METALSMITH

"The lyf so short, the craft so long to lerne"

A non profit organization devoted to the pursuit of excellence in the art of metalsmith.
A Chapter of ABANA

Volume 11 Number 4 1987

PRESIDENT'S MESSAGE

Another year is coming to a close. It seems like only yesterday that The Guild of Metalsmiths was beginning it's 1987 year of activities. Now we are about to close 1987. It is a good sign that the year went so quickly because it shows that The Guild had a good year. Let me reminisce a bit about what has happened during the last year.

I have good feelings about The Guild. Most of all, I don't feel burned out by being President for the past two years. The big thing that has kept me ging is all of the work, time and energy that so many people have put into the Guild. There are the old standbys who can be depended upon year after year to lend their support. And there are the new faces - people who are just beginning in their efforts to make The Guild a success. I hope that your interest will grow over the years.

What is it that all these people have done? My first thought turns to the 1987 Madness. What a fine time we had! Gary Crowther, Jim Hemming, Jon Hankes, Mike Frattalone, Pete Giese, and Bob Fredell helped congerence chairman Pete Stanaitis with the planning. An additional eight persons demonstrated their skills.

Paul Hubler, The Old Favorite, led off the Madness with a demonstration on tenon making and animal head making. Paul stressed hammer control throughout the demonstration.

Gary Crowther, Our Resident Inventor, presented his latest invention - a ceramic bed forge. This gizmo is gas fired and has a bed of ceramic balls that cover the stock to be heated. He tells me he is still working on improving the forge.

Ollie Juaire, Master Tool Maker, taught us a thing or two (and probably a whole lot more) about making our own tools.

Jon Hankes, The Jeweler's Jeweler, showed us what lost wax casting is all about. A demo enjoyed by all.

Marcia McEachron, Sculptor Exceptional, teamed with Paul Hubler to create an antelope. Marcia designed the piece and Paul did the forging.

George Dixon, The Treadle Hammer Man, demonstrated the use of a treadle hammer in forging a variety of well crafted designs. George used a torch to heat the stock. He made his own tools and dies.

Bob Walsh, The Old Reliable, demonstrated forge welding, a skill that so many of us need to sharpen up.

Tom, Magic Fingers, Latane` showed us some of the fines aspects of forging. As an example, he taught us his methods of making cupped leaf forms.

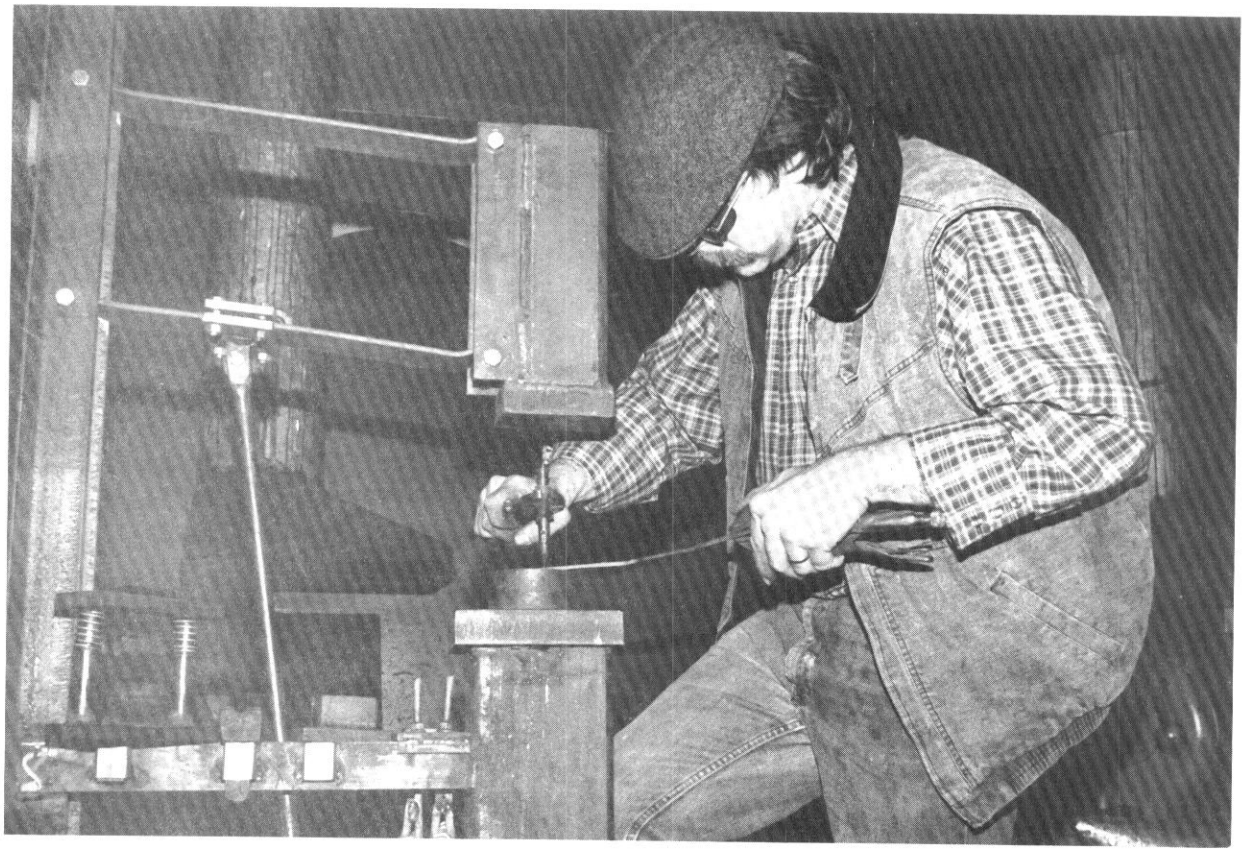
All the while that these demonstrations were going on The Little Theater was showing video tapes on jewelry making and blacksmithing.

