

Re: Fire (pine knots)

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- *From:* vincent@xxxxxxxxxxxxxxxx (pete)
 - *Date:* 31 May 2006 01:12:43 GMT
-

on 29 May 2006 21:01:57 -0700, Lee Olsen <paleocity@xxxxxxxxxxxx> sez:

` Mario Petrinovich wrote:
` > Lee Olsen:
` > > Mario Petrinovich:
` > > > deowll:
` > > > > Actually the myth busters managed to start a fire with a rounded lump
` > > > > of
` > > > > ice about the size of a person's head. A drop simply won't collect
` > > > > enough light to do jack.
` > > >
` > > > It would, be sure.
` > >
` > > Water drop testing.
` > >
` > > Could a monkey or some other animal (Pleistocene Homo for instance)
` > > start a fire by chance simply having sunlight focus through a drop of
` > > water suspended on a hair in the proximity of pitch or some other dry
` > > material?
` > >
` > > Glass bottles laying in dry grass have been known to start fires. The
` > > bottom of a coke can polished to a shine with tooth paste can focus
` > > sunlight enough to get a fire started with dry tinder. I've seen
` > > numerous survival-type people start fires with various combinations of
` > > sticks; however, I have yet to see this type of fire started without
` > > first blowing on the hot coal after igniting the tinder material. This
` > > means a combination of wind, water drop held at the correct distance
` > > long enough, along with the right tinder in order for the process to
` > > succeed.
` > >
` > > To test the water drop hypothesis, pine pitch has been suggested for
` > > tinder. I happened to have some pine pitch that I gathered for the
` > > purpose of testing its qualities as mastic for attaching arrowheads to
` > > a shaft (it works great).
` > >
` > > Materials and methods.
` > >
` > > A few of the tools used in this experiment.
` > > <http://tinyurl.com/kyx5s>

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`>>
`>>
`>> The focal length of the magnifying glass was approximately 7 inches. As
`>> soon as the light was pinpointed on the paper, it burst into smoke
`>> within a few seconds and coals rapidly burnt a hole in the paper.
`>> <http://tinyurl.com/hjp8h>
`>> Paper with hole burned in it ignited by the 80mm diameter magnifying
`>> glass. Also in the photo is one of the lumps of pine pitch.
`>>
`>> Surprisingly, the same method would not light the pitch. It simply
`>> smoked and blistered the pitch as it evaporated, reminding me of the
`>> Wicked Witch of the West in Oz after Dorothy threw a bucket of water on
`>> her.
`>> <http://tinyurl.com/ksbsv>
`>>
`>> No matter how long the glass was applied to the pitch, I could not get
`>> a coal or fire going. I tried several different lumps of pitch just to
`>> make sure the first one wasn't defective in some way.
`>> <http://tinyurl.com/g3hd5>
`>> A match finally did the trick and reduced the lump of pitch into a
`>> small cinder pile.
`>>
`>> Next I tried focusing sunlight through a drop of water suspended on
`>> various items with little success. Gravity seemed to mess up almost
`>> every attempt at some point, mostly wetting the paper rather than
`>> burning it. Using a hair I finally did manage to hold a drop in
`>> place long enough to concentrate sunlight on a piece of paper, but at a
`>> very close distance, something around two or three millimeters focal
`>> length. No smoke could be produced in this manner. Next I tried
`>> focusing the spot of light on my arm. I could feel no warmth at all. If
`>> the ignition point of pitch was higher than paper there was no point in
`>> trying to light the pitch with heat so low I could not detect it on my
`>> arm.
`>>
`>> My conclusion is that a drop of water could never kindle a fire using
`>> pitch or anything else, either deliberately or by chance.
`>
`> Never-the-less, it happens every year, after first shower, in
`> savanna.
`> At Mediterranean it is hot, very hot. Thankfully shore breeze cools
`> it just enough for us to feel extremely comfortable in that environment. But
`> inland it is still very hot, and sunbeams are very strong.

`> Not as hot as my magnifying glass focused on your arm. Would you like
`> to try it? People live outdoors just the same and paper or arms do not
`> smoke from just being in the sun, as they do the instant my magnifying
`> glass focuses on them.

`> Try to find something about pyrophytes. As I wrote, those plants
`> work that way. They need fire.

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` Yes, that is true, but it has nothing to do with: "the sun can magnify through water drops."

` And they are producing fire. Even without any
` > additional help.

` If that is the case, these trees were doing just fine long before
` monkeys came along.

` If you take a look at where those mediterranean pyrophytes
` > grow, they grow with the right metereological condition, which includes dry
` > summer, in regions of subtropical highs, where there are not many clouds.
` > What produces fire for those plants is pitch (resin), highly
` > combustible.

` You said "pine" I'm sitting right here with pine pitch in front of me.
` No water drop will ignite this pitch, my magnifier won't start it to
` burn and neither will a drop of water.

` As I wrote, this isn't so much exposed, naturally. But a monkey
` > can help to expose it to sun. This pitch isn't combustable just for us to
` > have fun. It is combustable to produce fire.

` Yes, and like the burning cigarette you mentioned, it was started with
` something a lot hotter than a drop of water acting as a focusing agent.

` This is the very reason of
` > existance of it. For a long time now, human is the main ignitor of fire. So,
` > maybe plants adjusted to this. Maybe they were more combustable in the past,
` > who knows.

` Pine trees have been around a lot longer than monkeys or man, so you
` can bet neither had anything to do with the process at all.

` > So, you are saying that pyrophyts aren't producing fire, and you are
` > saying that the big fire after first shower in savanna isn't started by rain
` > drops. Hm, this is what you are saying. I saw one documentray which deals
` > especially with that big fire in savanna, and specialsts for this claim that
` > it is started that way.

` I can assure you there is no detectable amount of heat produced by
` "sun can magnify through water drops"

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- ` Are you sure the fire wasn't caused by some sort of spontaneous combustion process?
- ` > But ok, if you think you shouldn't waste any more time on this, it
- ` > is alright with me. I will waste more time. -- Mario

` <http://tinyurl.com/hmqf6>

- ` scroll down to fig 9. It says pitch started by "Subsequent fires
- ` readily reignite in the exposed wood and flowing resin at the older
- ` wound boundary."
- ` It takes a fire to start the pitch burning, not the focus of a drop of
- ` water or even a magnifying glass. Pitch burns hot once its burning,
- ` but does not start initially that easy. I had to use a match to get it
- ` going, just like the URL implies.

Just a couple of notes: getting pitch to burn, or any volatile oil, is difficult because the liquid phase conducts heat away making it hard to achieve and maintain combustion temperature. That is why candles have wicks – only the gas burns, but it must be heated by an adjacent solid surface to reach combustion temperature. If you try your magnifying glass experiment with pitch and something for it to wick on, you may have much better luck – say a piece of string. In that case you may find the pitch/wick combination ignites faster than either component alone.

As to magnifying the sun through a sphere (water droplet), this mostly doesn't work, because the spheric shape means a lot of energy is dissipated in the material. Unless you have a very transparent material, your transmission losses prevent sufficient heat from being concentrated (and remember that transparency in the visible is not necessarily the same as transparency in the infrared).

The geometry of the situation is such that your loss rate is independent of the diameter of the lens. Broken glass works much better – it has a higher index of refraction, so a thinner lens will concentrate light better than water, and commercial glass is quite transparent.

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Disclaimer: all I know I learned from reading Usenet.

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