WINDOW INTO THE PALAEOLITHIC EUROPE 30,000 YEARS AGO: RESULTS OF THE MULTIDISCIPLINARY APPROACH

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Abstract

People of the Palaeolithic are often considered less intelligent and more aggressive than people in most human societies today.
However, the multidisciplinary approach (which takes into consideration archaeology, psychology, sociology, biology, genetics, etc.) leads to completely different conclusions.

The results of the approach applied to evolution of the human brain:
Human brain is unique among the species. Its development in our ancestors required large-scale cooperation. Such cooperation would be impossible without reduction of competitiveness and aggressiveness among individuals. The evolution of empathy, fairness, altruism and cooperation was closely interconnected, and enabled our ancestors to gain fully developed, effective brains. However, there are indications that the evolution of human intelligence had stopped or even reversed with an increasing number of people, which led to the re-emergence of increased competition and aggressiveness.

The results of the approach applied to the Pavlovian (Central European variation of the Gravettian) people, who were chosen as an example of a Palaeolithic society:
The people of the Pavlovian society 30,000 years ago were far more cooperative than competitive, peaceful than violent, egalitarian (including gender-egalitarian) than stratified. There are many reasons to suppose that they were also spiritual people, their spirituality being concentrated on feminine qualities. At the same time, sexual relationships were highly likely quite relaxed.

The Palaeolithic legacy is still alive in us. To understand this legacy and take it into the consideration in our lives can be very helpful for all of us.

Introduction

Our information on the people of prehistory is far from being complete. That is why the ideas about their lifestyles are often contradictory. The way to get a more realistic and truthful picture is to:

1. Use a truly multidisciplinary approach.
2. Select pieces of information which are in accord with each other, when put together.
3. Use consistently critical thinking.

General considerations – what to keep in mind

Nature of archaeological findings: Findings are generally very selective. When an artefact, human remains or an archaeological situation survived for many thousands of years and was discovered, a lot of favourable conditions had to be fulfilled. It is highly probable that the artefacts we have found are mostly those discarded, abandoned and/or lost by their makers. Normally, the objects had been used up to the point when they were worn out, broken, or otherwise spoilt. Many artefacts had been surely made from perishable materials and have not survived. It is thus reasonable to suppose that we are not acquainted with the most precious objects made by Palaeolithic people. The only exception is the parietal art that has survived untouched since the Palaeolithic.
Preserved and discovered human remains from that era are quite rare. Only a fraction of the then deceased people had been buried, only a fraction of the buried has been preserved and only a fraction of the preserved has been discovered and expertly documented. The described burials show considerable diversity. They contained infants (Einwögerer 2006:285), children, young and adult individuals of both sexes (some apparently pathological) buried in various positions (Svoboda 2003). The indications are that the dead were buried selectively, preferentially those who died prematurely (Brůžek and Velemínská 2008, 139) and/or were handicapped.

Description and comparison of different cultures and societies: Although useful, these comparisons must be made with a great deal of caution. For example, even if two societies live in strikingly similar physical environments and show similar technological adaptations to them, they may be extremely different in many aspects of their life, such as the Semai Senoi of Malaysia and the Waorani (also called Huaorani or Auca) of Ecuador (Robarchek 1992, 189). It follows that information that could be provided by genetics (genes are not fate, but their influence on human being is a reality) and factors like influences of diet, infectious diseases, recent and past histories, etc. should ideally be taken into consideration.

Evolution and development: We usually take it for granted that humans and their societies evolve from backwardness to sophistication. In fact, it can hardly be applied as a rule.
Several examples:
When the tsunami of December 26, 2004 devastated south and south-east Asia, more than 200,000 people perished. Surprisingly, the hunter-gatherers of the Andamans, Sentinel, and the other similar islands survived, because they had fled the coastal areas before the tsunami turned up (Stone 2007:138). They apparently were able to recognize the danger and cope with it, whereas the people of the developed nations were not.
Literature (Brown 1980:379) says that "The typical individual in a small-scale society can commonly name 400 to 800 plant species; a typical person in our own and similar societies may be able to name only 40 to 80".
The grammar of the Icelandic language which retained its archaic features is strikingly more complex than the grammar of the North Germanic languages which have been evolving much faster and substantially changed with time.
The ancient Greek science and philosophy were more advances than those of the Middle Age Europe.
Such examples point to often overlooked facts: Gain in one area may mean loss in another, and regress is possible.

Psychology of researches: As knowledge of the prehistoric peoples is always more or less fragmentary, some researchers tend to supply missing information in accordance with their own worldviews. Then we can often learn more about psychology of the author, than about people of the past. It seems that some authors are also influenced by a kind of vogue for some concepts. Another point is that certain personal characteristics important for achieving success during recorded history or today are often automatically considered as if they were important for fitness in the Palaeolithic.

The life of the modern humans of the Middle Upper Palaeolithic in Europe

Introductory remarks and specifications

The Middle Upper Palaeolithic era in Europe is dated in the region of 20,000 - 30,000 uncalibrated (radiocarbon) years before present, which is about 24,000 – 34,000 calendar years ago (CalPal online 2007). There exists a relatively complex archaeological record from this era (e.g. Roebroeks et al 2000, 1), allowing us to make certain (although still quite limited) insight into the ways of life of the then people. This period is connected with the Gravettian culture. The aim of this article is not to describe the nuances of the Middle Upper Palaeolithic in its different periods and places (for this, see for example Roebroeks et al. 2000, and Svoboda and Sedláčková 2004), but to portray some principal aspects of life of the Gravettian people. In order to be more exact, I chose a particular region and particular time with rich archaeological record as a central point, which will serve as a basis for the description. Since there are clear signs of long-range contacts among the Middle Upper Paleolithic Europeans, such a description can have more general validity. For the above-mentioned reasons (central position, abundance of archaeological findings), the central point of the following description will be the earlier Gravettian of Central Europe (sometimes called the Pavlovian) in its evolved form ("Evolved Pavlovian" - Svoboda 2006, 6), 25,000-27,000 uncalibrated (radiocarbon) years before present, i.e. approximately 30,000 – 32,000 calendar years ago (CalPal 2007).

Technology and subsistence overview

The archaeological findings show technological ingenuity of the Pavlovian (and Gravettian) people (Klíma 1985, Soffer 2000, 59, Svoboda et al. 2002, 175). Some of the technologies have been documented for the first time in human history. The important technologies include: fibre technology - weaving and net making (Soffer 2004, 407, Soffer and Adovasio 2007, 581), fired ceramics (ceramic figurines, not pottery) (Soffer and Adovasio 2007, 581), stone grinding and polishing, making of microliths (Soffer 2000, 59) and finely decorated objects (Farbstein and Svoboda 2007, 856), eyed needles (Hoffecker 2005, 186), protective footwear (Trinkaus 2005, 1515), grinding of plant foods (Mason et. al. 1994, 48), musical instruments such as bone flutes and pipes (Bortel 2005, 321). There was also a system of long-distance (typically 80-150 km), large-scale transport of quality flint and similar lithic materials. (Svoboda et al. 2000, 197, Oliva 2000, 219). These examples show that they were quite ingenious people.