The Madness auction not only was a huge financial success but was tons of fun and gave us some good belly laughs. Jim Ryan was the auctioneer and was assisted by Joe Youngs.

Bob Walsh organized a series of five workshops on tool making that were held at Mark Nichols' shop one Saturday a month

Tom Latane' of Lake Pepin, Wis. demonstrates the art of creating decorative leaves at the 1987 Madness.

George Dixon of Duluth, Minnesota demonstrates the techniques and benefits of the Treadlehammer.



from January to May. The workshops were taught by Paul Hubler, Tom Latane`, Andy Lininger, Dave Olin, and Bob Walsh. Gary Crowther completes the series by teaching a workshop where each participant will make a Treadle Hammer in January 1988. Bob tells me that he has bigger and better plans for this coming year.

Ollie Juaire's hammer and punch making workshops were of Ollies usual high quality. His workshops were well attended.

Our annual spring Hammer In was held as usual, at Pual Hublers shops. The Hammer In is an informal get to gether where people show their latest projects and talk about metalworking.

For the past three years Andy Lininger has organized our outdoor demonstration at the Midsummer Festival at Scandia, Mn. We made ironwork for the restoration of the oldest Lutheran Church in Minneosta which is located at Scandia.

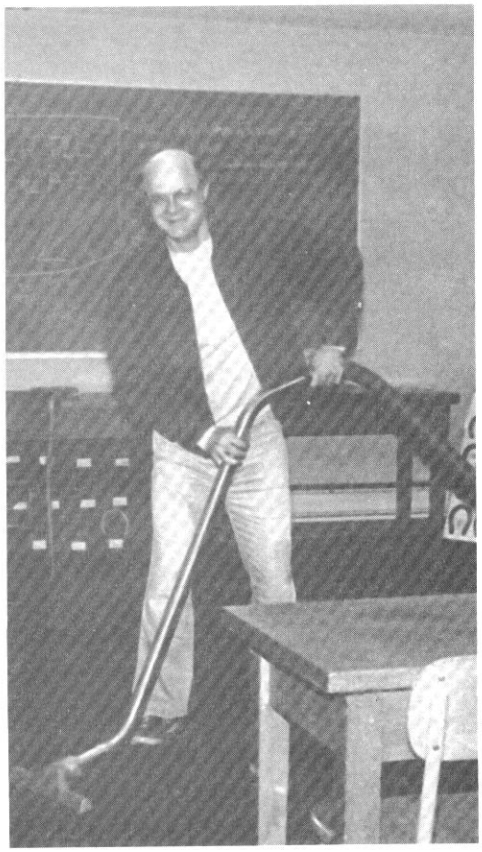
Gary Crowther and Jim Hemming got together and organized us so that we able to demonstrate at the Rogers Threshing Show. The steam engine people were so appreciative of us demonstrating at their show. We must do this again next year.

And then there is the newsletter. What a newsletter. Paula Crowther and Marcia McEachron--you people do such a fine job in producing Metalsmith. And all you folks out there in the The Guild of Metalsmiths land, Marcia and Paula need your articles for publiciation.

Pete Stanaitis and the program committee have done an outstanding job of planning intresting programs for our regular meetings. Come to these meetingss. You miss so much when you are absent.

Deny Nilssen, our treasurer, has good news for us. After missing the red ink by the skinniest of margins we are now sitting pretty with a treasury balance of $2230.70 as of November 10, 1987. This reminds me, you have now, or soon will receive a statement for your 1988 dues. Please pay promptly. It is such a nuisance for those persons who keep the membership rolls when people pay their dues as if they were on a slow boat to China.

The Publicity Committee, chaired by Jim Hemming, has been alive and well during this past year. In addition to designing announcements, they produced a new brochure for the Guild.

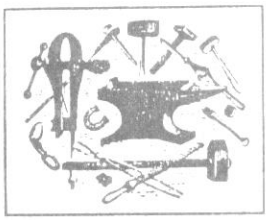


Loyal Jim Hemming demonstrates nitty-gritty basics of every successful conference!! Cleanup!!

We owe a big thanks to outgoing board members Ollie Juaire, Dave Hartje and Dave Olin as well as to Deny Nilssen who is retiring as Secretary-Treasurer. Happily, Gary Crowther has agreed to continue as vice president for another year.

I say that I have a good memory--it's just short, that' all. Who have I forgotten? Excuse my brain cramp. A BIG THANKS TO ALL OF YOU FINE FOLKS who have helped to make the Guild of Metalsmiths a real good outfit.

One more thing. I have a suggestion for you. You can increase your enjoyment of blacksmithing by becoming a member of the The Artist Blacksmith Association of North American (ABANA). You will like their high quality magazine, The Anvils Ring.



