



# Cooking

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## ***Notice to the Reader***

*This essay underwent many, lengthy metamorphoses and incarnations. It was the victim of bulimia, obesity, stammering and stuttering, and too many other deadly birth defects. I attempted to fix them; I am not sure that I succeeded, and you are welcome to e-mail me your verdict and suggestions.*



## Part 1: Between Heaven and Hearth

### My Passion for Food and Cooking

As far as I can remember I was always fascinated with food. Aren't we all? Either we lack access, or we stumble because of infinite choices, with all the stings of desire planted by the devils of advertising.

Cooking allowed for complex thinking, creative food preparations, diverse cuisines based on resources, but even more on invention. These are found everywhere, including in the *Epic of Gilgamesh*, the *Iliad*, the *Yellow Emperor Inner Canon*, the *Mahabharata*. The cosmos was enclosed by the arc of heaven with the rising of the sun in the East and its setting in the West. Cooking drove changes in the cosmos; humans imitated and improved with agriculture and their kitchens.

Besides the Principle of Hierarchy, the Sacrificial Bargain, culinary Cosmos stated that foods were part of an elaborate system of ages, compass directions, seasons, colors, tastes and flavors, and much more. (Cooked) Foods made us humans, aware of our condition, existence, duties in our societal community, and our unique place in the world. Cooking eliminated the slag, revealed and magnified the true essence, the magic and sanctity of food. In China, water had/has to be cooked.

The fiery rays of the Sun and the watery ones of the Moon commanded and sustained the Cosmos, as fire and water were transforming –even transmogrifying- foods in the kitchen. Fire was a *thing* that you saw and could touch, that burnt you, that frolicked when fed with fuel, and eventually died of exhaustion. Also new humans were cooked (or baked) in the womb, a steamy caldron where male seeds mixed with female juices.

Consumed cooked foods passed through the hot steamy caldron of the belly where cooking (digesting) continued. Fermentation was a puzzle; it remains so: as Andrew Waterhouse of UC Davis says: '*Wine is magic*'.

In history, there have been –and they do persist- three rules governing cooking and eating: you should eat according to your rank in society and place in the cosmos; you should eat food cooked as thoroughly as possible; you should participate in the feast that follows the sacrifice to the manes, the god(s), the ancestors, the spirits.



## Cooking

Cooking or cookery is the art and technology of preparing food for consumption with the use of heat. Cooking techniques and ingredients vary widely across the world, from grilling food over an open fire to using electric stoves, to baking in various types of ovens, reflecting unique environmental, economic, and cultural traditions and trends. The ways or types of cooking also depend on the skill and type of training an individual cook has. Cooking is done both by people in their own dwellings and by professional cooks and chefs in restaurants and other food establishments. Cooking can also occur through chemical reactions without the presence of heat, most notably with ceviche, a traditional South American dish where fish is cooked with the acids in lemon or lime juice.

Preparing food with heat or fire is an activity unique to humans. Humans have been eating cooked foods for over a million years.

East African sites, such as Chesowanja (near Lake Baringo), Koobi Fora, and Olorgesailie in Kenya, show potential evidence that fire was utilized by early humans. At Chesowanja, archaeologists found fire-hardened clay fragments, dated to 1.42 mya (million years). Analysis showed that, in order to harden it, the clay must have been heated to about 400 °C. At Koobi Fora, two sites show evidence of control of fire by *Homo erectus* at about 1.5 mya, with reddening of sediment associated with heating the material to 200–400 °C. At a "hearth-like depression" at a site in Olorgesailie, Kenya, some microscopic charcoal was found—but that could have resulted from natural brush fires.

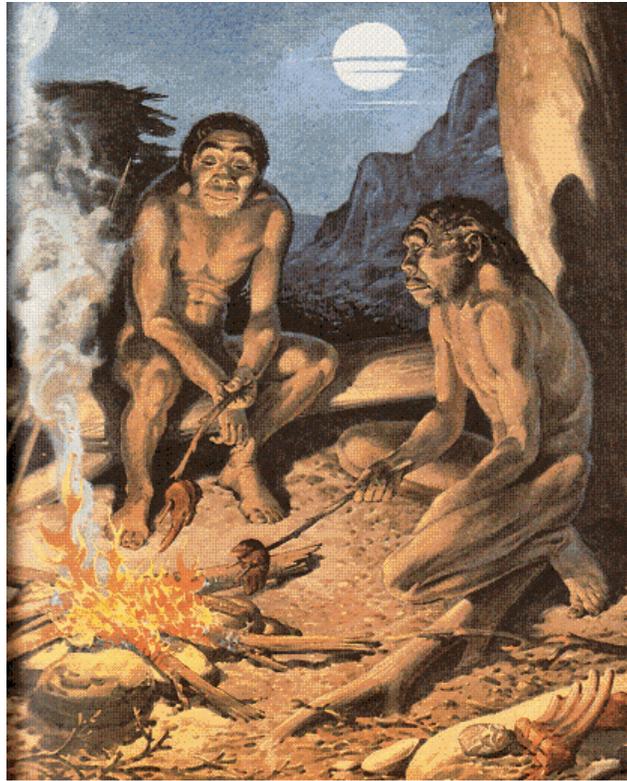
A site at Bnot Ya'akov Bridge, Israel is reported to evidence that *H. erectus* or *H. ergaster* controlled fire there between 790,000 and 690,000 BCE; to date this claim has been widely accepted. Also, that *Homo erectus* was cooking their food as early as 500,000 years ago. Re-analysis of burnt bone fragments and plant ashes from the Wonderwerk Cave, South Africa, has been dubbed evidence supporting human control of fire there by 1 mya.

Researchers have recently confirmed earlier work, which showed that the drop in molar size that occurred in *Homo erectus*, in Neanderthals, and in *Homo sapiens* far outstripped what would be expected by comparing it with other evolutionary

## COOKING



changes going in the body. The team found that *Homo erectus* and Neanderthals spent the same amount of time each day eating as do modern humans. That likely means cooking arose before *Homo erectus* evolved, 1.9 million years ago. Hence there are plenty of good reasons why the practice has survived to this day.



Most anthropologists believe that widespread cooking fires began only about 250,000 years ago, when hearths started appearing.

Today cooking is seen by many as a culinary art. It is easy to forget that it played a major role in human development. Cooking greatly increased the variety of foods available for consumption and decreased the amount of time spent seeking out ingestible raw foods, or over 6 hours a day chewing them. As a result, our bodies evolved to accommodate cooked food, from the shape of our teeth and jaws to the size and function of our digestive organs. Eating cooked food allows our bodies to digest and absorb more nutrients than eating raw food. Indeed, there are certain nutrients in some raw fruits and vegetables that are almost impossible to digest or absorb unless they are cooked.

## COOKING



Certain foods are associated with disrupted thyroid hormone production. Foods belonging to the cruciferous family are called “crucifers,” and include broccoli, kale, cauliflower, Brussels sprouts, cabbage, mustard, kohlrabi, and turnips. These foods appear to reduce thyroid function by blocking thyroid peroxidase, and also by disrupting messages in thyroid cells. Cooking these vegetables greatly reduces these negative effects. Lycopene is a phytonutrient that is much better absorbed by the body from cooked or processed tomatoes than from raw ones. Another phytonutrient that is more readily available for absorption when cooked is lutein found in corn. Similarly, carotenoids found in red, yellow, orange and many dark-green leafy vegetables are a good source of vitamin A, and they are much more easily absorbed when cooked.



The three basic food groups—carbohydrates, protein and fats—are a lot easier to digest and absorb cooked than raw. Imagine eating rice in its uncooked state, or steak and eggs, for that matter! Meals would not be a pleasant experience.

Cooking food dramatically improves its taste and aroma, too. The Maillard reaction, which is a chemical process that uses heat to turn food brown without the use of enzymes, makes food smell and taste better.

Also, eating food raw takes a significant amount of energy for chewing and digesting. Just compare the effort required to eat a raw carrot versus a cooked one—eating uncooked foods is not an efficient delivery system for the fuel an active body needs.

Apart from taste and digestion factors, cooking food is a healthy choice. Heating food kills dangerous microbes. Cooking kills food-borne bacteria, including strains associated with raw meat products such as *Escherichia coli*, *Salmonella*, *Campylobacter*, *Staphylococcus*, and *Listeria*. The potential energy savings due to reduced immune maintenance and up-regulation could be sizable.

Raw wild meat is possibly less pathogen-bearing on average than raw meat that has been raised and processed for mass-market consumption. When meat is processed

## COOKING



at the slaughterhouse, *E. coli* and other pathogens from the intestines can invade the ground meat. This is why most outbreaks involve burgers and other forms of ground meat but is not usually associated with steaks. These pathogens do not enter the inside of the muscle tissue (steaks). When eating industrially raised red meat, it is suggested to cook burgers well. New processing techniques in industrial meat facilities, such as piercing steaks to improve texture of tougher cuts of meat, can mean that pathogens may be entering steaks as well as burgers. Slow cooking meat appears to be one of the best methods to prepare meat for optimal digestibility.

Cooking does prevent many food-borne illnesses that would otherwise occur if the food were eaten raw. When heat is used in the preparation of food, it can kill or inactivate harmful organisms, such as bacteria and viruses, as well as various parasites such as tapeworms and *Toxoplasma gondii*. Food poisoning and other illness from uncooked or poorly prepared food may be caused by bacteria such as pathogenic strains of *Escherichia coli*, *Salmonella typhimurium* or *Campylobacter*, viruses such as noroviruses, and protozoa such as *Entamoeba histolytica*. Parasites may be introduced through salad, meat that is uncooked or done rare, and unboiled water.

The sterilizing effect of cooking depends on temperature, cooking time, and technique used. However, some bacteria such as *Clostridium botulinum* or *Bacillus cereus* can form spores that survive boiling, which then germinate and regrow after the food has cooled. It is therefore recommended that cooked food should not be reheated more than once to avoid repeated growths that allow the bacteria to proliferate to dangerous level.

When considering meat, there seems to be some evidence that processing meat either by pounding, drying, curing or cooking is beneficial. Pounding meat and making it soft seems to reduce the cost of digestion, partly because it can pass more quickly through the gut. The collagen surrounding each fascicle of muscle fibers generally remains too tough for mastication until heated to 60–70 C, when collagen begins to be hydrolyzed into gelatin, a soluble protein. Although the muscle fibers themselves remain tough, eat meat cooked beyond this temperature leads to gelatinization of the collagen, which separates the muscle fibers and the gelatin. Improved texture of meat makes it easier to chew, and easier for our bodies to break down. Also when the fats are heated to oil from a fat, it's easier for bile to emulsify

## COOKING



and ultimately leads to faster absorption. In studies, humans and chimps prefer the taste of cooked meat, leading to us eating more of it. Consumption of more protein meant larger brains and bigger muscles as we evolved.

It can also make it easier to preserve food. Some root plants are essentially inedible or even toxic until cooked for a while. Storage of cooked food is convenient and prevents spoilage.

