

# Ethnobiology sheet

# Tinder Fungus

# 15

Winter 2016

## Introduction

Folklore has preserved knowledge and activities since Prehistoric Times. In the dawn of nanotechnology, fusion energy and quantic computers, our elders still preserve the memory of ancient lore, miraculously transmitted to our days through oral traditions.

Among these ethnographical jewels is tinder fungus. Used to create sparks for fires since the Paleolithic, tinder fungus was still in use up to a few decades ago, when it was replaced by the arrival of matches and lighters (Arcaicos, 2015). Our main protagonist is *Fomes fomentarius* (L.:Fr.) Fr., a common bracket fungus which is a parasite or decomposer growing on broadleaf trees such as poplars. It grows on timber and is the oldest documented tinder.

## A touch of History

There are many findings in archaeological settlements in Central Europe (Belgium, France, Switzerland, Germany...) with well identified remains of this tinder fungus linked to human occupation, generally in caves. These remains belong to the Upper Paleolithic, with the oldest remains dating back 32,000 years BP. In the same period, archaeologists found remains of iron sulfur ( $\text{FeS}_2$ ) e.g. pyrite or marcasite, essential as spark starters. This evidence proves our ancestors *Homo sapiens* were familiar with this system to control fire thousands of years ago.

In addition, scientists have evidence of fire use since the Lower Paleolithic in coal remains found in human settlements dating back 400,000 years BP, for example in Terra Amata, France. This is the oldest evidence of "domesticated fire".



Figure 1: Typical appearance of a *Fomes fomentarius*

Fire changed human existence. We can say that we are "sons of fire", as in the classical myth of Prometheus, who stole the secrets of fire from the Gods and taught them to humans. Fire has helped us for tens of thousands of years: in preparing and cooking food, warming us, protecting us against predators, giving us light, and used as a tool to change landscape and work other materials.

People carried fire with them across oceans and continents, while the secrets and skills to manage and create it were among the most highly valued knowledge. Fire, undoubtedly, was well known as a natural phenomenon due to lightning and volcanoes, being the cause of many wildfires which burned forests and grasslands. But "tailor-made" fire was crucial to human development.



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### First, it was a spark

Perhaps somewhere, in a deep dark of a cave where our ancestors lived, someone struck two special stones together, a heavy marcasite or a pyrite, creating a bright wake of sparks. That person tried again and again until he learned how to reproduce this amazing phenomenon. When people learned how to control the production of sparks, the next step was to look for a material that was easy to burn and could light a domesticated fire.



Figure 2. Hot coal in *Inonotus Hispidus*

Exploring their environment, our ancestors discovered easily combustible plants for use as tinder, suitable for receiving sparks and starting a fire.

In Spain, some plants traditionally used to make tinder were *Echinops* spp., *Phagnalon saxatile* (L.) Cass., *Ptilostemon hispanicus* (Lam.) Greuter) Fajardo et al, 2000, y Tejerina 2010). Other sources for tinder were fungi and lichens (Pardo de Santayana, 2008). Perhaps they saw a tinder fungus burning slowly in a timber hit by lightning, discovering that the interior area of this fungus could remain incandescent for some hours.

### Pyrites and marcasites

There is even an area in SW Spain and Portugal named the "Iberian pyrite belt" in geological terms. Scientists have found pyrite remains in archaeological settlements, which could be linked with use as a fire starter in Iberian Prehistory.

In 1991, in the Alps, there appeared a frozen mummy dating back to the Bronze Age. He has been named Ötzi the Iceman. Among his belongings was a leather bag with a piece of tinder fungus inside. The analysis found remains of iron sulfide between its fibers, a proof of the use of this fungus as tinder five thousand years ago (Nora et al, 2015).

Both pyrite and marcasite (similar to pyrite but with rhombic crystallization) produce sparks when struck from a specific angle with a hard stone such as silicon, quartzite or basalt. Also, they produce sparks when hit together.