ANVIL THROW WINNERS

Women: (22 pound anvil) - Paula Crowther - 163 inches
Men: (50 pound anvil) - Daryl Cameron - 184 inches

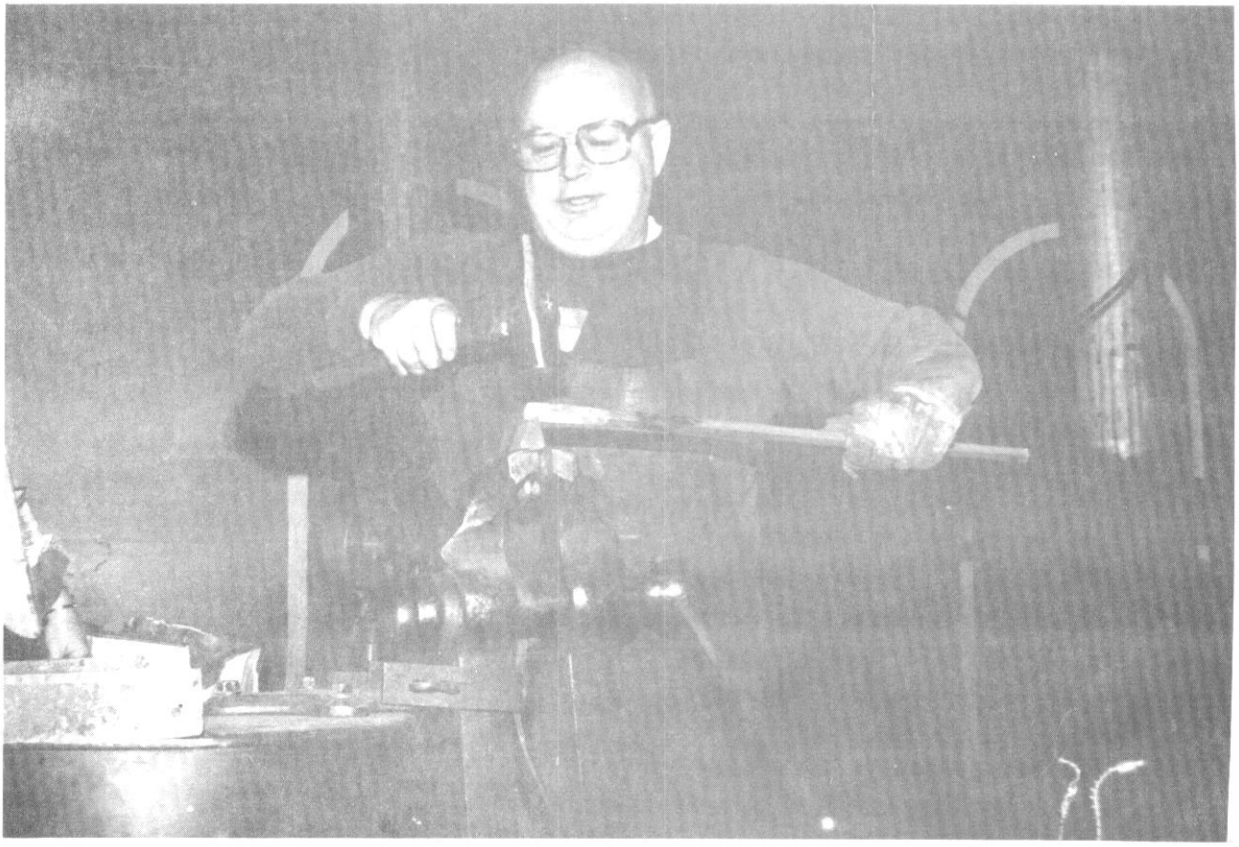
Businesses contributing goods to the Madness:

Martin Sales, New Brighton, Mn. - samples of Grime-Stopper Soap.

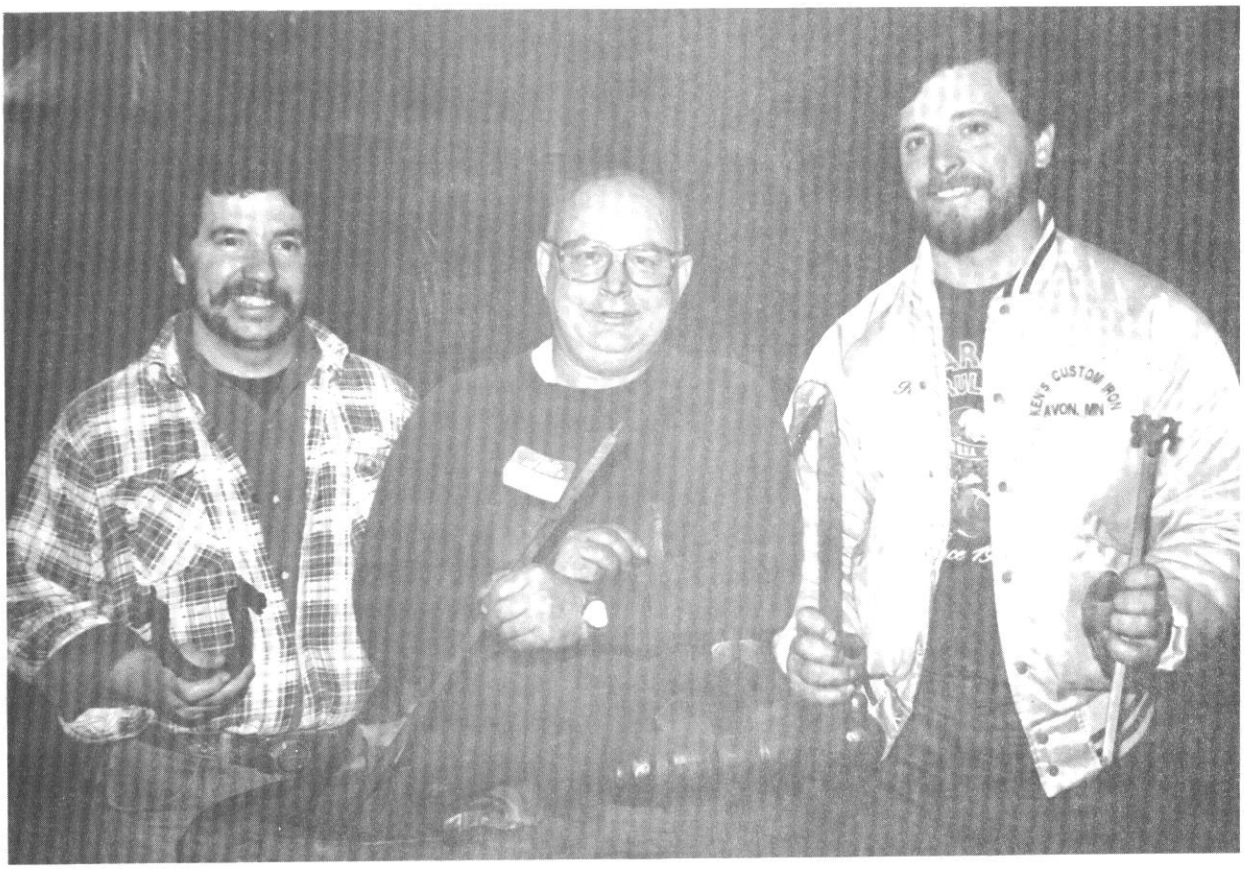
Toll Companies, Taft St., Mpls.,Mn.- several pairs of lined welding gloves.