The thermic effect of food (TEF) is defined as the increase in metabolic rate after ingestion of a meal, due to energy spent on digestion, absorption and metabolizing nutrients. Cooking also appears to have a positive effect on net energy in the body. Humans on vegetarian diets exhibit higher reproductive performance when eating cooked food than raw food. Evidence of low energy intake in women eating predominantly raw food is supported by their having higher rates of amenorrhea or menstrual irregularities than those eating cooked food. In one study, it was found that menstruation was absent in 23% of females of childbearing age who ate at least 70% of their food raw and in 50% of women reporting a 100% raw diet. Although these women were primarily vegetarian, the addition of raw meat to the diet did not change the odds of ovarian suppression. The researchers concluded that women suffered because of their relatively low net energy gain as a consequence of eating their food raw. In another study, a nutritional analysis suggested that in traditional communities, a diet of raw wild foods would render survival and reproduction difficult.

Vitamins are materials required for normal metabolism but which the body cannot manufacture itself and which must therefore come from external sources. Vitamins come from several sources including fresh fruit and vegetables (Vitamin C), carrots, liver (Vitamin A), cereal bran, bread, liver, our own gut microbiota (B vitamins), fish liver oil (Vitamin D) and fresh green vegetables (Vitamin K). Many minerals are also essential in small quantities including iron, calcium, magnesium and sulfur; and in very small quantities copper, zinc and selenium. The micronutrients, minerals, and vitamins in fruit and vegetables may be destroyed or eluted by cooking. Vitamin C is prone to oxidation during cooking and some may be destroyed by protracted cooking. The bioavailability of some vitamins such as thiamin (vitamin B1), pyridoxine (vitamin B6), niacin, folate and carotenoids are *increased* with cooking by being freed from the food microstructure. Blanching or steaming vegetables is a way

# COOKING



of minimizing vitamin and mineral loss in cooking.

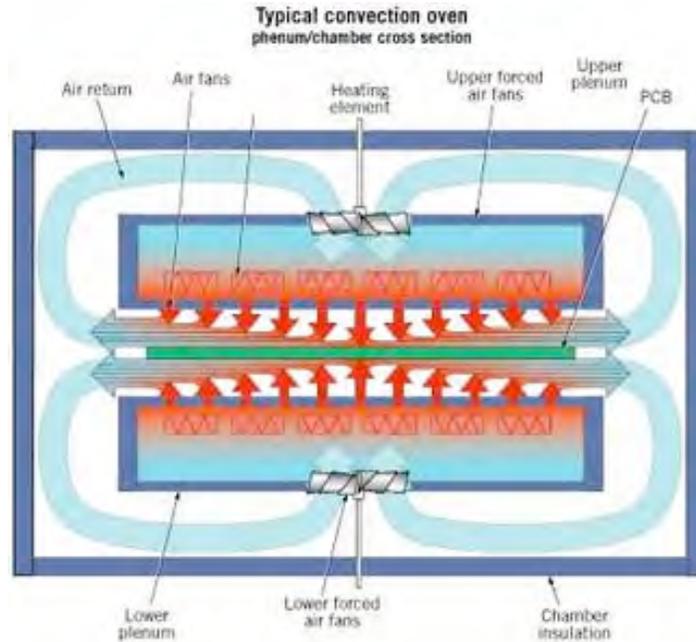
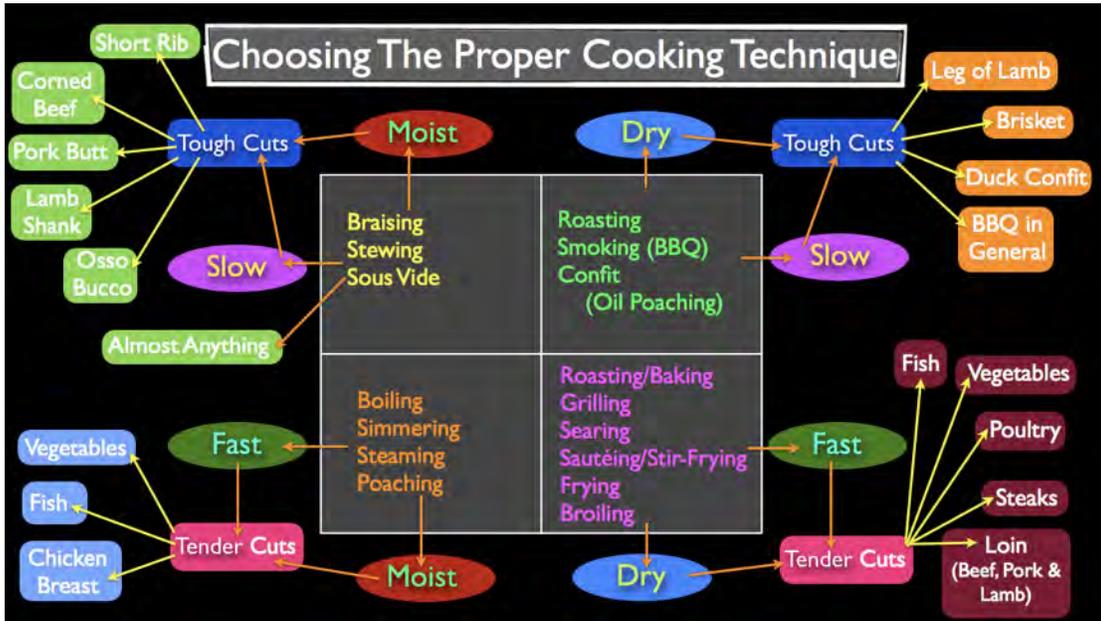
Cooking also increases the digestibility of some foods because many foods, such as grains, are inedible when raw, and some are poisonous. For example, kidney beans are toxic when raw or improperly cooked due to the presence of phytohemagglutinin, which can be inactivated after cooking for at least ten minutes at 100 °C. A slow cooker however may not reach the desired temperature and cases of poisoning from red beans cooked in a slow cooker have been reported.

Other considerations for food safety in cooking include the preparation, handling, and storage of food. According to the USDA, the temperature ranges from 4 to 60 °C is the "Danger zone" where bacteria are likely to proliferate, and food therefore should not be stored in this temperature range. Washing of hands and surfaces, especially when handling different meats, and keeping raw food separate from cooked food to avoid cross-contamination are good practices in food safety. Food prepared on plastic cutting boards may be less likely to harbor bacteria than wooden ones. Washing and sanitizing cutting boards is highly recommended, especially after use with raw meat, poultry, or seafood. Hot water and soap followed by a rinse with a diluted antibacterial cleaner, or a trip through a dishwasher with a "sanitize" cycle are effective methods for reducing the risk of illness due to contaminated cooking implements.

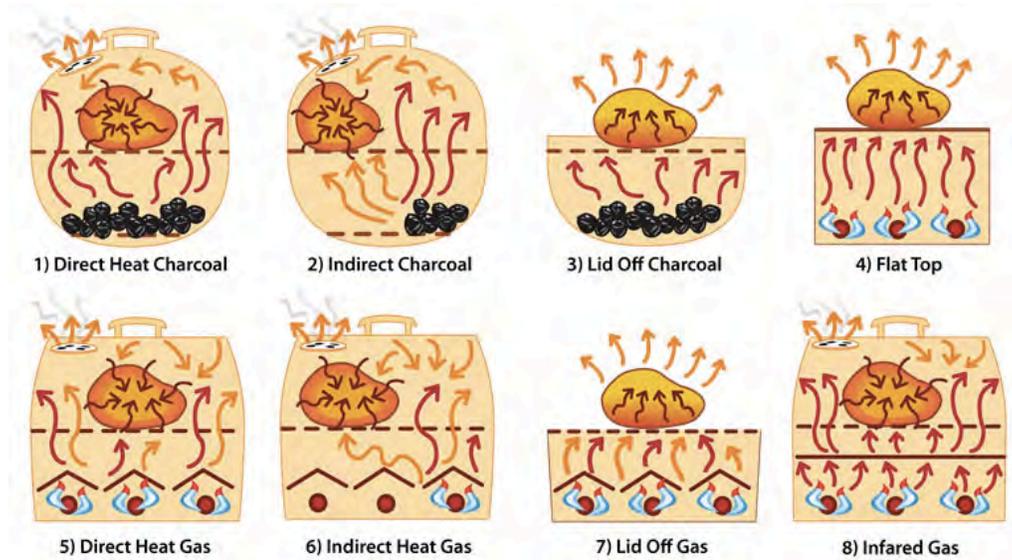
There are very many methods of cooking, most of which have been known since antiquity. These include baking, roasting, frying, grilling, barbecuing, smoking, boiling, steaming and braising. More recent innovations are microwaving and induction cooking.

Various methods use differing levels of heat and moisture and vary in cooking time. The method chosen greatly affects the end result because some foods are more appropriate to some methods than others.

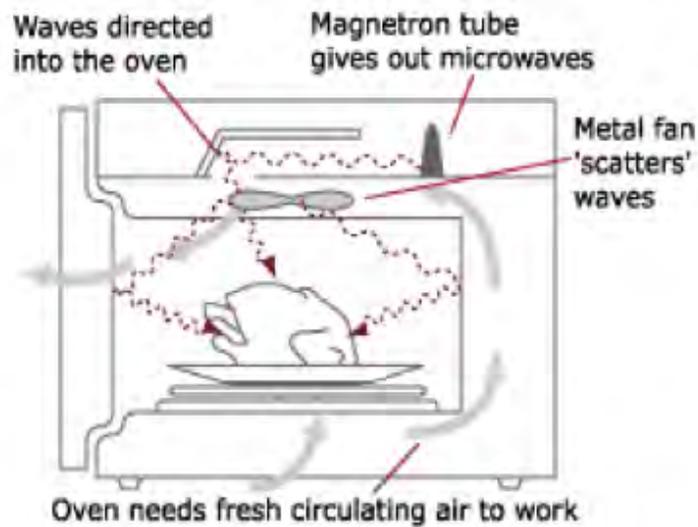
# COOKING



# COOKING



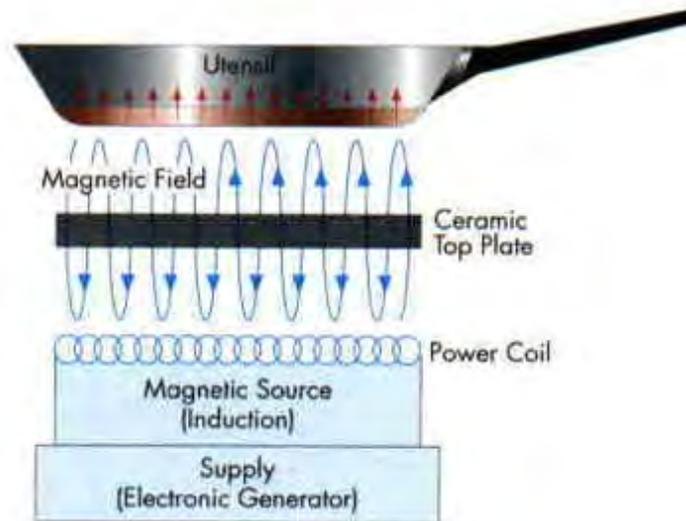
## Microwave Oven: How it Works



# COOKING



## Induction Cooking



Fermentation is a non-thermal process that produces chemical changes by enzymes produced from bacteria, microorganisms or yeasts and is one of the oldest known food preservation techniques. During fermentation, the carbohydrate energy source in food, such as lactose in milk is converted to lactic acid. The same happens when pickles are produced from cucumbers. Mushrooms and the yeast used in baking are kinds of fungi. Yeasts convert glucose to ethanol and carbon dioxide. Many health-producing secondary metabolites are produced through fermentation, especially B vitamins and bioactive peptides that can be antimicrobial and immunostimulatory. In the early 1900s it was realized that bifidobacteria may be effective in preventing infection in infants and the consumption of fermented milks were seen to reverse putrefactive effects of the gut microflora, leading to the development of the probiotic concept.

