



PRIMORDIAL CUISINE SOME RECIPES TO SHARE

CENTER FOR ACADEMIC RESEARCH
AND TRAINING IN ANTHROPOGENY

UNIVERSITY OF CALIFORNIA SAN DIEGO & SALK INSTITUTE FOR BIOLOGICAL STUDIES

CARTA

The Center for Academic Research and Training in Anthropogeny (CARTA) is a virtual organization formed to promote transdisciplinary research on human origins by drawing on methods from a number of traditional disciplines spanning the social, biomedical, biological, computational and engineering, physical and chemical sciences, and the humanities. CARTA is a collaboration between faculty at UC San Diego and the Salk Institute for Biological Studies, along with interested scientists at other institutions. Center for Academic Research and Training in Anthropogeny (CARTA) University of California San Diego 9500 Gilman Drive # 0060 La Jolla, CA 92093-0060 Phone: 858-246-0846

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Primordial Cuisine

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This small recipe book shares some simple recipes from a time long before fancy kitchens and kitchen equipment. Simple combinations of raw berries, fruit, nuts, and flavorful leaves or petals allow for some surprisingly tasty bites.

The dishes range from those prepared without fire, “raw cuisine”, to ones that use fire, but predate the use of pottery ca. 20,000 years ago, relying instead on direct exposure to fire or ancient natural containers, ranging from earth pits, to depressions in stone, to gourds and wrapping in plant leaves.

We hope that you enjoy the recipes and photographs and the many stories that we tell alongside them.

– *Your friends at CARTA*



BERRIES AND LEAVES

Recipe: Freshly picked, ripe dark mulberries (*Morus nigra*) served on fresh spearmint leaves (*Mentha spicata*). Substitute other ripe berries and any edible aromatic leaf of your choice.

Background: Fruits and leaves are an important part of the primate diet, including humans. The plant family to which mulberry belongs, Moraceae, include hundreds of species of figs, many of them valued food sources for our wild ape cousins. The mulberry is particularly interesting because humans not only eat the berries, but have made paper from the plant's inner bark (China, 8,000 BCE) and fed its leaves to domesticated silkworms (*Bombyx mori*) for the production of silk (China, 2,700 BCE).

The Latin word for mulberry is *morum*, which also gives us the word, *morula*, the name for an early stage of embryonic development. During the first few days after fertilization of the egg, the developing embryo undergoes repeated cell divisions, forming a compact cluster of identical cells that resembles a tiny mulberry.





FRUIT AND LEAVES

Recipe: Freshly picked, ripe strawberry tree fruit (*Arbutus unedo*) served on lemon balm leaves (*Melissa officinalis*) with slivers of lemon (*Citrus limon*). The fruit are tasty when perfectly ripe, but adding the sliver of lemon gives the fruit the little kick of acidity it lacks.

Background: *Arbutus* trees are native to the Mediterranean and parts of Western Europe. In Madrid, Spain, the strawberry tree, or “madroño,” features on the city’s coat of arms with a bear standing next to it. Because of their drought-tolerance, they are widely planted as an ornamental across Southern California. *Arbutus* fruit make good jam when boiled with sugar.





LEAVES AND LEAVES AND NUTS

Recipe: Green and red lettuce (*Lactuca sativa*) served on beefsteak plant leaf (*Perilla fruticosa*) with walnut dressing. Dressing is made by mashing walnuts (can substitute with other nuts) into a coarse paste and stretching with a little water, honey, salt and lemon juice.

Background: There are several wild edible leaves in Southern California: Lambsquarter, wild spinach, (*Chenopodium album*), mustard greens (*Brassica nigra*), and miner's lettuce (*Claytonia perfoliata*).





FRUIT, NUTS, AND LEAVES

Recipe: Grind dried pistachio seeds (*Pistacia vera*) into a paste with some lemon juice on a grinding stone or metate. Place paste on spearmint leaves (*Mentha spicata*) and top with pomegranate seeds (*Punica granatum*).

