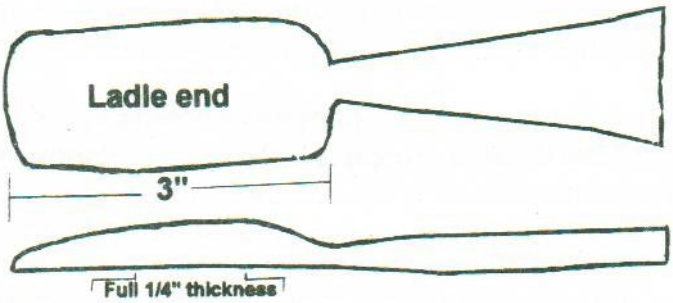
Start with 1" x 1/4" flat by 4"



Fuller in center down to sbout 1/2 original width maintaining 1/4" thickness



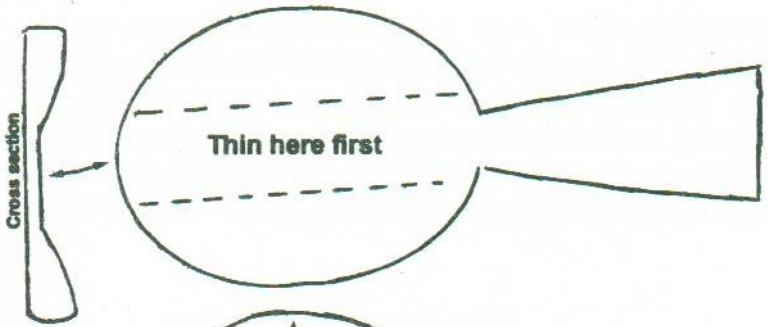
Draw out handle end as shown



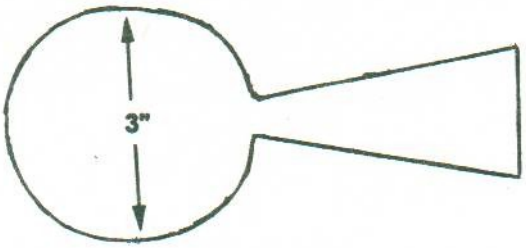
With a cross pien hammer, taper and stretch ladle end as shown, maintaining the 1" width

thinner here

Slightly thicker here than tip



With the cross pien, start in center, fuller to not quite the finished thickness



Then, keeping thick edges down in fire, draw out two edges as shown, use face of hammer to smooth out fuller marks

Larry Brown, Editor Tim Suter, Assistant Editor
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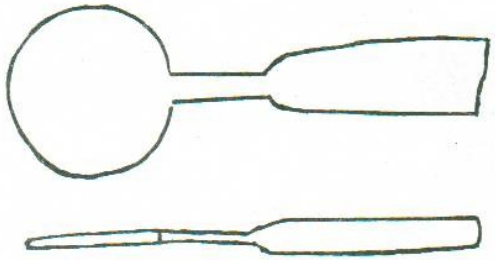
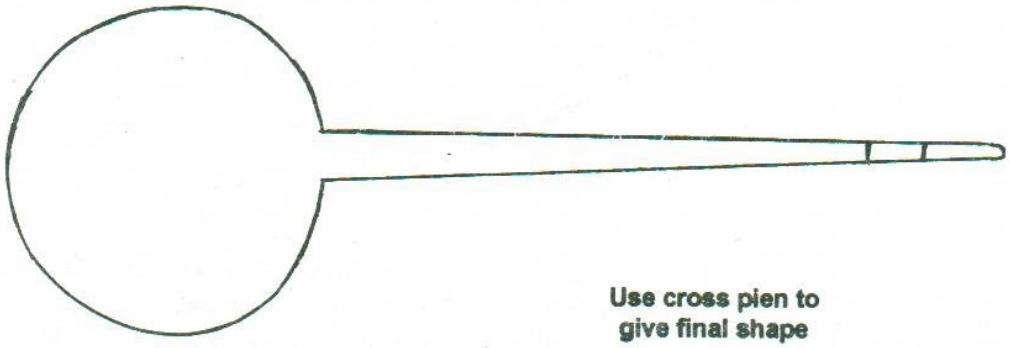
18th Century "Tasting Spoon" Continued



Next, start drawing out handle as shown, to a long straight taper in both planes.

