**GRASSHOPPER CANNON**
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[Note: These are notes written to be used in an interpretive program for school children on a field day to Cowpens National Battlefield.]

**Introduction**: On the battlefield, armies that faced off against one another could benefit from the use of a "**field cannon**" or "**field piece**." An army, with cannon, was at a distinct advantage against an opponent without cannon. Cannons provided not only fire power against fortifications and personnel but gained the owners' a psychological advantage as well. Few men were willing or could to stand up to cannon fire. The effects of cannon ball, grapeshot and canister fire was devastating to opposing forces. Whether laying siege to a fortification or laying down fire on a battlefield, artillery companies and their cannons could control the battle.

**What's in a Name**: Named "Grasshopper" for it's appearance. When outfitted with handspikes and moved up and down a battlefield to match the flow of battle, it reminded soldiers of a grasshopper. When fired, the gun would recoil or, jump backward again like a grasshopper. Built in the 1700's for the British military, in an English foundry, by Dutch designers Jan and Pieter Verbruggen. They produced over 500 of these guns during the Revolutionary War. Our Grasshopper is a replica.

**Changes:** Cannons, for ages, were made with **Iron** barrels and were cheap and easy to construct but thick and heavy, which required heavy wooden carriages to support them. Most field guns were pulled by horses, which required feeding and maintenance, requiring even more horses to pull their feed and supplies. Logistics, the ability to keep an army supplied, was a crucial element in winning battles. Field piece cannon barrel weight became a logistics issue.

**The Grasshopper Field Gun**: Crude by today's standards, the Grasshopper Cannons, for their time, were expensive and the leading edge of technology. They were made of **BRONZE**, an alloy of **90% copper and 10% tin**, which was about six times more expensive than iron back then. In fact bronze was actually heavier than iron but much stronger allowing barrels to be very much thinner in construction. Bronze, being more flexible, was less likely to explode, a safety factor, and the metal was more easily recycled after the barrel was worn out.

New technologies were inter-connected. **Boring after Casting** and a **Spherical Powder Chamber** complimented one another. The **Boring After Casting** allowed the bore to be more accurately aligned with the guns exterior, which allowed for more accuracy of the projectile. A **Spherical Powder Chamber**, placing the ignition near the center of the powder charge, produced a more powerful explosion, allowing (1) the use of up to 1/3 to ½ less the amount of powder charge, which, in turn (2) reduced the amount of stress on the barrel, thus (3) allowing a much thinner barrel to be used.

**Technological Side Effects**: This cannon boring technology made possible the high pressure steam engines that latter spurred the industrial revolution!

**Portability**: The Grasshopper was a **FIELD GUN**, and was made to be quickly and easily dispatched. The Bronze technologies used on the cannon barrel, allowed the barrel to be lighter, the carriage to be lighter. The amount of powder needed was less, therefore lighter to transport. All this required fewer animals for transportation. To take it even one step further, the carriage itself was designed to be disassembled quickly, reassembled in minutes and could be carried on one or two pack animals that could keep a better pace with cavalry than could a wagon. The Cannon with carriage weighed about 500 pounds, 206 pounds of that was the barrel weight.

**Carriage Technology:** (usually made of white oak, an extremely strong durable hardwood, The U.S.S. Constitution's, aka. old iron sides, frame and hull were made of white oak!) Looking at the carriage reveals that the designers had a great understanding of engineering as to the stresses on the equipment involved and solutions to help alleviate those stresses. The spokes of the wheels extended outward at an angle from the hubs, forming a saucer shape giving a softer less stressful ride for the cannon and carriage parts and better strength when cornering. It also tended to keep mud from flying into the faces of the troops during battlefield maneuvers. The wheels were slanted so that the lower spokes were vertical as they rolled toward the ground contact point, reducing stress. The axle-tree arm (projecting from axle into hub) was tilted forward to reduce stress.

All of these stress reduction techniques applied to the carriage helped to reduce the size of each connecting part, therefore reducing the weight of the carriage itself.

**Payload:** The Grasshopper cannon was a 3 pounder. It fired a solid iron ball that was just under three inches in diameter, weighing about 3 pounds. Effective long range was between 800-1000 yards.

**Ball** was used to smash or batter a target such as fortification, earthwork, houses.

**Grapeshot**, clusters of small balls, was anti-personnel ammunition used against men and horses.

**Canister,** also anti-personnel, an improvement over grapeshot, was a tin cylinder filled with musket balls. Canister gave improved range, more controlled dispersal of the shot inside and could be fired at a higher velocity.

**End Result**: Modern technology of the era provided a lightweight, rapidly deployable field gun. The Grasshopper would go on to prove its worth and be highly sought after and utilized by armies on both sides of this war. Cannon technology would continue to advance and increase the destructive power of artillery to unimaginable heights as witnessed by the Civil War, and World War I and II.

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**Firing Drill:** The Grasshopper normally had a six person artillery squad to "man" the gun. Each person had specific assigned duties that required total concentration,

especially in the heat of battle. Failure of one person to do the job required could have critical consequences resulting in injuries or even losing the battle in which they were engaged. Handled improperly cannons, like all fire-arms, could explode and cause serious injuries.

Today, with the help from six of you, we will go through the same firing exercise that soldiers, over two hundred years ago, practiced and used in battles. As part of the Army, the artillery squad, do there job to their utmost ability could win the day.

(The Drill)
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**REFERENCES:**

**Barrel Weight**: How much does this barrel weigh? The numbers on the 1:3:10 (112+84+10=206) IE. Hundred weight is 112 pounds (1) ¾ of that (3)= ¾ of hundred wgt. (1/4 = 28 lbs) 84 lbs and (10) for pounds. Iron barrels of similar 3 pounders' weighed 455 to 891 pounds

**Cannon and Carriage Parts:**

**Bore:** Is the interior hollow of the cylinder beginning in the front , or **Muzzle** and extending back to the other end, to the **Breech** and the **Cascable**, consisting of the **Knob**, **Neck** and **Fillet**. The thickest part of the gun is the **Reinforce** and the **Chase** is the conical part ahead of the reinforce. The **Swell** is the flare at the end of the muzzle, strengthened the muzzle. **The Trunnions** are the round side-projections on the barrel that allowed mounting to a frame, nearer the barrels center of gravity to ease vertical aiming. The **trunnion plates** hold the trunnions in place and protects the cheeks. The **Quoin**: a wooden wedge that props up the barrel, ours has been replaced by a screw auger type that was developed in Sweden and used later on, mainly used aboard ships and for larger/heavier guns.

**Trail**: is the wooden extension aft of the wheels. This trail is made up from the (1) two **Cheeks,** the main longitudinal pieces of wood the gun rests on, held together by (2) **Transoms,** two pieces of wood between the cheeks and (3) a **Box** for miscellaneous items. Sometimes there were side boxes astride the barrel for a quick source of ammunition. **Handspikes**: The wooden poles used to carry or move the cannon about.
**Axle Body**: Covers the axle-tree.
**Wheels**: **Nave, Spokes and Fellies, Streaks**. Wheels are attached to **axle-tree** by a **linch pin** and **washer**. **Duledge Plates** holds the fellies in place. The **Nave** is reinforced by **Nave-bands**.

**FIRING TOOLS:** SPONGE, RAMMER,VENT PICK, WORMER, LINSTOCK, THUMB STALL, CARTRIDGE, BALL, HAVERSACK, TAMPION(TOM KIN), WATER BUCKET.
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