

MEAT IN THE DIET OF MAN

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SUMMARY

Meat has traditionally held an important role in **man's** diet and culture. Our earliest truly modern human ancestors' life and religion **centred** around the search for large game which formed the basis - and often the major component of his diet.

The pressure of increasing population density coupled with the disappearance of many species of large game animals forced man to seek other alternatives for food. A more varied diet including many more plant foods developed and was assisted eventually by the advent of agriculture some 10,000 years ago.

No culture throughout man's history has ever been totally vegetarian, though diets containing up to **90%** meat are not uncommon.

In general anthropological evidence indicates that populations who had access to a variety of animal protein sources were healthier than those whose diet was restricted to plant foods alone.

The past 100 years - a mere moment in our evolutionary history - has seen an extremely dramatic change in the composition of the average western diet compared to those which our ancestors consumed for tens of thousands of years and which are still consumed by traditional hunter-gatherer populations today.

The high fat content of meat available to consumers today compared to traditional wild meats has contributed to the total increased fat content of the western diet.

This contribution is only small considering the range of pre-prepared and processed foods available today, many of which are high in fat and the fact that meat fat is visible and thus relatively easy to avoid. However, I believe meat producers have a responsibility to minimise the production of excess fat on animals and maximise production of nutrient dense, lean meat.

DISCUSSION

While humanity has existed as a genus for about 2 million years, the first truly modern human beings *Homo sapiens*, only appeared about **40,000** years ago.

Over this time the human genetic constitution has changed very **little**. Agriculture **and** modern food processing are far too recent to have had any evolutionary effect at all.

Thus, essentially the nutrition for which man is genetically programmed is little different to that of our preagricultural ancestors. **The** range of diets they consumed determines the range that still exists for we 20th century dwellers.

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Before the advent of agriculture some 10,000 years ago, **man's** quest for food **centred** mainly around meat - **this** was procured either by hunting or scavenging or a combination of both. *Homo sapiens* was omnivorous and supplemented his diet with whatever plant foods available - mainly nuts, berries or fruits. (Abrams, 1980)

The number of plant foods he could eat however was limited because many had to be cooked to be edible.

All contemporary hunter-gatherer societies (eg: aborigines) cook the majority of the wild plants they collect for food. The majority of modern staple plant foods - rice, corn, wheat, legumes and fiber crops like taro and potato - must be cooked to render them non-toxic and/or digestible.

Thus the discovery of fire and the mastery of the art of cooking - which only **occurred** about 50,000 years ago meant that a great variety of plant foods could be added to the diet. (Leopold & Audrey, 1972) (Interestingly, there is evidence of the use of fire by late *H. erectus* for some 50,000 years at least before it was actually widely used for **cooking**).

Eaton & Konner (1985) provide a timetable of the main events in human evolution which gives an overview of what is presently known about our ancestor's dietary habits. (**Table 1**)

While our hominid ancestors consumed some small animals along with insects and plant food, the development of stone and later more advanced tools paralleled a move towards a diet containing more meat.

Abrams (1980) suggests that it was our Paleolithic **ancestors'** reliance on meat as a major source of food which had the greatest impact on promoting the evolution of the human species.

Meat is a much more concentrated and efficiently utilised form of many nutrients than plant foods. A full day's foraging is likely to be necessary to obtain the amount of food value in one small animal.

However, humans are not carnivores - Humans are unique in their ability to utilise a huge variety of foods. Humans have the cutting incisors of a rodent, the grinding molars and premolars of a herbivore and the pointed canines of a carnivore.

Peter Farb and George Armelagos (1980) suggest that man's omnivorousness has allowed him to be able to supply his nutrient needs despite calamities such as pests, floods, fire and famine. It also allows man to thrive in a huge variety of environments and to travel widely without risk of starvation.

However, man is successful as an omnivore largely because of his higher intelligence allowing him to distinguish between and remember "good" and "**bad**" foods.

Abrams (1979) points out that no culture in the history of mankind has been based on a totally vegetarian diet. Conversely however, diets based almost totally on meat and animal products are quite common - even in recent times as in the case of Eskimos.

TABLE 1 The main events in human evolution and probable dietary patterns *

Years ago	Epoch	Development	Probable diet & associated information
100		Modern Western Diet	Dietary fat increasing and fibre decreasing
200		Industrial Revolution	Animal protein content of diets increasing. Average height increases again.
	Holocene		Average height decreased.
10,000		Agricultural Revolution	Increased plant food production and consumption. Meat intake reduced.
	Latest Pleistocene		Shift towards broader spectrum subsistence activities - hunting and gathering. Appearance of first plant processing tools. Large game herds depleted
45,000			First evidence of fish consumption (likely to be only minimal).
	Late Pleistocene		
80,000		<i>Homo sapiens neanderthalis</i> (Neanderthal man) appears	Hunting techniques and skills improving. Meat consumption increasing.
	Middle Pleistocene		
400,000		Archaic <i>Homo sapiens</i> appears	
1.6 mil	Early Pleistocene	<i>Homo erectus</i> present	Early stone tools manufactured. Larger amount of meat - hunting and scavenging.
2 mil		<i>Homo habilis</i> present	Diet up to 50% plant food.
	Pliocene		
4.5 mil		<i>Australopithecine</i> divergence	Plants, insects and small animals plus scavenged larger game.
	Late Miocene		
7.5 mil		Hominid - Pongid divergence (inferred)	
	Middle Miocene	African & Asian hominoids diverge	Mainly fruits, though dentition suggests omnivorous capability.