Leave enough mass on end for this detail



Use cross pien to give final shape

File edges to 3" round

Sink ladle at a red heat into a half round spoon form or a wooden block.

Larry Brown, Editor Tim Suter, Assistant Editor
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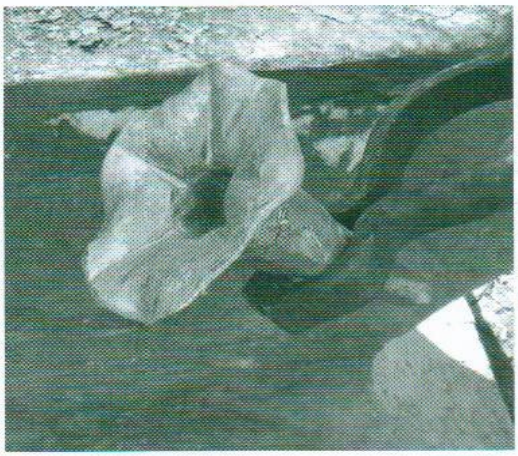
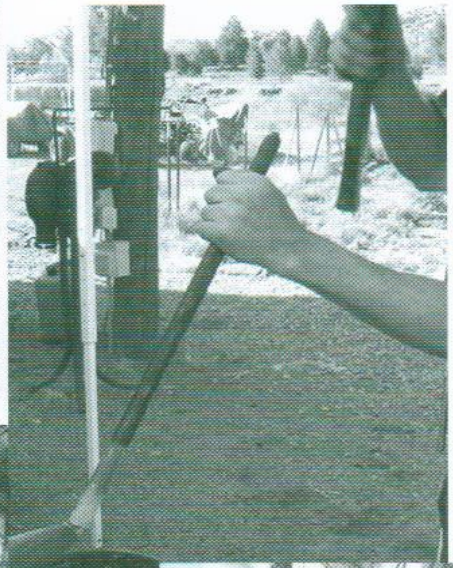
Morning Glories By George Witzke

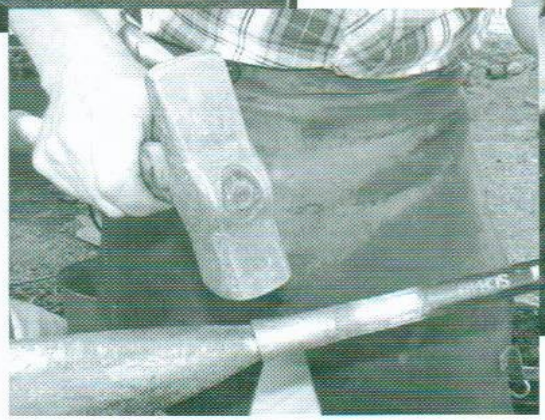


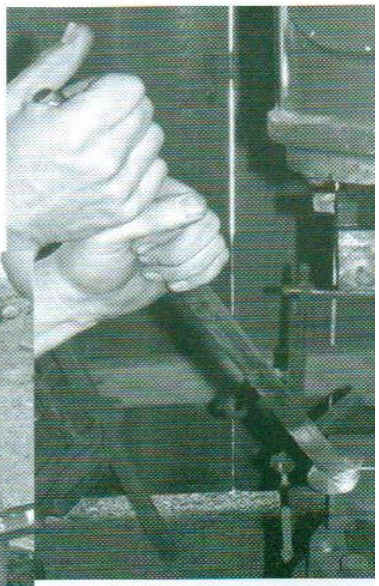
The curse of custom work is that you have to take the projects as they come. Initially, landing a canopy bed project with a morning glory theme was exciting. That is until I realized that the customer wanted the flowers to resemble real morning glories. Imagine that! My first twenty attempts to emulate a morning glory flower were maudlin at best. As luck would have it, I went to a blacksmith gathering and lo and behold someone had brought a morning glory flower on pipe that they had done in a class. Thank you Susan Frary of Las Cruces.

