



WE STILL CARRY THE FIRE

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Cover photo: Excursion with Interior Architecture and Furniture
Design students at Konstfack University of Arts, Craft and Design,
Stockholm, 2014.

Published by Gemenskapspraktik

ISBN 978-91-8059-321-2

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INTRODUCTION

We Still Carry the Fire is a project about human-fire relationships. It revolves around mobile wood-fired kitchens that provide various opportunities for exploring aspects of cooking using fire. The project is inspired by ideas from the fields of art, design, and anthropology. In an artistic context, the project is primarily inspired by relational environments. In a design context, the project is about prototyping: making, testing, evaluating, and finally learning from this process. In terms of anthropology, the focus is on how humans have evolved in interaction with fire, in particular through cooking.

The subject of fire and cooking is pretty much inexhaustible and this book does not claim to be a complete survey of the topic. Also, many theories are still debated in academia. For example, a tenet in this book is that fire enabled cooking. However, some scientists speculate that our ancestors may have used hot springs for cooking before they learned to cook using fire.¹ Despite the vastness of the subject I have done my best to fact-check and provide references.

The mobile wood-fired kitchens that this project revolves around were developed between 2012 and 2019. I had initially intended to summarise the project in a book many years ago, but for various reasons the book was postponed. Over time my understanding of the project has developed. In particular, I have discovered new research on fire's and cooking's role in the development of the human brain. Still, I see this book – and the project as a whole – mostly as a product of the period when it was initiated.

Lastly, I want to emphasize the importance of being cautious with fire. In 2012, when this project was initiated, lighting a campfire in the woods or barbecuing in a park was a common and unproblematic activity in Sweden. After the devastating forest fires during the hot and dry summer in 2018, many people, including myself, changed their attitudes towards fire. Given the now much more apparent risks with fire, it feels important to emphasize cautiousness when engaging in any activity that involves fire.

I acknowledge that some of the activities conducted as part of this project may have been a bit risky. Having grown up in the countryside with wood stoves for both cooking and heating I may at times have been too casual in my approach to fire. Through this book I hope to promote more responsible use of fire.

ACKNOWLEDGEMENTS

The mobile wood-fired kitchens built within *We Still Carry the Fire* have appeared in various contexts in Sweden and Norway, including in Vintervikens Trädgård in Stockholm (2013), at Bergen Kunsthall in Bergen (2013), with Maretopia at Stockholm Culture Festival (2013), in Årsta in Stockholm with students at the Interior Architecture and Furniture Design programme at Konstfack University of Arts Craft and Design (2014), at Slakthusateljéerna in Stockholm together with Slakthusområdet's hembygdsförening (2016), at Dome of Visions at KTH Royal Institute of Technology in Stockholm (2016), at Losæter in Oslo (2017), at Hjällbo fritidsgård and Askim Escape Pod in Gothenburg (2018), in the exhibition *A Longer Table* at Köttinspektionen in Uppsala (2019) and at Walking Festival of Sound in Vinterviken in Stockholm (2019).

Thanks to: Hannes Norr, gardener at Vintervikens Trädgård; Sergio Montero Bravo, lecturer at the Interior Design and Architecture programme at Konstfack University of Arts Craft and Design; Björn Norberg, curator at Dome of Visions; artists Linus Ersson and Marius Presterud, for coproducing the Full Moon Gathering at Losæter; Jens Evaldsson, artist and organiser at Maretopia and Askim Escape Pod; curators Heather Jones and Sally Müller at Köttinspektionen in Uppsala, and to artists Jacek Smolicki and Tim Shaw at the Walking Festival of Sound.

HUMANS, FIRE, AND COOKING

Many thinkers have said that it is the use of fire that differentiates humans from other animals.^{2, 3, 4} Although other animals occasionally take advantage of fires, humans are the only animals known to create and control fire. Throughout human evolution we and our ancestors have made use of fire for countless purposes; to cook food, scare away predators, heat and light up our dwellings, migrate to colder territories, clear land for agriculture, make pottery, work metals, and power machines – developments that have affected us and the Earth in countless ways.