Recent research is translating into new products now reaching the market. Examples include *Eleve*, a company being started at and by the University of California Davis, commercializing *Bifido longhum infantis* –the unique Bifidobacterium associated with healthy, breastfed newborns- with human milk oligosaccharides to promote much better long-term health and development in infants who are formula-fed.

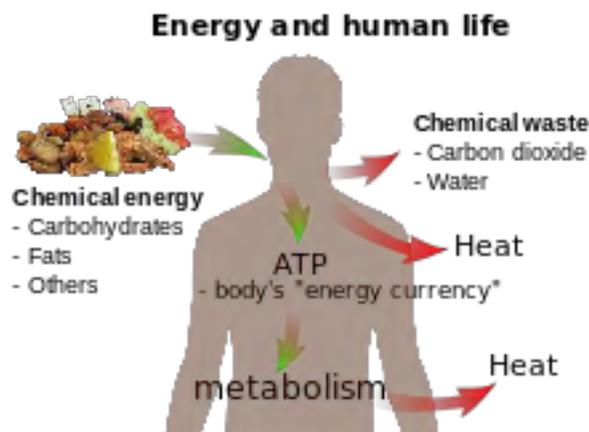
# COOKING



Probiotics are also used in the treatment of infections and used to promote a healthy immune system. A new company, *Synbiotics*, was started at and by the MIT to use specific gene(s) insertion to create novel probiotics, and a series of powerful – hopefully safe- medications. Consuming fermented foods will improve the presence of healthy bacteria in the gut.

All of these improve survival rates of populations and it is at the population level that evolution works. No doubt, then, that cooking has given us a very special place in the food chain. It has made us humans. It has also helped define us culturally through our cuisines. How much less interesting life would be without the joy of cooking!

Cooking –and much, much more- and most phenomena that surround us require energy: the processes of Earth's climate and ecosystem are driven by the radiant energy Earth receives from the sun and the geothermal energy contained within the earth. Heat and work are special cases in that they are not properties of systems but are instead properties of *processes* that transfer energy. In general, we cannot measure how much heat or work are present in an object, but rather only how much energy is transferred among objects in certain ways during the occurrence of a given process. Heat and work are measured as positive or negative depending on which side of the transfer we view them from.



## Basic overview of energy and human life

In biology, energy is an attribute of all biological systems from the biosphere to the smallest living organism. Within an organism, it is responsible for growth and

## COOKING



development of a biological cell or an organelle of a biological organism (e.g. mitochondria). Energy is thus often said to be stored by cells in the structures of molecules of substances such as carbohydrates (including sugars), lipids, and proteins, which release energy when reacted with oxygen and respiration. Sunlight is also captured by plants as *chemical potential energy* in photosynthesis, when carbon dioxide and water (two low-energy compounds) are converted into the high-energy compounds carbohydrates, lipids, and proteins. Plants also release oxygen during photosynthesis, which is utilized by living organisms as an electron acceptor, to release the energy of carbohydrates, lipids, and proteins. Release of the energy stored during photosynthesis, as heat or light, may be triggered suddenly by a spark, in a forest fire, or made available more slowly for animal or human metabolism, when these molecules are ingested, and catabolism is triggered by enzyme action.

Any living organism relies on an external source of energy—radiation from the Sun in the case of green plants, chemical energy in some form in the case of animals—to be able to grow and reproduce. In growing organisms, the energy that is converted to heat serves a vital purpose, as it allows the organism tissue to be highly ordered with regard to the molecules it is built from. The second law of thermo-dynamics states that energy (and matter) tends to become more evenly spread out across the universe. Simpler organisms can achieve higher energy efficiencies than more complex ones, but the complex organisms can occupy ecological niches that are not available to their simpler brethren.



# Great Cuisines of the World

A question comes back again and again: what are the Great Cuisines of the World? Or which one do you consider to be the greatest?

Chinese cuisines are the only ones that have survived (in their original form) to these days, and possibly the perfect example of absorbing and integrating foods, products or techniques from other continents, countries, climates or cultures. Others, including Italian, French, Indian (many), Spanish, Japanese, Moroccan, Vietnamese, Thai, East Mediterranean/Turkish, Indonesian or Mexican came later and/or have undergone too many changes, incarnations and colonizations before reaching their current status. Their *raison d'être* –besides feeding- is appealing to senses, surprise, prestige, art even but are not intimately interwoven with traditional medicine –itself part of a ~4,000-year-old but still omnipresent cosmogony: Chinese is the only successful, very much alive one.

Since the 17<sup>th</sup> century CE, French cuisine has been considered to reign supreme, but this is an illusion –or a blatant lie! Italian cuisines were the ones that shaped and molded most modern cuisines; after the fall of the Roman Empire it took a few short centuries for Sicily to be conquered and changed by the Arabs (827-1091). They brought rice, spices, and opened the final legs of the Orient and Silk Roads to a blessed climate and open-minded, welcoming peoples and cultures. Soon the rise, influence, domination, splendor and trading empire of Venice would amplify these trends towards the Byzantine, Ottoman, and Arab Empires as well as towards the Far East with the likes of Marco Polo.

The cuisines of the world changed when the Europeans navigators, explorers, colonialists started circling the world and pilfering the New World. After 1550 CE, food became globalized. Much, many, and in some countries most of the staples came from Meso- or South America; Italy adopted many that are now inseparable from its cuisines. But Italy was then a much more civilized, open, artistic, creative and advanced society than most –notably France. Food hygiene was practiced, table manners imposed, service was both impressive in courts, papacy or at bourgeois meals. When Caterina de' Medici married, in 1553, King Henri II of France, she introduced a long list of foods, techniques and utensils from Italy to France for the first time. Her legacy is amongst the most enduring and widespread in food history.

## COOKING



These include the dinner fork, parsley, lettuce, broccoli, artichokes, the garden pea, pasta, Parmesan, as well as the turkey, beans (instead of favas) and tomatoes of the New World. She has also received credit for introducing sauces and a variety of dishes such as duck à l'orange and deviled eggs. She also brought ice cream makers, maître d's, real professional master cooks who recreated the complex array of culinary techniques.

Since that was the court of the King of France, all was rapidly copied by the nobility and courtiers and spread to nearby countries, with wars, diplomacy and alliances.

François-Pierre de la Varenne, in *Le Cuisinier françois* (1651), was the first to present the considerable culinary innovations achieved in France in the seventeenth century, while codifying food preparation in a systematic manner, according to rules and principles. He introduced the first bisque and Béchamel sauce. He replaced crumbled bread with roux as the base for sauces, and lard with butter. Here one finds the first usage of the terms bouquet garni, *fonds de cuisine* (stocks) and reductions, and the use of egg whites for clarification. It also contains the earliest recipe in print for mille-feuille. The cooking of vegetables is addressed, an unusual departure.

Marie-Antoine Carême (1784-1833) worked as *chef de cuisine* to Talleyrand who actively encouraged Carême in the development of a new refined food style using herbs and fresh vegetables, simplified sauces with few ingredients. Talleyrand became a famous host during the Congress of Vienna (1815)—when the congress disbanded, not only the map of Europe but also the culinary tastes of its upper classes were thoroughly revised. Carême's impact on culinary matters ranged from trivial to theoretical. He is credited with creating the standard chef's hat, the *toque*; he designed new sauces and dishes; he published a classification of all sauces into groups, based on four mother sauces. He is also frequently credited with replacing the practice of *service à la française* (serving all dishes at once) with *service à la russe* (serving each dish in the order printed on the menu) after he returned from service in the Russian court.

Finally, Georges Auguste Escoffier (1846 – 1935) was a French chef, restaurateur and culinary writer who popularized and updated traditional French cooking methods. He is a legendary figure among chefs and gourmets and was one of the most important leaders in the development of modern French cuisine. Much of Escoffier's technique was based on that of Marie-Antoine Carême, one of the codifiers of French

## COOKING



*haute cuisine*, but Escoffier's achievement was to simplify and modernize Carême's elaborate and ornate style. In particular, he codified the recipes for the five mother sauces. Referred to by the French press as *roi des cuisiniers et cuisinier des rois* ("king of chefs and chef of kings"—though this had also been previously said of Carême), Escoffier was France's preeminent chef in the early part of the 20th century. Alongside the recipes he recorded and invented, another of Escoffier's contributions to cooking was to elevate it to the status of a respected profession by introducing organized discipline to his kitchens. Escoffier published *Le Guide Culinaire* (1903) that is still used as a major reference work, both in the form of a cookbook and a textbook on cooking. Escoffier's recipes, techniques and approaches to kitchen management remain highly influential today and have been adopted by chefs and restaurants not only in France, but also throughout the world.

However, Escoffier did not at all change the cuisine, food supply or techniques of the immense majority of French (and other modest or poor) eaters; his cuisine –as quoted above- was for the kings or the very wealthy. One had to wait until the 1970s for a major change that would make the idea and recipes of 'French cuisine' accessible to and doable by the masses, e.g. the *Recettes Inratables* ("Recipes you cannot fail!") by Michel Oliver.

My late friend Raymond Oliver (I was his best man to his late marriage with a Japanese young lady) was for more than 35 years the owner of *Le Grand Véfour* \*\*\* on the Rue de Beaujolais in the Paris' Palais-Royal district. His celebrity clientele ranged from statesmen like Winston Churchill and André Malraux, to writers including Albert Camus and Georges Simenon, to the industrialists and financiers Henry Ford and David Rockefeller. He was also an erudite who loved to remind us that '*French cuisine is...Chinese: Caterina de' Medici imported Italian cuisine and manners to France; but the Italians based their own cuisine on ...noodles that were invented by the Chinese!*'



## Table Manners

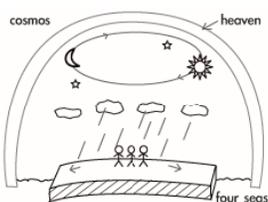
Since a meal is a sacrificial communion that connects the host, family and guests it has the rituals of celebration. Not the ones paraded on screen for mummified royalties, limping or fainting politicians, or *celebrities* whose brain is hazelnut-sized; but the family regular reunion that honors the food, the provider, the magician cook, and shares these gifts with the diverse generations seated around the table. My friend Claude Fischler names it *commensality*: “eating and drinking at the same table is a fundamental social activity, which creates and cements relationships. It also sets boundaries, including or excluding people according to a set of criteria defined by the group or society”. Hence *étiquette* and manners are *de rigueur*.

These are obviously not innate and differ according to culture, rank, means, pride, location, and many more. But a foreign visitor is somewhat expected to observe and comply. These sets of rules complement and magnify the flavors, textures of the food, harmonize the chew with the beverage(s), and help everyone enjoy the moment and the company. They are not rigid but flexible; they also evolve and adapt. Each new generation molds them slightly differently, often simplified.