There is a good evidence of significant cultural exchange and migration across Europe. Regional differences in appearance of the then Europeans were considerably lower in comparison with the present Europeans (Churchill et al. 2000, 31) and similarities of artefacts from different parts of Europe of the Middle Upper Palaeolithic are apparent (compare e.g. pictures in Abramova 1966, Jelínek 1977).

Taking into consideration this technological advancement together with a high potential of the territory for nourishment of people (Svoboda 2006, 13), we can expect their high nutritional status. It accords with the results of skeletal biology of the human remains from this period. It has been found that these people had high statures (Churchill et al. 2000, 31, Trinkaus 2006, 233), which means that they had a diet which both quantitatively and qualitatively satisfied their needs (Brůžek and Velemínská 2008, 139). When compared with contemporary Europeans, average heights of both men and women had been practically the same as those of men and women from Germany and Finland in surveys from 1987-1994 (Cavelaars et al. 2000, 407). At the same time, they were rather gracile. There is a conclusion that "…the Dolní Věstonice and Pavlov remains are less robust than those of preceding, late archaic humans, suggesting a significant

decrease in loads level in the upper limb. However, they are also less robust than later Upper Palaeolithic Europeans, as well as scattered recent human samples…suggesting that these Pavlovian people reaped the benefits of mechanically efficient Gravettian technology without the added burdens of the intensive hunting and gathering and then agriculture of some later human populations" (Trinkaus 2006, 327). The resources were quite diverse. Besides mammoth bones, abundant remains of small animals such as hares and foxes have been found. Reindeer was another commonly hunted animal (Svoboda et al. 2000, 197, Musil 2008, 15). As mentioned earlier, the findings from Dolní Věstonice show that it is probable that they also processed and ate plant food (Mason et al. 1994, 48). The evidence from Italian site of Bilancino (north-west of Florence), dated 25,410 (uncalibrated) years before present shows that it was in the scope of the then Europeans to process local reeds and grasses, most probably to make food from flour (Aranguen et al. 2007, 845).
Such nutrition allowed the Gravettian people to fully develop their properties they were predisposed to, not only physical, but also mental.

There is a widespread belief that lack of food, and even starvation was a common feature of the life of the hunting and gathering Palaeolithic people. There is even a hypothesis of the "thrifty genotype" based on assumption of feast-and-famine cycles. However, the above-mentioned facts show that this idea may be based on false assumptions. The hunters and gatherers of the past probably underwent episodic food scarcity (presumably due to natural disasters or extreme weather), but it would be a mistake to surmise that it was a typical feature of their lives. The test of the "thrifty genotype hypothesis" based on analysis of food shortages of contemporary foragers and agriculturalists showed no statistically significant differences between the two groups, leading to a suggestion that there should be "an evidence-based, population-specific approach to food security in the prehistoric/historic past" (Benyshek 2006, 120). If we take into consideration that the position of hunters and gatherers in the present world is very different from that of the Gravettian people, when the majority of the present hunter-gatherers is surviving in the harshest environments and is mostly under constant stress from "civilization", it is obvious that the situation of the Gravettian people was far more favourable. This would correspond to the information given in Table 6-1 in Cultural Anthropology (Ember and Ember 2006, 88). It shows that food shortages with foragers are infrequent, whereas they are frequent with intensive agriculturalists and pastoralists. It is also consistent with the results of the examination of human remains from Dolní Věstonice and Pavlov. Developmental defects of the dental enamel are the principal indicators of developmental systemic stress. It has been shown that "there are none on the numerous deciduous teeth…, and almost all of those present on the permanent teeth are very minor….Almost all of the developmental defects of the enamel appear to have occurred at the age of 4 to 5 years postnatal. A couple of them occurred slightly earlier…" (Trinkaus et. al. 2006, 419). A probable explanation for these defects is their connection with weaning, as it is known that there is a long period of breastfeeding in foragers, including prehistoric foragers (Clayton et al. 2006, 311). This explanation is open to verification using a method with carbon and nitrogen stable isotope ratios measurement (Fuller et al. 2006, 279).

As there are records of recurrent famines in European history (typically the Middle Ages) and food shortages are common in developing countries even in the contemporary world (see for example Grantham McGregor et al. 2007, 60), we consider frequent periods of starvation a "natural" state of mankind, which the developed countries got rid of only recently and, as many of us believe, for the first time of the existence of the humankind. However, this is a rather simplified picture of the past reality.

The basis for the assessment of the Pavlovian people: Mentality of human being - now and in the past

Empathy and altruism

One of the essential human features is the ability to empathize. Humans are able to recognize emotions of other people by two basic interrelated mechanisms. One mechanism is deduction. The other is mediated by a type of neurons in the brain called mirror neurons and is "firsthand, because the mirror mechanism elicits the same emotional state in the observer" (Rizzolatti et al. 2006, 30). For example, when seeing pain of another person, the neurons which are activated in the sufferer are also activated in the observer. They are activated automatically, without an explicit focus on empathy, so this reaction is not under voluntary control. The difference in brain activity between self-received pain and empathizing is that the former corresponds to unpleasantness and to location and intensity of the pain, whereas in the latter just to unpleasantness (Singer et al. 2004, 1157). Mirror neurons have been so far described in primates including humans (Rizzolatti et al. 2006, 30) and in some birds (e.g. Prather at al. 2008, 305). Analogical results have been obtained when people were exposed either to disgusting odours or watched video clips showing faces with a look of disgust. Both the situations activated the same sites in brains (Wicker et al. 2003, 655). In short, for a human being empathy means that your suffering is my suffering and, in a broader sense, that your problem is my problem, too.

From an evolutionary point of view, the ability to empathize enabled parents to understand the needs of their children better and thus increased their probability to survive and prosper. Besides, those with a good ability of empathy must have been much more valued partners than those with only a limited one or without it. Empathy naturally leads to altruism. Altruistic behaviour, i.e. helping others without any benefit or at the expense of oneself is one of the typical human behaviours. A form of altruism called "directed altruism", which is "helping or comforting behavior directed at an individual in need, pain, or distress" has been documented in some other species, as well, namely great apes, dolphins, whales, and elephants (de Waal 2008, 279). However, altruism of people goes further. They commonly help when feeling that they can benefit somebody, when can improve life of somebody, even if he/she is not in a stressful situation.

The tests with great apes (Silk et al. 2005, 1357, Jensen et al. 2006, 1013) showed that chimpanzees, on the other hand, were indifferent to the welfare of the other members of their group. They were neither altruistic nor spiteful; they were interested only in their own gains and losses. It seems that at least one of our two closest related relatives (the others are bonobos) are not motivated, unlike humans, by "other-regarding preferences".

Other-regarding preferences have been discovered recently in the first primate species (besides humans), common marmosets (Callithrix jacchus) (Burkart 2007, 19762), the small monkeys of Brazil. It was rather surprising, because the monkey is far more distant relative of humans than the great apes are and there is even no compelling evidence of the "directed altruism" in monkeys (unlike great apes) in general (de Waal 2008, 279). Nevertheless, both common marmosets and humans are cooperative breeders, i.e. offspring are cared for not only by their parents, but also other group members, called alloparents. For now, it seems as if the two forms of altruism existing in humans (directed altruism and other-regarding preferences) have different roots.

