Crowther described the making of home-crafted tortillas as an example of an essential everyday act that defines omnivorous humanity as **cookivores**.

“Cooking,” according to Brillat-Savarin (2009, p. 283), an early French gastronome, “is the oldest of all arts”.

This is the story of cooking, concerning hearths and kitchens, gender, cooks, cookery knowledge, and the shaping of cuisine.

The origins of fire use and cooking

When we talk about the use of fire in this lecture we are talking about the **control of fire**, not opportunistic uses. So, using fire and controlling fire are two separate research questions.

- Once acquired, fire needs to be tended, akin to other domesticates, demanding new skills and cooperation among its owners.
- A recent [research paper](#) outlined what level of intelligence our ancestors (*Homo erectus*) needed to control fire. The answer is a higher level than had previously been thought, because they needed to:
  - Plan ahead and gather the materials needed to keep the fire going.
  - Their capacity to cooperate, rather than compete, would be pivotal to the control of fire. This is what Twomey (2013) calls future-directed, self-regulation.

The origin of fire use, and its associated cooking, has long fascinated people, bringing explanations in the form of 1) **mythological traditions** and 2) **scientific hypotheses**.

- Many small-scale societies captured the significance of fire, in their mythological traditions that tell of this act as marking them as distinct from other creatures.
- **Myths** are sacred narratives explaining how things came to be the way they are.
Twomey’s Inferential Structure

- **Controlled fire use**
  - **Evidence**
    - Archaeological
    - Fossil
    - Demographic
    - Palaeoenvironmental
  - **Conditions**
    - Social organization
    - Subsistence strategies
    - Habitat
    - Climate
    - Technology
- **Behaviour**
  - Access fire
  - Transport fire
  - Provision fire
  - Protect fire
  - Use fire
  - Fire-related problems
    - Ecological constraints
    - Logistical constraints
    - Economic constraints
    - Free riding
    - Conflicts of interest
    - Delayed returns
  - Cognitive abilities
    - Extended working memory
    - Episodic memory
    - Decoupled representations
    - Collective intentionality
    - Protolanguage
- **Behaviour**
  - Anticipatory planning
  - Response inhibition
  - Future-directed cooperation
• The origins of fire use and cooking (continued)
  • While cooking cannot be credited as the primary force in human evolution, it is certainly worthy of attention—as Charles Darwin noted in his 1871 *Descent of Man*, cooking, cooking, along with language, was man’s greatest discovery (Darwin [1871] 2004, 68).
  • Your text mentions Chesowanja, Kenya (200,000 years ago as a *Homo sapiens* site)
  • There has been a series of earlier sites suggested to the candidate for first control of fire.
    • Among the best documented, and least challenged, has been Gesher Benot Ya'aqov, Israel, dating to 790 thousand years ago (kya).
      • Numerous hearths were identified.
      • Also found was burnt flint (more later on why this is important).
    • **Breaking news:** April 2012, a research paper reports a date of 1 million years age (mya) at Wonderwerk Cave, South Africa. Their evidence for the controlled use of fire included that:
      • Temperature of sediments measured using *Fourier transform infrared microspectroscopy (FTIR)*. Found the sediments were heated to temperatures consistent with fire.
      • Burned grasses, leaves and bones were 30 meters back from cave entrance, which decreases the chance of blow-in as an explanation.
      • The burning was done repeatedly.
Origins of Fire Use and Cooking 3

