

SINGLE & DOUBLE JACKING

The main tools used in the early days of shaft or tunnel sinking were hand drills and black powder. This work was carried out underground with the only available light coming from candles. Holes were cut in rock by “single-jacking” or “double-jacking. When “single-jacking” a lone miner held a drill bit in one hand and swung a four-pound sledge hammer with the other. He would turn his bit about 1/8” inch between blows of the sledge. “Double-jacking” involved two and sometimes even three miners. Usually one man held the drill bit or “steel” while another man took turns pounding on the drill bit with an eight-pound sledge. On rare occasions one man held the steel while two men alternated their blows on the end of the steel bit. It was tiring work and the men changed positions frequently. The drill bit was constantly rotated in an effort to prevent jamming or “fitchering”. Jamming was often caused because a blacksmith had not properly forged the bit. Not only did the blacksmith have to sharpen the tips of the bit, he also had to heat them to a glowing red and then douse them into cold water to turn them a steel blue. Bits that were not tempered correctly often bent and got stuck in the drill holes.

First the drill bit was forged back to its proper shape and given new edges. The hammering would give the sharp edge before the finishing touches were accomplished with a grindstone. When the degree of sharpness was obtained, the point of the bit would be heated to a glowing red before being plunged into a bucket of cold water. The color would then be checked to ensure that it was a dark blue. If the proper color wasn’t achieved, the blacksmith would repeat the process until the proper blue was visible. After tempering in the cold water, the bit would be left to cool.

According to ‘The Miners’ a Time Life series “the man on the steel would rotate the bit frequently to prevent jamming. A good team of double-jack men could deliver as many as 60 blows a minute and drill two inches into solid granite in that time for short periods of time. Ordinarily it took an hour or so to make a 30-inch hole.

Miners’ drills—usually called steels—were made of round or octagonal rods sharpened to plain chisel tips that had a slight flare as a further insurance against fitchering. The starter drill, or bull steel, was about a foot long with a 1 1/4 -inch tip. After a hole had been well begun, the bull steel was removed and replaced by a

“change” drill that was six inches longer and 1/32 inches narrower, so that it would follow easily in the hole. The changing was repeated until, at the usual maximum, the last steel was three feet long with a 1-inch tip. “Down” holes were considerably easier to make than “up” or “flat” (horizontal) ones, but up holes had an advantage: the rock dust fell out of them, whereas it had to be scraped out of the others with long, thin miners’ spoons made of copper. The “down” holes required water to turn the fine dust that was produced into a kind of slurry that was removed from the hole with the copper spoon.

After a drill had cut about six inches of hole, it had to be once more sharpened by one of the busiest men in the mine, the blacksmith.”

When cutting a hole the miners ordinarily used a pattern of seven holes and charges. In the centre of the face to be blasted, they drilled three holes about two feet apart, arranged in a rough triangle to meet at the apex of a pyramid within the rock. Then they drilled a “reliever” hole at the top of the face, “edger” holes at each side, and a “lifter” at the bottom. With proper timing, the centre charges exploded first, making a cavity into which the slightly later blasts from top and sides squeezed the surrounding rock. Finally the lifter blew the rubble out into the tunnel where it could be mucked into hopper cars. In some mines, where the rock was particularly resistant, a 16-charge pattern replaced the usual seven charges.

In the earliest days the blaster used black powder but in the 1870’s dynamite became the explosive of choice. The blaster in a frontier mine had to be a man of skill and good judgement if he proposed to enjoy a long career. He would use a measured amount of black powder and with the aid of wooden or copper tools to avoid the danger of a spark being produced, made it up into paper cartridges and fitted them with carefully measured lengths of fuse. When the cartridges were inserted into the holes, the fuses dangled out like rattails.

The earliest miners used a safety fuse invented and patented by William Bickman, an Englishman, in 1831. Originally it consisted of a “tube” of gunpowder surrounded by water-proofed varnished jute “rope”. This safety fuse burned at a rate of about 30 seconds per foot and gave miners ample time to get far away from the blast. It was flexible enough to be wound and carried on a big spool, and

consisted of a core of powder surrounded by twisted strands of jute, wrapped with a layer of twine and then wrapped again with a layer of twine and then wrapped again on the outside with waterproof tape.

To ignite the rattails the blaster cut a fuse called a spitter, shorter than all the rest. Then he shouted his traditional warning, "Fire in the hole!" lit the spitter and speedily applied its sparkling end to the rattails in the desired sequence. When the spitters singed his fingers he knew it was time to depart. When the blast came, it advanced the tunnel by about three feet.

In the 1870s, dynamite replaced black powder in the Western mines and was greeted with mixed feelings by the men that used it. The explosive element was nitroglycerine, so hypersensitive that it would detonate if a man so much as spoke harshly in its presence. Pure nitroglycerine, known as blasting oil, had been used experimentally in a few mines, but had proved so risky to handle that few men would touch it. The Swedish scientist Alfred Nobel housebroke it by combining it with inert substances, including chalk, that turned it into a stiff gelatin-like substance. Nobel's dynamite sticks were so docile, relatively, that they could be sliced like bananas, molded into charges shaped for special needs, or tamped down with a certain amount of vigor. To explode, dynamite required a heavy jolt that was usually provided by a small, tubular copper

In the 1870s, dynamite replaced black powder in the Western mines and was greeted with mixed feelings by the men that used it. The explosive element was nitroglycerine, so hypersensitive that it would detonate if a man so much as spoke harshly in its presence. Pure nitroglycerine, known as blasting oil, had been used experimentally in a few mines, but had proved so risky to handle that few men would touch it. The Swedish scientist Alfred Nobel housebroke it by combining it with inert substances, including chalk, that turned it into a stiff gelatin-like substance. Nobel's dynamite sticks were so docile, relatively, that they could be sliced like bananas, molded into charges shaped for special needs, or tamped down with a certain amount of vigor. To explode, dynamite required a heavy jolt that was usually provided by a small, tubular copper

The Life of a Hard Rock Miner

There were two methods of hand drilling in the mine shafts and adits. One was called the "single jack" and involved a single miner using a four-or-five pound hammer to strick the drill steel that was turned after each blow to keep the hole round. The other method was the "double jack" and it involved two miners. In this case the hammer weighted eight pounds and had a longer handle than the single jack. The two men worked as a team with one wielding the sledge hammer that struck the steel as the other partner turned the bit to keep the hole round. The miners would drill the holes into the rock to provide a place for a stick of dynamite prior to blasting. It was dangerous work.

At 1 July and 4 July celebrations contests were held to see which team of miners could drill the deepest hole in 15 minutes. One miner would hold the sharpened hand drills of various lengths to be driven into the rock by the other miner. The drillers twisted the drill to create a cutting action from the sharp edges of the drill rods. The objective of the contest was to see who could drill the deepest hole in 15 minutes. The drillers would change positions after the first and second minute and in 30-second intervals thereafter. A Rossland team competing in Spokane, Washington, in the fall of 1901

broke the record before 3,000 spectators by drilling 51 inches. The names of the two winners were W.M. Ross and George S. McLeod.



AN EIGHT-POUND SLEDGE HAMMER.

COURTESY PENTICTON MUSEUM & ARCHIVES

DRILLERS' ROCK

This historic rock received its large boreholes when used in a drillers' competition in Princeton in 1913.