No matter what the exact roots of their empathy and altruism are, humans are unparalleled altruists. For example, it has been shown that spending money on other people has a more positive impact on happiness than spending money on oneself (Dunn et al. 2008, 1687). Human altruism is not a priori limited to selected individuals. The subject of human altruism can be any human being, and even animal. It follows that it is superfluous to give reasons for altruistic acts in each particular case (an individual, culture, society), because they are natural. What calls for explanation are cases when people do not act altruistically. Empathy and altruism naturally lead to egalitarianism. Humans are strongly influenced by their egalitarian preferences and social inequality arouses negative emotions in them (Dawes et al. 2007, 794).

Competition, cooperation and human brain

Besides empathy and altruism, typical human features are social competition and cooperation. These features are not exclusively human. Both of them could lead to the development of intelligence and brain. Intelligence which is driven by social competition, i.e. gaining advantage over the competitors by outwitting them is commonly called the Machiavellian intelligence. For intelligence which is driven by collaboration (teaching, communication, problem solving) there has been proposed the name of the Vygotskian intelligence (Moll and Tomasello 2007, 639), named after Lev Semyonovich Vygotsky, 1896-1934, a Russian psychologist, who emphasized that learning and overcoming challenges by cooperation were extremely important for proper human development.

It is possible to imagine a "Machiavellian-Vygotskian scale" where on one side is a hypothetical being with only Machiavellian intelligence (only competition, no cooperation) and on the opposite another hypothetical being with only Vygotskian intelligence (only cooperation, no competition) and place humans and other higher animals on it to assess the consequences of their positions.

Tests with chimpanzees have shown that they performed better in tasks when competing than when cooperating. The results were similar whether the competitor/co-operator was a person or another chimpanzee (Hare and Tomasello 2004, 571). An example: When, under cooperative conditions, the experimenter pointed with an outstretched arm and hand towards food hidden in a container, the chimpanzees performed poorly in finding the food (not significantly above chance level). On the contrary, when, under competitive conditions, the experimenter outstretched arm and (as if) tried unsuccessfully to reach the container with food, the chimpanzees managed to find food significantly above the chance level. When tested the same task with a conspecific, the average results under cooperative conditions were slightly better, but still worse than under competitive conditions.

In another set of tests with chimpanzees and bonobos, cooperation (namely simultaneous pulling a rope) of two individuals was necessary to obtain food. When the food was sharable, the chimpanzees and bonobos were equally successful, but when the food was highly monopolizable, the bonobos performed better. And when two chimpanzees managed to obtain the monopolizable food, one of the partners took 93-100 % of the reward, whereas the successful bonobos shared it in the range of 50 – 68 % (Hare et al. 2007, 619). Even if the tests with captured apes are more or less biased and experiments in the field are highly recommended (Boesch 2007, 227), the results of the experiments described above yielded useful pieces of information. What is important, these findings do not contradict the dispositions of these species observed in the wild and described e.g. in Boesch et al. 2002.

The reason why the chimpanzees failed was their competitiveness. Thus, competitiveness (and related matters such as ranking, aggressiveness, and fear) presents a serious constraint for cooperation and development of the Vygotskian intelligence. On the Machiavellian-Vygotskian intelligence scale, the Machiavellian intelligence would prevail in chimpanzees.

In this context, there is another piece of information from an experimental population of foxes. Since 1959, in a farm in Siberia, Russia, foxes have been bred based on a sole criterion of low levels of fear and aggression toward humans. These foxes, although "with almost no experience with humans are as skilled at using human communicative gestures (i.e., a point-and–gaze clue) as domestic dogs" and, naturally, are also more skilled in using human communicative gestures than the control foxes (Hare et al. 2005, 226), which again emphasizes the connection between low aggressiveness and the ability to cooperate.

Humans, although also competitive, have the ability to cooperate, unmatched by any other primate. In an experiment where the brains of the participating women were scanned using fMRI (functional magnetic resonance imaging) technique it has been found out that "mutual cooperation was associated with consistent activation in brain areas that have been linked with reward processing", which meant that cooperation was pleasant. (Rilling et al. 2002, 395).

For the development of such an ability of cooperate it was necessary that some time in the past, aggressiveness and competitiveness of early humans became low enough to lift these social constraints (Hare 2007, 60, Moll and Tomasello 2007, 639). It is reasonable to suppose that it had to become at least as low as it is in the bonobos now, or far more likely, lower. It is not difficult to imagine that the suppression of aggressiveness, competitiveness, hierarchy, etc., relieved our ancestors of the burden of constant rivalry, vigilance, and fear, and unblocked a huge potential – for multilateral and unrestrained relations with each

other, for large-scale cooperation delivering a lot of new stimuli, such as need of coordination and the ability to undertake otherwise impossible tasks, and also for detailed exploration of their natural environment. Cooperation means gain for all participants, competition means that there are winners and losers. This led to the unparalleled development of human brain and created modern Homo sapiens. On the Machiavellian-Vygotskian intelligence scale, a considerable shift towards the Vygotskian intelligence occurred, and it was dominantly the shift that enabled humans to leave the other primates in the dust. It must be noted that suppression of competitiveness was a necessary, but surely not sufficient condition that had to be fulfilled.
It is sometimes assumed that evolution of human intelligence was a result a dichotomy between cooperation within coalitions and competition among them. However, as it has been shown in experiments, if people have a choice either to cooperate within a group or compete with another group, they much prefer to cooperate within a group without harming the other (Halevy et al. 2008, 405).
It is in accordance with the fact that in apes, the bonobos, which are less competitive and aggressive than chimpanzees within a community, are also less aggressive during intercommunity encounters (Doran et al. 2002, 14, Hohman and Fruth 2002, 138).

Synthesis: Empathy, fairness, cooperation and altruism interconnected

All the features are interconnected. Empathy, which influences altruism, can be modulated by fairness and cooperation/competition attitudes (Decety and Lamm 2006, 1146) and, conversely, fairness and altruism influence cooperation.
The empathic response can be substantially reduced, when the sufferer is perceived (on the basis of previous knowledge) as an unfair person. This phenomenon is significantly more pronounced in men than women. This men/women difference may point to a role of males in maintaining justice by punishing unfair persons (Singer et al. 2006, 446).
Competition has detrimental effect on empathy and has exactly the opposite consequences than cooperation. Not only that empathy is reduced, but it may even lead to counter-empathic responses, when, for example, grimaces of competitors elicit positive reaction, whereas their smiles elicit distress (Lanzetta and Englis, 1989, 543). Competition triggers the dark side of empathy. Even competitiveness in the form of sport, especially contact sport, could contribute to interpersonal violence (Kreager 2007, 705).
Interestingly, compassion meditation has such a positive effect on empathic response that it can be observed in the brain using fMRI (Lutz et al. 2008, e1897).
Fairness is another important and valued human trait. Experiments showed that, when neural responses to fair and unfair offers were examined, “tolerating unfair treatment for material gain involves a pattern of activation resembling suppression of negative effects”, whereas “fair offers led to higher happiness ratings and activation in several reward regions of the brain” (Tabibnia 2008, 339). Sanctions, when fair, e.g. punishment of “free riders” (an altruistic punishment), enhance cooperation, whereas sanctions, which are imposed to enforce unfair distribution, have detrimental effect on cooperation (Fehr and Rockenbach 2003, 422).

