Cinq millions d'années, l'aventure humaine - Five Million Years, the Human Adventure
M. Toussaint éd., E.R.A.U.L. 56, Liège, 1992, pp. 207- 228.

New Upper Palaeolithic Burials from Dolni Vestonice

Nouvelles sépultures du Paléolithique supérieur à Dolni Vestonice

Jan Jelinek *

Abstract

New excavations in the Gravettian site of Dolni Vestonice II have brought to light three very well preserved skeletons DV XIII, DV XIV and DV XV from a unique triple burial, a calotte of an adult male DV XI/XII and a skeleton of an adult male DV XVI. They have provided valuable information, not only on the physical type of South-Moravian, Gravettian hunters, but also on their life style and environment.

Résumé

Les nouvelles fouilles réalisées dans le site Gravettien de Dolni Vestonice II ont livré trois squelettes, DV XIII, DV XIV et DV XV, provenant d'une sépulture triple, ainsi qu'une calotte crânienne, DV XI/XII, et un squelette d'homme, DV XVI. L'ensemble apporte des informations déterminantes à propos de la morphologie des chasseurs gravettiens de sud de la Moravie, de leur mode de vie et de leur paléoenvironnement.

Key words : Upper Palaeolithic, Dolni Vestonice, burials, human remains.

Mots clés : Paléolithique supérieur, Dolni Vestonice, sépultures, ossements humains.

Introduction

The years 1986 and 1987 brought new significant discoveries of skeletal remains in Moravia, dating from the Upper Palaeolithic period. The finds were made on a slope above an old brickworks that was located at the eastern edge of the village of Dolni Vestonice. In the course of the excavation, loess was being mined for the construction of a reservoir on the River Thaya, near the Dolni Vestonice village. Bulldozers and scrapers had removed a layer up to 5 m thick of the youngest sterile loess, when a cultural layer came into view which contained bits of charcoal and isolated finds of animal bones or flint stone flakes.

The finds were thus deep under today's surface and would not have been discovered during regular agricultural cultivation. This site is located between the classical site of Dolni Vestonice I, researched from 1924 to 1939 by K. Absolon and from 1948 to 1949 by B. Klima, and the village of Dolni Vestonice, and has been designated as Dolni Vestonice II (fig. 1). Although the surrounding area is known to contain a lot of