Background: Both, pistachio and pomegranate are ancient food plants from Central Asia and Middle East. Commercial Pistachio harvest only started in the 1970s in California. Now California produces more pistachios than Iran. Pomegranates were one of the first trees to be domesticated 7,000 years ago.





FRUIT PASTES AND LEAVES

Recipe: Separately mash avocado (*Persea americana*), yellow tomato, and jalapeño (*Capsicum annuum*) with a mortar and pestle. On a sweet potato leaf (*Ipomea batata*), place a heaping spoonful of the avocado paste and then top with the yellow tomato and jalapeño (choice of chili variety will determine spiciness: from sweet red pepper to habañoero). Garnish with coarse sea salt.

Background: All these plants originated in the Americas but are now major part of cuisines around the world. Avocados used to be dispersed by gomphotheres (extinct elephant relatives) but is now entirely cultivated by humans.





FRUIT ON FRUIT PASTE ON FRUIT

Recipe: Mash ripe strawberry tree fruit (*Arbutus unedo*) with a mortar and pestle and set aside. Cut slices of cantaloupe (*Cucumis melo*). Extract pomegranate seeds (*Punica granatum*). Build the concoction starting with the cantaloupe slices, then the strawberry fruit mash, and top with pomegranate seeds.

Background: Pounding fruit into raw pulp allows to combine different fruits and blend flavors. Carving cantaloupe slices creates perfect bite sized containers to hold the other two fruits.





NUT ON FRUIT ON PETALS

Recipe: Halve ripe figs (*Ficus carica*) with your favorite sharp instrument, in this case, a obsidian stone flake. Place the fig halves on canna lily petals (*Canna indica*) and top with walnut pieces (*Juglans regia*).

Background: *Canna Indica* petals come in different yellow to red colors and are very tasty and decorative in salads. Figs are crucial food for all great apes. Rather than a typical flower that turns into a fruit, figs are syconia (a type of inflorescence that later becomes fruit) filled with two kinds of flowers, one for the plant's reproduction and the other to provide housing for the symbiotic wasps that pollinate the fig. Most commercial figs do not have wasps in them any more and produce fruit without pollination. *Canna Indica*, also called “African arrowroot” despite its South American origins, is an important fallback food during periods of crop failures. Its roots contain starch, including high levels of “resistant starch,” a dietary carbohydrate that resists digestion in the small intestine, making it a healthy food that promotes microbiota and lowers cholesterol.





NUTMEAL ON FRUIT ON LEAF

Recipe: Halve Natal plums, also called “big num-num,” (*Carissa macrocarpa*). Finely dice macadamia nuts (*Macadamia integrifolia*) into a meal. Place Natal plum halves on sage leaves (*Salvia officinalis*) and top with macadamia meal.

Background: South African Natal plums are grown on hedges all over San Diego. Australian macadamia nut trees are also rather common in San Diego. The abundant flowers on Macadamia trees give rise to much fewer fruits. Macadamia nuts are the only edible plant in the family, Proteaceae.





FRUIT ON FRUIT ON FRUIT

Recipe: Prepare ingredients by cubing a watermelon wedge (*Citrullus lanatus*), slicing one banana (*Musa acuminata*), shaving a coconut (*Cocos nucifera*) half with an basalt stone flake or the edge of a spoon, and prepare passion fruit (*Passiflora edulis*) by cutting one end off. Layer ingredients starting with watermelon, followed by coconut shavings, one banana slice, and top with a teaspoon-sized dollop of passion fruit.

Background: Wild watermelons originated in northeastern Africa and were small, tough, bitter, and not juicy. Domestication began ~5,000 years ago in ancient Egypt and Sudan. The earliest evidence of banana cultivation is from over 7,000 years ago in Papua New Guinea. Modern domestic bananas were selected for triploid genomes which made the plants sterile and seedless. Today, bananas are propagated through cloning by humans. Coconuts were originally from Southeast Asia but they have spread all around the tropical world through natural ocean drift (the coconut seed evolved to be buoyant and tough to withstand months at sea and also carries its own water supply) and human transport. Passion fruit evolved in the subtropical forests of South America and was cultivated by Indigenous people and brought to the Caribbean Islands long before its global spread.