To sum up, humans are empathetic and have a strong tendency towards cooperation, fairness, altruism, and egalitarianism. Competition is potentially dangerous, because it impairs empathy and makes people prone to violence. It was the peacefulness of ancient humans that enabled close cooperation and, as a consequence, led to the big and effective human brains.

Too many people?

Although the human brain is, in relation to the body, big and very effective, it has its limitations. One of the constraints is the limit of other people, with whom it is possible to maintain social contacts which are intensive enough to sustain identification of each single human being in a group. As soon as the number of people living together for a long period of time increases above a certain limit, the relationships, at least with

some individuals, are necessarily becoming weaker and weaker. It is no more possible to fully empathize with so many people, and it is also becoming physically impossible to behave altruistically towards everybody in need.
There are several studies on "the social network size in humans" that can give a clue to the number in question (which, of course, is not an exact constant). For example, the neocortex size assessment gave a number of 147.8 individuals (Dunbar 1993, 681). (This work also cited, among others, the case of Hutterite communities to support this finding). The Christmas card network yielded a very similar number, 153.3 (Hill and Dunbar 2003, 53). For a looser network (the number of people the respondents knew in certain subpopulations) the estimated numbers were 291.2 and 281.2 (McCarthy et al. 2001, 28).
Not to make an overestimation, the number of about 150 can be taken as the above-mentioned limit.

This limit may have been of crucial importance for the evolution of humans. Once the limit of some 150 people living together is exceeded for a considerably long time, the following scenario must be taken into consideration: As the identification of a member of the group with all the other members is now beyond the human capacity, weakening of their relationships sooner or later leads to a division into "we" and "they", the common basis of competition, inequality, and negligence of "the others". At the same time, it is also becoming more and more difficult to reveal free-riders (parasites) and punish them accordingly. The social network is decaying. As the competition is soaring, empathy is suppressed, and violence and warfare along with social stratification and inequality among the people follow. Some people are expected to subordinate to the others because of a "common goal", and such conditions are favourable to the collectivistic concepts, such as conformity and xenophobia. In short, this situation opens the door to the unfortunate image that could be seen in so many societies throughout human history.
What matters is the accumulation of people in one place, or in a small area for a considerably long time, not the type of economy of these people. Another point is that accumulation may occur either as a result of demographic expansion enabled by production of food surplus, when, at the same time, territorial expansion is impossible or severely hindered, or as a result of deteriorating environment, driving people to several locations with favourable living conditions.
The important outcome of this situation is that genetic dispositions towards antisocial, aggressive and selfish behaviour, existing e.g. because of the genetic drift and kept at bay by the ethos of the non-violent group, are now manifesting themselves and, even worse, their positive selection occurs, because these traits give a competitive advantage. Shifting from the Vygotskian to Machiavellian intelligence follows. When these conditions and gene selections are lasting long enough, these selected genes can then contribute to retaining of competition, violence, inequality, etc. in the "affected" group, even if the original cause, the accumulation of people in one place, has vanished. This may be, for example, the case of the native inhabitants of the Amazonian basin, as there are reasons to believe that there were densely populated areas in the prehistoric Amazonia (Hornborg 2005, 589). (It does not mean that they must inevitably be violent, etc. but that they are more prone to it.) On the other hand, when the accumulation of people lasted for a time, which was too short to enable the selection of the "antisocial" genes, the unfortunate situation described above could vanish, when the people were dispersed again, and the original collaborative, non-violent way of life could be re-established.
There is an interesting proof of spreading genes of warlords of Eurasia. It has been shown that about 2-3 million males today are descendants of a single Irish "powerful man" living some 1,700 years ago (Moore et al. 2006, 334), and perhaps 16 million men today are descendants of Genghis Khan, the Mongol Emperor (Zerjal et al., 2003). It is not unreasonable to suppose that warlords and people like them were not the exemplars of selflessness and altruism. The exact opposite is far more probable and this must have been reflected in genes they spread. When comparing the genes of the present Europeans with those of the deep past, this possible influence should be kept in mind.
Another interesting point is the human brain volume and intelligence. There is a strong genetic influence on both the brain volume and intelligence (e.g. Posthuma et al. 2002, 83, Thompson et al. 2002, 34, Miller and Penke 2007, 97, Peper et al. 2007, 464).
Besides warlords, those who had a competitive advantage, and were more successful in spreading their genes, were the rich people. (Shennan, 2002, 228). Because there is no relationship between intelligence and wealth (e.g. Zagorsky 2007, 489), there was generally no selection of genes increasing intelligence any more. New studies even show that in the present world, there is a negative correlation between IQ and

fertility (dysgenic fertility; on average, the less intelligence, the more children) and that the world's IQ is declining (Shatza 2008, 109, Lynn and Harvey 2008, 112).
When comparing the Paleolithic Europeans with the present ones, it is evident that the cranial capacity and, thus most probably also human brain has decreased in size since the Paleolithic (Henneberg 1988, 395, Ruff 2002, 211, compare e.g. data in Franciscus and Vlček 2006, 63 with data in Miller and Penke 2007, 97, see also conversation with John Hawks at www.archaeology.org/0803/etc/conversation.htm). Evidence suggests that the present Europeans have smaller brains than the Pavlovian/Gravettian people had, although the body dimensions of both groups are generally the same. The difference is not subtle, but typically well above ten per cent of the brain volume.
There is surely a need to be cautious about equalling human skull (brain) size and intelligence (Haier et al. 2004, 425, Jung and Haier 2007, 135) but, in general, there is a proven positive correlation between the brain size and intelligence (Witelson et al. 2006, 386, Miller and Penke 2007, 97). It has been proposed that certain genes, namely microcephalin (MCPH1), abnormal spindle-like microcephally associated gene (ASPM), CDK5RAP and BRCA1, which are supposed to be under selection in the recent millennia, made brains more effective, i.e. even if the brains are smaller, they are more efficient. Nevertheless, the data so far show that MCPH1 and ASPM are neither associated with the brain size (Woods 2006, doi:10.1093/hmg/ddl126), nor with increased intelligence (Mekel-Bobrov et al. 2007, 600) and neither of ASPM, MCPH1, CDK5RAP and BRCA1 is associated with IQ, working memory, or the head size (Bates et al. 2008, doi:10.1016/j.intell.2008.04.001). Another idea was that it was the increase of the cerebellum that enabled smaller brains to be more efficient, as there has been documented an increase of the cerebellum/neocortex ratio in the present humans in comparison with the Palaeolithic ones (Weaver 2005, 3576). Again, the data so far do not support this idea (Dunbar and Shultz 2006, doi:10.1098/rstb.2006.2001, Timmann and Daum 2007, 159, Frank et al. 2007, 242).
Although it may sound highly implausible, there is a possibility that mental abilities of Europeans 30,000 year ago were greater than they are now. It would accord with the assumption that the expansion of the human brain was enabled by a substantial reduction in competition and unprecedented cooperation. Once there emerged a shift towards more competition, the growth of intelligence has been inhibited or even reversed. The rise of knowledge and skills of the civilized world could be caused by summing achievements of thousands and millions of single brains, not by growth of intelligence of individuals.