* Jan Jelinek, Anthropos Institute, Moravian museum, Brno, Czechoslovakia

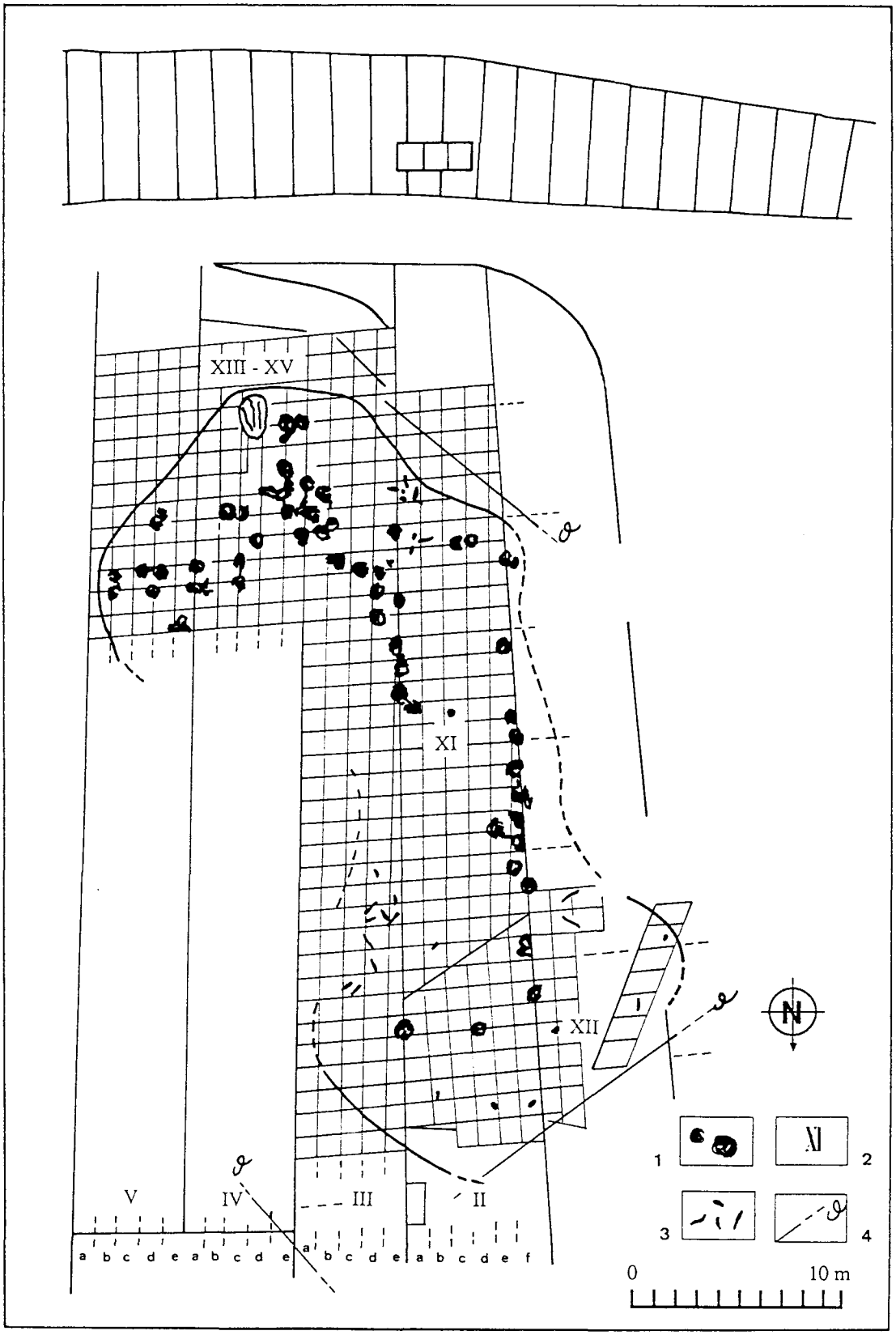

Fig. 1 Dolni vestonice II site. The excavated space with discovered remains of surface fires, mammoth bones and human remains. 1, fire; 2, human skeletal remains; 3, mammoth bones, according to Klima.

sites which have produced Palaeolithic material, generally the finds have not been very numerous and therefore these sites, although known, do not have special designations. The whole system of principal Gravettien sites is situated on the edge of the Pavlov Hills (fig. 2) and along the fringe of the flood plains of the River Thaya : Pavlov I, Pavlov II and Milovice. They were examined in the course of thorough archaeological excavations (Absolon, 1945; Klima, 1963; Oliva, 1988).

Dolni Vestonice XI-XII

On 14 June 1986, the skull-cap of an adult male with a beginning obliteration of the sagittal suture was found. Judging from this and from the exo- and endocranial condition of the other sutures, we can estimate his age at the time of death at around 40. Several days later, 15 m north of this site, a smaller bone fragment from the forehead, with a large, healed wound was uncovered. The leader of the archaeological team designated the cranial find in agreement with numberings of earlier anthropological finds, by the number XI, and the new find of the forehead bone fragment by the number XII, because both finds are morphologically compatible. What is more, the cranium has preserved an edge of the healed injury the major part of which is on the frontal fragment. So it happened that both finds, discovered 15 m apart have different numbers, even though they belong to one and the same individual. The edges of the breaks are sharp, they have not been smoothed, nor do they bear other traces of being worked. Significantly, the cranium, unlike finds of complete burials, is not coloured with red ochre. The question arises whether or not it is a remainder of a secondarily disturbed grave.

The extensive healing of the trauma on the frontal fragment is interesting for several reasons. First of all, the wound penetrated the bone : it was probably a very complicated lesion and the bone fragments were most likely removed.

