

# PLOD ESSAY: The Copper and the Donkey

When you have a hot water system, you take running hot water and bath time for granted. In my youngest days, we did not own a hot water system. Bath night was Sunday night and making a bath required a lot of effort and some discomfort along the way.



My first bathtub as a child was a metal laundry pan placed in front of the kitchen stove for warmth, but I also had some baths in the concrete sink when I was small. When I was old enough I was allowed to use the big tub in the bathroom like my older siblings. The hot water for the bath came from the laundry, which was next to our bathroom. There, resting on a concrete plinth, stood a copper. It was a cast iron monster, 'The Rex' brand, with, obviously, a copper water container inside. The copper held about three hundred litres of water. It was normally fired up twice a week: Sunday night for bath water and on Thursdays to provide hot laundry water (during laundry, whites were boiled in it).

The copper was first filled with cold water through a rubber hose from the tap above a concrete double sink. After it was filled, a fire was lit in its firebox and tended until the water was nearly boiling hot. This took quite a long time: maybe an hour or two. There was a small problem here: either because of chimney design, or its placement relative to house roof geometry, under some wind conditions the fire did not draw well. As a result, first the room and then the house would fill with smoke. Amid much coughing, doors and windows would be flung open to get rid of the smoke (and clouds of steam when the water started to boil). In wintertime, this meant Arctic blasts of freezing air roaring through the house.

When the water was finally ready, another length of rubber pipe was used to send the water into the bath in the next room. Then everyone, sequentially, had a bath. Kids being the grubbiest

went last. By the time we had finished there was a thick, dirty soap scum around the bath.

This was a weekly event until I was five or six when Dad, with the help of his mates, built a shed adjacent to the kitchen and we bought a 'Donkey' coal fired hot water service to be installed in it.

One of my daily tasks in late childhood was to light and look after our 'Donkey'. The etymology for this use of 'donkey' was probably from the 'donkey engine', a stationary steam generated mechanical power source used in Victorian times. Lighting it involved cleaning out the previous day's ashes, setting kindling, igniting it and then gradually introducing quantities of coal until the fire was fully coal based. The fire then had to be fed periodically with more coal.

The donkey has simple construction. There is the water reservoir tank, with the chimney rising through the middle of it. Below the tank and connected to the chimney is the firebox, which has a chute and hinged trap-door for feeding coal. Below the firebox is the ashtray and controllable vent for combustion air intake. Lighting it was a late afternoon task and the object was to control



the fire such that the water in the storage tank would be fully heated and a smoldering, slow combustion fire would continue to burn through the night, without further fuel resupply, to maintain the water temperature. If everything went to plan, there would be a hot water supply throughout the following day.

Broken or 'slack' coal is used to fire the donkey. Slack coal contains particles ranging from dust to about the size of a walnut. The rate at which coal burns is inversely proportional to the particle size. Power stations use pulverized coal for this reason: it burns efficiently and rapidly, producing lots of heat. However, there is a danger – coal dust burns so fast that it is explosive and all coal mines take action to mitigate coal dust build up to prevent such explosions.

As well as coal dust being explosive, when you toast coal, especially bituminous coal, like that from Wonthaggi, and wet coal, you produce explosive 'firedamp'. Firedamp is a mixture of

methane, carbon monoxide and water vapor, and goes BANG very nicely. It is this mixture that causes coalmines to explode every now and then (along with the coal dust).

One night when the donkey was in its night-time slow combustion mode, I went out to feed a final load of coal for the night to keep the fire going until morning. To my shock and great interest, when I opened the firebox feed door, a huge flame exploded several feet outwards and singed off all of my hair. Whatever the conditions in the firebox were, firedamp had pooled, and when I opened the door, the inrush of oxygen-rich air had created an explosive mix, which ignited.

After I had recovered from my surprise, I decided that this phenomenon required a bit of investigation and experiment. For the next few weeks when lighting the donkey I experimented by changing all the variables: fuel load, wetness, particle size and degree of air intake openness or closure. Eventually I had it mastered and had my three main tricks:

1. Simple explosion: this essentially mimicked the event that singed all of my hair in the first explosion. I would perform this one just for the sake of seeing it, as a demonstration to impress someone or malignantly when I had someone that I did not like in the line of fire of the explosive flame.

2. The donkey becomes a dragon: I found that with the correct fuel load and the right air intake setting, if the fuel box door was cracked open slightly, you could get sequential explosions, producing a train-like ‘chuff-chuff-chuff’ sound and with a tongue of flame exploding out through the air intake with each chuff.

3. The booby trap: this was for when someone else was taking over my duties for me. I would set up the donkey as in the simple explosion scenario, but not tell the next operator. I managed to singe my brother a few times with this.

If I got bored with explosions, I would sometimes set up the donkey as a geyser. As protection against the water reservoir tank

exploding due to overheating and pressurization, there was a pressure relief system which was simply a two-centimeter diameter copper pipe from the top of the tank to above the roof where it was curled over. A really hot fire would cause the tank to boil and steam and hot water would come spurting out of the pressure relief pipe. I would plead innocence whenever this happened.

The chimney of the donkey was a straight through design: if you looked down the chimney, you looked right into the middle of the firebox.

There was a removable cap on the top of the chimney to prevent rain going down and putting out the fire.

What this meant was that light from the fire was directed straight upwards. Under normal circumstances, a coal fire does not give off all that much light, so this observation was not of any value. However, I reasoned, if the light were intensified in some way, then I would be able to send signals up into the sky for UFOs to see.

I knew that magnesium burnt rapidly and very brightly – photographic flash bulbs operate by burning a magnesium filament. I also knew that my

school had quite large quantities of magnesium ribbon. It just so happened that sneaking some lengths of magnesium ribbon was possible when there were no teachers about.

About six inches of ribbon was enough to produce a decent flash. From ground level, apart from a brief puff of white smoke, nothing could be seen by passers-by to indicate what I was up to. However, if there were low cloud, a spot would briefly illuminate when the magnesium burned. By throwing in successive lengths, I could get a flashing signal going on the clouds.

The UFOs did not answer back, but I enjoyed myself.

My philosophy was that work should not be a chore, and my donkey and I had quite a bit of fun together.

**By Kit Sleeman**



*The Donkey*