The Pavlovian people in the light of the presented thoughts

Competitive or cooperative, violent or peaceful, stratified or egalitarian?

As mentioned above, the number of people living in one place is very important. Both the older and newer estimations regarding the number of people living in the large Pavlovian settlements gave similar results, namely up to 120 (Klíma 1983, 82) or 100 (Svoboda 2006, 13) individuals. None of the estimations exceeded 150 people living in a single place for a long time.
Under such conditions, the society was most probably cooperative, egalitarian, and peaceful. The burials from that period showed no unequivocal proof of a violent death, but there is evidence of caring for the disabled (Svoboda 2003, 55). Even J. Dale Guthrie, who appears to be deeply preoccupied with sex and violence (see Bahn, 2006, 575), points out the lack of depiction of war or group violence (Guthrie 2005, 182) and no depiction of shields (Guthrie 2005, 423) in the Palaeolithic art. There are proofs of violent deaths in the very late Palaeolithic and later (Svoboda 2003, 22). It is possible that by this time there had emerged conditions for local overpopulation, especially by the seas. Key archaeological sites are still undiscovered, lying under sea waters (Bailey and Milner 2002, 1).
According to some, a peaceful way of living is impossible for humans because of our genes (Pinker 2003), but the reality contradicts this view. Peaceful societies exist and are well documented: the Batek of Malaysia (Endicott, 1988, 110), the Paliyans of southern India (Gardner 2000, 215), the Piaroa of Venezuela (Overing 2003, 293) being examples. As for violence in society in general, there is not a question whether there was any violence at all, but what role it played. Whether it was considered as an excess, which sometimes

happened, but was socially unacceptable, or whether it was considered a standard way of achieving goals or even regarded virtue.
For the Pavlovian, it is possible to admit a kind of violent behaviour as a result of altruistic punishment, but ostracism seems a more probable possibility of punishing unfair behaviour. As personality of every individual in the group was distinguishable, it is reasonable to suppose that individualistic value system (as opposition to collectivistic values, such as sharp distinctions between in-groups and out-groups, xenophobia, conformity, etc.) prevailed. The collectivistic values are supported by high pathogen prevalence (Fincher et al. 2008, doi:10.11098/rspb.2008.0094). It is known that although the Palaeolithic was surely not free from human pathogens, there were less pathogens in the Palaeolithic than in the Neolithic and following civilizations (Diamond 2002, 700, Armelagos and Harper 2005, 109). The individualistic value system increases the effectiveness of altruistic punishment and decreases a probability of antisocial punishment (Gintis 2008, 1345, Herrmann et al. 2008, 1362). It also speaks in favour of generally non-violent relationships among different groups of the then people, which can also be expected from their peaceful nature.
Violence in society is often connected with social stratification, whereas egalitarian societies tend to be peaceful. The non-violent Batek are also an illustrative example of a profoundly egalitarian society (Endicott and Endicott 2007). The fact that such peaceful and egalitarian societies like that of the Batek still exist in spite of pressure from surrounding civilizations, may seem like a kind of miracle and there surely must be some special reasons for this persistence. Naturally, it is not to say that the Pavlovian people had the same lifestyle as the Batek, but just that the peaceful and egalitarian societies exist.
However, egalitarian does not automatically mean non-violent. The most typical example is probably the Huaorani (Waorani or Aucas) of Ecuador, whose men tend to be extremely violent. Surprisingly, the Huaorani do not consider homicide as an act of bravery, but as a result of an unfortunate drive which is beyond human control and they consider that the desired death for man is to die as a victim of spearing (Rival 2005, 285). The reasons may be sexual asymmetry existing in the society (Rival 2005, 285), past history (with gene selection), the fact that the Huaorani are highly inbred (Larrick et al. 1985, 445) and probably such factors as infectious diseases. The Yanomami of Venezuela and Brazil, also often mentioned as an egalitarian society, are reputed for their aggressiveness. However, their women have an inferior position (Soukup 2004, 499), so they are not in fact egalitarian and, besides this, their violent reputation may be also a result of an exaggeration (Sponsel 1998, 97). At least some reasons for their violent ways may be similar to those of the Waorani, as there are some considerable similarities between them, being the native people of Amazonia. The people of European Gravettian, on the other hand, were profoundly different (no proof of violent death, substantial gene flow (Churchill et al. 2000, 31), completely different past histories, etc.). However, there have been documented some cranial traumatic lesions, especially in the human remains of Dolní Věstonice and Pavlov (Trinkaus et. al 2006, 419). These remains of head injuries, which were mostly minor, are sometimes considered an indication of possible fights. However, these views do not go beyond a mere speculation, and there are many other possible explanations, such as accidents during hunt, children's play, or other common activities.

What the burials can tell us and what they cannot?

Graves are considered an important source of information about the past. Paleolithic graves in general show considerable variability (Svoboda 2003, 14). The prevailing funeral ritual in the Gravettian is not known. Inhumations were rare and surely not typical (Oliva 2007, 167). Body positions and places of the Pavlovian burials are diverse. Grave goods are few or missing (Svoboda 2002, 211). There were more grave goods documented in graves of later Gravettian (e.g. Brno 2 - the "Shaman of Brno", Czech Republic, Arene Candide, Italy, Sungir, Russia), (Svoboda 2003, 54, 34 and 51), but they may well reflect individual decisions, as there is no pattern, which would be analogous to, e.g. labrets and cranial deformations, distinguishing groups of buried people native of the Northwest Coast of North America (Ames 2003, 19, Fitzhugh 2003, 13).
There is a clear selection of buried people. As there is an unnaturally high proportion of young (Brůžek and Velemínská 2008, 139) and disabled individuals, it seems that unfortunate individuals, who had not lived a full, complete life were inhumed selectively.

As for the life span in the Palaeolithic, there is a commonly held belief that average life expectancies were some 30 years, and an individual older than 50 was a rarity (Jelínek 1977, 118). However, the recent thorough study on longevity among hunter-gatherers gives a completely different picture: "Post-reproductive longevity is a robust feature of human life and not only a recent phenomenon caused by improvements in sanitation, public health, and medical advances….The data show that modal adult life span is 68-78 years, and that it was not uncommon for individuals to reach these ages, suggesting that inferences based on paleodemographic reconstruction are unreliable" (Gurven and Kaplan 2007, 321). So it is not unreasonable to suppose that also the life span of the Pavlovian (and Gravettian) people was in this region and that the burial rituals of those reaching these normal ages did not include inhumation. Another study concerning human survival (Walker and Hamilton 2008, 115) shows that low population density means high body size and low juvenile mortality. The fact that the Pavlovian people had relatively large body sizes is in line with the inferred low population density (Svoboda 2006, 13) and suggests that juvenile mortality was relatively low in these people.

So called complex society in the Pavlovian?