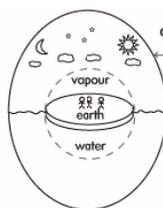


# Part 2: From Heaven to Hearth

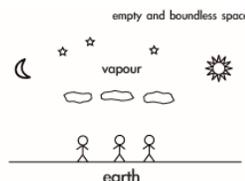
## Three Early Chinese models of the Universe



The *Gai Tian* Model  
(Hemispherical Dome)

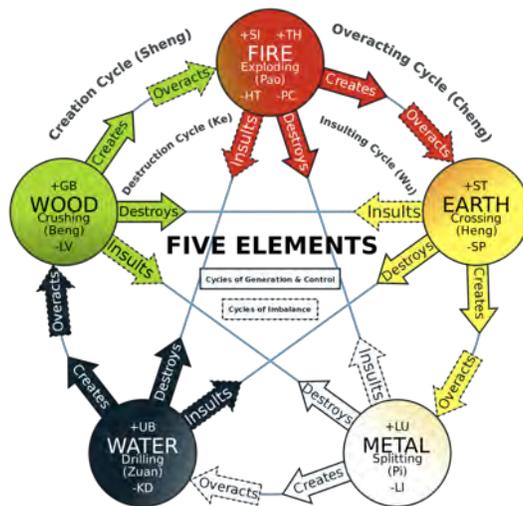


The *Hun Tian* Model  
(Celestial Sphere)



The *Shuen Ye* Theory  
(Infinity)

For Chinese Daoists, a *Triple Burner* in the stomach and intestines cooked foods into sweat, saliva, gastric juices, and finally blood. For them, fermentation is just another form of cooking. Pregnant Chinese women had to stay away from fermenting foods for fear that the seed cooking in the womb would interfere with the ferment cooking in the jar.



## COOKING



Food, like everything in the cosmos, was made of 4 or 5 basic elements (wood, fire earth, metal, water, air) that could be combined in adequate proportions.

Oil, water, salt, air, spices, aromatic, colored foods each have special significance and properties. Oil, congealed fire, contains the spark of life. Water –like fire- is at once an agent and an element; the ultimate element, tasteless but able to combine other flavors into a harmonious blend. Pure sweet air is therapeutic, while foul air is poisonous. *Eat breath, not grains* say the Daoists. *Qi* whose character is made of components that read as *vapors arising from rice or millet* (foods!) suffuses the universe; linked with semen, it is the essence, energy, strength derived from food that allows the body to grow, develop and act. Salt is a panacea, effective against the plague of worms; a little revealed the flavors of bland food without displaying its presence.





## Energy in the Dao

Dao can be roughly thought of as the *flow of the Universe*, or as some essence or pattern behind the natural world that keeps the Universe balanced and ordered. It is related to the idea of *qi*, the essential energy of action and existence. Dao is a non-dual concept – it is the greater whole from which all the individual elements of the Universe derive. Dao is more commonly expressed in the relationship between *wu* (void or emptiness, in the sense of *wuji*) and *yinyang* (the natural dynamic balance between opposites), leading to its central principle of *wu wei* (non-action, or action without force).

Dao is usually described in terms of elements of nature, and in particular as similar to water. Like water it is undifferentiated, endlessly self-replenishing, soft and quiet but immensely powerful, and impassively generous.



Physical energy as we know it is not part of Chinese tradition. *Qi* encompasses all forms –physical, chemical, biological- of energy.

In traditional Chinese culture, *qi* or *ch'i*, also known as *gi* in Korean culture, *ki* in Japanese culture, is an active principle forming part of any living thing. *Qi* literally translates as "breath", "air", or "gas", and figuratively as "material energy", "life force", or "energy flow".

Some elements of *qi* can be understood in the term energy when used by writers and practitioners of various esoteric forms of spirituality and alternative medicine. Elements of the *qi* concept can also be found in Western popular culture, for example "The Force" in *Star Wars* and Jediism. Notions in the West of *energeia*, *élan vital*, or "vitalism" are purported to be similar.



The ancient Chinese described it as "life force". They believed *qi* permeated everything and linked their surroundings together. They likened it to the flow of energy around and through the body, forming a cohesive and functioning unit. By understanding its rhythm and flow they believed they could guide exercises and treatments to provide stability and longevity.

Although the concept of *qi* has been important within many Chinese philosophies, over the centuries the descriptions of *qi* have varied and have sometimes been in conflict. Until China came into contact with Western scientific and philosophical ideas, they had not categorized all things in terms of matter and energy. *Qi* and *li* (理 : "pattern") were 'fundamental' categories similar to matter and energy. Fairly early on, some Chinese thinkers began to believe that there were different fractions of *qi* and that the coarsest and heaviest fractions of *qi* formed solids, lighter fractions formed liquids, and the most ethereal fractions were the "lifebreath" that animates living beings. Not only human beings and animals were believed to have *qi*. Zhuangzi indicated that wind is the *qi* of the Earth. Moreover, cosmic yin and yang "are the greatest of *qi*." He described *qi* as "issuing forth" and creating profound effects. He said "Human beings are born [because of] the accumulation of *qi*. When it accumulates there is life. When it dissipates there is death... There is one *qi* that connects and pervades everything in the world."

*"Heaven (seen here as the ultimate source of all being) falls (duo 墮, i.e., descends into proto-immanence) as the formless. Fleeting, fluttering, penetrating, amorphous it is, and so it is called the Supreme Luminary. The dao begins in the Void Brightening. The Void Brightening produces the universe (yu-zhou). The universe produces qi. Qi has bounds. The clear, yang [qi] was ethereal and so formed heaven. The heavy, turbid [qi] was congealed and impeded and so formed earth. The conjunction of the clear, yang [qi] was fluid and easy. The conjunction of the heavy, turbid [qi] was strained and difficult. So heaven was formed first and earth was made fast later. The pervading essence (xi-jing) of heaven and earth becomes yin and yang. The concentrated (zhuan) essences of yin and yang become the four seasons. The dispersed (san) essences of the four seasons become the myriad creatures. The hot qi of yang in accumulating produces fire. The essence (jing) of the fire-qi becomes the sun. The cold qi of yin in accumulating produces water. The essence of the water-qi becomes the moon. The essences produced by coitus (yin) of the sun and moon become the stars and celestial markpoints (chen, planets)." — Huai-nan-zi, 3:1a/19*



The concept of *Qi* bears no resemblance to the concept as used by physicists. *Qi* is a non-scientific, unverifiable concept. And this remains one of the major challenges for communication between Western (science-based) and Chinese scholars.

## The Kitchen God and his Two Wives

In Chinese popular beliefs, there are three domains in the cosmos - Heaven, Earth, and the Underworld - and each domain is populated by a host of important gods and goddesses.



One of the most important deities of the Earthly Domain was the Kitchen God (or Zao Jun, also known as the Hearth God or the Stove God). Every family had its own Kitchen God, who was considered to be that particular family's guardian. The Kitchen

## COOKING



God was an important intermediary between a family and other important gods since the stove was thought to represent the unity of the family. In late-imperial China there was a process known as “family division,” in which two brothers who were both married and had children could decide that they can no longer live together practically as one family and want to split up into two families. When this happened, at least one of the brothers had to dedicate a new Kitchen God, for two families could not share one Kitchen God.

The Kitchen God was often represented with his wife, or sometimes with his two wives.



It was widely held that once a year, just before the Lunar New Year, the Kitchen God went to Heaven to report to the Jade Emperor on his family’s activities during the year. The family “sent” its Kitchen God to Heaven to make his report by burning the paper image that had hung over the stove for the entire year. But in order to ensure a good report before the Jade Emperor, a bit of honey would first be rubbed on the lips of the paper god, so that he would have only sweet things to say to the Jade Emperor (or so that the sticky honey would prevent him from opening his mouth, and no bad news would get out).



# Chinese Cuisines

Chinese cuisine includes styles originating from the diverse regions of China, as well as from Chinese people in other parts of the world including most Asian nations. The history of Chinese cuisine in China stretches back for thousands of years and has changed from period to period and in each region according to climate, imperial fashions, and local preferences. Over time, techniques and ingredients from the cuisines of other cultures were integrated into the cuisine of the Chinese people due both to imperial expansion and from the trade with nearby regions in pre-modern times, and from Europe and the New World in the modern period.

Classically the “Eight Culinary Cuisines” of China are Anhui, Cantonese, Fujian, Hunan, Jiangsu, Shandong, Sichuan, and Zhejiang cuisines.

To illustrate in one map the real diversity and complexity of China’s culinary diversity here’s the one published recently in the MIT Technology Review: <https://www.technologyreview.com/s/517401/food-network-analysis-reveals-patterns-behind-chinese-regional-cuisines/>



The colors of the different cuisines are superimposed on the provinces.



Many cuisines cover more than one province, and some provinces offer diverse cuisines.

These results threw up a couple of surprises. First the research team found two regional cuisines that differed substantially from each other and from everything else: the cuisines associated with Hong Kong and YunGui. This may reflect the facts that ethnic minorities have historically resided in the YunGui region and that Hong Kong was ruled by the British Empire and Japan for more than 100 years.

They also found that the geographical proximity, rather than climate proximity, is a crucial factor that determines the similarity of regional cuisines.

That also provides an interesting insight into the way food cultures evolve. Clearly, Chinese people move(d) from one region to another, taking their recipes with them, where they can modify them as they wish. Obviously, that happens more often between regions that are geographically close.

Historically, Chinese society greatly valued gastronomy and developed an extensive study of the subject based on its traditional medical beliefs. Chinese culture initially centered around the North China Plain. The first domesticated crops seem to have been the foxtail and broomcorn varieties of millet, while rice was cultivated in the south. By 2000 BC, wheat had arrived from western Asia.

However, these grains were typically served as warm noodle soups instead of baked into bread as in Europe. Nobles hunted various wild game and consumed mutton, pork, dog, and beef as these animals were domesticated. Grain was stored against famine and flood and meat was preserved with salt, vinegar, curing, and fermenting.

By the time of Confucius in the late Zhou, gastronomy was becoming a high art. He was recorded discussing one such picky eater: *"For him, the rice could never be white enough. When it was not cooked right, he would not eat. When it was out of season, he would not eat. When the meat was not cut properly, he would not eat. When the food was not prepared with the right sauce, he would not eat."*

During Shi Huangdi's Qin dynasty, the empire expanded into the south. By the time of the Han Dynasty, the different regions and cuisines of China's peoples were linked by major canals and leading to greater complexity in the different regional cuisines. Not only is food seen as giving "qi", energy, but food is also about maintaining yin and yang. The philosophy behind it was rooted in the I Ching and Chinese traditional medicine: food was judged for color, aroma, taste, and texture and a good meal was

## COOKING



expected to balance the Four Natures ('hot', warm, cool, and 'cold') and the Five Tastes (pungent, sweet, sour, bitter, and salty). Salt was used as a preservative from early times, but in cooking was added in the form of soy sauce, and not at the table. The predominance of chopsticks and spoons as eating utensils also necessitated that most food be prepared in bite-sized pieces or (as with fish) be so tender that it could be easily picked apart.

