

# ZAGRAY FARM MUSEUM MACHINE SHOP EVOLUTION OF A MUSEUM

By Dave McClary

It can be said that the current Zagray Farm Machine Shop Museum captures the essence of small machine shops as they existed up through the middle of the twentieth century. Stanley Zagray, the oldest of the three Zagray brothers, graduated from the Connecticut State Trade School as an apprentice machinist in 1936. He spent time working at Pratt & Whitney Aircraft in East Hartford and he started the current shop at the farm by building the small room, a solid concrete structure with a then low roof. This was probably completed before or during World War II. One of the first machines acquired was a belt driven Pratt & Whitney engine lathe. Evidence was found that there was an electric motor driven overhead line shaft that would have been used to power the lathe. The lathe was subsequently modified with a homemade mounting for an electric motor and is currently on display in the Quonset hut. The mount was patterned after then commercially available motor mounts developed to power older equipment after the advent of electrical power and motors in the early 1900's. In the early 1950's, a second room was constructed made of cement block and approximately twice the size of the original room. Included was a pit as seen in early automobile service stations, apparently intended for use on farm owned equipment. Found in this room was a number of large production type machines. Adjacent to the machine shop was a Quonset hut shaped structure in poor condition that housed several additional machines set up for operation. It is surmised that the Zagrays acquired these and many other machines at auctions after WW II when manufacturers were buying new equipment to improve productivity. Aside from the machines in the shop, many more were found out in the woods beyond the fields, generally without protection from the elements. Apparently purchased with use or as a parts source in mind, most of these have since been sold or scrapped. In back of the machine shop there was a large cupola furnace that was used for making iron castings. It was later found that this furnace and accompanying equipment were acquired from the Collins Company, a well known foundry in Collinsville, CT, in the late 1960's when that company closed its business. Included with that acquisition were approximately two hundred wooden patterns used for making cast iron machine parts and various other shapes. These were found randomly piled in the attic of the machine shop. Behind the machine shop were several sheds with machines set up for operation such as a horizontal boring mill and a five spindle drill press. It is known that Stanley Zagray operated the machine shop as a business, making items for customers as well as for use on the farm. In addition, he had an inventive mind, designing and patenting an automatic screw dog, used to hold logs for sawing in saw mills, for which he cast and machined the parts. The original machines found in the shop form the basis for the museum that has now evolved. Stanley became incapacitated about 1990 and the machine shop was probably little used thereafter.

The acquisition of the Zagray Farm lease and equipment by QVEA occurred early in 2001 over a short period of time. There was no opportunity to plan out in advance what the objectives would be, other than use of the farm as a show ground, or what the sequence of improvements would be. Committees were formed and started work in their areas of responsibility, just beginning to grasp the enormity of the task ahead. After the first year, plans became more thought out and objectives could be envisioned. The machine shop was no exception and proceeded more or less independently to create a museum of older machine tools and tooling. A first task of the machine shop committee was to inventory the machines in the shop and located in sheds and elsewhere on the farm. Over seventy machines were found. The principal ones that had been set up to run in the shop were three shapers, four lathes, five milling machines, a large drill press, a large planer, an inside/outside grinder and two gear hobbers. Some were powered with three phase current generated by converters. However, it was judged that the condition of wiring throughout the shop was too poor to permit any use unless improvements were made. Also noted, the machine shop was not properly secured and there was a minimum of hand and measuring tools found. Steps were taken to lock the building properly and to shut off the power source from the farm house. Cleaning of the shop, including removal of two rusted homemade wood stoves, was another first task. QVEA held an auction in November 2001 to remove as much surplus and unusable equipment from the farm as practical. This included tractors, farm implements and trucks as well as machine tools. Following that, some unsold and other items not wanted were scrapped. As detailed in another article, a number of building improvements were made in the next few years.

Signs were placed on the machines on display identifying what they were and providing history that could be attached to the machine or the manufacturer. It was intended to place an emphasis on New England made machines to relate to local history. One of the key decisions made by the Machine Shop Committee was that the shop would be a museum and not a working machine shop, although Club members wanted to know when it would be operable as they envisioned using the machines for making or repairing parts. However, it was clear to the committee that most members had no formal training in machine tool operation, the skills required or the dangers involved. In addition, none of the machines had any of the protective devices like those now required in a commercial shop. Retired machinists showed little interest in contributing to the work required to clean up and maintain the machines. This writer, as a retired engineer, was fascinated by the mechanical mechanisms found on these old machines. QVEA started receiving offers of donations of old machine tools as members and visitors learned and spread the word of the developing museum from the three public shows held each year. Donations were accepted with the objective of displaying older and less well known machine designs. Donated machinery is cleaned or refurbished for appearance purposes and placed on display.

In 2005, machines started being placed in a new Quonset hut for display. The following year all of the wooden patterns were removed from the attic to allow cleaning the space and sorting the patterns by kind. Some have been placed on display. An inventory of tooling which had been randomly stored throughout the shop was made in 2007, listing items by type and location in the Quonset hut in some seventy-five steel boxes. Larger items are lined along the walls of the hut. These machine attachments and cutting tools were most probably acquired with the machine tools when those were purchased. Much of this inventory would find little use today because of machine design changes. A number of items found were considered to be unique and of interest to visitors touring the shop and a large display cabinet was made in 2008 for some of the measuring devices and more valuable items. A notebook available for viewer's use explains what the items on display are. Other notebooks on display show early 1900's machine advertisements to provide a time perspective on machine tool development and identify the manufacturers involved. In 2009, installation of a line shaft and two countershafts was completed in the small room of the shop. The line shaft is motor driven at slow speed to run a circa 1860 engine lathe and an 1893 shaper to demonstrate operation of belt drive systems as well as these two machines. While the major work is done, continuing efforts are required to improve the appearance of the shop and condition of the machines on display.