Given fire's ubiquity, it is not surprising that fire has been regarded as both a physical and metaphysical element in many, if not most, cultures throughout history. The ancient Greeks considered fire as one of the four elements together with water, earth, and air. In the 17th century, a theory of a fire-like element or substance called phlogiston was proposed. In the 19th century, oxygen's role in combustion was recognised, ending the idea of a special fire element. Science now tells us that fire is an epiphenomenon: the visible trace of a chemical process of very rapid oxidation of hydrocarbons.^{5, 6}

Fire has not been an ever-present occurrence in Earth's 4.5 billion-year-old life. Charcoal in the sedimentary record reveals fire activity on Earth since roughly 400 million years ago.⁷ Fire appeared at this time because living organisms had created enough oxygen in the atmosphere for fire to be possible. Fire needs oxygen, fuel, and ignition. Basically, fire "takes apart what photosynthesis puts together."⁸

The ubiquity of fire activity on Earth makes it impossible to use geological records to determine when our ancestors first began to use fire.⁷ Like modern hunter-gatherers, early humans likely made open fires that leave no archaeological traces.⁹ However, it is generally thought that no hominid before *Homo erectus*, around two million years ago, could have been capable of capturing and handling fire. Solid evidence of fire exists from around four hundred thousand years ago, from when the remains of home bases with proper hearths have been found.⁴

It has been argued that it was when our pre-human ancestors began to use fire for cooking that they separated from other primates and became "human".²

Cooked food unlocked a store of nutrition for our ancestors. By cooking food, they didn't have to eat as much as before, and they could make use of a wider variety of foodstuffs.

Cooking can detoxify vegetables such as tubers and remove parasites like trichinosis from meat, and it can make otherwise inedible food palatable and digestible. Cooking also greatly increases the availability of starch, a form of glucose, in food.^{8,9,10} Glucose is what the human brain and body run on. It is converted into nerve propagation and muscle contraction in a process called cellular respiration which, interestingly, is a combustion process just like fire.

While most of a cooked meal can be metabolised by the body, only a third of the nutrients are accessible in a raw meal.¹¹ To put cooking and access to more nutritious foodstuffs in perspective, modern humans can get by eating cooked or otherwise processed meals for around twenty minutes three times a day. In comparison, chimpanzees, our genetically closest living relatives, feed for more than six hours a day to meet their nutrient requirements.¹²

Anthropologist Richard Wrangham makes a convincing case that our ancestors began using fire for cooking already some two million years ago. He has studied the physiology of primates and argues that eating cooked food caused our ancestors' digestive systems and mouths to become smaller and their brains to get bigger.²

A common view today is that larger brain size and more neurons in relation to body size are the main characteristics that set humans apart from other animals. Chimpanzees, for example, are comparable to humans in size, but the human brain is about three times as large as the chimpanzee brain.

Brains consume a lot of energy, and most of the energy is consumed by neurons. In *Homo sapiens*, the brain only accounts for 2% of a person's total body weight, but over 20% of the body's total energy use, of which up to 80% is consumed by neurons.¹³ Likely, the evolution of the comparatively large human brain with its many neurons may only have been possible because of the use of fire to cook food.¹⁴



Cooking vegetable soup at Losæter. Oslo, 2017.

Tending fire and cooking are also activities that likely had major influences on our ancestors' behaviour on both the individual level and the level of the group.^{5, 2} Keeping a fire going requires foresight in gathering firewood, care in supplying it with firewood so it doesn't go out, and planning to protect it from wind, rain, and snow. This benefits from division of labour and cooperation. Food that is being cooked has to be watched carefully so that it isn't burned, and eating it has to be postponed until it is cooked properly and sufficiently cooled. This requires patience and focused attention. Both making a fire and cooking involve skills that have to be learned and passed down through generations.