During the Han dynasty, Chinese developed methods of food preservation for military rations during campaigns such as drying meat into jerky and cooking, roasting, and drying grain. Chinese legends claim that the roasted flatbread Shaobing (shao-ping) was brought back from the Xiyu (the Western Regions, known as Central Asia) by the Han dynasty General Ban Chao, and that it was originally known as Hubing 胡餅 (barbarian pastry). The shao-ping is believed to be descended from the Hu-ping (Hubing) and to be related to the Persian and Central Asian Naan bread and the Near Eastern Pita bread. Foreign westerners made and sold sesame cakes in China during the Tang dynasty.

During the Southern and Northern Dynasties non-Han people like the Xianbei of Northern Wei introduced their cuisine to northern China, and these influences continued up to the Tang dynasty, popularizing meat like mutton and dairy products like goat milk, yogurts, and Kumis among even Han people. It was during the Song dynasty that Han Chinese developed an aversion to dairy products (or an intolerance to lactose) and abandoned the dairy foods introduced earlier. The Han Chinese rebel Wang Su who received asylum in the Xianbei Northern Wei after fleeing from Southern Qi, at first could not stand eating dairy products like goat's milk and meat like mutton and had to consume tea and fish instead, but after a few years he was able to eat yogurt and lamb, and the Xianbei Emperor could ask him which of the foods of China (Zhongguo) he preferred, fish vs. mutton and tea vs. yogurt.

The great migration of Chinese people south during the invasions preceding and during the Song dynasty increased the relative importance of southern Chinese staples such as rice and congee. The Yuan and Qing dynasties introduced Mongolian and Manchu cuisine, warm northern dishes which popularized hot pot cooking. During the Yuan dynasty many Muslim communities emerged in China, who practiced a porkless cuisine now preserved by Hui restaurants throughout the country. Yunnan cuisine is unique in China for its cheeses like Rubing and Rushan

## COOKING



cheese made by the Bai people, and its yogurt that may have been due to a combination of Mongolian influence during the Yuan dynasty, the Central Asian settlement in Yunnan, and the proximity and influence of India and Tibet on Yunnan.

As part of the last leg of the *Columbian Exchange*, Spanish and Portuguese traders began introducing foods from the New World to China through the port cities of Canton and Macao. Mexican chili peppers became essential ingredients in Sichuan cuisine and calorically-dense potatoes and corn became staple foods across the northern plains.

During the Qing Dynasty, Chinese gastronomes such as Yuan Mei focused upon a primary goal of extracting the maximum flavor of each ingredient. However, as noted in his culinary work the *Suiyuan shidan*, the fashions of cuisine at the time were quite varied and in some cases were flamboyantly ostentatious, especially when the display served also a formal ceremonial purpose, as in the case of the Manchu Han Imperial Feast.



Manchu Han Imperial Feast

Simulated in the Tao Heung Museum of Food Culture, Fo Tan, Hong Kong

The People's Republic of China, amid numerous false starts, has largely industrialized food production. A side effect of this process was the introduction of American poultry-rearing techniques, which has greatly increased the relative

## COOKING



consumption of eggs and chicken in various Chinese cuisines.



# Chinese Cooking Techniques

**Chinese cooking techniques** (Chinese: 中餐烹調法) are a set of methods and techniques traditionally used in Chinese cuisines. These date back millennia but have been –and are- constantly adapted by Chinese chefs, with regional variations due to diverse opportunities, constraints or limitations.

The cooking techniques can either be grouped into ones that use a single cooking method or a combination of wet and dry cooking methods.

## Single

Many cooking techniques involve a singular type of heated cooking or action.

## Wet

Wet-heat, immersion-based cooking methods are the predominate class of cooking techniques in Chinese cuisine and are usually referred to as "zhǔ" (煮). In fact the term (zhǔ, 煮) is commonly used to denote cooking in general...

## Quick

Fast wet-heat based cooking methods include:

<i>English Equivalent</i>	<i>Chinese</i>	<i>Pinyin</i>	<i>Description</i>
Braising	Simplified Chinese: 烧; traditional Chinese: 燒	Shāo	Braising ingredients over medium heat in a small amount of sauce or broth and simmering for a short period of time until completion. Known as hongshao (紅燒, lit. red cooked) when the sauce or broth is soy sauce based.
Quick\ Boiling	氽 or 焯	Dùn or Zhá	Adding ingredients and seasonings to boiling water or broth and immediately serving the dish with the cooking liquid when everything has come back to a boil.
Scalding	焯 or simplified Chinese: 烫; traditional Chinese: 燙	Chāo or Tàng	Par cooking through quick immersion of raw ingredients in boiling water or broth one-time followed by immersion in cold water.

## COOKING



### Prolonged

Prolonged wet-heat based cooking methods include:

<b>English Equivalent</b>	<b>Chinese</b>	<b>Pinyin</b>	<b>Description</b>
Bake stewing	煨	Wēi	Slowly cooking a ceramic vessel of broth and other ingredients by placing it in or close to hot embers.
Gradual simmering	Simplified Chinese: 炖; traditional Chinese: 燉	Dùn	Adding ingredients to cold water along with seasonings and allowing the contents to slowly come to a prolonged simmering boil. This is known in English as double steaming due to the vessels commonly used for this cooking method. The term is also used in Chinese for the Western cooking technique of stewing and brewing herbal remedies of Traditional Chinese medicine.
Slow red cooking	simplified Chinese: 卤; traditional Chinese: 滷	Lǔ	Cooking over prolonged and constant heat with the ingredients completely immersed in a strongly flavoured soy sauce based broth. This technique, along with hongshao (红烧, lit), is known in English as red cooking.
Steaming	蒸 or 燻	Zhēng or Xún	Steaming food to completion over boiling water.
Decoction	熬	Áo	Cooking slowly to extract nutrients into the simmering liquid, used to describe the brewing process in Chinese herbology with the intention of using only the decocted brew.

## COOKING



### Dry

#### Air-based

Food preparation in hot dry vessels such as an oven or a heated empty wok include:

<b>English Equivalent</b>	<b>Chinese</b>	<b>Pinyin</b>	<b>Description</b>
Baking or Roasting	烤	Kǎo	Cooking by hot air through convection or broiling in an enclosed space
Smoking	熏	Xūn	Cooking in direct heat with Smoke. The source of the smoke is typically sugar or tea.

#### Oil-based



Oil-based cooking methods are one of the most common in Chinese cuisine and include:

<b>English Equivalent</b>	<b>Chinese</b>	<b>Pinyin</b>	<b>Description</b>
Deep frying or Frying	炸	Zhá	Full or partial immersion cooking in hot oil or fat
Pan frying	煎	Jiān	Cooking in a pan with a light coating of oil or liquid and allowing the food to brown.
Stir frying or high heat Sautéing	炒	Chǎo	Cooking ingredients at hot oil and stirring quickly to completion. This technique—as well as bao (爆炒, 油爆)—is known in English as stir frying. This technique uses higher heat than that of Sautéing.
Flash-frying or High heat Stir frying	[油]爆	[Yóu]Bào	Cooking with large amounts hot oil (油爆), sauces (酱爆), or broth (汤爆) at very high heat and tossing the ingredients in the wok to completion.

## COOKING



Stir frying (爆 bào) is a Chinese cooking technique involving relatively large amounts of oil.

Kian Lam Kho identifies five distinct techniques of stir frying:

<b>English Equivalent</b>	<b>Chinese</b>	<b>Pinyin</b>	<b>Description</b>
Plain stir-fry or Simple stir-fry	清炒	qīngchǎo	To stir-fry a single ingredient (with aromatics and sauces). A plain stir-fry using garlic is known as 蒜炒, suànchǎo.
Dry stir-fry or Dry wok stir-fry	煸炒	biānchǎo	To stir-fry a combination of protein and vegetable ingredients (with a small amount of liquid).
Moist stir-fry	滑炒	huáchǎo	To stir-fry a combination of protein and vegetable ingredients (with a Gravy-like sauce).
Dry-fry or Extreme-heat stir-fry	干煸	gānbīan	To scorch in oil before stir-frying (with no addition of water).
Scramble stir-fry	软炒	ruǎnchǎo	A technique for making egg custard.

### Without heat

Food preparation techniques not involving the heating of ingredients include:

<b>English Equivalent</b>	<b>Chinese</b>	<b>Pinyin</b>	<b>Description</b>
Dressing	拌	Bàn	Mixing raw or unflavoured cooked ingredients with seasonings and served immediately. Similar to tossing a dressing into salad.
Marinating or pickling	腌	Yān	To pickle or marinate ingredients in salt, soy sauce or soy pastes. Use for making pickles or preparing ingredients for addition cooking.
Jellifying	凍	Dòng	To quickly cool a gelatin or agarose containing broth to make aspic or agar jelly.



## Combination



The chicken in General Tso's chicken has been fried and lightly braised in sauce (Liu, 溜)

Several techniques in Chinese involve more than one stage of cooking and have their own terms to describe the process. They include:

- *Dòng* (凍): The technique is used for making aspic but also used to describe making of various gelatin desserts
  1. Simmering meat for a prolonged period in a broth (Lu, 滷) or (Dun, 炖)
  2. Chilling the resulting meat and broth until the mixture gels
- *Hùi* (燴): The dishes made using this technique is usually finished by thickening with starch (勾芡)
  3. Quick precooking in hot water (Tang, 燙)
  4. Finished by stir-frying (爆, 炒) or Shao (燒)
- *Liū* (溜): This technique is commonly used for meat and fish. Pre-fried tofu is made expressly for this purpose.
  5. Deep frying (Zha, 炸) the ingredients until partially cooked
  6. Finishing the ingredients lightly braising (Shao, 燒) it to acquired a soft "skin"
- *Mēn* (燜):
  7. Stir-frying (爆, 炒) the ingredients until partially cooked
  8. Cover and simmer (Shao, 燒) with broth until broth is fully reduced and ingredients are fully cooked.



## Chinese Food Therapy

**Chinese food therapy** (traditional Chinese: 食療) is a mode of dieting rooted in Chinese understandings of the effects of food on the human organism and centered on concepts such as eating in moderation. Its basic precepts are a mix of folk views and concepts drawn from traditional Chinese medicine. They describe the effect of each kind of meat, grain, herb, or vegetable on the human body, how the body operates, and gave suggestions about what to prepare to stay healthy or cure disease. It was the prescientific analog of modern medical nutrition therapy; that is, it was a state-of-the-art version of dietary therapy before the sciences of biology and chemistry allowed the discovery of present physiological knowledge. It now qualifies in the West as alternative medicine.

A Chinese medicinal diet is not a simple combination of food and herbs, but a specially prepared dish made from Chinese herbs, food and condiments according to the theoretical guidelines of diet preparation. Such a diet is in response to the different symptoms of a disease and its diagnosis according to TCM, and used to prevent and treat diseases, improve fitness, and/or slow down the aging process.