HIBISCUS INFUSED WATER

Recipe: Sweeten water with honey or tamarind paste (*Tamarindus indicus*). Make a cold hibiscus/ roselle (*Hibiscus sabdariffa*) infusion. The infusion can be exposed to the sun for more efficient infusion.

Background: The botanical name for Tamarind, *Tamarindus indicus*, indicates an origin in India, but recent botanical research points to Africa. Any sweetened drink left out for some time will undergo fermentation by airborne yeasts and bacteria. Alcoholic beverages are, thus, naturalistically pre-programmed. Honey on its own is the only food said to never go bad due to the high concentration of sugar (the monosaccharides, glucose and fructose, prevent the growth of any microbes. If honey is diluted, then yeasts and bacteria can thrive.





CEVICHE WITH FLOWER ON LEAF

Recipe: Prepare the ceviche by marinating 1-2 pounds of cubed raw fish (any fresh, mild, semi-firm white ocean fish such as snapper, sea bass, or mahi mahi) in 1 cup of lime juice per pound of fish, 1 tablespoon of honey, and 1 teaspoon of salt for 45 minutes. On serving tray, or a cleaned, broad banana leaf, layer the acid-marinated fish on freshly washed shiso leaves (*Perilla fruticosa*) and garnish with nasturtium flowers (*Tropaeolum majus*).

Background: The nasturtium flowers have a ice and slightly spicy taste. The low pH of the lime or lemon juice chemically “cook” the fish, by altering the structure of proteins. This is reflected in the color change of fish, as the meat goes from slightly translucent to opaque.





SASHIMI AND SUSHI

Recipe: Freshly caught bluefin tuna (*Thunnus orientalis*) and Yellow tail (*Seriola doralis*), both yield excellent raw muscle for sashimi or sushi. Raw fish is excellent with *Perilla fruticosa* leaves, or with coconut milk, that can also be fermented.

Background: Raw fish is eaten in many places around the world. Except for salmon runs where fish can be caught by hand, most fishing requires technology, including line, hooks, or harpoons. The earliest harpoons (made out of bone) were found in central Africa and date to 90,000 years ago. Pelagic fish such as these would also require watercraft: rafts or boats, the age of which is still undetermined in human evolution.





HOW TO MAKE FIRE 🔥

To start a friction fire with a simple hand-drill, which is cellulose acting on cellulose, you need to prepare a smoothed and gently tapered stick of fleabane (*Erigeron philadelphicus*) and a platform of incense cedar (*Calocedrus decurrens*) with a triangular notch carved on it's edge. Alternatively, you can use Yucca (*Yucca filamentosa*) for both. This technique requires much effort as the fleabane stick needs to be rapidly rotated between your hands while applying downward force into the base. The side notch is critical as it acts as a chute for the heated plant dust generated by the drilling action to collect into a pile. When done correctly, the pile of dust will ignite into a small ember. Let the ember mature slightly before carefully transferring it to a bundle of dried grass. Either slowly swing the bundle in the air or lightly blow breaths to fan the initial flame.





GROUND OVEN ROASTED TUBERS 🔥

Recipe: Dig a hole 4 feet deep by 1.5-2 feet wide. Fill the bottom of the hole with dried kindling and other easily ignitable material. Light a fire in the hole and let it burn for an hour or more, being sure to add copious amounts of large split log pieces to create many coals. The heat needs time to soak into the ground. While the fire is burning, prepare various tubers, roots, squashes, and plantains by wrapping them in banana leaves. When ready, add plenty of juicy

plant material, such as agave leaves, on top of the coals to produce steam. Pack the wrapped goods on top of the agave and cover with a thick layer of banana leaves (fill entire oven to the brim to retain heat and steam). Let bake for 1.5 hours and carefully extract the thoroughly steamed and cooked goods.





