

# Biosociocultural Aspects of Nutrition<sup>1</sup>

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## IN SEARCH FOR THE *CONDITIO HUMANA*

Cultural and social anthropology, also called ethnology—from Greek *ethnos* for “tribe”—are among the disciplines that try to understand mental, psychological and spiritual concepts, life, customs, rules and behaviour in other—often more or less traditional, but also urban-industrialised—ethnic groups. Culture—from Latin *cultura*, “the working of the soil, doing agriculture; the process of refinement”—comprises the sum of rules, customs, typical behaviours in a given society or population and passed on from one generation to the other.

Humans are,<sup>2</sup> as other living beings, the product of the evolution of different life forms on earth. Thereby, many of our features can be explained on the grounds of evolutionary biology and biopsychology—also termed evolutionary psychology and psychobiology—and can be understood as adaptations to living conditions prevailing in the times when hominisation took place, *i.e.* approximately two million years before present in case of *Homo erectus* who was quite similar to us and, longer ago, *H. habilis* and other, earlier ancestors. On the other hand, humans are the species whose members learn -internalise their physical and social environment—more than any other species. We are, thus, cultural by nature.

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1. Edited version of a text originally prepared for the curriculum of a M.A. course in “Community Nutrition”, Universitas Indonesia, Jakarta.
  2. *Homo sapiens* in taxonomic terms, also sometimes named, especially by philosophical anthropologists: *H. loquens* for the speaking being, *H. faber* for the ability to make tools and work with them, *H. symbolicus*, *H. religiosus* or *H. oeconomicus* for making rational choices aimed at maximising one’s benefit. There are more such attributive terms.

Food –eating, nutrition, cuisine, diets, recipes...– lies, like sexuality, at the crossroad of nature and culture and is, therefore, a particularly interesting subject which needs to be researched in an interdisciplinary manner. Biological drives direct us to food and fluids of various kinds and reward us for good choices by special rewarding mechanisms in our physiology and psyche: we feel good after ingesting these substances. Culture interprets, defines, and intervenes in this process in manifold ways.

Some cultural anthropologists see cultures as basically unique units, very different from each other, the members of which can see the world only through a window defined by the rules and customs of the respective society, the so called Sapir-Whorf hypothesis. This narrow approach has been proved inadequate to explain the full power of human perceptions, emotions, thoughts and behaviours. Human ethology and evolutionary anthropology, as typical approaches within evolutionary biology, stress the biopsychic base all humans share and, thereby, the commonalities, “universals,” between all cultures.

Studies on biosociocultural aspects of nutrition are not confined to traditional cultures. Rural and urban populations of various socioeconomic levels will reveal important insights as well. Minorities, especially in towns, like homeless people, scavengers, alcoholics and addicts of other drugs, need particular attention and study.

The basic question in anthropology is “Who are we humans in essence?” Or in other words: what is the *conditio humana*, our human condition? The anthropology of food contributes to finding answers to this central question. Food shapes our being. “We are what we eat”: in German, “Man ist, was man isst” is a slightly exaggerated, but still insightful expression for this fact. Food is needed for energy to enable various forms of activity —work, interaction, play, thought, reproduction— and states: being happy, content, creative.

#### HUMAN EURYPHAGIA AND THE ROLE OF CULTURE

Humans are euryphagous, having a broad spectrum of food possibilities. Sometimes the terms omnivore or omnivorous –eating everything– are used to describe our species-typic way to select and utilise food. Some animals, like cats, are carnivorous –eat meat–, some, like cows, are herbivorous –eat plants.

If a species relies basically only on one food source, it is called monophag –like the Panda of China: 99 % of its diet consists of bamboo leaves; this species would be seriously endangered, should the various bamboo plants become scarce in its environment. The wide possible range of food in our human species is one of the reasons why we are (in a similar way as rats) so successful, living in all climates, almost all ecosystems and on all continents –and have scary growth rates in many societies leading to problematic overpopulation.

Basically, all beings are able to find good food. This ability is, depending on the species, governed by interplay between more or less biological –“instinctive”– drives, tendencies and preferences, and individual experiences as well as learning from others. Owing to our euryphag nature, plus our being a very social species, plus our being dependent on parents and others for a long time during our childhood, plus our very large and powerful brain, learning from others is particularly important for us. We humans typically pass on this kind of acquired knowledge to the next generation –thereby culture is created. By being fed and cared for, we internalise these behaviours, customs and rules. Culture becomes part of us. In a way, we ingest culture as we ingest food.