In sum, using fire to cook food unlocked a well of nutrition. This enabled larger brains, freed up time to pursue activities other than feeding, and allowed our ancestors to use their larger brains to develop new skills and behaviours.¹⁴

In modern societies we don't see fire as often as people used to in the

past, but we still completely depend on it. Perhaps, as sociologist Johan Goudeblom notes in *Fire and Civilization*, the motor car can serve as a symbol of the highly complex and differentiated, yet not immediately visible, ways in which fire is used today:

When driving, people do not perceive the process of combustion which keep their car going; they do not see the petrol gas burning under the bonnet, nor have most of them even remotely sensed the fire in the factories and power plants without which their cars would never have been produced at all. (p. 173)

It is also important to consider fire's destructive power. The ease with which a fire can be lit bears no relation to the potential destruction a fire can cause. Learning to handle fire can therefore be seen as an integral part of the civilising of individuals in modern society.¹⁵

Occasionally we hear about building- or forest fires on the news. While these events may be frightening, they might not be frequent enough or



Vegetable soup served in clay bowls made by artist Linus Ersson. Losæter, Oslo, 2017.

close enough for us to think about fire as a particularly strong destructive force. However, we hear almost daily of the dangers of climate change, from rising sea levels to intense droughts and deadly heat waves. Myriad forms of combustion of fossil fuels, from that in cars to coal plants, are the driving cause of global climate change.

According to fire historian Stephen J. Pyne, climate history is a sub-narrative of fire history, and the earth is now advancing into a deepening fire age.⁸ It is clear that we ought to use less fire, but at least for the moment we can't remove fire completely. Fire also has its place outside of purely human concerns – many species and ecosystems have evolved in the presence of fire and depend on fire. According to Pyne, we have too many bad fires and too few good ones, and we have too much combustion on the planet overall. We can't survive without a fire culture, but we need one that ensures fire's proper place.¹⁶

Although right now we may be heading deeper into a fire age, it is fascinating to consider that after hundreds of thousands, or even millions of years of intensive use of fire, we could eventually move into a post-fire age. Emerging technologies such as geo-, wind-, hydro-, and solar energy do at least in theory enable us to cook, heat our homes, and travel without burning wood or fossil fuels. Global warming, resource depletion, and pollution give us every reason to try to do so.

A SHORT HISTORY OF MOBILE STOVES

In the early prehistoric era, nomadic people likely used fire-making tools such as fire drills to light open fires for cooking. However, starting a fire with primitive tools can be very time-consuming, so people eventually began to carry fire with them in fire pots. A fire pot is an earthenware vessel in which a small slow-burning fire can be kept alive for a long period. The small fire in the fire pot can then be used to start a larger fire.¹⁷

Heat resistant ceramic cooking vessels is an innovation that emerged around fifteen thousand years ago and remnants of fire pots from around ten to eleven thousand years ago have been found.^{10, 17} Over time, fire pots developed into pots that both supported and heated a cooking vessel, and eventually into more efficient stoves.¹⁷ This development contributed to a shift from nomadic hunting and gathering toward more settled living with the domestication of plants and farming.

In the 18th century, the Western World switched almost completely from open fires to closed stoves, and in the early 20th century to stoves powered by gas or electricity.¹⁸ However, in other parts of the world people still cook over open fires and many variants of wood-burning stoves are still in use.

In the West today, portable stoves are usually associated with camping. Lightweight portable stoves for camping became commonplace in Europe in the latter half of the 19th century. Later, camping stoves gained traction in North America as backpackers became more aware of the impact they had on the environment.¹⁹ Fire scars from open fires can remain on the ground for years and the risk of fire spreading is also higher with open fires than if the fire is contained in a stove.

Sweden has a notable history of portable stove development. The Primus stove, the first soot-less kerosene stove, was invented in Sweden in 1892. It became popular for demanding expeditions, such as the first journeys to the South Pole and the summit of Mount Everest.