Over the centuries, Chinese cuisine has developed into a remarkably varied one, using far more vegetables and meats than available in the West. One factor behind this development is the link between diet and Traditional Chinese Medicine (TCM). Food is considered more than just sustenance; it contains therapeutic properties and is prescribed by TCM doctors. While acupuncture and massage may be used to treat an ailment, and herbal mixtures infused to make teas, the first line of treatment is usually diet itself. Consider the fact that although China suffers from air, water, and soil pollution, life expectancy in the country has grown to 71 years which rivals that of the West. This is a remarkable achievement given its extremely low per capita income, shortage of medical services, and levels of pollution.

Food therapy has long been a common approach to health among Chinese people both in China and overseas and was popularized for western readers in the 1990s with the publication of books like Bob Flaws' *The Tao of Healthy Eating* and Grace Young's *The Wisdom of the Chinese Kitchen*.

A number of ancient Chinese cookbooks and treatises on food (now lost) display an



early Chinese interest in food, but no focus on its medical value. The literature on "nourishing life" (*yangsheng* 養生) integrated advice on food within broader advice on how to attain immortality. Such books, however, are only precursors of "dietary therapy", because they did not systematically describe the effect of individual food items.

The characteristics of using Chinese medicinal foods for health and healing are:

### **1. Synergy of food and medicine**

Medicine and food function as supplements and complement each other. Medicinal food is rendered with medicinal properties, and the effects of medicine become stronger with the combination of food.

### **2. Applied by differentiation of symptoms and signs**

TCM diagnosis and therapy are based on differentiating symptoms and signs, and this is incorporated into the selection of functional foods. Specific groups of signs and symptoms indicate specific treatment protocols. For example in spleen deficiency which is diagnosed by low spirits, weakness of limb, loss of appetite and abdominal distension - foods like Chinese date, ginger, Chinese yam and ginseng are added in order to invigorate functioning of the spleen.

### **3. Unique cooking techniques and procedures**

In order to ensure the desired result of a medicinal diet, herbs and foods should be specially processed such as cutting it into pieces, parching or grinding. Besides, cooking techniques are considered for retaining the effective constituents of food and bringing to bear its full effects on treatment and health care. Proper techniques also help to preserve the original juice and flavor of the ingredients so that it results in attractive colors, aroma, flavor and texture, thus arousing the appetite. Usual cooking methods are steaming, stewing, boiling or making soup while those of deep-fry or roasting are rarely used (see sections below).



#### 4. For enhancement and treatment

Chinese medicinal foods are a milder course of treatment and can be used either to treat disease, or to help healthy people build stamina and prevent disease. This is one of the characteristics in which medicinal diet is different from drugs.

The earliest work on these various topics dates from the early Han Dynasty era (206 BCE-220 CE) and is called the *Huangdi Neijing* (The Yellow Emperor's Classic of Internal Medicine). It contains the basic ideas of Chinese food therapy. The text gave recommendations on what to eat for different health conditions and different environmental conditions. However, the earliest extant Chinese dietary text is a chapter of Sun Simiao's *Prescriptions Worth a Thousand Gold* (*Qianjin Fang* 千金方), which was completed in the 650s during the Tang dynasty. Sun's work contains the earliest known use of the term "food (or dietary) therapy" (*shiliao*). Sun stated that he wanted to present current knowledge about food so that people would first turn to food rather than drugs when suffering from an ailment. His chapter contains 154 entries divided into four sections – on fruits, vegetables, cereals, and meat – in which Sun explains the properties of individual foodstuffs with concepts borrowed from the *Yellow Emperor's Inner Canon*: *qi*, the viscera, vital essence (*jing* 精), and correspondences between the Five Phases, the "five flavors" (sour, bitter, sweet, pungent, and salty), and the five grains. He also set a large number of "dietary interdictions" (*shijin* 食禁), some based on calendrical notions (no water chestnuts in the 7th month), others on purported interactions between foods (no clear wine with horse meat) or between different flavors.

Sun Simiao's disciple Meng Shen (孟詵; 621–713) compiled the first work entirely devoted to the therapeutic value of food: the *Materia Dietetica* (*Shiliao bencao* 食療本草; "food therapy *materia medica*"). This work has not survived, but it is quoted in later texts – like the 10th-century Japanese text *Ishinpō* – and a fragment of it has been found among the Dunhuang manuscripts. Surviving excerpts show that Meng gave less importance to dietary prohibitions than Sun, and that he provided information on how to prepare foodstuffs rather than just describe their properties. The works of Sun Simiao and Meng Shen established the genre of *materia dietetica* and shaped its development in the following centuries.

Although the precepts of Chinese food therapy are neither systematic nor identical

## COOKING



in all times and places, some basic concepts can be isolated. Food items are classified as "heating" (*re* 熱; "hot") or "cooling" (*liang* 涼; "cool"). Heating food is typically "high-calorie, subjected to high heat in cooking, spicy or bitter, or 'hot' in color (red, orange)", and includes red meat, innards, baked and deep-fried goods, and alcohol. They are to be avoided in the summer and can be used to treat "cold" illnesses like excessive pallor, watery feces, fatigue, chills, and low body temperature caused by a number of possible causes, including anemia. Green vegetables are the most typical cooling food, which is "low-calorie, watery, soothing or sour in taste, or 'cool' in color (whitish, green)". They are recommended for "hot" conditions: rashes, dryness or redness of skin, heartburns, and other "symptoms similar to those of a burn", but also sore throat, swollen gums, and constipation.

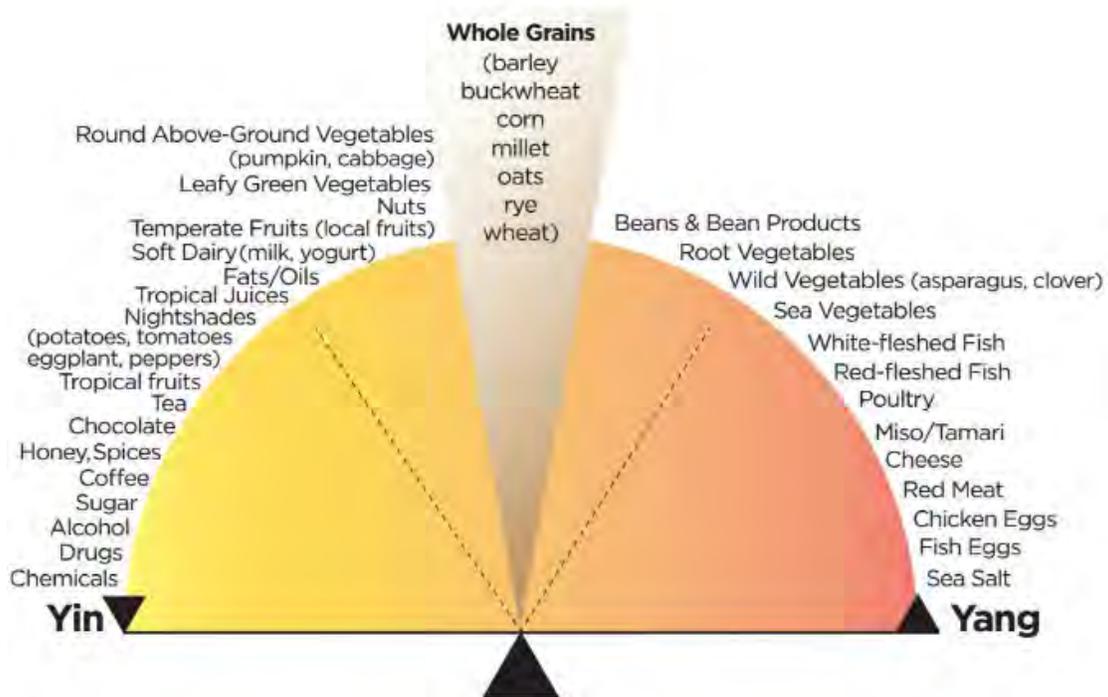
Ancient Chinese medical books list hundreds of plant, animal, and chemical ingredients and tell their specific effects on the human body. These books give ideas about the physical principals involved in human health, and they describe how herbs or special foods help, along with TCM techniques such as moxibustion and acupuncture. Currently, there is a wide choice of foods that are used in many different ways to promote health and wellbeing. It is estimated that there are more than 600 different kinds of resource ranging from cereals, fruits, vegetables, meats and marine products. Many of these may be unfamiliar to foreigners who may be reluctant to try them; however, all are quite precious and effective in the field of medicinal food. Many different ingredients are used to add to the appeal as well as to strengthen effects of the cuisine. Wine, sugar, oil, salt, vinegar and honey, and other commonly available items such as almonds, mandarin orange, or peanuts, all are utilized in the cooking process.

The basic idea is to balance the *qi* and the body fluids — the fundamentals of Chinese traditional medicine. It is thought that a healthy body or organ has a proper balance of these things. When they are out of balance, there is disease or sickness. The environment or physical injury disrupts the balance. For example, cold weather causes a lack of *qi* or high *yin* in the body. So high *yang* foods are eaten. In hot weather when there is naturally too much *yang*, high *yin* foods are eaten. Healing herbs or animal parts can be added to the diet to heal disease. Interestingly, any of the same herbs are used by Western herbalists and herbalists in other parts of the world for the same conditions.

## COOKING



All foods are categorized by qi temperature, ranging from high *yang* to high *yin*, and one of the five food flavors (sour, sweet, bitter, hot and salty). A food item's qi temperature and specific flavor influences the body in its own way. It is thought that people should generally include all the flavors in every meal and balance the "heat". Most Chinese people think that if too much of one type of food is consumed, it can cause an imbalance in the body.



The ancient texts described not only what to prepare for meals, but also how to eat meals. These Chinese customs about eating meals have been part of the culture for hundreds of years:

- Try to avoid overly processed food. Eat naturally.
- Eat seasonal vegetables and fruits.
- Always make sure the vegetables are cooked.
- Sit down to eat at a quiet place.
- Chew the food well.

## COOKING



- Eat slowly. (慢吃 mànchī 'eat slowly' means "bon appétit!" in China)
- Pay attention to your eating and get away from distractions. In TCM your mind plays a part in how well you digest food, so pay attention to the tastes of the food.
- Do not skip meals.
- After lunch, take a nap or rest for a while.

Chinese believe that eating seasonal food is generally best. For example, in summer *yin* foods like melons and cucumber are available, and in winter high *yang* foods like garlic and onions are available for consumption as well as easily stored red pepper and other high *yang* herbs. It is as if nature produces the right healing foods for each season for people. During cold and flu season in the late fall and winter, Chinese would refrain from eating melons, especially if they had a cold. If Chinese get sunstroke (from hot Chinese summer days) they avoid garlic and onions.



## A Few Seasonal Recipes:

### Winter: Chicken & Ginger Soup



Chinese people like to drink lots of hot soup on cold winter days. But their idea is to make soups with high yang vegetables and herbs and include meat to balance the dish. A favorite winter soup, just like in the West, is chicken soup.

#### *Directions:*

Take chicken portions and boil them with 2 chopped potatoes, half a white Chinese turnip and a tablespoon of mined Ginger. When the potatoes and chicken pieces are almost cooked, add diced vegetables and spices.

The diced vegetables should include 3 minced cloves of garlic and 1 chopped onion, essential for adding *yang*. You can also include a cup of carrots, one of mushrooms, one of zucchini and/or bok choy, or other winter vegetables.