- Environmental, biological and cultural advantages of fire use
  - **Environmental advantages** include:
    - Along with clothing and shelter, fire has enabled humans to settle into a global environment.
    - This is in spite of our species being a K-selected species, reproductively.
    - **K-selected species** adapt to limited environments. Spreading into too many environments means placing your few offspring at risk.
  - **Fire provides warmth, extends the activity period (light), and helps with predator control.**
    - Every time it gets colder, my heating bill goes up.
    - The new PBS series, *How we go to now: Light*, discusses the importance of light in human history. Of personal interest to me was how the invention of the electric light shifted our sleep patterns.
  - We like to see ourselves as the top predator of the world, but for much of our history we were prey.
    - In fact, many of the hominin fossil finds have been found with tooth and claw marks from predation. FYI: Hominins are primates with large brains, who make tools, and have thicker tooth enamel. (In other words: us and our direct ancestors).
  - **Fire also aids in pest control.** Place some green vegetation on a fire and the resulting smoke will deter biting insects.
• **Environmental, biological and cultural advantages of fire use (continued)**
  • **Biological advantages** include:
    • **Cooking of foods makes them more eatable.**
      • Cooking “predigests” our food.
      • This means that previously hard to access calories are now available for less effort.
    • There is one hypothesis that suggests cooking our food was pivotal to the expansion of our brains (the **cooking hypothesis**). Check out this TED talk about brain organization and the cooking of food: [What is so special about the human brain?](#)
    • Another, related hypothesis, the **scavenger hypothesis**, is where early humans scavenged for brains using stone tools to crack open the skulls of discarded carnivore kills.
    • Yet a third hypothesis suggests our big brains are due the need for men to strategize when hunting (the **man the hunter hypothesis**). This idea lead to other proposals:
      • **Woman the gatherer hypothesis** as the explanation for our brains. Then, **woman the hunter hypothesis** was proposed.
      • Finally, **man the hunted hypothesis** (whose authors argued that hunting only began with control of fire).
  • **Cooking kills parasites and other potentially dangerous organisms.**
    • My late father urged everyone to cook beef until the “moo-ing stopped”.
    • I took him seriously; he worked night clean-up in a meat-packing plant.
  • There are several other biological responses to the cooking of food, besides brain size.
    • The decrease in the size of our molars as well as the decrease in the strength of our jaws.
    • The change in our digestive anatomy is apparent (our stomach surface area is 1/3 of what our body size would suggest; our large colon is 60% smaller). (Wrangham, 2009).
Environmental, biological and cultural advantages of fire use (continued)

- **Cultural advantages** include:
  - Fire makes the working of tools easier:
    - The oldest known evidence of tool use is about 3.4 million years ago (McPherron, 2010), hafted tools 500,000 (Bernaa et al., 2012).
    - Some stone flake better after heating.
      - Stone tools are created by taking advantage of the natural, small fissures found in rocks.
      - Some stones need heat to help create these imperfections.
      - If interested, this [link](#) provides a temperature guide for various types of stone.
    - Heated, wooden spear tips are stronger.
      - This process is often called “fire hardening” or “fire polishing”.
      - FYI: The evidence for the oldest wooden spears are 400,000 years ago, at Schöningen, Germany.
  - Fire allows for the firing of pottery.
    - Some cultures still place their pottery directly on the fire
    - Others now use kilns.
  - Allowed for the invention of metallurgy.
    - Early techniques appeared to be based on cold hammering
    - With fire the use of metals bounded.
  - Landscaping
    - Prehistoric groups often controlled the landscape by the use of fire.
    - Today, **swidden** (slash-and-burn) farming remains a common practice in the tropics. In Oregon, the burning of the grass seed fields is an annual event.
  - The combustion engine.
Cooking Techniques

Cooking, in general, refers to an application of heat to produce an irreversible change. However, it is more than this; cooking follows cultural rules, and these are the basis of a cuisine. Cooking includes all the preparation: the processing of ingredients to transform them into the recognized food of the culinary tradition.

1. Physical Change: The processing and preparation of ingredients, which includes grating, grinding, milling, pounding, peeling, chopping, and slicing; all alter the shape of the foodstuffs, making them smaller and more manageable.
   - The size will be influenced by the intended outcome, such as making flour for breads or porridges.
   - The physical change also encompasses squeezing juice, pressing oil, separating eggs, churning milk, and rendering fat.
   - A further physical change comes with combining or mixing ingredients, whipping, stirring, and beating, changing the texture and density of the substance.

2. Water Content Change: Involves adding or removing the water content of the foodstuff through the judicious use of liquid.
   - This includes marinating, soaking, adding flavored liquids, and lengthy curing in brines and acids to preserve food.
   - Further reduction of water content in foodstuffs can be brought by salting, smoking, and drying, all ancient methods of preserving foods for storage and imparting flavor.
   - Freezing, traditionally used in the Arctic, is now a standard Western food preservation technique, and is another facet of cooking techniques.

3. Chemical Change: This probably the most familiar aspect of cooking, as it includes the use of heat—but it also includes fermentation.
   - The use of heat is divided according to its intensity: direct exposure, such as grilling and roasting; and indirect exposure, found in baking in ovens.
   - Heat is also applied through two major media: water and fat or oil.
• Hunter-gatherers (foragers)
  • Preparation and cooking techniques for small-scale hunter-gatherers are relatively simple and are organized by the gendered division of labor.
    • Women doing the majority of daily food processing and cooking.
    • Men tended to butcher, and often cook, the larger animals, and also to cook for big social gatherings and rituals.
  • The resultant dishes of hunter-gatherer cuisines are more accurately represented as assemblages of foods to create a meal. They appear not to be named as distinct culinary artifacts; instead they are combinations of ingredients and flavors to create recognizable food.
  • Example: The mobile Mardudjara
    • Cooking involves impromptu fires and the use of hot charcoal and an earth oven, combining brief grilling, singeing, and baking.
      • Men hunt, butcher at the kill site and cook meat; then they bring the remainder back to the camp. This meat is distributed to kin, according to the degree of relationship.
      • Women and children also build small fires when out foraging, teaching cooking techniques, and enjoying ash-grilled small game as fast, convenient snacks.
    • The main processing of foodstuffs is women’s work, and the most arduous is that of grinding grass seeds into a paste to make seedcake damper.
      • Women carry a small grinding stone, but they will make use of naturally flat rocks or larger, long-used base-grinding stones that remain at campsites, also
      • Some foragers do not carry such heavy materials; depends of food base.
    • The dispersal, mobility, lack of storage, and availability of resources makes food processing and cooking an ongoing, as needed, part of people’s daily routines.
Hunter-gatherers (foragers) (continued)