Some time ago, there emerged a term of "complex hunter-gatherers". This term is not exactly defined (Sassaman 2004, 227), but generally means that the hunter-gatherers called as complex are characterized by institutionalized social stratification often connected with violence and warfare. Typical examples are the native people of the Northwest Coast of North America, the Chumash of California or the Calusa of Florida (a review by Sassaman 2004, 227).The complex hunter-gatherers have become so popular, that Kenneth E. Sassamann mentioned "those jumping on the complexity bandwagon…" in the comprehensive review. The term itself is rather unfortunate because it is confusing, and Ben Fitzhugh wrote in his excellent work about evolution of Kodiak Alutiiq society "…I worry about the messiness of concepts like complexity" (Fitzhugh 2003, 13).
The conditions which may lead to the emergence of the so-called complex society of hunter-gatherers are mentioned above, in the part "Too many people?" and described in detail in the case study of the Kodiak Alutiiq (Fitzhugh 2003, 13). In the Pavlovian, the conditions were very different from those favourable to the existence of the so-called complex society. It has been suggested that there may be an analogy between mass exploitation of migrating salmon in the Northwest of North America and migrating reindeer of the European Paleolithic. A recent research using a method which enabled to determine the season of the death of a hunted animal showed that in the Pavlovian settlements, the reindeer were hunted continually all year long (Nývltová-Fišáková 2007, 13), so at least the Pavlovian could not be the case.

Aggressiveness, altruism, selflessness, and clues from genetics

The influence of genes on human behaviour is surely higher than zero. They can influence e.g. fairness preferences (Wallace et al. 2007, 15631), aggressiveness (Popova 2006, 495), antisocial (Baker et al. 2007, 219) or altruistic behaviour (Bachner-Melman et al. 2005, 333, Knafo et al. 2007, doi:10.1111/j.1601-183X.2007.00341.x). We are still far from complete understanding of all mechanisms behind, and the spectrum of the genes known as influencing human behaviour is still limited. However, the data so far show that the assessment of human behaviour without taking genetic influences into consideration is incomplete.

Here are typical examples:
Monoamine oxidase A (MAOA). The MAOA enzyme catabolizes neurotransmitters such as serotonin (5-hydroxytryptamine, 5-HT,) and norepinephrine. There is a polymorphism, which consists of a 30-base pair repeat sequence present in 3, 3.5, 4 or 5 copies (Sabol et al. 1998, 273). The MAOA-uVNTR (upstream variable number of tandem repeats) alleles with 3.5 and 4 repeats cause high expression of the MAOA enzyme (MAOA-H), whereas the MAOA-uVNTR alleles with 2, 3 and 5 repeats cause low expression of MAOA (MAOA-L). This difference has an impact on aggressiveness and impulsivity. The carriers of the MAOA-H genotype tend to be less aggressive than those of the MAOA-L genotype. The impact of MAOA-L, the higher risk of aggressiveness affects far more men than women, and is connected with impulsive

aggressiveness (Meyer-Lindenberg 2008, 6269). Whether this predisposition is expressed or not depends, as expected, on the environment. For example, in a study of maltreated children, the individuals with MAOA-L genotype were significantly more probable to be convicted of violence than the individuals with MAOA-H genotype (Caspi et al. 2002, 851). It is thus probable that upbringing aimed at promoting violent behaviour in future warriors etc. may have a similar effect.

Catechol-O-methyl transferase (COMT). COMT is involved in degradation of catecholamine neurotransmitters (dopamine, epinephrine and norepinephrine). There is a single nucleotide polymorphism of the gene for COMT, guanine-adenine transition, which leads to substitution of valine for methionine. This results in lower activity of COMT. It has been found that the methionine variant is associated with better cognitive functions, whereas the valine variant could increase the probability of antisocial behaviour (De Mille et al., 2002, 521, Thapar et al., 2005, 1275).

Dopamine D4 receptor (DRD4). There is a polymorphism consisting of uVNTR of a 48-base pair sequence in the third exon of DRD4 gene, the most common alleles being the 4- and 7-repeat alleles (Chang et al. 1996, 91, DeYoung et al. 2006, 1410). It has been found that the 4-repeat allele (DRD4-4) is associated with selflessness and altruistic behaviour, whereas the DRD4-7 is associated with more aggressive and perhaps antisocial behaviour (Bachner-Melman 2005, 333). The DRD4-7 arose relatively recently, perhaps between 20,000-65,000 years ago and underwent strong positive selection (Wang et al. 2004, 931). It has been found that whereas normally the externalizing behaviour (aggressiveness, antisocial behaviour) is associated with lower IQ, this association was completely attenuated in people with DRD-7 (DeYoung et al. 2006, 1410). This fact may explain the reason for the recent positive selection.

Surely, it would be interesting to know which alleles of the MAOA, COMT and DRD4 and other important genes able to substantially influence human behaviour were present in the Pavlovian/Gravettian (and other prehistoric) people. So far, it has been only possible to make some estimation based on the present situation. It is reasonable to assume that the present Europeans (except for those from South-Eastern Mediterranean) are the closest living relatives of the Pavlovian people. Geographic distribution studies of the alleles, although fragmentary, so far say that MAOA-H prevails in Europe (or in people of European origin), whereas MAOA-L prevails in Asia, Pacific and Africa (Sabol et al. 1998, 273, Caspi et al. 2002, 851, Supplementary material), COMT valine variant ratio is the lowest in Europeans, whereas it is extremely high in the native people of South America (DeMille et al. 2002, 521). DRD4-7 ratio is very low in Asians, quite low throughout the world except for native Americans, especially South Americans (The highest ratio in the native North Americans has been found in the Maya.) (Chang et al., 1996, 91). If we take into consideration that the alleles associated with antisocial behaviour were most probably intensively spread during the periods after the Paleolithic (as discussed in part "Too many people?"), it is reasonable to suppose that genetic risk of antisocial behaviour of the Pavlovian people was quite low. The differences in worldwide distribution of the alleles can give a clue to, for example, why homicide rates are much higher in hunter-gatherers of Amazonia than those of Africa and Asia, documented e.g. by Hill et al. (2007, 443) and a lack of altruism in the Maya, noticed by Brian Hayden (at www.world-science.net/exclusives/050724_inequalityfrm.htm, article "When wealth and poverty began").

Men-women relationships

The analyses of Upper Palaeolithic human remains show a considerable similarity in the upper and lower limb bones strengths and shapes between men and women, showing that both men and women engaged in similar activities and pointing to none or low sexual division of labour. This is in sharp contrast to the contemporary hunter-gatherers, where sexual division of labour is almost universal (Churchill et al. 2000, 31, Holt 2003, 200). It was the cooperative breeding, typical of humans (Hrdy 2005, 167), which enabled both sexes to engage in similar activities. There are indicators that allow us to surmise the equal status of men and women in the Pavlovian. These days, the gender-egalitarian societies are extremely rare, most contemporary societies discriminating against women. One of the most important reasons is the above-mentioned growing intensity of competition, causing widespread physical violence and warfare,

which are typically male areas of activity. Another phenomenon leading to the gender inequality (i.e. patriarchy) is the economy based on plough agriculture, as described in detail by Evžen Neústupný (1967). A study of African cultures showed that adopting cattle led to the loss of matrilineality (Holden and Mace 2003, 2425).