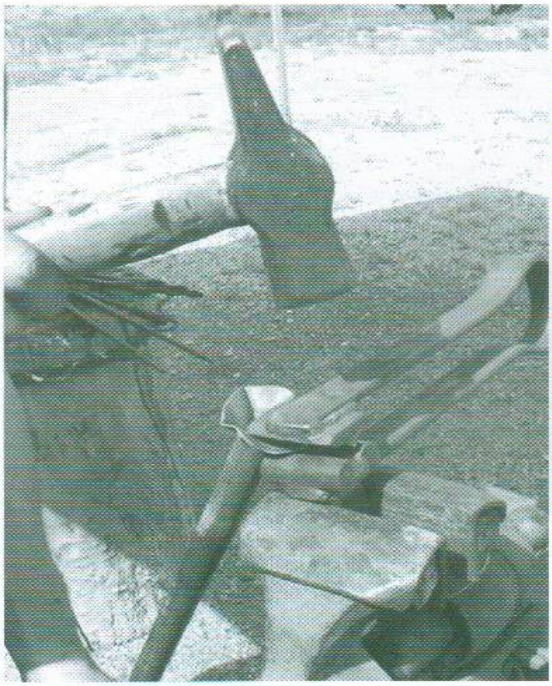
For those of you who are familiar with morning glories, you may also recall that there are a gazillion flowers and leaves on those vines. I have perfected Susan's technique and am averaging 4.8 flowers per hour. Thirty-eight point four down, only 96 bazillion to go!

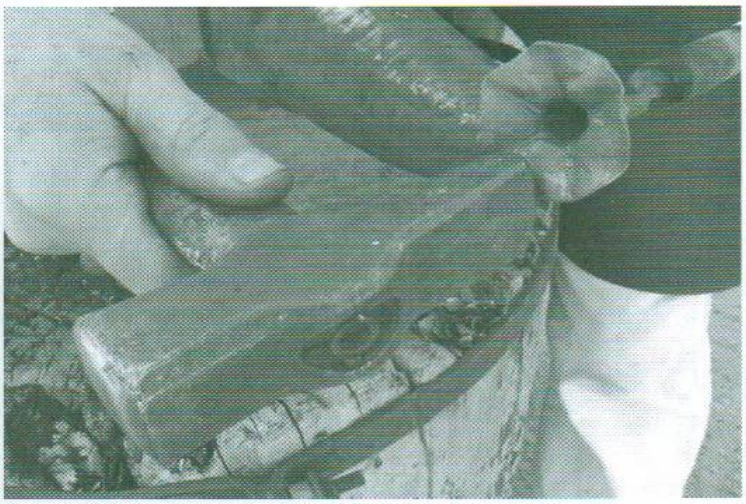
To make start with ½ inch ID schedule 40 pipe. Over several heats, alternate between upsetting the end of the pipe and working the edge over the anvil horn to create the flare. The corner edge of flat dies on a power hammer can make short work of flaring the petals once started, but it can be done just as well with a little more work over the horn. Next using a V shaped spring swage clamped in the vice, or with a chisel and V swage, cut 5 proportionately distanced veins in the flower face. Back at the anvil curl the petals to give dimension between each vein. Then with a fullering gulletine swage the neck of the pipe down about 2 inches away from the flared end. Finally, hammer that down to a gentle taper and twist the flower off the pipe.