In 1906, Swedish inventor Anna Julie Heilborn was given a patent for a portable kitchen that could be used for cooking outdoors. Her kitchen was intended to be used by ordinary people on family excursions. At the time such leisure activities were reserved for a minority of privileged people

and her invention was never commercialised. However, she is credited as the inventor of the first “mobile sports kitchen”.²⁰

In 1951, the Trangia stove was developed: a complete cooking system with a liquid fuel burner, a windshield, and a cooking pot. The stove system, which hasn’t changed much in recent decades, has become iconic in Sweden and is still popular with campers.

Like the Primus and Trangia stoves, most contemporary portable stoves use gas or liquid fuels. But there are also mobile wood-burning stoves that use firewood, twigs, and cones. They are not as efficient and they produce more smoke, but they have the advantage that fuel is readily available in nature. Many also think it is a fun activity to light a fire and cook over it.

A rocket stove is a particular kind of wood-burning stove that can be both portable and stationary. Rocket stoves were initially developed in the 1980s to mitigate issues with health and deforestation in the developing world. More recently they have gained in popularity in the West among “preppers”, but also for camping and leisure.

Rocket stoves use a vertical chimney as a high-temperature combustion chamber to achieve almost complete combustion before the flames reach the cooking surface. When cooking over an open fire most of the energy content in the firewood is lost to the environment. A rocket stove uses less than half the amount of fuel than an open fire to cook the same amount of food.¹⁸ Because rocket stoves are so much more efficient they can potentially solve a lot of problems associated with open fires and ineffective wood-burning stoves.

Globally, over two billion people still cook their food over open fires or by using inefficient wood- or coal-burning stoves.²¹ Open fires and inefficient stoves are major contributors to global warming, pollution, and deforestation, and every year millions of people die prematurely and fall sick from breathing in smoke while cooking.^{21,22} As women and children typically are responsible for cooking and collecting firewood, they are the most affected. Inefficient cookstoves are also a source of inequality since those who cook and gather fuel do so at the expense of studying or pursuing income-generating work.

Wood- and coal-burning stoves emit carbon dioxide, soot and methane.^{21,22} Carbon dioxide is the largest contributor to global warming. However, recent studies indicate that soot is number two, possibly responsible for close to a fifth of the warming of the planet, and as much as half of Arctic warming.²³ Soot has a relatively short atmospheric lifetime compared to other greenhouse gases, such as carbon dioxide. Converting to low-soot stoves would therefore quickly remove the global warming effects of soot emitted by inefficient stoves.

It's been estimated that globally, improved stoves could reduce energy use and green house gas emission from stoves by more than a third.²⁴ Rocket stoves can be made quite easily, inexpensively, and locally from used materials such as metal pipes and empty barrels or gas containers, or they can be mass-produced using industrial processes. Because of this, they are potentially cost-effective and viable intermediate solutions to problems associated with open fires and inefficient wood-burning stoves. However, in the long run, electric stoves and cookers are preferable to gas and wood stoves because they emit little to no unhealthy smoke while cooking and are safer and easier to cook with.^{25,26}

ABOUT THE KITCHENS



Fire soup at Dome of Visions. KTH, Stockholm, 2016.

The wood-fired kitchens built within this project are artefacts that allow for practical exploration of cooking using fire. The kitchens are not intended to be fully functional for any specific cooking purpose. In a sense, they are means for playing with fire. Playing with fire is generally a bad idea. However, playing is part of learning, and it is difficult to purely intellectually understand phenomena like fire and practices such as cooking. The idea is that the kitchens offer reasonably safe environments for cooking over fire. The stoves ideally contain the fire within safe limits, and the kitchens have been used with fire extinguishing equipment such as water and fire blankets nearby.

When cooking using a wood-fired kitchen, one will experience the thrill of lighting a fire, the work it takes to keep the fire alive, and the coordination required to tend to the fire and cook at the same time. Most characteristic for wood-burning stoves, one will hear the crackling of burning wood, smell the wood smoke, feel the warmth from the fire, and be mesmerized by the flames.