Despite genetically based neurobiological safeguards, food choices and eating patterns can go wrong. Either when there is not enough good food available (due to ecological, economic and/or political problems), which will cause various forms of malnutrition like protein deficiency –“kwashiorkor”–, iodine deficiency goiter –if not enough iodine is dissolved in drinking water, like in many mountain regions–, high infant mortality and other conditions which are some of the reasons why food aid and intervention programmes are carried out, or when the norms of a given culture prevent its members to make the best use of food sources in the environment. Some researchers say that in some areas of the world people die of hunger despite the fact that enough edible food is available in their environment. Making wrong choices with regard to food, is also typical for many developed, industrialised societies whose members increasingly suffer from overweight/obesity with all kinds of bad consequences for their health: skeletal, especially joint problems, hypertension, hypercholesterolaemia, arteriosclerosis, ischaemic heart disease/heart attack and stroke, to name just a few. Anorexia nervosa and bulimia are other –often also very serious– conditions in Western countries; interestingly, these conditions are usually absent in traditional societies.

The new discipline of “Palaeodiet” tries to understand, on scientific grounds, what early humans were eating, in which way this benefited their health and in which way some elements of modern diets are harmful for us.

Human food perceptions, evaluations and choices were primarily shaped in the long process of hominisation in the so called Environment of Evolutionary Adaptedness (EEA), a process which eventually led to *Homo sapiens*, approximately 150,000 years before present. Once this species, we humans, evolved, first in Africa, then spreading around the globe, it was forced to adapt to new climate conditions and new habitats. Its members became more and more intelligent in the use of the environment, particularly with regard to food. Meat and bone marrow, extracted by means of tools, may have been, as valuable proteins, decisive in bringing about the calory-wise costly large brain of humans.

The fact that *H. erectus*, the predecessor of *H. sapiens*, used fire to process food made it possible that the massive chewing-muscles (*Musculus masseter*), which were so typical for earlier hominid ancestors, could gradually be reduced. Cooked food is softer than uncooked food. Some scientists believe that it was this reduction of the mighty chewing muscle, strung out from the lower jaw to the temporal part of the skull, which freed the skull cap from considerable pressure and, thereby, gave it a chance to expand, which could not have happened as long as raw, hard food had to be chewed. The use of fire to process food had other advantages. It gave access to foods which were not edible before, either because they were too hard or because they contained toxins which could now be destroyed by heat. Important *H. erectus* world heritage sites are situated at Sangiran, near Solo in Central Java where du Bois (1891) and von Koenigswald (in the 1930s) found fossils which prove that at least one million years ago *H. erectus* lived in Indonesia.

#### HUMAN DIET IN EVOLUTIONARY PERSPECTIVE

The palaeolithic was the “old stone age” period before the domestication of plants and animals; the neolithic period, the “new stone age” began approximately 10,000 years before present, when humans started to cultivate food plants, e.g. cereals in Mesopotamia (today’s Iraq). One of the few centres

worldwide, where plants were domesticated to yield better and more plentiful food are the remote highlands of New Guinea and generally Melanesia. About 8,000 years ago, Papuan peoples started to grow taro (*Colocasia esculenta*, *Alocasia esculenta*) and most probably also banana (*Musa paradisiaca*) and two types of sugar cane (*Saccharum edule*, of which the inflorescence is eaten as vegetable, and *Saccharum officinarum*, the juicy sugar cane). The introduction of sweet potato, (*Ipomoea batatas*) from the Americas, where Amerindian peoples domesticated this valuable food plant, to Melanesia is yet unsolved with regard to time and mode –either pre-European through contacts of Polynesian seafarers with South American cultures or through Europeans who brought this plant from newly discovered America. Other plants domesticated in other areas of the world include the many plants which were domesticated by the Amerindian/native American peoples, like maize, tomatoes, beans, potato, sweet potato, tobacco and several others. Around the same time several animals were domesticated as food source (meat, milk) or for other reasons (skin, wool, transport).

