A History of my Black Powder Experiments

As A Kid

~1976

When I was a kid, maybe age 12, I knew that black powder required potassium nitrate. This was supposedly obtainable from decayed animal remains. Thus, I collected white crusted dogpoo. This did not yield anything interesting. I didn't tell anyone about this until now.

GOEX

1991

Living on UC campus, I couldn't legally own a gun. However, black powder firearms don't count. As a result, I spent some time with friends shooting BP pistols and revolvers during grad school. The GOEX years. I've since found a 1985 Army ballistics lab report on BP, and it mentioned the history of how GOEX took over other factories. Other articles I've read have confirmed this.

I still have GOEX and my percussion cap pistols. They work as noisemakers even without any bullet, simply because of the mass of BP.

I once took BP to an outdoor range in LA. My BP shots kept setting off the alarm on this pimpy car that was there. It was funny.

2000

Grant's experiments BBQ

Fast forward to say 2000. I owned part of a house in suburbia. A small concrete patio in back, cinderblock walls around. I went to Home Depot and found they sold KNO3 as Grant's stump remover. This "stump" would later be elaborated as arrested combustion of charcoal. In any case, I imagine burning a stump could be very entertaining.

The point is that KNO3 is an accelerant -an oxidizer. It helps burn out dry stumps. If instead of dry wood you have partially combusted wood ---not just pure C--- then you get BP. It turns out the sulphur is only to reduce the ignition temp. It also makes it stinky smoky and more corrosive.

BTW, if you mix KNO3 and sugar you get the "candy propellant" used by amateur racketeers, including the Palestinian resistance folks.

Anyway: BBQ briquettes are a poor source of charcoal. They contain inhibitors like clay and are not as porous and reactive as real charcoal. I didn't realize this

Skylighter Epiphany

I learned about sky lighter.com just after discovering the chems you could find on eB*y. There is much to learn at that site. I eventually bought a BP "kit" from them, using red gum as the binder. It contained a big box of air float quality charcoal. I then learned (from meal and amateur corned experiments) that its all about charcoal (and a bit of processing). Air float means it will float in the air if disturbed. It makes a serious mess, though its harmless.

I realized this: Ancient man didn't know nitre; Modern man doesn't know charcoal. Ancient man didn't understand nitre chemistry. Modern man doesn't make or use charcoal himself.

BTW, one of the challenges in this Performance Art is to use improvised reagents, ie household chemicals. For instance, you can get copper sulphate (a colorant) as Zep root kill. You can get CaCl2 (eg for making copper chloride) as a dessicant at Albertson's.

Cooking

Read up on charcoal manufacture. See list below for those interested in that art.
Its basically cooking wood, sometimes in its own gasses; a reducing atmosphere.

Of course, folks in primitive places still make charcoal. Some cover fires with sand; others build structures to cook it in. I've seen these in NZ.

Tongue depressor attempt

My first attempt was this. I took a quart paint can and stuck a slightly smaller can on top of it, roughly doubling the height. (This because I didn't have the top to the paint can, but the smaller can fit perfectly.) In the top can I put 5 nail holes. I joined the cans with Al tape left over from a clothes dryer incident.

I cooked it over the natural gas fireplace --which is a key part of the suburban pyro experience--- and got a very small amount of charcoal. Just a few at the bottom of the can. But coffee-mill ground with the other ingredients, it worked! It *is* charcoal after all.

Again, note the use of the suburban gas fireplace: the chimney naturally vents the nasty smelling gases away. The natural gas is cheap, cheaper than any other fuel such as briquettes or firewood. Of course, if I were rural (without natural gas feed) using a 55 gal drum and firewood from my property, the economics and logistics would be different.

All part of the Art.

Arondo attempt

Next I tried some giant grass from the back yard. You'd think it was bamboo, basically. I spent more time watching the charcoal and got more and more uniformly cooked stuff. I used a 20 year old section of the UCI physics building to grind it into smaller pieces. Then into the (research) coffee grinder.

Success!

Simply grinding the 75:15:10 ingredients together yields meal powder. A small pile goes whoof.

Ignition

A good source of ignition for the suburban amateur chemist is a reading fresnel lens. Of course a long BBQ lighter also works, but you can get farther with a lens. And its cool too, part of the Performance.

So lets review:

- Metal can
- Fireplace
- Random dry stems
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- Coffee grinder
- Page-magnifying lens
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- Grant's stump remover
- Sulphur (opt.)

Processing

Meal powder doesn't burn as fast as it can, and it will separate, being a simple mixture. You process this into grains, using moisture, pressure, and sometimes a binder like red gum. This is called corning. Professional powder is also graphited which changes the surface burning properties, and also granular flow and electrostatic discharge.

BTW, I've seen on the web where high voltage discharges cross a pile of BP. It doesn't go off. BP is flame sensitive, but not very friction or pressure sensitive in the small amounts I use. And of course its not a brisant explosive; just a propellant.

So I've experimented with water and alcohol moisture and pressure. I have a piece of plastic tubing that a broom handle fits into perfectly; I can cast a large grain (say 20mm diam x 50mm). Though the pressure is likely low.

You corn moistened meal powder dough by forcing it through a screen. I haven't done this yet. For rocketry purposes, you ram meal into a tube, as a single solid grain.

Discovery of Rocketry

One piece of this pressed grain material took off --like a rocket-- when ignited at one edge. Thus the discovery or invention of rockets by the Chinese would have been obvious when they played with the magic material.

References

Musketeer.ch
sky lighter.com

Historical Saltpeter manufacture

Other users

If you search the web for homemade charcoal, you find other DIY folks, often craftsmen who want to get deeper into their Art (or simply can't buy what they can make). These include:

Gourmet restaurants (who prefer to cook over charcoal)
Metal smiths (eg knife makers)
charcoal artists (who want soft natural charcoal to draw with)

Pictures

Figure 1 Paintcan oven and dry wood

Figure 2 Oven sealed hermetically

Figure 3 Starting to cook

Figure 4 Outgassing flames. Foil was added to block some air.

Figure 5 After cooling, raw charcoal

Figure 6 Grinding into smaller pieces

Figure 7 Coffee grinder milled charcoal

Figure 8 Meal powder: 15% charcoal