Fire soup at Dome of Visions. KTH, Stockholm, 2016.

The drawbacks of cooking over fire will also be apparent. It is difficult to avoid inhaling smoke or getting it in the eyes, or getting clothes stained by soot. While the smell of burning wood might be appealing outdoors, it is not as fun when you get home and can't get it out of your clothes. In the worst case, someone might get burned, or the fire might spread and cause major destruction.

When making a fire and cooking in a social context one will experience how people take on different roles in the process. Some might be anxious about the risks involved with fire, while others will want to move fast and take charge of the cooking. Generally, a functional division of labour is quickly established and people find different tasks to take care of. For example, one person may tend to the fire, another may chop vegetables, and a third may stir the pot to prevent burning.

Food that is cooked and eaten outdoors generally tastes great. It's interesting to note though that the same food, when saved and eaten indoors often seem unappealing.

THE TIN CAN KITCHEN



Cooking excursion with Konstfack students. Stockholm, 2014.

The tin can kitchen is a set of two stoves made of discarded tin cans. The small stove is suitable for heating a pot of water. The larger one can be used to cook food. Both stoves are built following do-it-yourself instructional videos found on YouTube. The stoves are fitted in a mobile wooden box together with plates, mugs, and cutlery. The kitchen is suitable for cooking for one or two people. The stoves work, were fun to make, and could potentially be useful in the unlikely situation that there are no alternatives around. However, they provide no real benefit when compared to more compact and portable camping stoves.

THE BIKE KITCHEN



Cooking excursion with Konstfack students. Stockholm, 2014.

The bike kitchen provides seating for five and has five sets of plates, mugs, and cutlery. The stove that is fitted onto the bike trailer is a commercial tent stove that was originally developed to be used in disaster situations. The kitchen is also equipped with a small axe for making kindling and chopping wood, and with various utensils for cooking food.

Unfortunately, the tent stove is not particularly efficient for cooking, since a lot of heat dissipates through its sides instead of heating the cooking pot. The bike trailer is also cumbersome to transport when it isn't attached to a bike, such as when moving it in and out of storage. Mostly because of storage concerns, the bike kitchen has been dismantled.

THE ROCKET STOVE KITCHEN



The rocket stove kitchen at *A Longer Table*. Köttinspektionen, Uppsala, 2019.

The rocket stove kitchen is equipped with a rocket stove and it has plates, cutlery and seats for five. The rocket stove is a model called the “Grover Rocket Stove”. This particular stove was made in the U.S. and marketed with the slogan, “For Hot Meals in Hard Times”. It is made of recycled steel and has removable legs and a carry handle for portability. The design is not protected so anyone with sufficient metalworking skills can make one.

The kitchen also includes an axe for chopping firewood, a tarp that can provide shelter from bad weather, and a first aid kit in case of an accident. The trolley has large puncture-free tires. The boxes are made of aluminium, which makes them both light and durable. The lids have been covered with plywood and can be used as tables or seats.

The rocket stove kitchen has seen several improvements over time. The original rocket stove kitchen included a pressure cooker but it is not included in the kitchen anymore. Although very efficient, the pressure cooker can be challenging to cook with. It’s also not as fun to cook soup with, since you can’t see what you are cooking.



The rocket stove kitchen at *A Longer Table*. Köttinspektionen, Uppsala, 2019.

The homemade foldable three legged stools (pictured above) were rather flimsy to sit on and didn't fit well on the trolley. For this reason they have been replaced with seating pads.

The impression is that the kitchen is durable and functional enough that it could actually be useful in a disaster situation or during a power outage. However, the kitchen seems a bit of overkill for social cooking excursions. For leisure, cooking using a tripod stand over a campfire or in a pre-existing fireplace or grill makes more sense.

FIRE SOUP



Fire soup at *A Longer Table*. Köttingspektionen, Uppsala, 2019.