This period of finding a new solution to subsistence, namely planting foods and keeping animals (also termed animal husbandry), is called the “neolithic revolution”. In most cases, it did *not* provide a better diet; on the contrary, people had been healthier and lived longer in many hunting-gathering-fishing societies before, where they had a very varied diet of animal and plant foods. This is clearly shown in the skeletons of hunter-gatherers, e.g. in southern Scandinavia; they consumed wild foods and were much healthier than their successors whose food was less diversified, thus lacking essential elements, and perhaps also because their digestive system was not yet perfectly adapted to the new kinds of foods (see below). But the large amount of energy-rich starch-containing food which could be grown by the new method and the possibility to monopolise large surpluses of storable food gave individuals, probably mostly males, high status and thereby changed considerably the social structure of human societies.

Interestingly, new archaeological research in Eastern Turkey has revealed that towns with sophisticated infrastructure and large religious buildings and monuments were built by a population of hunter-gatherers, *i.e.* before the neolithic “revolution”, which obviously was less revolutionary, also with regard to subsistence strategies, than hitherto thought. There seems to have

been a long overlapping period in which food was procured through hunting-gathering-fishing and, at the same time, through beginning agriculture.

Eventually, urban settlements in the “fertile crescent” between Mesopotamia, Western Turkey, Syria, the Levant and Egypt became more numerous, larger and still more sophisticated. Specialisation of labour became common; writing for administration and religious purposes was invented. And after a while, the new cereal-based diets became more diversified and thereby healthier. The next big change was the “industrial revolution” with the advent of large scale production of goods, also of foods with the help of machines and special technologies.

Newborn children in Western Europe today have an average life expectancy of over 80 for girls, and about 76 for boys, the figures for the Republic of Indonesia are 60 and 56. Typical average life expectancies (for new born children) during good periods of the human past were about 55 years, in bad periods about only about 30 years. Life expectancy for traditional groups like that of the Eipo, members of the Mek group of languages and cultures in the highlands of the Province of Papua (West-New Guinea), where there was (due to an altitude above 1,600 m) no malaria or other dangerous parasite-related diseases, was about 40-45 years until recently. After children had survived the critical first years of life, the chances to become old were much bigger; some few persons in traditional New Guinean societies were well over 80 years of age. Today, infant mortality, measured in the first year of life, is ranging between 25 percent, and more, in suburban slums with very bad hygienic conditions and insufficient availability of clean water and healthy food (e.g. Bangladesh and other countries) and below one percent in leading industrialised countries. In some New Guinea highland societies, infant mortality was around six percent, which is very low given the fact that medical help was absent. It shows that living conditions, including nutrition, in traditional societies were actually quite favourable.

Modern research has shown that populations differ in some important aspects of their ability to digest certain foods. Examples are wheat and other cereals, which have been domesticated (see above) only 10,000 to 8,000 years before present and to which some persons are not adapted—their ancestors did not have the new genetic mutation which enabled them to eat the new kind of food without any negative side effects. Foods made on cereal

basis, like bread, noodles, cakes, beer etc. cause gluten allergy or sprue in these persons, who then suffer from diarrhoea, exanthema of the skin etc. because the gluten (a special “sticky” protein) of these cereals harms their bodies. Due to the demands of bakeries and modern agriculture which responds by growing new types of wheat, the amount of gluten is increasing, thereby causing more problems for the persons who are sensitive to this food.

In a similar way a genetic mutation has made it possible for members of some populations, but not for the majority of all humans, to digest, without bad effects, fresh milk. Lactase is an enzyme which makes it possible to digest lactose, a sugar component of milk. This enzyme is normally decreasing (also in other mammals) after weaning, *i.e.* stopping receiving breast milk. Only persons (*e.g.* in European populations) who have a genetic mutation which causes lactase to persist after weaning, can drink fresh milk without problems. Persons without this novel mutation suffer from lactose intolerance. They rely on milk to be processed to yoghurt, cheese, butter etc. before consumption. In some African societies cows are kept not for milk but for regular bleeding which gives valuable protein; the blood is replaced by the animal’s body after some time.

In a population whose members had the genetic mutation producing persistent lactase, children and juveniles as well as adults had a better chance to survive because of the very valuable protein, fat, and mineral content of milk. Others who did not have this gene, died earlier (due to detrimental effects connected to lactose intolerance problems and also because they did not get as much of this high quality food as the others, by intuitively or consciously avoiding fresh milk), so that individuals who did not have the persistent lactase gene gradually were replaced by the ones who had it. Such population would then be one which could rely on cow (or sheep, goat etc.) milk in the daily diet. This relationship between genes and culture is a good example for co-evolution between genes and culture: One single mutated gene in the bodies of humans brings with it the capacity to digest a new food, namely milk, and this leads to an increase in the number of cattle and the technologies to raise and handle them; children and juveniles who can’t digest this new valuable food die or don’t thrive well, so that, in this kind of cattle culture, the genes for persistent lactase increase, more and more children are born who thrive well on milk. One single gene, *i.e.* a tiny biological unit, may thus decide which way a whole

culture is going, to be a milk drinking culture or a culture which relies on other sources of protein, like soya in Asia and South-East-Asia.