STONE CURRY SOUP 🔥 🚫

Recipe: For this coconut mushroom curry, the cooking is done with hot stones in a calabash—hence “stone soup.” Start by heating several medium-sized stones (4-5” in diameter) in a fire. Let them heat in the fire for at least a half hour. Prepare the soup ingredients: 3 liters of coconut milk, 2 pounds of cleaned mushrooms (shiitake, portabella), two hand fulls of grated ginger (*Zingiber officinale*), one handful of grated galangal (*Alpinia officinarum*), six cleaned stalks of lemon grass (*Cymbopogon nardus*), half a chopped kabocha squash (*Cucurbita maxima*), four large cubed purple sweet potatoes (*Ipomoea batatas*), six sliced jalapenos (*Capsicum annuum*), 10 chopped shallots (*Allium ascalonicum*), and 10 cloves of minced garlic (*Allium sativum*). This soup can be cooked in a natural container such as a large gourd (*Lagenaria siceraria*), in rock depressions, or even in animal skin. You can use your favorite metal pot instead. Combine coconut milk,



mushrooms, ginger, galangal (Siam ginger), lemon grass, chopped up kabocha squash, cut purple sweet potatoes, jalapeno, shallots and garlic and salt in the container. Add hot stones one-at-a-time using a tong. Be very careful as the stones are super-heated and will cause the soup to boil instantly. Add stones as needed until the soup is ready.





CHICKENS ON A SPIT 🔥🚫

Recipe: Prepare 4 local whole chickens and then season the cavity by rubbing with a mix of salt, ground black pepper, minced garlic, and minced ginger. Thoroughly rub chicken cavity with the season mix. Prepare an aromatic stuffing: 1 large onion quartered per chicken, and 2 stalks fresh lemon grass cut in half lengthwise and smashed with flat side of a knife, ginger leaves, cardamon leaves, galangal leaves, and kaffir lime leaves. Stuff the chickens with the aromatics. Tie the chickens to a bamboo or hardwood spit with New Zealand flax (*Phormium tenax*) fibers. New Zealand flax is a great fiber for cordage and the seeds are edible (see image below). Roast over a fire (make sure to make two lines of fire to the side so fire is not directly under the chickens) turning chickens regularly until cooked through and skin is a deep golden color. For extra flavor and color, paint chicken skin with honey during the final 5 minutes of cooking.





PIG ON A SPIT 🔥 🚫

Recipe: 1 local pig (from Ramona). Begin by seasoning the cavity with a mix of minced garlic and salt and then pack it with lots of smashed garlic and ginger, quartered onions, scallions, green onions, and heavy bunches of fresh lemongrass (bruise prior to inserting) and galangal leaves (*Alpinia galanga*). Secure the opening with New Zealand flax fibers (*Phormium tenax*). Mount the pig on a bamboo spit and tie legs with more New Zealand flax to prevent rotating. When mounted, pat dry the skin with paper towels and generously sprinkle coarse salt to help blister the skin. For the fire, build a charcoal bed on the outer sides of the spit rather than directly under the center. This stops dripping fat from causing flare-ups and prevents the thin belly meat from drying out. Roast low and slow: Maintain a steady temperature of around 250°F to 275°F. Rotate pig slowly for 4 to 6 hours, depending on the size of the animal, until the internal temperature reaches 160°F. Crisp the Skin: For the final 30 to 45 minutes, push more hot coals closer or increase the heat to blister and puff up the outer skin until golden and crunchy. Brush the skin with honey diluted with citrus juice for the final 5-10 minutes of cooking. Remove the pig from the fire and let rest for 15 minutes before chopping and serving with sauce and sides of your choice.

This type of slow roasting can be achieved without any metal equipment as the coals are far away enough to not burn the bamboo spit. A whole pig can also be baked in a ground oven (“imu” in Polynesian). For this style of cooking, it is crucial that sufficient steam-generating plant parts (such as banana stems) be added to the pit above the hot rock/coals.

Cutting the roasted pig with an obsidian flake.