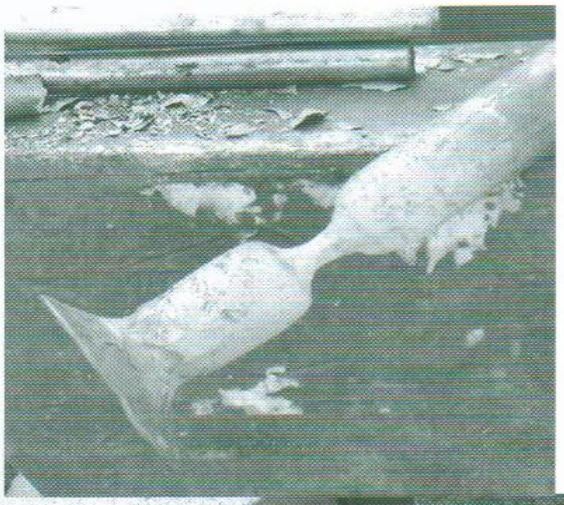










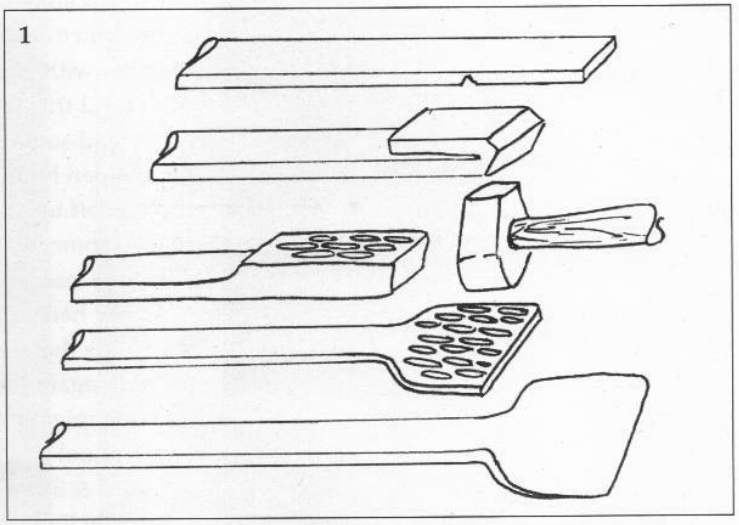


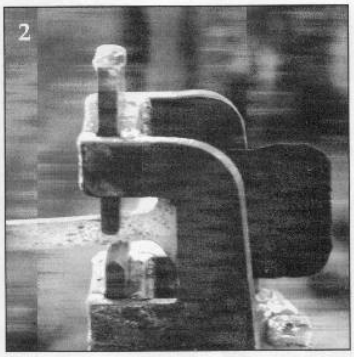
A Spatula Story

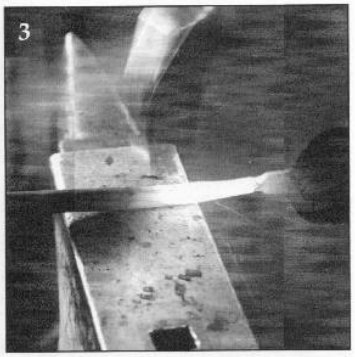
Demo by Mark Aspery, Springville
photos by John Graham, illustrations by Eden Sanders

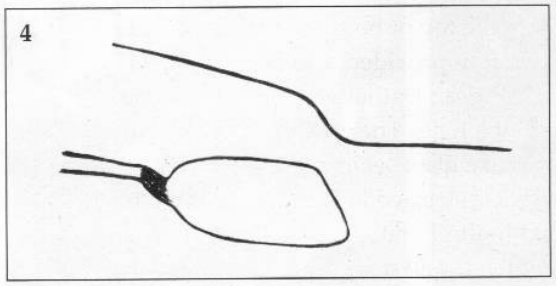
Someone forgot to bring a spatula for the hamburgers on Saturday night, and there just happened to be a 24" piece of ¾" x ¼" flat bar on hand that could be made into a spatula. Coincidence?