#### *Seasonings:*

To the mix add a teaspoon of sea salt, and thin slices of *Astragalus* 黄芪 (vetch root) and pinches of turmeric; also red chili pepper flakes will help.



## Spring: Asparagus and Vinegar Recipe



In the spring, plants come alive and start growing. It is important for living things to get more *yang* for growth. Since liver and gallbladder are especially important at this time, eat the green seasonal vegetables that sprout out since they supply the necessary *yang* and help to nourish the liver. *Green is the color of the liver and of spring* is a saying. Drink fresh sour juices: these stimulate the *qi*.

It is also a time when the body does “spring cleaning” on itself by getting rid of stored fats and meat, so eating less meat and fat is better for health.

### *Directions:*

Wash a bunch of asparagus and a carrot in clean water. Chop up the vegetables and lightly steam them until the asparagus is slightly tender and bright green.

Prepare a dressing with 2 parts of virgin olive oil to one part of plum vinegar (or apple cider vinegar). Pour the dressing on the vegetables and enjoy the dish with some lemonade: squeeze a fresh lemon and add the juice to water.



## Summer: Tomato and Cucumber Salad Recipe



A favorite dish for summer when the *yang* is naturally high, and you need to cool down a bit. Tomato and cucumber are high *yin* vegetables that are readily available.

*Directions:*

Use ripe ingredients. Dice a red onion, and slice tomatoes (peeled if possible) and Chinese or Persian cucumbers partly peeled. Mix with olive oil, dill, salt and pepper to taste.



## Autumn: Butternut Squash Soup Recipe



In the fall, life ebbs away and the *qi* returns to the earth. In TCM, the *qi* goes inwards into the body's core.

Eating the vegetables and fruits that are seasonal helps your body to transition and stay healthy.

### *Directions:*

Take a large butternut squash, a medium onion, 2 cloves of garlic, a stalk of celery, a large carrot, some boiled chicken meat; add salt, pepper, cinnamon and nutmeg to taste.

Chop up and dice all ingredients, but first boil the squash in water in a large pot. When the squash is almost cooked, add all the other ingredients (except the spices) and simmer for a few minutes; then add the spices and mix well. It will be fragrant and chunky; if you prefer it smooth, just blend in a food processor. Can be reheated.



## The Special Niche of Cantonese Cuisine

Since I made, for many decades, Hong Kong my 'home away from home', I want to detail somewhat the cuisine of the area, i.e. Cantonese Cuisine.

**Cantonese cuisine** (traditional Chinese: 廣東菜) comes from Guangdong province and is one of the Eight Culinary Traditions of Chinese cuisine. Its prominence outside China is due the numbers of emigrants from Guangdong. Chefs trained in Cantonese cuisine are highly sought after throughout China. When Westerners speak of Chinese food, they usually refer to Cantonese cuisine.

Guangzhou, the capital of Guangdong province, has long been a trading port and many imported foods and ingredients are used in Cantonese cuisine. Besides pork, beef and chicken, Cantonese cuisine incorporates almost all edible meats, including offal, chicken feet, duck's tongue, snakes, and snails. However, lamb and goat are rarely eaten, unlike in the cuisines of northern or western China. Many cooking methods are used, with steaming and stir-frying being the most favored due to their convenience and rapidity. Other techniques include shallow frying, double steaming, braising, and deep-frying.

For many traditional Cantonese cooks, the flavors of a finished dish should be well balanced and not greasy. Apart from that, spices should be used in modest amounts to avoid overwhelming the flavors of the primary ingredients, and these ingredients in turn should be at the peak of their freshness and quality. There is no widespread use of fresh herbs in Cantonese cooking, in contrast with their liberal use in other cuisines such as Sichuan, European, Thai or Vietnamese. Garlic chives and coriander leaves are notable exceptions, although the latter are usually used as mere garnish in most dishes. In Cantonese cuisine, a number of ingredients such as spring onion, sugar, salt, soy sauce, rice wine, cornstarch, vinegar, scallion oil, and sesame oil, suffice to enhance flavor, although garlic is heavily used in some dishes, especially those in which internal organs, such as entrails, may emit unpleasant odors. Ginger, chili peppers, five-spice powder, powdered black pepper, star anise and a few other spices are also used, but often sparingly.

Although Cantonese cooks pay much attention to the freshness of their primary



ingredients, Cantonese cuisine also uses a long list of preserved food items to add flavor to a dish. This may be influenced by Hakka cuisine, since the Hakkas were once (Ming Dynasty) a dominant group occupying imperial Hong Kong and other southern territories.

Some items gain very intense flavors during the drying / preservation / oxidation process and some foods are preserved to increase their shelf life. Some chefs combine both dried and fresh varieties of the same items in a dish. Dried items are usually soaked in water to rehydrate before cooking. These ingredients are generally not served *a la carte*, but rather go with vegetables or other Cantonese dishes.

There are a small number of deep-fried dishes in Cantonese cuisine, which can often be found as street food. They have been extensively documented in colonial Hong Kong records of the 19th and 20th centuries. A few are synonymous with Cantonese breakfast and lunch, even though these are also part of other cuisines. Slow-cooked soup, or *lou fo tong* (traditional Chinese: 老火湯) in the Cantonese dialect (literally meaning *old fire-cooked soup*) is usually a clear broth prepared by simmering meat and other ingredients over a low heat for several hours. Chinese herbs are often used as ingredients. Soup chain stores or delivery outlets in Cantonese-dominated cities such as Hong Kong serve this dish due to the long preparation time of slow-cooked soup.

Due to Guangdong's location on the southern coast of China, fresh seafood is prominent in Cantonese cuisine, and many Cantonese restaurants keep aquariums or seafood tanks on the premises. In Cantonese cuisine, as in cuisines from other parts of Asia, if seafood has a repugnant odor strong spices are added; the freshest seafood is odorless and, in Cantonese culinary arts, is best cooked by steaming. For instance, in some recipes, only a small amount of soy sauce, ginger, and spring onion is added to steamed fish. According to Cantonese cuisine, the light seasoning is used only to bring out the natural sweetness of the seafood. As a rule of thumb, the spiciness of a dish is usually inversely proportionate to the freshness of the ingredients.

Noodles are served either in soup broth or fried. These are available as home-cooked meals, on *dim sum* side menus, or as street food at *dai pai dong*s, where they can be served with a variety of toppings such as fish balls, beef balls, or fish slices. Little pot



rice (simplified Chinese: 煲仔饭; traditional Chinese: 煲仔飯) are dishes cooked and served in a flat-bottomed pot (as opposed to a round-bottomed wok). Usually this is a saucepan or braising pan. Such dishes are cooked by covering and steaming, making the rice and ingredients very hot and soft. Usually the ingredients are layered on top of the rice with little or no mixing in between. Many standard combinations exist.

After the evening meal, most Cantonese restaurants offer *tong sui* (Chinese: 糖水; literally: "sugar water"), a sweet soup. Many varieties of *tong sui* are also found in other Chinese cuisines. Some desserts are traditional, while others are recent innovations. The more expensive restaurants usually offer their specialty desserts.

But since Southern China –essentially the Cantonese Cuisine cradle- has a long, respected tradition of healthy cooking, it also has a wealth of medicinal foods and recipes. Many are common to other parts, provinces, cuisines or traditions of China, but a number are specific, widely prescribed and used, and the population has faith in them. Cantonese cooks have classified the most important ones.



## Cantonese Medicinal Cooking Techniques

Rough translation	Related symptoms/ effects	Examples	Cures
Dry fire (yang)	Causes dryness of skin, chapped lips, nose bleed etc	Chili pepper, deep fried food, beef jerky, lychee	Any yin or cooling food
Wet heat (yang)	Causes mouth core, urinary burning etc. probably due to acidity or alkalinity	Mango, pineapple, cherry	Chrysanthemum, sugar cane,(竹蔗) , imperata arundinacea (茅根) ,Prunella vulgaris L. (夏枯草)
Cold cooling (yin)	Causes dizziness, weakness, pale or green face (low oxygen level in blood) etc	Watermelon, cantelope, honeydew and certain kinds of melon-type fruits or vegetables, green tea.	Any boosting or dry fire food
Blocking	Cause indigestion, stomach gas etc.	All fibrous food, e.g. yam, chestnuts	Haw (fruit 山楂), malt (麥芽)
Poisoning	Causes pus or swelling in wound, outbreak of acnes, hemorrhoid etc.	Duck, goose, bamboo shoot, all shellfish	Abstinence at outbreak
Greasy	Causes gastric upset, runny stool, outbreak of acnes	All greasy food, e.g. bacon etc	Not needed if not overused
Clear cooling	Mild yin type that counteract the dry fire type. Also listed as yin when overused	Beer, lettuce, sugar cane,(竹蔗) , imperata arundinacea (茅根) , American ginseng	Not needed
Nourishing	Moisturizing, soothing	Apple, pear, fig, winter melon, longan, Dioscorea opposite (淮山), lotus seed, lili bulb, etc	Not needed if not overused
Boosting	Replenishes blood and Qi. Also listed as dry fire when overused	Mutton, snake, wild games, beef, red dates (紅棗)	Not needed
Vigorating	Circulating blood and Qi	Red wine, Korean ginseng	Not needed
Generating, strengthening	Improves various internal functions	Various	

This superficial survey of some aspects of Chinese cuisines (and culture) should make you hungry for more food –including for thought!



## Part 3: Are We Still Eating What We Like?



In 2012 the scientific journal *Flavour* published an Op-Ed of mine: “*We only eat what we like*” or do we still?

Here are some paragraphs that are today just as relevant:

*What do we like in food? The list is long and open ended. We obviously follow our senses: sight, smell, taste, texture, diverse sounds. We get messages from our genes, groomed for millennia. We do cherish memories and they rush back fast, very fast. We position food in its current environment, at times pleasantissime, at other times intolerable, but always in context.*

*We eat stuff because we were told, or attracted/lured, brainwashed, coerced, by imitation or begging for inclusion, or even by challenge or curiosity. We also eat because it's time and we are hungry, because we need food if we drink, because of salt, or chili peppers, or gluttony, or... Sometimes we are satisfied, or full, or happy, or frustrated.*

*There's little rationality, no real rules, no foolproof recipe. It is you, now, then, there, in a given environment; and it will never be the same twice.*

Food is needed to live and survive. Some of our genes have been honed to perform in a hostile environment, the one that was the lot of the >90% until the twentieth century.

## COOKING



Sugar was industrialized in the 1500s; fat was synonymous of feast until the 1900s; food was seasonal, and preserving it was difficult, random, expensive. In Warsaw, Poland (where I was born), ice from the Wisła (Vistula) was sliced in March, kept in caves and distributed over the summer and fall until the 1960s.

Now, with concentration of production and mass distribution, any failure in the chain results in decimating food poisoning. The world has changed: Taylorism and industrial production, assisted by expert sociologists, marketers, psychologists, physiologists, nutritionists and other food scientists have managed to globalize food before any other human activity. When we know that the advertising budget of Coca-Cola (\$4.3 Billion) is bigger than the GNP (gross national product (GNP)) of >100 countries of the United Nations, I feel humbled writing this prose.