BREAD ON COALS 🔥🚫

Recipe: Make a simple bread dough: 4.5 cups of water, 2 Tsp of dry instant yeast, and 2 Tsp of salt. Let sit for a couple of hours at room temperature or overnight in the refrigerator. Roll out into flat breads or throw like pizza dough, then arrange large pieces of coal to one side of the fire, keeping the burning wood and flames to the other. Place the dough straight on the coals. Watch the dough bubble up and turn the flat bread after a few minutes, be careful not to burn too much, brush off the ash and serve.

Background: Humans started eating grass seeds long before the domestication of the major crops. Grass seeds like einkorn, emmer, spelt, barley, and rye can be ground into flour on grinding stones or primitive mills. The gruel can be cooked in water, or finer flour can be made into a dough. Any simple dough left at room temperature will soon start fermenting, which is how ancestral breads were leavened. Bread is dough that captures the ‘burps of wild yeast and bacteria into solid bubbles’. Simple flat bread baked directly on coals.



For advice on
how to make a variety of
different doughs and breads,
visit Pascal's kitchen
recipe website:





SEVEN HERB TEA / TISANE 🔥🚫

Recipe: Without pottery, boil water in a calabash with hot stones as explained on page 15. Steep a bundle of sage (*Salvia officinalis*), lemonbalm (*Melissa officinalis*), peppermint (*Mentha piperita*), spearmint (*Mentha spicata*), thyme (*Thymus vulgaris*), lemon verbena (*Aloysia citrodora*), lemongrass (*Cymbopogon citratus*) in boiling water for ten minutes. Sweeten with honey.

Background: Each of these herbs is known for its medicinal value. Infusions can be made with cold water as well, but boiling water will extract more flavor.





HOW TO MAKE POTTERY 🔥 🍵

Pottery is the transformation of clay into water- and heat-proof items through firing. Start by shaping clay creations (can use a variety of clay types) and allow to air dry. Dig a hole and fill it with your pottery pieces. Fill all empty space with saw dust. Light a fire above the hole and let it burn all the way through the sawdust. The next day, take out your fired pieces and rinse them with water. With pottery, cuisine really takes off!

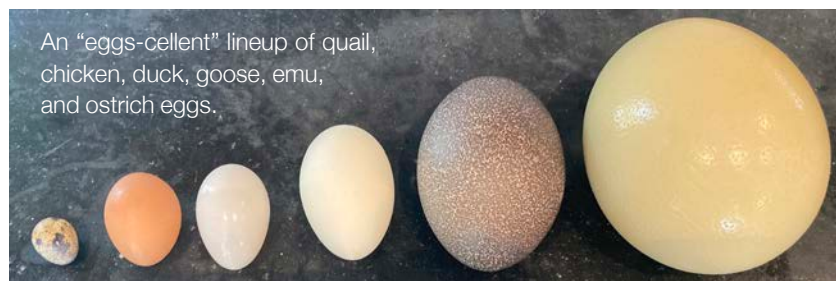




EGGS AND FLOWERS 🔥 🍲

Recipe: Make an omelet with your choice of egg (see below). Here, the filling is Yucca blossoms (*Yucca sp.*), which are very tasty when cooked inside an egg omelet. Harvest fresh yucca flowers, remove bitter reproductive parts, and blanch the petals by briefly boiling in water to remove some of the saponins (toxic compounds used by the plant to store sugars). Strain the yucca flowers and mix with beaten eggs. Season with salt and pepper and cook.

Background: Pottery cooking surfaces, such as comals, flat clay pans, allowed people to make primordial omelets. Eggs from birds or reptiles have long been an attractive food. Eggs are perfectly packaged doses of fats and protein that are widely used in the cuisines of the world. Most yucca have edible flowers, which are traditionally consumed by indigenous people in the South Western United States.