Oxygen Service Company, 111 Pierce Butler Route, St. Paul, Mn. - Ear plugs for all attendees and several pairs of tinted safety glasses for the auction.

Please remember to thank these companies when you visit them for their generosity to the Guild.!!



Our accomplished cornerstone smith, Paul Hubler demonstrates the basic techniques of hammer and forging techniques.



Paul Hubler holding the tenon he demonstrated and Guild smiths finally stand still for a Fredell photo.

Jim Ryan, auctioneer and his assistant Joe Youngs laugh it up during Auction antics.

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November 9th I think

RE: Metalsmith Madness

Dear People;

This is just a note to thank you for the wonderful time we had at your recent Madness. And Madness it was! A crazy good time was had by all. It has been five years since I was able to attend one of these, and you still had two of the demonstrators from that visit doing their thing this year. Tom Latane' and Paul Hubler are still great, and not getting any older, just getting balder, er I mean, uh, getting better. (Pardon that Freudian slip). Any way, the demonstrations were marvelous and enlightening and entertaining. The conference was well organized. And the friendships formed and renewed will be long lasting.

Sincerely,

Jim Ryan

Jim Ryan

1988 WORKSHOPS

Last year the Guild held a series of winter/spring workshops. If every participant did his homework, he should now have 2 pair of tongs, an eye drift, spring fuller, spring handled tenon tool, set hammer, hot set (cutter), 2 fullers, 90 degree decorative set tool, and a butcher.

This year the Guild would like to continue on with this series, first with a few more tools, then putting these tools to work. The tentative agenda looks like this,

Finances & Treasurer of Workshop Fees	Mike Frattalone
January 16, Straight peen & 45 degree peen hammers.	O. Juaire
February 6, Cut off hardy & 3/8 and 3/4 bottom fullers. Bring your own anvil for fit.	Paul Hubler
March 5, Decorative strap hinges with ornamented bolts.	Dave Olin
April 2, Thumb latch door pull, inside lift bar etc.	Bob Walsh
May 7, Decorative door knocker.	Tom Latane'

If you were not involved in last year's program and have the tools we made, plus some basic forging experience, we'd love to have you join up!! All workshops will be held in Mark Nichols studio and the fee will be $75.00 per day studio rent plus $15.00 travel expense for instructors plus materials. The total of these amounts will be divided by the number of people involved. Once the cost is established, it will be paid in full to Mike Frattalone up front. All instructors time will be donated.

This is an extremely good deal for those interested. If you would like to sign up, drop me a note or give me a buzz. I have moved so use the address and phone number listed below.

Robert Walsh
Rt.1 Box 83
Stockholm, Wisconsin 54769
(715) 442-3102

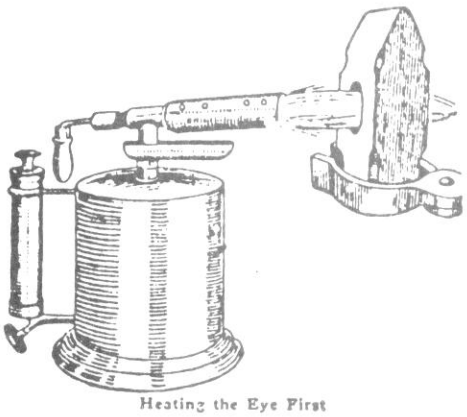
These dates are all the first Saturday of the month, except Ollie's on January 16.

Let Bob Walsh know of your interest before January 1 due to the need to order materials.

How to Temper a Hammer

If a hammer is hardened all over the same as the face and peen it is liable to crack at the eye. The only way to prevent this is to temper the face and peen hard enough to prevent battering and leave the metal around the eye soft so it will not break. A great many mechanics try to do this tempering by heating the hammer all over, then plunging the pole and then the peen into the water or hardening solution and letting the heat run up both sides at once. The heat is almost sure to run up one side faster than the other by this process, thereby causing the temper to be lost on one of the two sides or both.