Alcoholdehydrogenase is an enzyme breaking down aldehyde, the second component in the process of digesting alcohol. It appeared, again through gene mutation, in some populations. Many people of the world (e.g. more than 50% of all Asian populations) lack this enzyme and get bad effects (flush, itching of the skin, headache, diarrhoea etc.) from alcohol. Most Europeans, on the other hand have this enzyme-gene. This explains why alcohol is an ancient part of European traditions, but limited to sacred and some other rituals in premodern Asian cultures. Today, Chinese and Japanese people consume more alcohol, especially beer and wine, than before. To a certain degree, the body can get used to tolerating alcohol. But for traditional Asian cultures, it can be said that also in this case one single gene can have far-reaching consequences for the culture of its bearers.

#### FOOD CLASSIFICATION

One part of anthropology is cognitive anthropology, also called ethnoscience. The aim here is trying to understand the world through the eyes and minds of the indigenous people. To do this, one should be able to communicate with the informants in the local language and to grasp the explanations, ideas and concepts typical for the respective culture. This is called *emic* approach (a term borrowed from the word *phonemics*). The second, and equally important task of the anthropologist, is to step out of this approach and analyse the data (which were collected, in the *emic* way, by observation and note-taking) on the basis of one of the various theoretical viewpoints developed in modern academic research; this is called *etic* approach (from *phonetics*).

Subfields of ethnoscience (the attempt to understand the scientific worldview of a given ethnic group) are

- ethnobotany
- ethnozoology
- ethnomedicine
- ethnopharmacology and others.
- One could put here also

- ethnonutrition as a field in which researchers try to understand the local theories about foods, digestion, the role of food in ceremonies, as ethnic markers, etc.

The theories underlying categorisation are an important subject of the mentioned disciplines and sometimes subsumed under the term ethno-classification.

Examples for the amazing knowledge in the field of ethnobotany can be found in the Eipo culture and many other traditional cultures. Plants are categorised in ways which are very similar to our own scientific Linnean system: primary criteria are the morphology of flowers, fruits and leaves. Relationships between some species were better known to local Eipo informants than to two botany professors from Germany.

Cultures have, this is demonstrated by these examples, found various, often quite similar ways to structure the innumerable things present in the visible world, especially plants and animals, e.g. by classificatory particles—the Trobriand language is very rich in them—or by assigning classificatory gender to beings and things like in many European languages, etc.

Often the classifications follow a simple dualistic structure, like “good-bad”, “white-black”, “female-male”, “high-low”, etc. One important way to structure conditions, especially with regard to food, is to classify them as “hot” or “cold”. This classification is found in very many cultures of the world and seems to be a typical, possibly universal way of humans to express inner qualities of foods and other things. Sometimes, as in the Chinese system, the gender-related “yin-yang” system overlaps with the “hot-cold” system. The Indonesian concept of “hot-cold” (*panas-dingin*), similar to that of other cultures, is not easy to understand for somebody coming from outside, but can intuitively be acknowledged by Indonesians themselves. Here are some examples (given by participants of the course) of this system:

Foods	
“hot”	“cold”
<i>durian</i> fruit goat meat ( <i>kambing</i> ) sheep meat ( <i>domba</i> ) Ginger fermented cassava ( <i>tape</i> ) chili ( <i>sambal oeleg</i> ) beans ( <i>pete</i> ) In the Philippines: dog meat	<i>cincao</i> gel chrysanthemum tea roots of <i>alang-alang</i> grass Cucumber type of cabbage ( <i>kangkung</i> ) worms ( <i>cacing</i> ) ...

Body Conditions	
Hypertension high cholesterol (new concept) ...	Hypotension Anaemia women post partum

Another classification system (see below) is that of *halal-haram*, defining, in the Islamic tradition, religiously proper and improper food—kosher and non-*kosher* in the Jewish tradition.