- For complex hunter-gatherers, the semi-sedentary existence in permanent village sites meant people could accumulate a greater range of stored food and cooking equipment.
- This allowed for the emergence of more involved and elaborate cooking techniques and recipes that were designed for specific occasions and guests.
- Example: the Haida and Kwakwaka’wakw on the Pacific Northwest Coast.
  - The abundance of salmon and range of other wild resources, combined with storage techniques such as smoking, wind drying, and preserving in oolichan grease, enabled larger semi-sedentary populations to be supported.
    - Oolichan grease was produced from the candlefish (a form of smelt fish found along the Pacific Coast).
    - The resultant grease used as a flavorful condiment and was eaten in vast quantities at grease feasts.
- In these ranked societies, food processing and cooking reflect the social order, with greater quantities and rarer qualities of ingredients shaping the preparation of meals and feasts.
- Women were especially important in the processing of food ready for storage, and this is a significant part of the cooking techniques.
  - Many of these techniques were concerned with changing the water content of the animals and
  - The preserved foods were placed in bentwood boxes, baskets, and bowls to await consumption at family meals, feasts, and potlatches.
- The processing, often during the spring to fall months, is still an important part of many First Nations’ families’ food activities.
Pastoralism

Pastoral peoples are subject to the demands of mobility, which can reduce the accumulation of food processing and cooking equipment, and can place time constraints on cooking techniques.

Example: The Nuer

- They are being seasonally mobile, do have a range of gourds, clay cooking pots, grinding stones, granaries, and brewing pots that are found at the permanent village sites.
- This is where lengthier food preparation takes place, such as brewing millet beer and storing grains for use through the year.
- Wood is limited for the Nuer, and it is used for cooking fires, while dung feeds all other fires.
- The preparation of food, such as making millet porridge, milking, and cheese-making, are women’s responsibilities, and they feed their families—husband and children—in their own household, or camp, but sharing of food between households is common.
- Cooking requires an efficient use of fuel, and consequently the staple food—milk—is drunk without cooking, although cheese-making involves a brief boiling of curds and porridge-making involves short boiling in clay pots.
- Blood is also boiled in some cases.
- Food preparation, cooking, and eating serve to differentiate the Nuer according to their gender, age, and initiated status, and thus reiterates the social order.
- Initiated men, for instance, cannot milk cattle, nor can they drink milk in the presence of women.
- Daily cooking is very definitely associated with women, and men distance themselves from engaging in such a domestic task. Other foods—such as blood, meat, and fish—are roasted on open fires, with men often taking the task of cooking them.
Horticulture

Horticulturalists’ sedentary lifestyle, necessitated by tending their gardens, has created the conditions for more elaborate cooking techniques, such as the use of earth ovens.

Earth ovens are found across the world, from North America through the “jerk-pits” of the Caribbean, Polynesia, and into Melanesia and Australia.

This form of indirect heat, generated by hot ash or heated stones, bakes and steams a collection of foods placed in a hole in the ground.

It does require some preparation, but it offers a slow-cooking experience for meats, root crops, and some shellfish.

Example: The Wola, PNG

Anthropologist Paul Sillitoe offers instructions for building an earth oven as an alternative to the suburban barbecue, based upon his fieldwork with the Wola.

The basic principle is digging a pit, lining it with leaves; then heating stones in a fire, placing these at the bottom of the pit, and layering in foodstuffs according to cooking time; and finally closing off the oven with mounded earth (called an umu).

Again, the division between men’s prestigious cooking and women’s domestic, daily, and private cooking becomes more pronounced, and women’s work tends to be overlooked.
One of the best-known discussions concerning fire takes us back to the practice of cooking our food. In 1969, Claude Leví-Strauss published his foundational work, *The raw and the cooked: Introduction to the science of mythology*. Claude Lévi-Strauss, who regarded cooking as demonstrating the control of culture over nature, and within its techniques could be found evidence of what distinguished humans from animals. This was at the heart of his structuralist analysis of cooking techniques, and it represents one of many attempts to try to elucidate a pattern or structure that would help explain the deeper meaning of cooking.