* Modified from Eaton & Konner (1985)

Man's reliance on meat as a food is evidenced by fossil remains from as far back as 3 million years ago of butchered animals and tools used to secure and process animal foods. The first evidence of the development of tools designed for processing plant foods comes much later - around **20-30,000** years ago.

For *Homo erectus* and the early *Homo sapiens*, daily life revolved around his hunt for large game (Abrams, 1980).

However, plant foods still probably made up more than 50% of the diet (Isaac & Crader, 1981) at this stage.

When Cro-Magnon man and other truly modern humans appeared big game hunting increased (Eaton & Konner, 1985). At this time (45,000 - 70,000 years ago) the human population was still small compared to the available prey and hunting technology was well advanced.

Cro-Magnon man's life, religion and magic all **centred** around the hunt for large game (**Eaton & Konner, 1980**). This is most obviously evidenced in his cave art which shows many of the types of animals eaten - including bison, bear, horse, woolly mammoth and deer.

The quest for game was also the force which compelled Cro-Magnon man to move to previously unpopulated and climatically less desirable parts of the world like Alaska and Siberia.

While Cro-Magnon man no doubt consumed a variety of plant foods, it is likely that in many areas meat provided 50% or more of the diet at this time. In areas like Alaska he had to rely almost entirely on meat.

However, **Cro-Magnon** and our other progenitors effectively hunted many species of large game to extinction (Martin, 1967) over the next 30 to 50 thousand years and gradually there was a move away from big-game hunting to gathering a wide variety of other foods. Although there is evidence of fish and shellfish being consumed around 80,000 years ago, it is at this time (immediately before the agricultural revolution - around **10-12,000** years ago) that fish and shellfish are thought to have been more commonly included in the diet. It was also this period which saw the development of early grinding type tools for plant foods (Eaton & Konner, 1985).

With the supply of game exceedingly **depleted humankind** faced its first real struggle for survival - a struggle which resulted in the advent of agriculture and the domestication of animals. Abrams (1980) contends that humans turned to agriculture only from necessity - it is pressure of population which has the greatest effect.

The amount of animal food consumed by any culture however, depends largely on availability. Apart from religious groups and other small sections within different cultures, most people will eat animal food when it is available.

Marvin Harris (1985) notes that most (predominantly) herbivorous modern cuisines are associated with dense populations whose habitat and food production technology cannot support the production of animals for meat without reducing the amount of protein and calories available for humans. In contrast most (predominantly) carnivorous cuisines are associated with relatively low population 'densities and lands generally unsuitable (or not needed) for cultivation.

Certainly historical evidence supports this relationship. However, vegetarianism does exist even within populations where meat is quite readily available. For example, Trappist monks abstain from meat because they consider it to be a luxury that is incompatible with their vows for a simple way of life (Abrams, 1980).

In fact, Abrams (1980) points out that the prohibition of eating meat or certain types/combinations of meat is not health related in any traditional religion or sect.

At our present fairly advanced state of knowledge of human nutrition, it is theoretically possible for one to obtain all the essential nutrients from a completely vegetarian diet by carefully balancing the intake and combination of plant foods. **However**, it is still difficult for most people to achieve as it does require a **fairly indepth** understanding of nutrition or some training in combining and selecting different plant foods.

There are some cultures who have effectively managed on extremely low intakes of animal protein, but in general - and often contrary to claims made by vegetarian advocates - historical evidence suggests that peoples who have had restricted access to animal foods were less healthy.

The shift from Cro-Magnon man's diet containing around **50%** (or more) meat to one containing up to 90% vegetable sources with the advent of agriculture had profound morphological consequences. Eaton & Konnor (1985) report that the early **European Homo sapiens sapiens** who enjoyed an abundance of animal protein 30,000 years ago, were an average six inches taller than their descendants who lived after farming.

In addition, **Nickens** (1976) notes the same pattern among Paleoindians in America. **They** were big game hunters 10,000 years ago but their descendants just before European contact practiced intensive farming, ate little meat and were considerably shorter in stature. There is also evidence that they had skeletal manifestations of suboptimal nutrition related to protein - energy malnutrition (Abrams, 1980).

New World cultures such as the Inca of South America and Aztecs of Mexico combine consumption of maize (corn) with beans to compensate for a lack of animal protein in the diet. However, they did not depend exclusively on this combination, utilising any animal protein they could as it became available. They consumed fish, guinea pig, duck, turkey, worms and some species of native dog among others.