These ways to classify foods are very deeply rooted in the culture and not easily changed. For food aid programmes it is very important that these traditional concepts are known and taken into account. In doing so, it must also be borne in mind that such concepts governing food choices are difficult to overturn. Programmes directed at changing food habits have to deal, therefore, with this in an appropriate way.

#### FOOD AND TRADITION

As mentioned, New Guinea was one of the world’s first centres of agriculture where people found out that different types of sugar cane and banana could be selected to give better results in quantity, palatability and other aspects. In

the highlands, the swampy soil was drained and taro was planted around the same time period when cereals were domesticated in Mesopotamia. There was no connection between these two events in early agriculture.

Two cultures in Melanesia, that of the Papuan Eipo in the mountains of the Province of Papua (former Irian Jaya, West-New Guinea) and that of the Austronesian Trobriand Islanders of Papua New Guinea, and their similarities and differences with regard to nutritional anthropology (e.g. domesticated plants and animals, the role of gathering, hunting, fishing, collecting marine foods) are a good example of how, in traditional societies, life is basically similar, but also how different the environment and the subsistence techniques can be. The Eipo rely, as dietary staple, on sweet potato, *Ipomoea batatas* and taro, *Colocasia esculenta*; most of the protein in their rather vegetarian diet (out of necessity, not of desire) comes from leafy greens like *Rungia klossi* and *Abelmoschus manihot*). The staple diet of the Trobrianders is yams, *Dioscorea alata*, most of their protein stems from easily available fish, shells and other marine resources. Both groups domesticate pigs. But as these animals have to be fed to survive and grow, they are competitors for the food humans eat. The number of pigs is therefore limited, especially in the highlands of New Guinea. Per Eipo person there is no more than an average of one gram of pork per day. Pig meat is, as among the Trobrianders, reserved for feasts and special occasions.

Horticulture carried out with digging sticks, probably the earliest agricultural technique worldwide, is still carried out by Melanesians today. They grow food on garden land according to the method of shifting cultivation: periods of fallow allow recovery of the soil (often judged by the growth of certain trees which serve as bioindicators). To prepare the soil for planting the slash and burn technique is still widely used. This raises concern as the often large fires add to the increasing CO<sup>2</sup> level in our atmosphere. But it is of course difficult to make people change this ancient method.

Among the Eipo, who can be seen as modern models for the ancient past of human existence, sources of protein for human consumption are insects and their larvae, reptiles and birds. The bulk of these four protein sources are utilised by children and their mothers, who gather these small, but important foods during their daily walks to and from the gardens. The larger (but still quite small) wild marsupials which, like the domesticated pigs, are usually consumed only at important ceremonies and don't contribute much

to daily protein intake. Vegetable plants (leafy greens especially, see above) are the most common source of protein. Various ways of “cooking” are used –*i.e.* roasting, baking in hot ashes, steaming in large earth ovens–and hosting guests is an essential element in many festive and ritual events.

This importance of hosting with large amounts of special food (and, in their case, additional betel nuts) is also true for the Trobriand Islanders, whose mortuary ceremonies involve hosting large groups of people and, among others, the exchange, among the women, of large amounts of banana fibre skirts (*doba*) and the material of which these skirts are made of. The men exchange valuable goods in the *kula* expeditions to other islands. This latter, a highly ritualised system of exchange, served the primary purpose of connecting the inhabitants of these islands with each other and with the New Guinea mainland so that access to vital primary materials (stone for stone adzes, flint, pottery and others) was secured in a stable, reliable way.

High population pressure in Melanesia –since some years ago, one of the fastest growing regions worldwide– is due to some positive impact of a generally not very well functioning health system. Mothers are very concerned about the health of their infants and bring them to aid posts and clinics to be vaccinated and treated if necessary; this leads to the survival of some infants and children who would have otherwise died. An additional factor producing the enormous population growth lies in the fact that wives and husbands are giving up the traditional long periods of post partum coitus taboo. Many contemporary couples resume sexual intercourse much earlier than before, and this leads to much shorter inter birth intervals and thereby to a much larger number of children. A worsening nutritional situation, depletion of food resources (like overfishing, shortening fallow periods) and other problems affecting the availability of healthy food are already obvious and will be an even bigger threat in the future. Nutritional anthropologists are much needed to study and mitigate these problems.