Mobile kitchens, like the ones in this book, can be used for many types of cooking. One advantage they have over open fires or grills is that they can be used with a pot to cook soups and stews.

During cooking excursions within this project, the concept of a “fire soup” has emerged. A fire soup is a hot and spicy soup cooked over a fire using primarily red, orange, and yellow ingredients. It’s fun to improvise with different colored ingredients and see how the color of the soup turns out. The result is usually tasty.

Examples of ingredients that can work in a fire soup are: red and yellow tomatoes, pumpkin, onion, chilli, yellow beets and even fruits such as pomegranate. It’s best to avoid red beets since they can make the soup too red. Turmeric or saffron can be added to ensure that the soup base gets a warm yellow color.



The rocket stove kitchen at *A Longer Table*. Köttinspektionen, Uppsala, 2019.

In Swedish, “a soup” is a metaphor for “a mess.” Thus “a fire soup” can also be a metaphor for the mess of global warming, resource depletion, and pollution that we humans have caused through our intensive use of fire.

In exhibitions, the kitchens have been shown together with a cooking pot filled with books about human-fire relations. The books presented in the pot are key references in this project and book.

Books that have been presented in the pot include:

Fire and Civilisation by Johan Goudsblom (1992), *Fire: The Spark That Ignited Human Evolution* by Frances D. Burton (2009), *Catching Fire: How Cooking Made Us Human* by Richard Wrangham (2009), *Cooked: A Natural History of Transformation* by Michael Pollan (2013), and *The Pyrocene* by Stephen J. Pyne (2021).

CONCLUSIONS

It would be easy to interpret this project as romanticising fire. However, while I have built on the social appeal of fire I have also attempted to communicate the impractical and destructive aspects of fire. People have gradually stopped using open fires and wood stoves for good reasons. Fire is polluting and bad for both indoor and outdoor health, and in cities distributing firewood is impractical. Finally, fire is dangerous and can burn down houses, cities, and forests. For most everyday purposes, such as for cooking, modern technologies such as electric stoves are safer and more practical than fire.

Coming together next to a fire is an immersive social experience and it is widely recognized that gathering around a fire induces relaxation and enhances prosocial behavior.²⁷ For this reason campfires, fireplaces, and wood stoves, etc. will likely always be present. However, in general, and especially in cities, people will likely increasingly use modern technologies to simulate the multisensory and social experience that a fire can provide, thus reducing the pollution, negative health aspects, and dangers inherent to fire, while still retaining its benefits.

As an artistic material, fire is perhaps the worst. Logical thinking and restraint are not always compatible with creativity, and although art may seem calm and de-stressing the production conditions are often stressful, requiring swift adaptations to opportunities and unknown conditions, without much time for dialogue and reflection. That is perhaps exactly how not to work with fire. Fire is inherently risky and things can really go wrong if it is handled without knowledge or in the wrong state of mind. With that said, knowing how to make and handle fire can be life saving, and it makes sense to develop functional relationships to fire even in modern societies.

FIRE SAFETY

Fire-making is always a personal responsibility. It is generally not permitted to start fires in densely populated areas or during hot and dry summer months. Before making a fire: 1. Check with the fire department if you are allowed to make a fire. 2. Do not make a fire if it is dry and windy. 3. Be sure to have fire extinguishing equipment close by. 4. Always be at least two people present in case of an emergency. 5. Make sure you can call for help if there is an accident. 6. Always make sure you have put out a fire completely before you leave it.

Fire bans must be respected. Fire can spread rapidly and if the ground is dry a single spark can cause a fire with devastating consequences. For this reason, making a fire is completely forbidden when there is a fire ban. Independent of if there is a fire ban or not it is generally not a good idea to make a fire if the ground is dry or if it is windy. It is generally also not advisable to make fires when it is dark outside. Flames from the fire can be seen from further away when it is dark and it is difficult for people who see the flames to determine if the fire is under control or not. Making fire when it is dark outside can therefore cause unnecessary alarm.

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