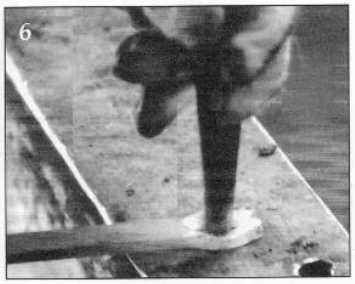
1. Illustrations show the faggot weld and spreading and thinning of the spatula.
2. Fuller at the transition from the handle to the base of spatula.
3. Put a 5" taper on the handle back from the fuller.
4. Illustrations show the zigzag bend at the base of the handle.
5. Slit hole at end of handle for hanging. Make chisel one and a half times the diameter of the hole size.
6. Drift hole. The circumference of the drift should equal two times the length plus twice the width of the slit.
7. Shape the hole and round off the edges on the bick/horn.
8. Fuller the sides of the handle below the hanging hole.
9. Bevel the end of the handle, tapering the bevel for about 4" to give it a nice shape.
10. Final handle. ♣

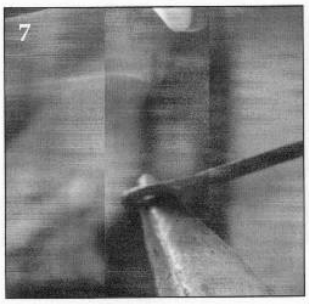


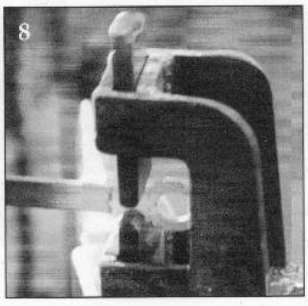


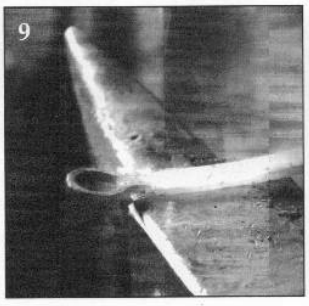


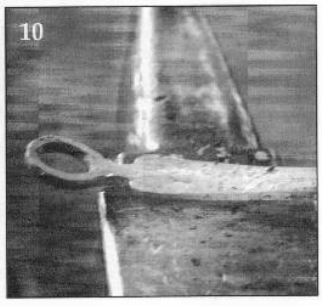












CLASS I - ART

4 ft X 8ft Peg Board Panel or Wall Space
1st - $35 each 2nd - $25 each
or
Space for a single item - $5 each

RULES

- Exhibits must be labeled & set up by 10 am
- LABELS PROVIDED FOR ARTWORK THAT IS TO BE JUDGED
- Exhibitors will furnish hooks
- Only original art work by the exhibitor will be judged
- Panels cannot be shared
- Cradles allowed but must be within rented space

BEST in SHOW.....$400
Cash awards for 1st, 2nd & 3rd
In each of these 6 categories
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1st - $100 2nd - $75 3rd - $50

The Expo Center is West of Walters on Highway 53
Building will be open at 7 am Sat for set up

For Art Show questions contact Lavonne High at 580-875-2144 or lmasonhi@martineer.net

CLASS I I - CRAFTS

10 ft X 10 ft Exhibit Space
1st - $35 each 2nd - $25 each
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Space for a single item - $5 each

RULES

- Booths must be set up by 10 am
- LABELS PROVIDED FOR ARTICLES THAT ARE TO BE JUDGED
- Only 2 exhibitors per space
- All items in booth must be hand made, decorated, or assembled by the crafter
- You may drive into building to load & unload, but must park outside.
- You may rent 30 in x 6 ft tables at $3 each
- No items that are propelled or that fly

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Through the generosity of local merchants and patrons, there will also be many purchase awards

For Craft Show questions contact Peggy Klein at 580-875-2204 or pjklein@martineer.net

DUE by **APRIL 16**

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Make checks payable to CCAC

NAME_____ **PHONE**_____

EMAIL_____

ADDRESS_____ **CITY**_____ **ST**____ **ZIP**_____

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