## THE ETHICS OF ANTHROPOLOGICAL FIELDWORK

One important question in conducting anthropological fieldwork in general and also in nutritional anthropology is, whether it is ethically permissible to stay, as a foreigner, in a group of traditionally-living people, where one inevitably is an agent of change. In nutritional anthropology one common reason to carry out fieldwork is to facilitate educational or other programmes which are designed to improve nutrition and health. Change is thus not only a byproduct of fieldwork, but actually often intended. The most important criterion is whether the local people accept, on their free will, the presence of researchers. Usually, such groups are happy to host strangers because they bring new knowledge about life outside their often rather confined horizon and generally are interesting persons to have as guests. There is usually also substantial material benefit for the local people, who get some form of payment for providing food and services, or medical assistance. Also, most members of traditionally-living groups welcome and actively seek change –after all, the history of humankind has been a long chain of changes. A very important factor in the assessment of anthropological fieldwork by the indigenous people is whether the researchers are interested in documenting traditional customs and knowledge which the local people often see as endangered by acculturation. It is common for anthropologists to preserve –by taking notes, making photographs, tape recordings, etc.– essential aspects of traditional cultures, thereby contributing to keeping some form of pride and continuity, also, and particularly, with regard to food and food related customs.

Whereas most indigenous people do not have objections to host anthropologists in their midst, once the project has been properly explained to them and their informed consent has been given, some ethnic groups do not want any foreign visitors because they fear that their traditions will be contaminated by influence from outside. Such groups usually live in a pronouncedly “non-modern” way, rejecting electricity, modern forms of communication, travel and, particularly, strange food stuffs. One Indonesian example for this are the Baduy in Banten Province, who try to protect, since many centuries already, their culture in an “inner circle” where no outside influence is permitted; this nuclear zone is buffered against modern life by an “outer circle” where interactions and exchange are taking place. Groups with similar attitudes are also

found in other areas of the world: *i.e.* Andaman Islanders, religious groups like the Amish and the Hutterites in the U.S. –the latter very strict about the production of food in traditional ways, *e.g.* without machines.

## FOOD AND SYMBOLISM

Humans are prone to create, use and understand symbols (*Homo symbolicus*).

Food exchange on an individual basis and more formalised food exchange systems are very common in many societies and a symbol for the bond between people. One of these systems is the custom of harvest gifts or *urigubu* among the Trobriand Islanders (first described by the social anthropologist Bronislaw Malinowski), where the majority of yam, the main staple diet, is given to persons who are closely related to *ego* and who can give support and protection, like fathers and older brothers. These influential men own special yam storage houses, *liku*. The best gardeners, usually younger men and their families, give away the largest quantities of food and thereby also gain status and may rise in rank.

Food sharing takes place in the societies of the world:

- among individuals (mostly in families, *i.e.* kin-based food sharing)
- among groups of people (usually clan or other kin, but also within village communities and within larger units, like regions)

especially during ceremonies (mortuary rites and other feasts), when particularly valuable foods are presented to the guests

Sharing food and eating together is a symbol of:

- kinship
- trust
- friendship
- and, in some cultures, sexual intimacy

Among the Trobriand Islanders for instance, a young couple is considered married when they do not, after having spent the night together, separate in the early morning hours but sit on the veranda, side by side, and eat together.

Food, in particular certain recipes and dishes, are strong symbols of ethnic identity, of age and social classes, etc. In particular, certain foods are

quasi “loaded” with prestige and status and, therefore, are utilised in ceremonies and rituals which serve the purpose of bonding with the guests, but also to impress them to a certain degree. An example of this is the *potlatch* ceremony of Canadian West-Coast Indians who tried to belittle and shame the guests by throwing large amounts of valuable food plus other things of value (blankets, copper items) in front of the guests (“fighting with food”).

### FOOD AND MEDICINE

Health, especially in traditional societies, where modern treatment (*i.e.* by antibiotics) is or was still uncommon or limited, is influenced to a very large degree by the amount and severity of infestation/infection with parasites (parasite load). In modern industrialised societies the most common diseases are not infectious, but chronic-degenerative. Sufficient good quality food is another essential factor for health. It is interesting to note that many members of traditional societies are surprisingly healthy, without any vitamin pills, micronutrients and other additions to their daily food. What they normally eat comes fresh from the gardens, the forest and the sea or rivers and lakes, and is usually fulfilling all nutritional needs. Members of affluent, rich societies like ourselves, sometimes have problems understanding this fact.