What does the industry sell, why and how? It sells sweet and fat; it sells it at the lowest cost (= mass produced) and maximal profit; it sells it everywhere with minimal differences; it sells it by bribing policy makers, and buying the whole chain of distribution; it sells it with help some of the smartest scientists that consult or work there for transient illusion of glory and fortune; it sells it like the tobacco industry sells by targeting children and women And it works: Nestlé is listed No. 1 in the Fortune Global 500 as the world's most profitable corporation with a market capitalization of \$ 271.5 billion. It has added Jenny Craig to its empire, the Jenny Craig that sells meals *plus 2 snacks* including an *Anytime Bar* that packs 110 empty calories in the daily ration of the US customer. The bucket of Kentucky Fried Chicken will deliver ~3,000 kilocalories, mostly fats and carbohydrates, and I know many who eat that by themselves!

I wrote that "*the only natural thing in a Diet Coke is the water*" -if you accept that tap water (for example Dasani) is strictly natural; the revenue of the Coca Cola Company was US\$43.6 billion in 2015.

If we all benefit everywhere from the diverse, successive revolutions in water safety, agriculture already capable of feeding 9 billion earthlings; in health and life expectancy; in taming soon the Four Horsemen of the Apocalypse (Conquest, War, Famine and Death) -assuming that we can control human nefarious instincts- we have also built an invasive system of financial-industrial complexes that are creating major, growing, destructions of people, nature, climate and widening the intolerable gap between the <1% haves and the >99% have less or close to nothing.

## COOKING



In food –as in tobacco and pharmaceuticals- almost every daily aspect of our production, transport, information (a.k.a. entertainment), policies, safety, distribution, transformation, is controlled by just a few mammoth industrial/commercial conglomerates whose executives share and exchange seats on their respective Board of Directors, or in governments, parliaments, international organizations, by playing a permanent game of musical chairs. The game is rigged, always in their favor.

The Golden Calf (Greed) is the only idol worshipped. Just look below at this list of companies: they already populate the shelves of every supermarket or convenience store of the planet –included the bases in Antarctica or the piles of garbage of the Everest or the Texas-sized patch in the vortex of the Pacific Ocean.



All these groups, with Adecoagro, Adler Seeds, Agria, AgriSA, Agrium, Alico, Archer Daniels Midland, BASF, Monsanto and their kin or allies are open about their plans: they publish each year a Report detailing goals and strategy.

## COOKING



This is the danger of Globalization: uniformity (just like the chow for lab rats); mass production with maximum profits, lowest salaries and costs; irreversible destruction of local resources, environment and cultures; amplification of climate changes and catastrophes; social, familial, personal misery, unrest, with violence and crime; and each and every corner of our Blue Planet is targeted, soon affected.

Responsiveness to sugars and sweetness has very ancient evolutionary beginnings. Newborn human infants also demonstrate preferences for high sugar concentrations and prefer solutions that are sweeter than lactose, found in breast milk; it also controls pain in preemies and newborns.

Sweetness appears to have the highest taste recognition threshold, being detectable at ~1 part in 200 of sucrose in solution. Sweetness intensity indicates energy density. The 'sweet tooth' thus has an ancient evolutionary heritage, and while food processing has changed consumption patterns, human physiology remains largely unchanged.

Then, recently two discoveries changed our food supply: a by-product of corn/maize, the high-fructose corn syrup (HFCS), and the artificial sweeteners. The HFCS is composed of a mixture of 42 to 55% fructose, 41 to 45% glucose and 0 to 5% glucose polymers depending on the specific blend. In the 1980s it mostly replaced sucrose as the main sweetener of soft drinks.

Rates of obesity subsequently rose, paralleling an increase in the consumption of soft drinks in general. In addition, laboratory research suggests a link between consuming large amounts of fructose and various health problems e.g. high blood pressure, elevated blood triglycerides, size and type of low-density lipoproteins, and uric acid levels. Worse, HFCS is addictive.

The most elaborate theory of sweetness to date is the *multipoint attachment theory* proposed by Jean-Marie Tinti and Claude Nofre in 1991. This theory involves a total of eight interaction sites between a sweetener and the sweetness receptor, although not all sweeteners interact with all eight sites. This model has successfully helped to develop highly potent sweeteners, including the guanidine family with lugduname, about 225,000 times sweeter than sucrose. But plasma beta-endorphin concentrations were more elevated after an aspartame drink than after the sucrose drink or fasting, and insulin increased after drinking as much with aspartame as with sucrose, meaning that possible addiction and obesity were right there with the



sweetener!

The problem is that the palatability and enjoyment of foods are often tied to their energy density, and therefore fat content. Energy-dense foods that are rich in fat are more palatable than are many low-energy density vegetables and fruits. High-fat foods, many containing sugar or salt, have an undeniable sensory appeal and are difficult to resist.

There are many explanations for why humans like fat. Several physiological mechanisms have been proposed, many of which are based on the strong links found between fat content, palatability, satiety, and energy density. The orosensory properties of fat or fat

“taste” are perceived through specific receptors and a combination of taste, texture, and olfaction. My friend Marian Apfelbaum, MD, a great nutritionist, starts his lectures on fat (and diet) by whispering into the microphone: “*Fat tastes goood; fat is goood*”.

Indeed fat tastes and makes food taste very good. Fat is also a concentrated source of energy with rewarding post-ingestive effects. The learning of food preferences may be based on associating sensory attributes with the physiologic consequences of ingestion, such as satiety and wellbeing.

That is why the combination of sweetness and fat in fast or junk food is difficult to resist, and is eventually “as addictive as heroin.” Getting a shot of opioids and dopamine to the brain while on the go, snacking on a dark penis-shaped bar full of industrial fats, and guzzling a supersized HFCS-laden drink is the city dweller’s fate in many, and more countries.

Then they get glued to the television that brainwashes with seductive ads promoting these products and that lifestyle. These “foods” and beverages are very smartly designed and created to appeal to our *nucleus accumbens*, and hedonic hunger.

Meals were and are shared; they are communion, conviviality, commensality (Claude Fischler’s great neologism). We eat, not nutrients and calories, but foods, dishes, meals and we do so in specific places, at specific times and with specific people with whom we have interactions and relationships. Eating is not just individual behavior; it also consists of social practices and rituals. In most if not all societies on the planet, eating is done in a social context.

## COOKING



Individualization and, as it were, privatization of eating in plethoric societies may carry more liabilities than benefits while there may be long unsuspected benefits associated with the sharing of food in the common meal. Meals are the heart and the hearth of all human groups, from the original soup -bread soaked in broth- to the 3-day wedding feasts of Bosnia or India. Eating, sharing together is the quintessential basic human activity – with sex. It has been transmogrified a few decades ago in “feeding” individuals with processed chemicals and flavors, blessed by some nutritionists whose horizon is the lab bench and the rodent cage: >85% of scientific studies in nutrition are conducted on pure strain rats or mice, and then applied (with catastrophic, repeated results) to humans. If all living organisms share common genes, we have little in common with these experimental animals, their environment, diet, or gut microbiota!



In none of the 143 countries (and counting) where I have worked is the degradation of the human bonding worse than in the United States; bromides and the omnipresent empty message of “family values” are what politicians and policy makers utter, in a country where one in four children eats alone (watching commercials on junk food); where food stamps do not deliver the healthy foods poor families so badly need, but too often some amongst the worst processed ones; where our daughter Emilie was the only student in her 4th grade class to draw a real chicken (beak, feathers and all) while the others sketched a frozen, packaged miserable bird; where most young adults will never know as fish anything but Mrs Paul’s fish fillets; where you better not drop a “vine” calibrated tomato on your toe (it will hurt!); where standard sliced sandwich bread has the texture and blandness of a Kleenex tissue; and where people get lonesome, angry, hopeless, joyless, because they are deprived of sharing the crusty fragrant bread -the meal that we all need.



My rant could stop here, but it would barely graze the surface of very complex interactions, many of them have come to light recently, for example the micro-biome. I cannot think of any mass-promoted diet that could possibly be beneficial to simply overweight people. These are either chastising – and rapidly abandoned-, or unaffordable, impractical.

It is not because these diets are all bad; some of them are in fact pretty good, but they address a moment in time, just a given moment in the life of human, social individual, with a complex mixture of pasts, presents and visions of the future. They are not tailored, and revised, adjusted, modified, according to a myriad of interferences.

How could they?

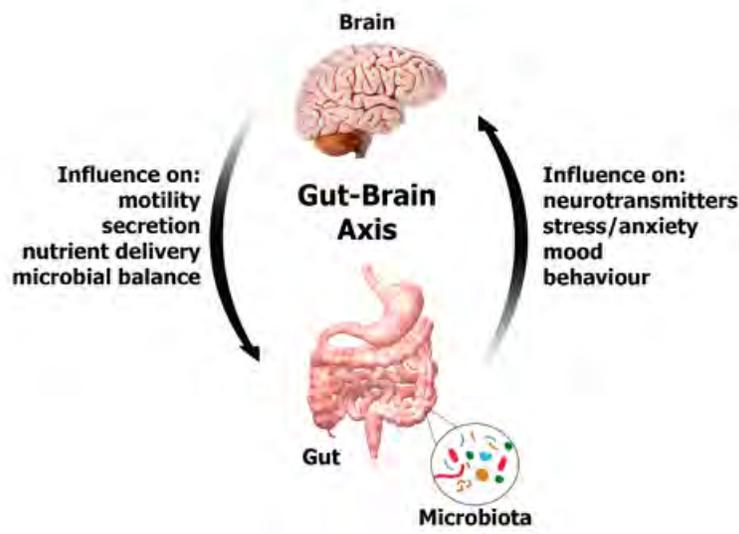
And they ignore our unique human feature: pleasure. Pleasure is not an “ extra”, or bonus bringing a little more soul to certain of our acts; it is a fundamental part of our animal life. It is just as difficult to define as spirit, but nonetheless humans need it . Otherwise they dive into the abyss of impasse, nothingness or suicidal depression. As Jean-Anthelme Brillat-Savarin wrote: *The pleasures of the table are for every man, of every land, and no matter of what place in history or society; they can be a part of all other pleasures and they last the longest, to console us when we have outlived the rest.*

Our own, personal Gut-Brain axis conditions our daily life. It is adaptable, flexible, adjusts to mood, food, circadian rhythms, climate, environment and each one of us needs it in perfect shape. It exemplifies our unique, transient, hourly reincarnations –even with aging, decrepitude and ultimately death.

In an article published on 19 April 2016 the Australian authors describe a gut microbiota–inflammasome–brain axis, whereby the gut microbiota via inflammasome-signaling modulate pathways that will alter brain function, and affect depressive- and anxiety-like behaviors.

Since our mood does condition and is modulated by our gut microbiota –hence the food we search and enjoy- how can we ever be happy with universal, industrial, standardized –and ever more often unsafe- feeding concoctions?

# COOKING



If indeed we should only or mostly eat what we like, we must consider what we can afford; what matches our inherited and newly mutated genes, and the ones of our microbiota; what is in our culture and in the ones we explore or adopt; what makes the Pantheon of our pleasurable memories (mostly before the age of six!); what we bring to the kitchen or the table, discuss, forage for, and are proud, elated to share and partake. What made, makes and will make us Humans.

Bon Appétit!

Portola Valley, May 2016



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