LASAGNA 🔥 🍲 🍷

Recipe: Make pasta dough from a 50:50 mixture of unbleached white flour and semolina (durum wheat) with just enough water to keep the dough together (the drier the better). You can substitute an egg for some of the water. The dough is worked with a pasta machine until smooth and thin. Slice eggplant (*Solanum melongena*) and sprinkle with salt to extract water. Slice zucchini (*Cucurbita pepo*) and pan fry both in olive oil. Mince onions, garlic, carrots, and mushrooms, and saute. Prepare textured vegetable protein (TVP): Soak textured soy protein in soy sauce and warm water. Saute the vegetable and TVP mixture until browned. De-glaze with white wine. Spray olive oil in a big pan and put down one layer of raw pasta sheets to cover the pan. Build the lasagna by layering cheese, béchamel sauce, and ragu (tomato sauce), followed by more pasta. Repeat until just below the top of the pan. Cover the final layer with béchamel, tomato sauce, and grated cheese. Cook in an oven for 1 hour at 450 F. Alternatively, store-bought dry pasta sheets and minced meat can be used.

Background: The browning (Maillard) reaction results from sugars and proteins interactions in the heat.





RATATOUILLE CASSOULET 🔥 🍲 🍳

Recipe: Soak Lima beans (*Phaseolus lunatus*) overnight in water, then replace water and boil beans until soft (a pressure cooker will save time). Make a ratatouille by browning chopped onions, shallots, and garlic in olive oil. Then slice eggplant, zucchini, sweet peppers, and tomato, and add to the browned onions. Cook mixture until all veggies are soft. Towards the end of the cooking, add herbes de Provence, which is a mixture of summer savory (*Satureja hortensis*), marjoram (*Origanum majorana*), rosemary (*Rosmarinus officinalis*), thyme (*Thymus officinalis*), oregano (*Origanum vulgare*), tarragon (*Artemisia dracunculus*), basil (*Ocimum basilicum*), bay leaves (*Laurus nobilis*), and black pepper (*Piper nigrum*). Place ratatouille in a baking dish, cover with a thick layer of cooked beans, and sprinkle with bread crumbs. Bake 30 minutes at 425 F.

Background: Zucchini, peppers, tomatoes, and beans all originated in the Americas, but became key ingredients in many cuisines all over the world. All beans contain potent toxins and anti-nutrients called lectins. Cooking inactivates and transforms lectins into precious nutrients. Beans and other pulses are rich in dietary fibers (indigestible polysaccharides), that provide sustenance to our microbiomes (i.e. acting as prebiotics).





BERRY ICE CREAM ON PUFF PASTRY DOUGH LEAF 🔥 🍪 🍷

Recipe: Take out 250g of unsalted Irish butter, set aside and let come to room temperature. Make dough: 1 cup water, 1 tablespoon salt, 4 tablespoons of sugar, 500g flour, 25g soft butter mixed into a dough until smooth. Place in refrigerator until chilled. Put butter between two sheets of parchment paper and roll into an 8x8 inch square. Put back in fridge to cool. Once dough is chilled, remove from fridge and roll out into a large square, 13x13 inches. Place chilled butter on top of the dough rotated 45 degrees relative to dough. Fold the four sides of the dough like an envelope and gently roll into long rectangle, 10x16", fold this in thirds like a letter. Put dough in fridge for 30 minutes, minimum, wrapped in parchment paper (this represents the first turn and results in 4 layers of dough). Take dough out and roll into a 10x16 inch sheet. Fold three times again and place back in the fridge. Repeat this process 4 more times. The final turn will have over 1000 layers – thus French mille-feuilles. Roll out a final time and cut out leaf-shaped forms. Place leaves on cooking sheet and use a chopstick to press in the central vein of the leaf. Bake at 400 F for 20 minutes. Let cook and top with ice cream of your choice.