The impact of these materials against iron sulfur creates enough energy to separate a tiny incandescent piece, due to chemical combustion, in the presence of oxygen. According to the colour, the spark can reach temperatures around 800° C.



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Figure 3. Marcasita halved

With luck and training, we can direct that spark to a fuzzy material (cottonlike) or dusty substance (tinder) which receives the spark and becomes incandescent. That incandescence lasts tenths of a second, which is time enough to ignite the easily combustible tinder).

### ***Fomes fomentarius*: the best tinder**

Opening up one of these fungi, we can see three different sections: a germinal zone with a sphaeric shape; another central zone which is compact but spongy and soft; and a third area which corresponds to the pores (hymenium) from which spores are spread.

Talking about tinder, we are interested in the middle zone, the spongy one, shaped by a net of fine fibers, the secret to easy combustion. The best option is to scrape that net until creating a little pile of brownish fuzz. That pile must be pressed softly to compact the fuzz, creating a place to harbor the ember.

Its microfiber structure and the oxygen which exists in the interstices allow the sparks to nestle and extend easily, without blowing. If this happens, the miracle of fire will happen!

In some conditions, it's possible to use other species of bracket fungus, such as *Phellinus igniarius* (L.) Quél. (which is the meaning of its specific scientific name: "suitable to produce fire") or even the more common *Inonotus hispidus* (Bull.) P. Karst, which exists in many urban parks.



Figure 4. Cross section of *Fomes fomentarius*

These fungi, due to their slow combustion, are suitable for transporting fire from one place to another, as a controlled ember. Ötzi the Ice-man carried a recipient of birch bark with maple leaves inside where he probably carried slowly burning fungus.

### **Other curiosities**

Another way to use these fungi, under controlled conditions, allows us to light a fire. This consists in using the dust originated from dry decomposition as tinder. This is possible with the birch polypore (*Piptoporus betulinus* (Bull.) P. Karst) or with the ground up central flesh of *Inonotus hispidus*. Lighting a fire with this dust is more difficult than with common tinder, but not impossible.





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Obviously, this process is easier if we change the weak spark from pyrite-marcasite for the stronger one from a commercial bar of magnesium-cerium (included in many survival kits), these sparks reach a temperature of 3.000°C, which make the ignition of less-efficient tinders easier.



Figure 5. Birch mushroom Dust

There is another way which has been in use since Roman times called the "links", similar to chain links but specifically used to light fire. This is made up of a piece of iron with a high carbon content. When struck against a hard stone edge (silicon for example) the chain releases a piece of incandescent metal at a temperature of about 1.200°C. That's the "lighter" used by our grandparents in the Spanish countryside before the arrival of wick lighters. In addition to the iron, kept in a little pouch, people had tinder made from some thistles such as *Echinops ritro* L. or *Ptilostemon hispanicus* (known as "tinder thistles" in Spanish), or from other plants such as *Phagnalon saxatile*.

Another source of tinder was dry slices of a tinder fungus (*Fomes fomentarius*), previously boiled in water with ashes from a hardwood, e.g. oak (*Quercus faginea* L.) or holm oak (*Quercus ilex* subsp. *Ballota*). The ashes were impregnated with potash, making it easier to light after being dried. Another method was a bath in a solution of weakly-concentrated potassium nitrate ( $KNO_3$ ).

### Fomes handicraft

In Romania, a handful of elders still use the inner trama of *Fomes* to create amazing craftworks. This knowledge is still alive thanks to the tourist market. Craftsmen peel the bark fungus using a sickle, cutting slices and stretching it to obtain pieces to be decorated pyrographically with geometric designs, animals, etc.



Figure 6. Craft fomes

These layers were also used in folk medicine to treat hemorrhages, using them as an anti-rheumatic bandage or even as sanitary napkins.

Perhaps the next time you see this humble tinder fungus growing on a tree, you will see it with new eyes!!!



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Figure 7 Link and fomes

**Tinder, obtained in nature from fungi, lichens and plants and prepared with ingenuity, enabled us to produce the miracle of fire, a powerful tool for advancing human civilization**

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