In many cultures - including the Aztecs - religious human sacrifice was also common and some anthropologists believe that the victims were eaten to satisfy the desire for animal protein- (Harris, 1977).

It is interesting that in societies where a ruling class existed there was marked variation in health status between the classes. For example Abrams (1980) quotes anthropologist William **Haviland's** study of the Mayan **civilisation**: it seems the ruling class, who supplemented their diet with the few animals foods available, enjoyed better health than the rest of the population consuming mainly corn and beans. The ruling class were significantly taller (170 cm vs 157 cm) and lived longer than the masses.

In areas where the population density disallows extensive livestock production, some societies have domesticated animals in order to be provided with milk to increase the animal protein content of their diets.

In societies where lactose is not tolerated, fermented milk products are often used. However, milk and milk products are not regarded as appropriate food for a large proportion of the **world's** population for other reasons. One good example is China where milk drinking is widely regarded as we might look upon the drinking of blood.

In terms of the nutritional status of whole populations, the Industrial Revolution saw the beginning of a move back towards increasing the animal protein content of human diets. One reason why we are now nearly as tall as were the first biologically modern human beings may relate to the increased protein content of the diet. (Eaton & Konner, 1985).

However, our diets still differ markedly from theirs. In a short 100 or so years (an extremely short time in evolutionary terms indeed!) the fat content of the average Western diet has increased greatly while the fibre content has decreased. At the same time **labour-saving** devices and readily available transport modes have reduced exercise levels to minimal for most people.

The domestication of **meat-producing** animals (particularly cattle, sheep, pigs and chickens) and subsequent advances in production have contributed to the increased fat content of the Western diet.

I believe that their contribution is consistently **over-emphasised**, due mainly to the misuse of domestic **dissappearance** based data in assessing the contribution made by red meat to the fat content of the diet.

Only a very small amount of the fat originally present on an animal **carcase** is actually purchased or consumed as meat itself (Fantini & Macdonald, 1987). However, some of the fat originally present on the **carcase** which is discarded in preparation of retail cuts **re-enters** the food supply as edible tallow or industrial margarines used in processed food manufacture.

Thus, if the total fat content of beef and lamb **carcases** was reduced at the production end of the chain, the total amount of this source of saturated fat in the diet would also be reduced - something which I believe could only benefit us nutritionally.

The diseases of affluence which have emerged in the past 100 years are dominant health problems in Western countries but are still virtually unknown among the few surviving hunter-gatherer populations.

Modern day hunter-gatherer societies maintain similar lifestyles to our ancestors.

Kerin O'Dea and Andrew Sinclair (1983) in Melbourne have analysed a number of wild animals still used as food by traditional aboriginal communities in Australia (Table 2).

TABLE 2 fatcontent and **fatty** acid composition of meats *

Lean meat	Fat content %	Saturated	Monounsaturated	PUFA
Lamb	3.1	40	40	10
Beef (Kimberley)	2.5	33	38	18
Pig	1.4	33	34	25
Chicken	0.9	40	24	36
Rabbit	2.0	39	24	38
Samba Deer	0.8	28	14	31
Kangaroo	1.1	28	19	38
Freshwater Turtle	0.6	28	14	44
Freshwater crocodile	0.8	30	13	54
Freshwater Bream	1.6	37	26	27
Buffalo	1.1	31	27	29

* Modified from O'Dea and Sinclair (1983)

Most wild meats will have similar composition. **O'Dea** and Sinclair (1983) note that traditional **hunter-gatherer** diets were never rich in saturated fat - even if mainly derived from animals since wild animals are low in fat with a high proportion of polyunsaturated fat.

A number of different animal species are quite readily available to even urban dwellers in Australia - these include rabbit, venison and even kangaroo meat.

CONCLUSION

Abrams concludes from his work (1979) that, based on evidence of the diets of the earliest humans: *Australopithecines*, *H. erectus* and Paleolithic *Homo sapiens* are omnivorous but that the emphasis of the diet should be on fresh meat or animal protein supplemented with plenty of fresh vegetables, fruits and whole grains along with ample exercise.

However, the emphasis in domestic animal production must be on the provision of quality lean meat to consumers. The inclusion of a wide variety of meats is also advantageous provided visible fat and skin is avoided and low fat cooking methods maintained.

Lean red meats remain our most readily available source of iron and zinc in easily utilisable forms and thus have an important place in our diets.

Visibly lean red meats - particularly beef have a fat content similar to chicken meat which is widely accepted by consumers to be low in fat.

The modern western diet should, I believe, include a moderate intake of lean meats along with as wide a variety of other foods as possible so that fruit, vegetables and bread and cereal foods form the basis of the diet.

The message to this meeting however is to continue work towards increasing the amount of lean meat available to consumers at the expense of excess fat production⁷

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