Another factor could be pathogens. It has been shown that the societies with high pathogen stress tend to be polygynous (Low 1990, 325). Recent studies show an unexpected impact of a parasitic protozoa Toxoplasma gondii, causing mainly asymptomatic, lifelong infection of humans. The origin of its major lineages falls in the time of agricultural expansion and domestication of the cat, within 10,000 years ago (Armelagos and Harper 2005, 109). The rate of infected persons in the populations worldwide (including developed countries) is about 20-70 per cent. The Toxoplasma increases concentration of testosterone in men and decreases it in women (Flegr et al. 2008, 1). Men with latent toxoplasmosis are perceived as more dominant (Hodková et al. 2007, 110), tend to disregard rules, be more expedient, suspicious, jealous, and dogmatic. Women, on the other hand, are among others more conscientious and moralistic than uninfected persons (Flegr 2007, 757). The infected women also have significantly more sons. The phenomena depend on the length of infection and concentration of the antibodies. It is possible that the spread of toxoplasmosis in the past could increase the changes to women's disadvantage.

A typical feature of cooperative breeders is a flexible mating system (Hrdy 2005, 167). Indeed, it is typical of humans. Monogamy, polygyny, polyandry, non-residential polygynandry ("wife swapping") and residential polygynandry have been documented in various cultures (Skupnik 2002), the modern version of polygynandry being called polyamory. The fact that humans have not been simply monogamous or polygynous is confirmed by comparison of sperm speeds (which is an indicator of sperm competition) of humans and primates. In a recent study, the sperm of chimpanzees travelled at a rate of about 0.7 m/s, humans 0.2 m/s and gorillas 0.1 m/s (Nascimento et al. 2008, 297). Whereas female chimpanzees commonly copulate with numerous males (e.g. with several males within a five-minute period, Stanford 2001, 58), female gorillas, living polygynously, have only one mate and there is no sperm competition. The results for humans indicate that during human evolution, sexual intercourse of women with more than one man within a short period of time was so common that it induced a selective pressure on sperm motility. The fact that there is a higher female population size than male population size in the contemporary people (Dupanloup 2003, 85, Hammer 2008, doi: 10.1371/journal.pgen.1000202) does not necessarily mean that Homo sapiens practiced a gorilla-like model of polygyny, but much more likely it reflects that simply (besides other factors) some males were more successful in reproduction than others. Interestingly, there has been observed much lower male/female effective population size in bonobos than that in humans (Eriksson 2006, 939). Note that human predecessor, Australopithecus afarensis and its relative, Paranthropus robustus, both showed highly likely very high sexual dimorphisms, similar to that of gorillas, and their mating patterns were surely different from mating patterns of modern humans (Lockwood et al. 2007, 1443, Gordon et al. 2008, 311). The initial departure from this pattern could have been enabled by forming close relationships among females, as several females together could face a physically much stronger male. This, i.e. that women show stronger automatic in-group bias than men (Rudman and Goodwin 2004, 494) must have been an important factor throughout the prehistory of the modern humans.

An interesting study revealed a possible important bias of contemporary sexuality studies. Men and women answered questions about their sexual behaviour. The questions were answered under different conditions; one of them was that the participants were told they were connected to a lie detector. Although it is commonly reported that men tend to have more sexual partners, and their attitude toward sex is more positive in comparison with women, under the would-be lie detector conditions these differences between men and women were negligible, but emerged in the answer results under other conditions, including anonymous ones (Alexander and Fisher 2003, 27). It was generally because of differences in the answers of women, as under the conditions that are commonly used in such studies, women are apparently afraid to diverge from the so-called social norms. These norms have been imposed on them by men and their typical features are double standards, aimed at chastity of women, enabling men to be certain about their paternity.

Considering all the above, the following picture emerges for the Pavlovian people:

Activities of men and women were quite similar, which was enabled by cooperative breeding, i.e. many people of the group (allomothers and allofathers) participated in childcare. Marriages, if any, were quite loose and sexual attitudes were relaxed. This would not exclude lifelong relationships, depending on individual preferences.

Spirituality

Humans are spiritual beings, and the Pavlovian people surely were no exception. For people who live in nature and with nature, natural objects and phenomena have spiritual meaning. In general, the religious system reflects the particular society where it originated. For example, the monotheistic religions with the single male superior god typically reflect the position of an absolute, powerful ruler, who must be unconditionally praised and obeyed by all his subjects.
The Pavlovian society was not stratified, so it is reasonable to suppose that there was either a form of pantheism, or belief in many imperfect deities with different areas of activity. We can expect special spiritual attitudes towards some types of landscapes (symbolic landscape-Svoboda, 2006, 13), natural monuments, such as the rocky formations of the Pavlov Hills (see figure 1) or those in Předmostí, natural phenomena, or impressive animals (mammoth, lion, rhinoceros, bear, big ungulates, etc.). Indeed, activities in the vicinity of the above-mentioned rock formations and numerous representations of animals from the Pavlovian have been well documented (Klíma 1983, Jelínek 1977, Svoboda et al. 2002, Oliva 2007). These representations of animals could symbolize not only the animals as such, but also their spiritual transfigurations, as it is common in many cultures, where, for example, deities take forms of animals (Zeus as a bull or swan), animals can be attributes of gods/goddesses (the boar Hildisvíni of the goddess Freya), or animals themselves could be considered deities (Bast, Apis of the ancient Egypt). Many contemporary hunter-gatherers consider animals as persons (e.g. Willerslev, 2004, 629). Animals can transform into humans and vice versa in many myths and fairy tales.

Figure 1
The view of a part of the Pavlovské vrchy (The Pavlov Hills), under which the Pavlovian sites of Dolní Věstonice and Pavlov were located. Notice three limestone rock formations Tři panny ("The Three Maids") under the ruins of the Dívčí hrad (The Girls' Castle) on the left side of the picture.
Photograph by Vít Lang

Interesting artefacts from the prehistory are small female statuettes, often called Venus figurines.
In Central Europe, Venus figurines have appeared again and again, in various forms, for a time span of 30,000 years. Their persistent recurrence gives a clue that they must have been important, and that their existence was connected with the psychology of humans rather than their cultures. Interestingly, the Venus figurines fit into certain concepts of the prominent psychologist Carl Gustav Jung
When investigating the products of the human unconscious (dreams, fantasies, and visions) he found that there were some types of figures and situations that repeated themselves frequently. Jung called one of the figures Koré. When Koré is observed in man, she is an aspect of anima (i.e. the feminine part of male psychology) (Jung, C. G. 1971, Collected Works Vol. 9/1, pp.183). Anima, or rather the unconscious as represented by anima, according to Jung, "Whenever she appears, in dreams, visions, and fantasies, she takes on personified form, thus demonstrating that the factor she embodies possesses all the outstanding characteristics of a feminine being. She is not an invention of the conscious, but a spontaneous product of the unconscious" (Jung, C. G. 1978, Collected Works Vol. 9/2, pp.13). In woman, Koré belongs to the type of "supraordinate personality". "I usually describe the supraordinate personality as the "self", thus making a sharp distinction between the ego, which, as is well known, extends only as far as the conscious mind, and the whole of the personality, which includes the unconscious as well as unconscious component" (Jung, C. G. 1971, Collected Works Vol. 9/1, pp. 187). Thus, the Venus figurines could enable both men and women to worship the feminine qualities and to project aspects of their own unconscious self into them. The fact that the Venuses were often faceless or had quite symbolical forms shows that they did not represent a certain person, but feminine qualities in general, which enabled every person to project their individual contents of psyche into them. (Compare Jung, C. G. 1971, Collected Works Vol.6, pp. 235, about negative effects of collective worship of Mary). Interestingly, the image of woman could have its sexual component not only for men, but for women as well, because for most women, high sex drive is associated with increased attraction to both women and men (Lippa 2007, 209), which may be somehow related to the above-mentioned in-group bias in women (Rudman 2004, 494). The Venus figurines were made according to real models, because they featured many exact depictions of certain anatomical patterns (figure 2). This explains why they are of different shapes (e.g. some plump, others slim) depending on a particular model. Their nakedness accentuated their feminine nature and may indicate that nakedness was common. Besides the Venus figurines, there are also other forms of depiction of women, e.g. the engraving on the mammoth tusk from Předmostí (see figure 3).