In this work he makes numerous points for discussion. Here are a few:

- Both the “savage”/”primitive” mind and the “civilized” mind are the same; one is not superior to another.
- Humans often use binary oppositions to access more complex ideas.
  - His work draws from a cross-cultural comparative of mythologies.
  - He argued that the function of myths was to resolve the conflicts found between these binary oppositions, to explain the conflicts.
- He formulated the culinary triangle through which raw natural ingredients are transformed into cultural food by cooking, or become rotten through a natural transformation.
- Lévi-Strauss considered the application of heat through fire—roasting—which he believed to be the most natural; and the mediation of water—boiling—which he deemed to be cultural, because it involved some sort of receptacle.
- To further the utility of his model to “admit other categories of cooking”, he took the triangle into a third dimension—the culinary tetrahedron or tetrahedron of recipes—adding grilling, steaming, oven-roasting, braising, and frying.
Thinking about Cooking 2

- **Anthropophagy**
  - Types of cannibalism *anthropophagy*)
    - **Exo-cannibalism** is the eating of humans from outside your social group.
      - This may be an expression of power, “I am so powerful I can eat you”.
      - It may be a war tactic to scare the enemy.
    - **Endo-cannibalism** is the eating of humans from inside your social group.
      - One type is *survival cannibalism*; the most famous examples for Americans are the Donner Party and the Andean soccer plain crash.
      - Other groups honor their death as part of funerary rites; the most famous is the South Fore, Papua New Guinea due to the introduction of *kuru*.
    - **Auto-cannibalism** is the eating of self.
      - It includes nail-biting.
      - It can also be seen in the drinking of one’s own blood or similar activities.
  - **Paul Shankman**, through a close examination of cannibalism.
    - Lévi-Strauss (1997, 31) had suggested a correlation would be found between *roasting* and exo-cannibalism and between *boiling* and endo-cannibalism. The society’s structure of oppositions between relatives and enemies should be made apparent by the different cooking techniques.
      - Shankman found 60 accounts: 29 *exo-cannibalism*, 26 *endo-cannibalism*, & 5 both.
      - The specific prediction of boiling and roasting did not stand the comparative test, with too many cannibals boiling their enemies and only one roasting (Shankman 1969, p. 63).
    - The point of Shankman’s article was to test Lévi-Strauss’s sweeping hypothesis, but he was careful not to reject the possibility of uncovering parallels between language and cooking, and between cooking and social structure.
• Examination of English cooking terms
  • Adrienne Lehrer’s work (1969) reveals the usefulness of the linguistic method and offers further caution about extrapolating the findings from one language to explain the general phenomenon of human cooking.
  • It breaks down over 30 English cooking terms into more and more specialized techniques that are differentiated by the 1) sources of heat; 2) cooking time; 3) addition of liquids; 4) types of utensils; 5) ingredients; and 6) desired outcomes.
  • The general concept of cooking in English includes the following words: boil, simmer, stew, poach, braise, parboil, steam, reduce, sauté, pan-fry, deep-fry, broil, grill, barbecue, charcoal, plank, bake, roast, shirr, scallop, brown, rissoler, sear, parch, toast, flambé, and burn.
  • As a model, Lehrer’s work reveals the dimensions of possible cooking methods and how these are then chosen by people in different social contexts, such in a sedentary, stratified society with a differentiated cuisine.
  • This table represents lexical fields or semantic domains: Collections of culturally meaningful vocabulary used to talk about an aspect of the world.

<table>
<thead>
<tr>
<th>Boil</th>
<th>Fry</th>
<th>Broil</th>
<th>Bake</th>
</tr>
</thead>
<tbody>
<tr>
<td>simmer</td>
<td>sauté</td>
<td>barbecue</td>
<td>shirr</td>
</tr>
<tr>
<td>boil</td>
<td>deep-</td>
<td>plant</td>
<td>scallop</td>
</tr>
<tr>
<td></td>
<td>fry</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>pan-fry</td>
<td>grill</td>
<td>roast</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boil – generalized, simmer</td>
<td>Boil – fast, rolling</td>
<td>poach</td>
<td>stew</td>
</tr>
</tbody>
</table>
References


TED Blog Video (contributor). (2013). *Two monkeys were paid unequally: Excerpt from Frans de Waal's TED Talk*. Retrieved from https://www.youtube.com/watch?v=meiU6TxysCg