The proper way is to heat the hammer all over even and plunge it into the water or hardening solution, after which clean bright with emery cloth. Then hold it over a gasoline torch, allowing the blaze to go through the eye. In a short time the metal will turn a light straw color around the eye,



Heating the Eye First

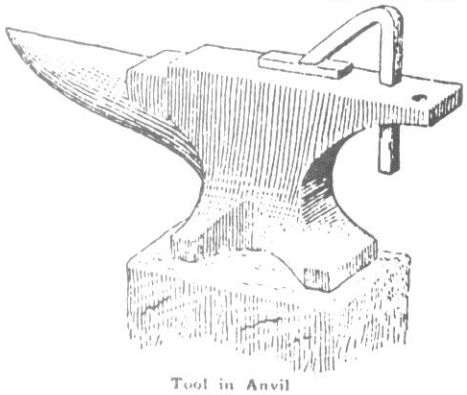
gradually spreading toward the face and peen. As the color spreads, the part close to the eye will become darker, of course, and the darker it is, the softer the metal. After the color reaches a dark straw it will turn to a deep purple and at this color it is soft enough for the eye. The face and peen should be a dark straw or brown.

If the color spreads too fast, turn off some of the heat; and if too slow, draw pole and peen over the blaze to help spread the heat. In most cases the heat will run up the peen faster than up the pole as the former has less metal in it. In this case, let the blaze strike a little to one side of the eye toward the face. Treat double-face and claw hammers in the same way.

If a torch is not at hand, heat a large bar of metal red hot and lay the hammer across it. This is not so good as a torch, however, as it applies too much heat at once.—Contributed by R. D. Benjamin, Harper's Ferry, W. Va.

A Blacksmith's Holding-On Tool

The blacksmith finds it necessary at times to have someone to hold a piece of metal on his anvil, while doing some work that requires the use of both his hands. An extra person is not always at hand when wanted and this necessitates some device for holding the metal.



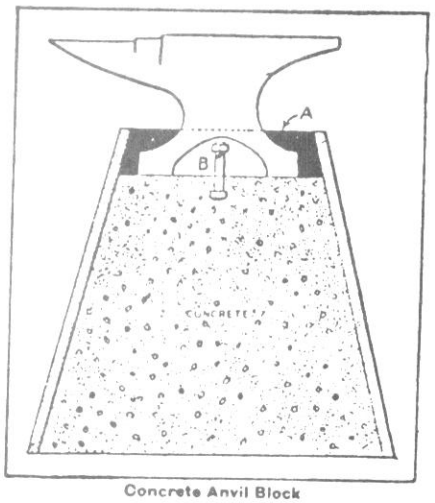
Tool in Anvil

Various appliances are used for this purpose, but the one illustrated herewith is simple to make and holds the metal well. The device consists of a square piece of steel bar of a size to fit the square hole in the anvil nicely and bent as shown.

When the square steel is driven down with a few blows, it binds in the hole and the spring of the metal will hold the work firmly to the anvil. A blow or two from a hammer on the bottom end releases its hold.—Contributed by John A. Cook, Birmingham, Ala.

How to Make a Concrete Anvil Block

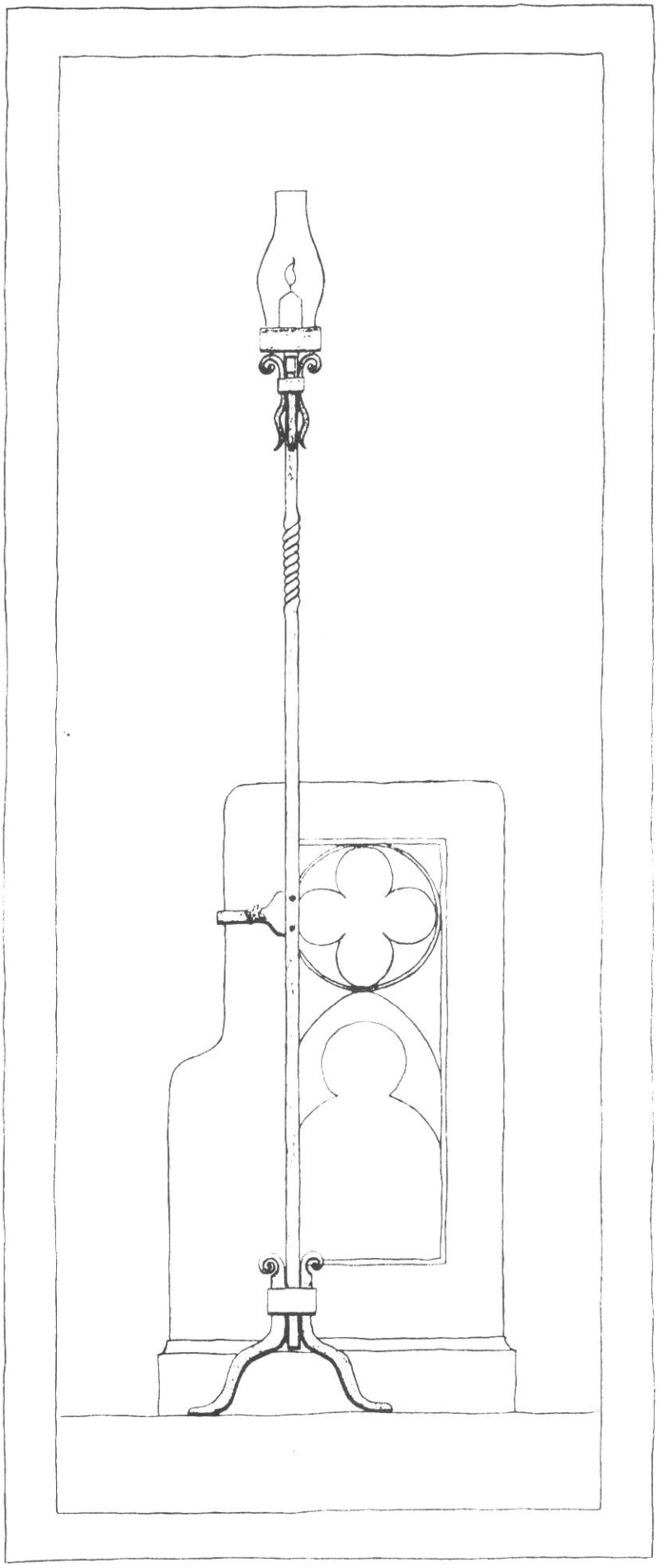
The tapering cast-iron box is filled to within 2 in. of its top with concrete. Wood will do as well as cast iron for the form, only that the cast iron may