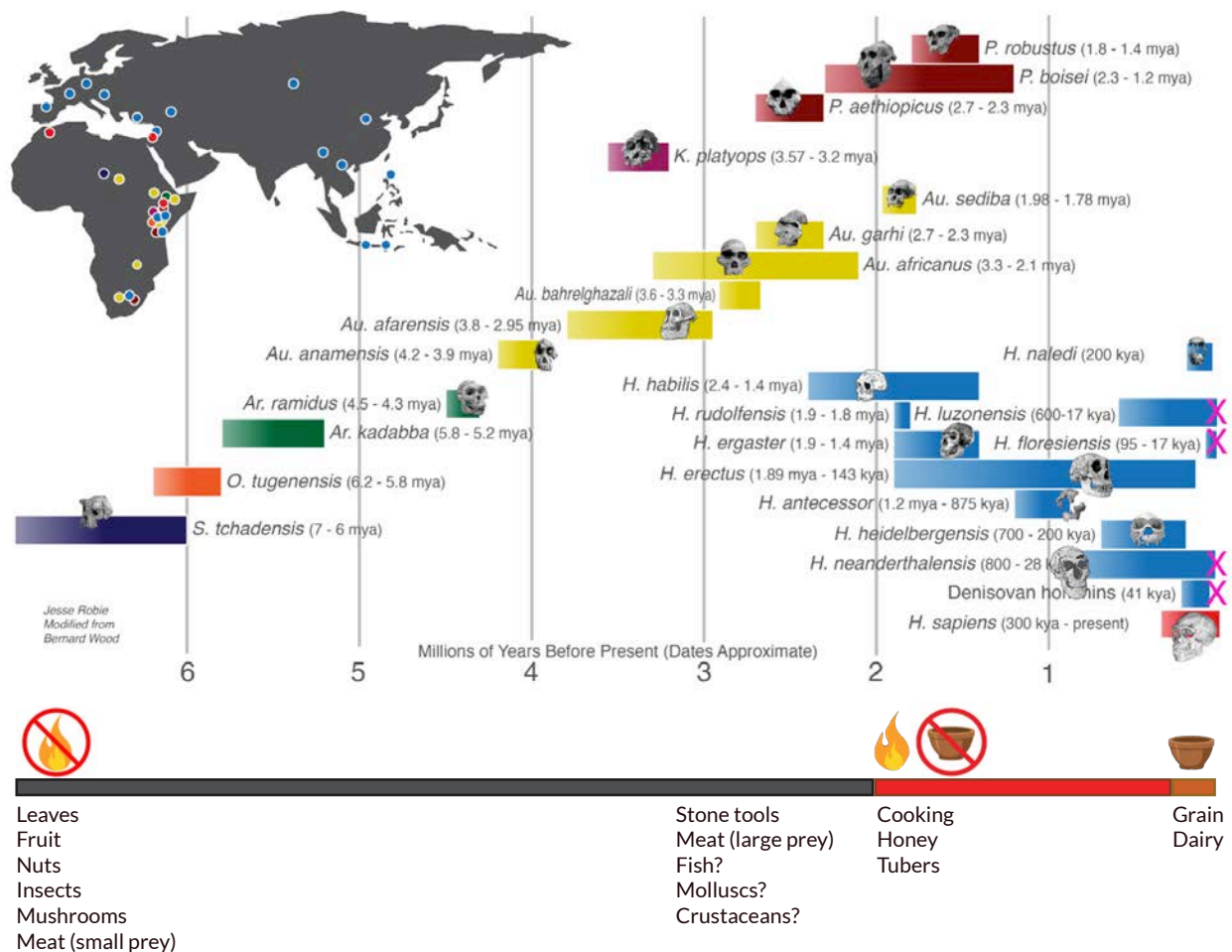
Background: The leavening is accomplished entirely by trapping steam emanating from the unleavened dough in between layers of butter. Adding yeast into this recipe produces dough for croissants, which are made by rolling up long dough triangles.





GRAPHIC SUMMARY OF HOMININ FOSSILS

To place cuisine in a paleoanthropological context, it is helpful to know the key timings of human evolution. The earliest fossil evidence for bipedal apes (hominins) dates to over 6 million years ago in Africa. Compare this to the earliest hominin fossils so far found outside Africa, which are younger than 2 million years old. Fire use may date back to 2 million years, with clear evidence for fire in caves at 1.6 million years ago. The earliest ceramics were figurines at ~ 30 thousand years ago and the earliest pottery dates back to ~ 20 thousand years ago. Domestication of plants and animals didn't begin until ~10 thousand years ago.



Time depth of important food sources exploited by hominins over the last 6 million years.



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