In order to provide a complete grasp of the scope of the Machine Shop Museum, a listing of the items on display is provided below. There were three basic ways to machine or shape metal developed in the nineteenth century. The lathe is a device that rotates the material to be machined about an axis with a moveable cutting tool that can travel longitudinally and radially to form various round shapes. The planer and the shaper move the material or cutting tool in a straight line creating straight surfaces. A milling machine rotates a series of cutting edges about a fixed axis and moves the material relative to that rotating cutting tool to form complex shapes such as gears. Another common machine, the drill press is not unlike a milling machine except the rotating cutting tool moves into material fixed in place. When the need to cut metal efficiently and accurately came about, men created these tools and used the power then available in the form of water power, as was available in grist mills and saw mills for example, or the then developing steam power. Key word here is power. Hand operated chisels, scrapers and files were used first to shape metal used to make the early machines. These early machine tools are now scarce because individuals quickly made improvements in the designs and created innovative new features at a rapid pace giving the tools broader capabilities. One of the variety of lathes developed is the engine lathe, the lathe form that can mechanically move the cutting tool to make uniform screw threads, a primary early need of gun, clock and sewing machine makers. Other variations on display are a moving bed lathe developed early on to permit machining large diameter items such as wheels for railroad cars and locomotives, a turret lathe, an initial step in automation, and an automatic screw machine (lathe), the next step in automation. There is also an 1890's foot powered engine lathe for use where other forms of power were not available. Planers and shapers similarly evolved into more

flexible machines with alternate means of providing sequential motion between the cutting tool and material being worked. An example is the traverse shaper where the cutting tool moves laterally on successive passes instead of the material moving. The third category of machine, the miller, has perhaps the widest variety of forms such as plain millers, universal millers, vertical millers, hand operated millers and thread millers. That latter machine combines characteristics of the lathe and milling machine. Stanley Zagray made the acme threads for his automatic screw dog using the thread miller now on display in the Quonset hut. The material is rotated as on a lathe and the cutting tool is a rotating cutter that moves synchronously along the material. A jig borer is a drill press that can be set up to locate holes very precisely. There are now fifty machines listed below and of those, eighteen have been donated and contribute significantly to the variety of machines on display.

#### Machines on Display at the Machine Shop Museum as of 2012

- Lathes:       Hendey Machine Co. 16" x 8'  
              Hendey Machine Co. 14" x 5'  
              Pratt & Whitney Co. 16" x 6' (don)  
              Pratt & Whitney Co. No. 1 Turret Lathe (don)  
              Pratt & Whitney Co. 16" x 6'  
              Shepard, Lathe & Co. 14" x 5' (ca 1860) (don)  
              Fay & Scott 42" x 6' Moveable Bed  
              Brown & Sharpe Mfg. Co. No. 2 Automatic Screw Machine (don)  
              W. L. Chase Co. 11" x 4.5' Foot Powered (don)
- Millers:       Brown & Sharpe Mfg. Co. Universal Miller No. 2  
              Garvin No. 13 1/2 Plain Miller (don)  
              Whitney Mfg. Co. No. 6 Hand Miller (don)  
              Burke Machine Tool Co. No. 3 Bench Miller  
              Pratt & Whitney Co. Vertical Miller & Profiler  
              Pratt & Whitney Co. Thread Mill  
              U.S. Burke Machinery Co. No. 1 Miller  
              D.E. Whiton Machine Co. Gear Hobber  
              Hendey Machine Co. No 1B Universal Miller (don)  
              John T. Burr & Son Hand Key Seater (don)
- Planers:       G.A. Gray Co. 30" x 30" x 8'  
              Unknown Manufacturer 15" x 15" x 3' (don)
- Shapers:       Cincinnati Shaper Co. 20"  
              Hendey Machine Co. 15" Friction Drive (don)  
              Boynton & Plummer 8" Traverse Shaper (don)

Drill Press: Cincinnati Machine Tool Co. 24" (2)  
Pratt & Whitney Co. No. 1 Jig Borer (don)  
Sigourney Tool Co. Bench Sensitive Drill (don)  
Henry & Wright Mfg. Co. 14" #2 MT  
Champion Blower & Forge 21" (don)  
Barnes Drill Co. 20" Geared Drive (don)  
J. E. Snyder 20"

Misc: Brown & Sharpe Mfg. Co. #1 OD/ID Grinder  
Reid Brothers Surface Grinder (don)  
Cincinnati Universal Grinder  
Greenfield Machine Co. Universal Grinder (don)  
Grant #3 Wooden Arm Hammer  
Foley Grinder, Saw Blade  
Greenerd Arbor Press, Hand Operated 15 Ton  
Armstrong-Blum Marvel Drawcut No. 2 Power Hacksaw  
Hisey-Wolf Pedestal Grinder  
Baker Bros. Vertical Slotter  
Bradley, Large Wooden Arm Hammer  
Home Assembled Shape Duplicating Lathe For Wood