Concrete Anvil Block

remain in position. On each side of the anvil is imbedded a bolt and nut, B. The space above the concrete is filled with melted lead, A, which holds the anvil rigidly in place, says the American Blacksmith, also deadening its sound to a marked degree.

Bob Mederno

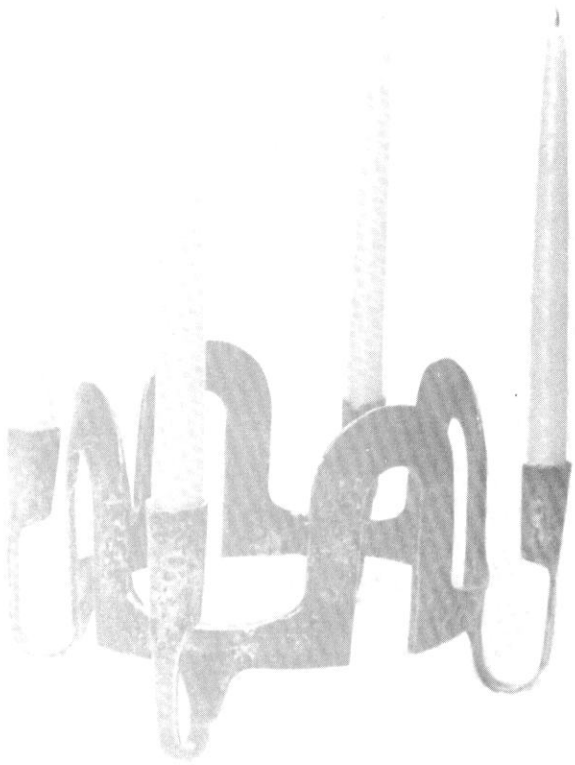


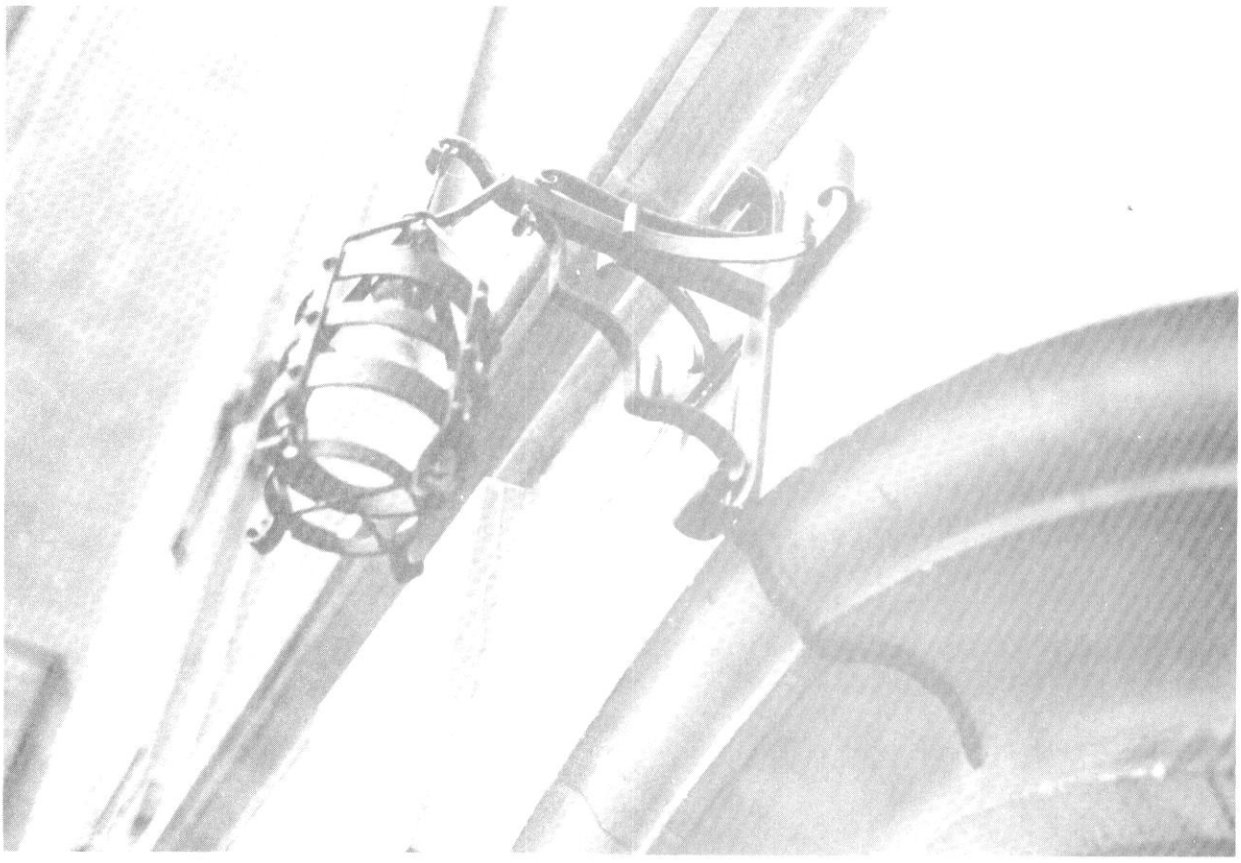
Lighting the Way

M. McEachron

These selections of various ironwork designs represent traditional and contemporary concepts that the designing smith should be aware of as he or she designs for specific applications. The drawing on the **left** represents a design by Guild member, Bob Walsh for the Hennepin Ave. Methodist Church in Minneapolis. **Top right photo** is a contemporary candleholder on display at the B.A.B.A. Conference '87 in England. (photo by Bob Fredell)

On the **Bath Abbey** in England, traditional ironwork surrounds an updated lightbulb. (photo by Bob Fredell)





Forging of Brasses

by George Martin.

Santa Monica, California Reprint from the California Blacksmith Association

Brasses are easy to forge-- some of them. They have been around a long time. Generally, the bronzes were alloys of copper and tin--mainly for casting; the brasses, alloys of copper and zinc, were for hammering into shapes and sheets. viz. Goliath of Gath' helmeth of brath. Nowadays the term bronze is applied to the colour rather than a specific alloy. Thousands of tons of brass are forged annually. To forge it one has but to bear in mind three factors.

The Copper Development Association in New York has sorted out the copper alloys. It has assigned a three digit number to each alloy. Wrought alloys, alloys suitable for cold working or hot working (forging) have the following CDA numbers. These numbers have now been incorporated into an international alloy numbering system of ALL alloys.

#101 - 199 copper. #200 - 399 brasses, copper and zinc and maybe .5-4% lead. #400 - 499 tin brasses; copper, zinc, and a little tin. #500 - 549 tin bronzes; copper and tin plus, generally, some phosphorous. #600 - 642 aluminum bronzes; copper , zinc and up to 10% aluminum (no tin). #647 - 699 silicon and manganese bronzes; copper, zinc and a little silicon, manganese, aluminum (no tin). #700 - 799 various special alloys of copper and zinc, with some of nickel, chrome, manganese, tin, etc. etc.