In the textbooks of medicine, paediatrics, nutrition, tropical medicine, etc. standards are usually given—*i.e.* the “minimum requirement” for protein: one g per kg bodyweight—which are derived from Western countries and do not necessarily apply to other populations (“Eurocentrism”). Much discussed in recent years is whether “stunting” of children’s growth is dangerous because it might affect the normal functions of the brain or whether stunting is just an appropriate physiological answer of a child’s body to react to limited food supply. Figures from the Trobriand Islands (Papua New Guinea), show that children are indeed small for their age (measured against Western standards), but normal when weight for height is plotted. Those children are very vital and don’t seem to have defects with regard to their intelligence. This issue (should stunting be accepted or not) is one in the forefront of discussions of persons and institutions involved in food aid programmes, especially for children. If, through food aid, body weights and body heights of children are

raised, then one will have, some years later, bigger and heavier adults who require considerably more food than in the situation before, food which may just not be available for them.

Cultures are using classifications of food into specific categories, especially in the attempt to cure illness. So, if a condition from which a patient is suffering is considered to be caused by too much “hot” forces, the treatment should consist of administering “cold” substances to counterbalance the predominance of “hot” ones (see above). Balancing the various elements and factors and their influences on life is indeed a very wide spread concept believed to be essential in regaining health for body and mind. The ancient Greeks had a system of four fluids (blood, phlegm, black bile and white bile); the balance between them was considered the important way to ensure wellbeing. One tried to reach this balance by giving specific medicines and/or specific foods. This system is called humoral pathology, it involves particular cures to get rid of or otherwise counterweigh an excess of specific humoral fluids and has influenced other medical systems as well. In the Arab Unani medicine, which was the leading medical system in pre-Renaissance Europe and incorporated many elements of Greek medicine, similar concepts were formulated. In modern medicine, this concept of humoral pathology, which is more a mental, cognitive concept than a good description of human physiology, is not used any more.

Often, especially in traditional cultures, the basis of treatment is analogy: something in nature looks like something one would like to have, and this similarity is perceived as a possible way to achieve the wanted result. One example among many is the little “liver flower” (*Anemone hepatica*) in German folk medicine: its leaves look like the lobes of the liver (*hepar* in ancient Greek language) and the plant is, therefore, believed, since old times, to have properties which can cure liver diseases. This plant is not used in modern medicine, which, on the other hand, has incorporated many medicinal plants from many cultures. This principle, the belief that secret “signatures” are hidden in nature which humans just have to discover and be able to interpret correctly in order to find a suitable plant medicine or also healthy food, is wide spread in the world. It is also the basis for homoeopathy, the principle of which is: “similar things should be cured with similar things”, in Latin *similia similibus curentur*.

The “placebo effect” is a very important element of all medical treatment and explains why substances (e.g. plants used for medical purposes) are

effective even when they do not contain any substances which are pharmacologically active against the treated disease. On the other hand, in many cultures people have found pharmacologically active plants which have often also become part of modern “Western” medicine (curare for surgery, quinine for malaria, digitalis and other substances for heart disease, *Vinca rosea* and other plants for cancer etc.). All these examples show the deep knowledge of nature humans in preliterate societies have accumulated. This is also true for knowing and utilising healthy food sources.

### FOOD PREFERENCE AND TASTE

In the minds of people everywhere in the world a close connection exists between food and wellbeing or illness. We humans, as animals, have various ways to assess the qualities inherent in a particular food and possess a psychological-mental mechanism which is designed to protect us from bad food. Experiments were carried out with rats who were subjected to invisible X-ray exposure which made them feel sick. These animals avoided the particular food which they had eaten last before the onset of X-ray-induced nausea and vomiting. This experiment demonstrates that animals –and experience and introspection tell us, also humans– associate the feeling of being sick (nausea) first and foremost to what they believe, in retrospect, has been “bad” food. Much more rarely, even among people educated in modern medicine, someone will say: “I don’t feel well, because I have a virus infection”. To attribute a change in wellbeing to the intake of specific “bad” foods is a basically useful, albeit not always correct, way to interpret feeling sick on nutritional grounds and a sign of how, in the course of evolution, adaptations of this kind were made part of the biopsychological evaluation mechanisms in animals and humans.