Figure 2
The famous Venus of Dolní Věstonice I (Věstonická venuše), fragments of some other Venus figurines from Dolní Věstonice and reconstructions of possible Palaeolithic models according to whom the figurines could be made.
Reconstruction by Libor Balák

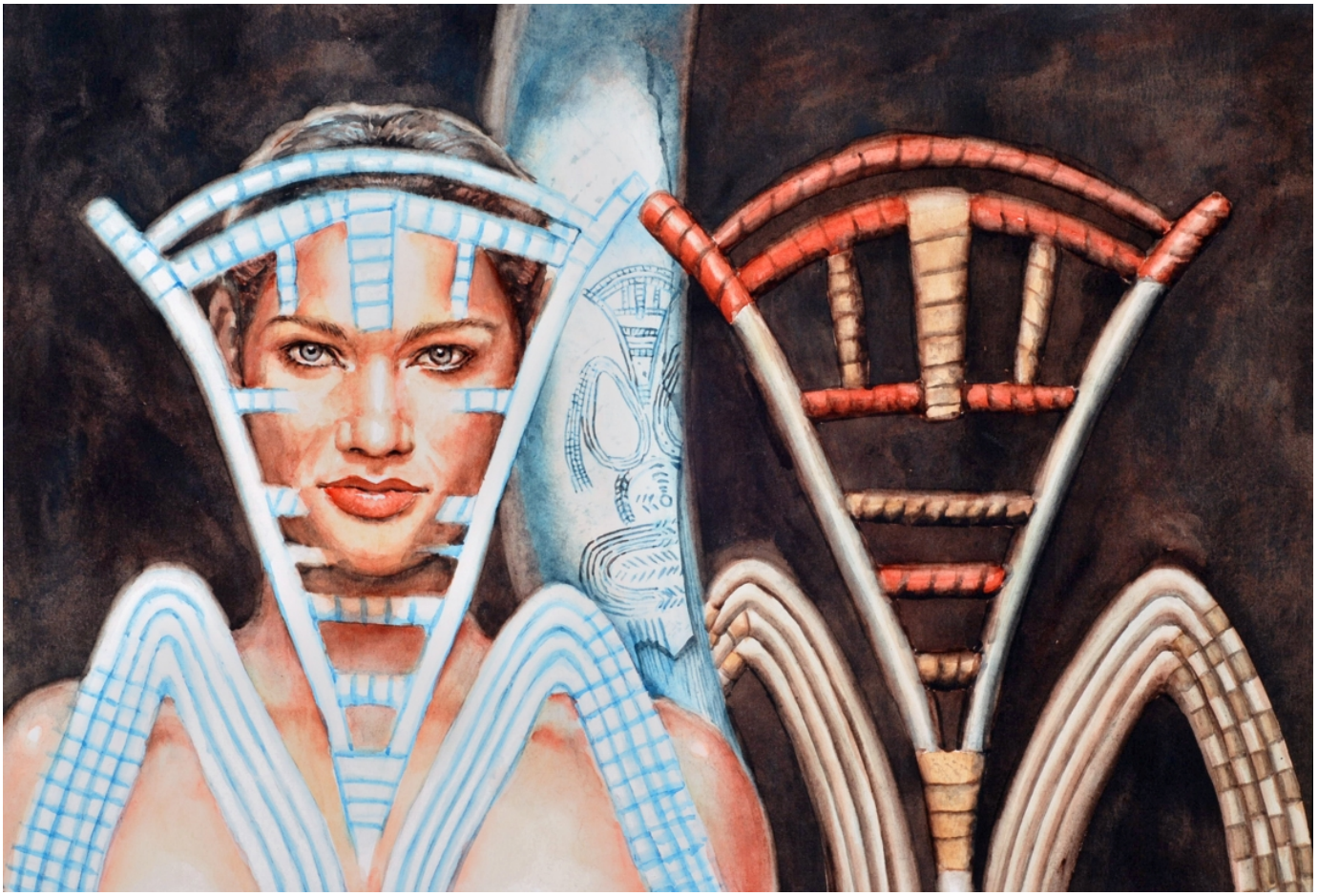

Figure 3
The engraving of a woman from Předmostí and the depiction of a possible model by Libor Balák

Interestingly, fingerprints have been found on ceramic artefacts (mainly fragments of animals) from the Pavlovian. Their study indicates that the imprints belonged mainly to women and children, not to adult males (Králík and Novotný 2005, 449). Such an imprint has been found on the famous Venus of Věstonice as well. Again, this imprint could not belong to an adult male, but it may have belonged to a young adolescent or adult female (Králík et al., 2002, 107). Although it is uncertain that the fingerprints belonged to the maker, it generally, makes sense that the objects like Venus figurines were made by women (as it could be important that the representation of the feminine should be made by a female), probably at least sometimes in the presence of children. The kilns used to fire the ceramics were too sophisticated (Klíma 1983, 62) to be just a result of children's play, but their participation in undoubtedly interesting activities of the adults seems to be natural.
All these objects were rather small, enabling more or less intimate relationships. As could be expected, no artificial monumental structures have been documented, because a need for surpassing nature and impressing common members of society is typical of stratified societies and their religious systems.

Conclusion-the legacy of the Palaeolithic humans

A contribution of humans of the Palaeolithic to our legacy was unique. This contribution does not include traits like competitiveness and aggressiveness, because these traits are extremely old and had been present in human ancestors eons before genus Homo evolved.
The contribution includes our big and effective brains, our ability of intensive cooperation, our tendencies towards egalitarianism and altruism. The idea that "all people were created equal" is a typical product of the human Palaeolithic legacy. In a pack of wolves, every member acknowledges its position in hierarchy.

People, on the other hand, consider freedom of actions as their natural right and they feel unjust when they are denied the rights that the others have.
Another contribution is the mating system of contemporary humans. Although people are generally considered monogamous, it is a mere social construct. Scholars now suggest distinguishing between social attachment and monogamy in both humans and animals (Ophir et al. 2008, 1143).

It is acknowledged that "know yourself" is one of the most important tasks of a human being. Not to know yourself means to be too often a helpless subject of the forces that dwell in your psyche. Understanding of the Palaeolithic ancestors also means to understand oneself better. At the same time, we should recognize our closeness to the ancestors and acknowledge their importance for us.

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