Here, then, are the Great Truths about forging brass: The first is that of the above alloys only some are suitable for forging. The alloys numbered from 400 to 549 are uniformly bad hot working alloys, difficult or impossible to forge. Coppers, alloys from 100 to 199, containing about 99% copper, almost all forge very well. Table 1 contains a list of other alloys specially developed for forging. The list contrains a rating on cold and hot work; a rating number giving the hot forgeability relative to forging brass (alloy 377) which is rated at 100; and the optimal forging temperature range. Alloys 210 to 270 and 360 are, normally, not hot forging alloys. You will also find that the alloy you want is available in every shape you need. However, that is a problem common to most things - and people.

So you find some 385 alloy of the right shape and forge it into beautiful scrolls for a frame of 268 alloy tubing. And you will discover the second great truth: most brass alloys vary slightly in colour, from deep bronze to bright yellow. Like the various gold alloys, they must be carefully

TABLE 2

FORGING OF BRASSES —

Thermocouple reference tables

Table 16.11 NICKEL-CHROMIUM NICKEL-ALUMINIUM THERMOCOUPLE TABLES—TYPE K (Chromel-Alumel)

Temperatures C (IPTS-68) Temp.	0	10	20	30	40	50	60	70	Reference junction 80	90
					e.m.f. μV					
−200	−5891	−6035	−6158	−6262	−6344	−6404	−6441	−6458		
−100	−3553	−3852	−4138	−4410	−4669	−4912	−5141	−5354	−5550	−5730
0	0	−392	−777	−1156	−1527	−1889	−2243	2586	−2920	−3242
0	0	397	798	1203	1611	2022	2436	2850	3266	3681
100	4095	4508	4919	5327	5733	6137	6539	6939	7338	7737
200	8137	8537	8938	9341	9745	10151	10560	10969	11381	11793
300	12207	12623	13039	13456	13874	14292	14712	15132	15552	15974
400	16395	16818	17241	17664	18088	18513	18938	19363	19788	20214
500	20640	21066	21493	21919	22346	22772	23198	23624	24050	24476
600	24902	25327	25751	26176	26599	27022	27445	27867	28288	28709
700	29128	29547	29965	30383	30799	31214	31629	32042	32455	32866
800	32277	33686	34095	34502	34909	35314	35718	36121	36524	36925
900	37325	37724	38122	38519	38915	39310	39703	40096	40488	40879
1000	41269	41657	42045	42432	42817	43202	43585	43968	44349	44729
1100	45106	45486	45863	46238	46612	46985	47356	47726	48095	48462
1200	48828	49192	49555	49916	50276	50633	50990	51344	51697	52049
1300	52398	52747	53093	53439	53782	54125	54466	54807		

REFERENCES

1. 'The International Practical Temperature Scale of 1968', Amended Edition of 1975. HMSO, London.
2. 'The 1976 Provisional 0·5K to 30K Temperature Scale', *Metrologia*, 1979, 15, 65.
3. C. R. Barber, 'The Calibration of Thermometers', HMSO, London, 1971.
4. L. Crovini *et al.*, 'Extended List of Secondary Reference Points', *Metrologia*, 1977, 13, 197.

matched in colour. Most people buy brass alloys because they want them brightly shined - and polishing accents colour differences. Alloy 220 is coppery; 230, 385, the aluminum and silicone bronzes are bronzy; the rest is yellow. There are, however, finer shades which are likely to be noticed.