A special small area in the brain (the *Area postrema*, the most important of a few places where there is no blood-brain-barrier, situated close to the centres where vomiting is released) is responsible for this kind of very fast aversive learning. The feeling of disgust is closely associated with this kind of aversion. It can be released easily, also without physical stimuli of a possible harmful nature, like faeces, rotten food etc., against which the disgust reaction has evolved as a protective biopsychological mechanism, prevent-

ing close contact with these substances. The psychological disgust reaction is widely used in cultures to identify “bad”, “disgusting” (nutritionally completely acceptable) food and other items versus “good” ones (see above *kosher*, *non-kosher*, *halal*, *haram*).

Organoleptic (smell, taste, touch, vision...) perceptions lead us to assess the quality of certain foods. The preference for sweet (glucose containing) food is one of the evolutionary elements in our food perception. It has led our ancestors to find wild honey, sweet berries and other such foods, *i.e.* carbohydrates, which are important because they deliver instant or almost-instant energy. In this way one can understand the preference of children for noodles and other forms of easily digestible carbohydrates.

In some cultures, special smell and food preferences were developed which are not readily shared by members of other cultures (durian, cheese, alcohol, hot spices...). These are good examples of how culture can influence perception.

#### CARE, CULTURE AND INFANT NUTRITION

In many cultures, but not typically in the Western world, there is a very high degree of body contact to infants: approximately 60 percent of the hours of the day there is body contact to the mother –figures from the Bushmen/Kalahari San and Melanesia– and there is free access for infants to the mother’s breast (feeding on demand), in contrast to fixed 4-hour feeding schedules which were advised, until recently, in parenting books in the West. In many traditional societies infants spend up to 15 percent of the hours of the day in mouth-contact to the mother’s breasts. This reflects the species-typic way of infant care.

The very high degree of mother-infant chronobiological synchronisation is demonstrated by results of an actimeter study which was carried out in a Trobriand village. It shows, in a very precise, scientific way, that infant and mother move their bodies at the same times and at the same rates in the nights. Such a very high degree of symbiosis between mother and infant is typical for traditional cultures, especially in the night when the mothers immediately react to the signs of their wakening infants, who are then immediately breastfed. The contrast to customs in the industrialised

countries, where infants are expected to sleep in their own bed in their own, acoustically insulated, room, is quite striking.

Western cultures restrict the answering of signals (cries and others) from infants because one fears (according to a behaviouristic model) that one will spoil the baby and will make it easy for him/her to learn to manipulate the parents and others (become a tyrant). Other cultures have the opposite belief: signals of babies should be answered immediately and competently –a principle which takes into account the actual biopsychic needs of infants. It has been shown that this latter model creates “basic trust” in infants and is therefore the better way to treat small children. Such children find it easier to become autonomous than children in whom the building of basic trust was impeded by not responding sufficiently to their signals.

The mother’s breasts are a source of:

- nutrition (babies can regulate how much water and how much nutrients they get by sucking either in short bouts or for long periods);
- psychological comfort (suckling without receiving milk, a very important part of the baby’s contact to the mother’s breasts).

Some anthropologists, sociologists, historians and others have claimed that “mother-love” is a purely cultural concept. Proof in their writings is usually the fact that mothers in some cultures (*i.e.* women in rich French families during a certain period of the past) gave their babies to wet-nurses, *i.e.* did not breastfeed them at all and obviously were not bonded to them much. But this is quite rare in a worldwide and historic perspective. One basis of mother-love is prepared by the powerful mechanism of oxytocin released during childbirth and thus has, besides the cultural base, also a non-cultural, *i.e.* biopsychological base. This is part of research was carried out in evolutionary biology/human ethology and similar disciplines.

An Indonesian proverb says: “Kasih ibu sepanjang jalan, kasih anak sepanjang galah” [The love of a mother is as long as the road, the love of the child is as long as a bamboo pole]. Other cultures have similar sayings. Here, we can see that cultures tend to build on biopsychological tendencies present in humans and transform these tendencies into cultural norms: nature and culture usually pull in the same direction.

In Indonesia it is quite common to give small amounts of complimentary food before the baby is six months old (the time until, according to new regulations by WHO, strictly no other food than breastmilk should be given). The question is whether this very strict WHO rule is perhaps too much interference with cultural traditions which may neither be harmful to the breast-feeding process nor to the wellbeing of the child. Further research is needed to get a better understanding of this.

#### CONCLUDING REMARK

It may have become apparent in this text that the anthropological study of nutrition is a fascinating subject. In a world with ever changing living conditions and often deteriorating food supplies it is also a very useful and necessary one.