Table 1 contains the optimal forging temperature ranges. And here is the third great truth: optimal forging ranges for brasses are much narrower than those for irons on the one hand, and silver and gold alloys on the other. Forging temperature ranges for common brasses are as tight as those for highly developed tool steels. If you do anything like production, a temperature controlled electric or gas furnace is essential. Of course, one can heat brasses in an open forge. Heat it till it JUST turns red and stop bashing when its black. The light is critical. Fire forge heating brass is a rather tricky operation. However you heat the material, forging should be very clean: no hammer marks, exact shape. It's worth it to work our your hammering sequence on a piece of iron beforehand. There is not much time to work a heat. And remember, any roughness, all hammer marks, must be ground out to polish your work.

So, if the material cracks as you work it, check first your temperature. Is it red? Did the piece at any time get too hot? Overheating is far worse than forging too cold. If your temperatures were right, do you have the right alloy? A grey coloration on the surface of the cracks often indicates leaded alloys. However, if alloy and temperature are right, power hammer forging is used quite regularly in industry.

As a corollary, here are some notes on temperature measurement instruments. The furnace can be a proper gas or electric one, or you can build a chamber of firebricks. The cheapest temperature measurment device is a thermocouple and a mV meter. One good for up to 1900 F is made from a, say, 5 ft. length of chromel wire and 5 ft. of alumel wire, about 1/16" thick. Chromel and Alumel are two alloys specially developed for that temperature range. Weld one end of one wire to one end of the other by giving the ends a couple of twists, warming the ends in borax for flux and then quickly welding a SMALL bead at the joint with a small, oxidising flame. That is your hot junction. The other ends of the wires are then connected, by screw or solder joints to copper wires goint to a millivolt meter. These joints are the cold junction. A small mV meter is about $10.00. If there is a temperature difference between the hot junction and the cold junction, a current will flow whose millivoltage is related to the temperature difference between hot and cold junction. So now you will need a termperature/voltage table shown in table 2.

To measure the furnace temperature place your hot junction into the furnace and the cold junctions outside, as cool as possible. Make sure that the two thermocouple wires do not touch each other or any metal. Place a thermomenter where it can measure the cold junction temperature. From (cont. next page)

Cover Photo:Santa-Smith Paul Hubler is pictured in his new Blacksmithing Cap which he bid for at the Metalsmith Auction. Created by Sheri Stanaitis they are available: Call Sheri at (715)698-2895 or write Route 1, Box 117B,Baldwin,Wis. 54002.

the tables find the mV equivalent of the cold junction temperature. Deduct that voltage from the voltage shown on the meter. Find the temperature equivalent of that voltage difference from the tables and you have your true hot junction or furnace temperature.

This simple temperature measurement system can be improved; thermocouple wire insulated with ceramic, a meter with automatic cold junction temperature correction and reading directly in degrees, a recording meter, a meter coupled to the gas or electric supply and automatically maintaining the furnace at constant temperature and so on. Quite sophisticated instruments are now available for $100 to $200.

The Copper Development Association lives at 405 Lexington Ave., New York 10017. Volume 2 of their standard handbook covers wrought alloys. Omega Engineering Inc. has published a free and very comprehensive temperature measurement handbook and catalogue, obtainable on phoning 203-359-1660.

TABLE 1 - Some of the Common Copper Wrought Alloys, Excluding Various Leaded Brasses Used For Machining Only

CCDA# NAME	ALLOY 1)	WORKABILITY COLD	HOT 2)	FORGE RATING	FORGING TEMPERATURE
210 gilding bze	95/5	E	G		1400/1600
220 commercial bze	90/10	E	G		1400/1600
230 red brass	85/15	E	G		1450/1600
240 low brass	80/20	E	F		1500/1650
260 cartridge brass	70/30	E	F		1350/1500
270 yellow brass	65/35	E	P		
280 Muntz metal	60/40	F	E	90%	1150/1450
360 free cutting	62/35 3 Pb	P	F		
377 forging brass	60/38 2 Pb	P	E	100%	1200/1500
385 architec. bze	57/40 3 Pb	P	E		1150/1350
464 Naval brass	60/39 1Sn	F	E	90%	1200/1500
624 aluminum bze	86/-10 A,4F	F	E	80%	1400/1625
642 silicon bze	90/-7A,2S	P	E	80%	1300/1600
651 low silicon bze	98/- 2S	E	E		1300/1600
674 manganese bze	58/37 3M *	P	E	100%	1100/1250

NOTES

1) alloy: %copper/%zinc + Pb = %lead, Sn = %tin, A = %aluminum, S= %silicon, M= % manganese, F= % iron
compositions are normal.

2) workability: E = excellent, G = good, F = fair, P= poor.

* also 1% A, 1 % S