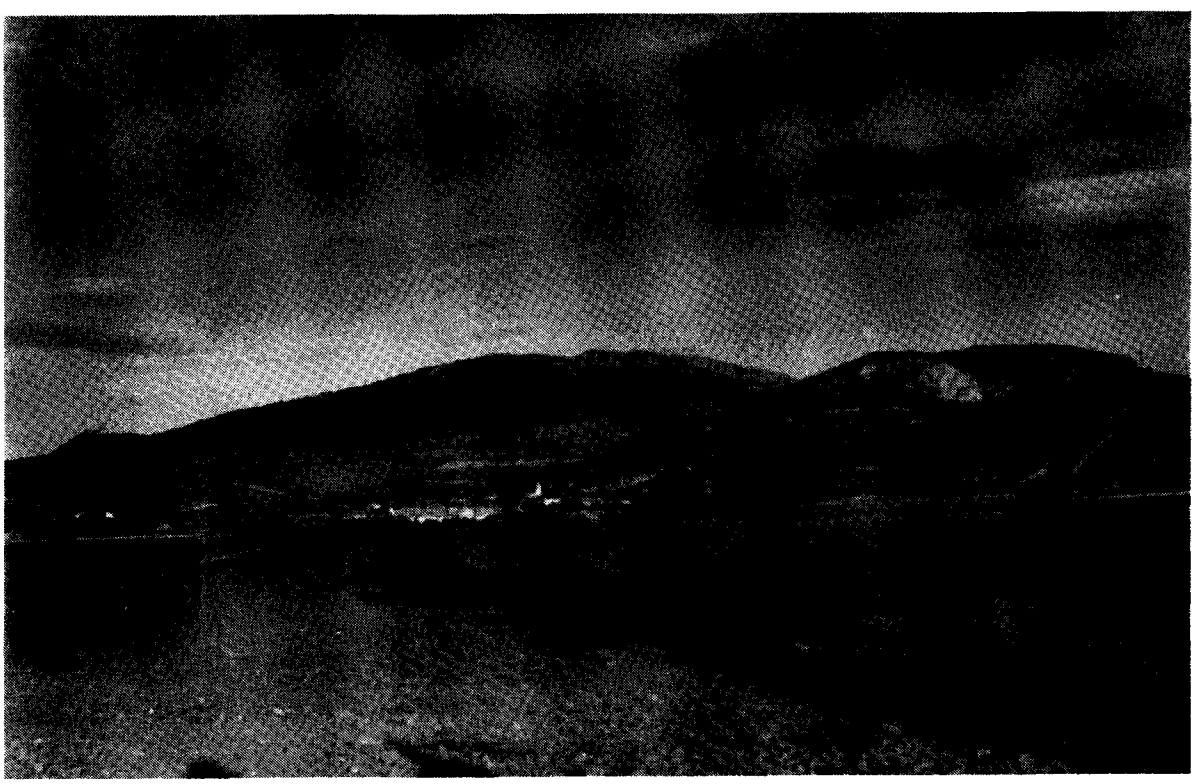

Fig. 2 Pavlov Hills. At the foot of the slope are situated Palaeolithic sites.

The healing demanded not only resistance on the part of the organism, but also knowledge and the ability to cure.

Furthermore, the location of the lesion is an interesting one. In this sense, the find Dolni Vestonice XI/XII is not a rare one among the skulls of men from the Upper Palaeolithic period. Similar, usually smaller lesions can be found on male skulls DV XIII, DV XVI, Brno II, Mladec V, VI and others. Evidently these were not chance accidents from hunting expeditions, but the results of conflicts, whether intrapopulational or interpopulational. In view of other finds, cultural development and even the social structure whose existence can be deduced from archaeological finds (Jelinek, 1987), the second alternative seems to be the more probable.

An interesting fact is the evident thinness of the skull bones, for example, in the area of frontal bosses : 0.3 cm. In an adult male, such thin skull bones are exceptional, especially if we consider that the bone relief of the superstructures is well formed. Supraorbital arches are strong and connected by the glabella. They are placed medially and merge laterally into a flat supraorbital triangle. Of the occipital bone, there is only a part of the scale surviving, with occipital plane and supreme nuchal lines, and a small beak-like external occipital protuberance. The transition into a flat nuchal plane is angled, which is clearly visible in a lateral view. The *Planum occipitale* protruded, thus creating a bun, which is a frequent feature in other Gravettian skulls. The important indication, in the case of this male, is that general robustness does not have to be connected to thickness of cranial bones.

Palaeoenvironment

The main site, Dolni Vestonice I, was dated by the C^{14} method 25,000 ± 170 BP (gro 1286). The site Pavlov I was dated at 24,800 ± 150 BP (gro 1325). Another dating, 27,660 ± 80 BP, was made at a site approximately 200 m north of Dolni Vestonice II, in the direction of an old claypit.

P. Havlicek and J. Kovanda (1985) published pollen analyses from a (timewise) near locality (Bulhary) which lies to the east of Dolni Vestonice I. This date (25,675 ± 2,750 - 2,045 BP) is close to that of Dolni Vestonice I and provides us with important information on the plant life and environment. Tree pollen, namely of *Pinus, Picea and Betula* is quite abundant; then comes *Alnus, Ulmus* and, more rarely, *Quercus* and *Fagus*. Even though the majority of the pollen came from grasses, it is certain that trees were present, especially in river valleys and in protected gullies and ravines.

The analyses of charcoal, from wood fires in Doni Vestonice II, further indicate that the fires were most often fed with spruce wood. Surviving charred chunks, up to 10 cm thick, indicate that the wood is from mature trees. The existence of *Quercus* and *Fagus* further indicates that the weather, although certainly cold during winter months, was not so cold as to exclude trees so typical of moderate climates.

Stratigraphically, the cultural layer is situated in the upper part of the humus layer and is of the last Interpleniglacial type.

Although not numerous, animal remains at the Dolni Vestonice II site are interesting. The numerous bones of mammoths are not the most typical. Although at 200 m east of this site a larger mass of mammoth bones was discovered, the mammoth bones of Dolni Vestonice II were rare and only found in two places. Furthermore, there were rare finds of bones of horse, wolf, reindeer, arctice fox and hare. These rare finds of food remainders and equally rare finds (in comparison with the main settlement) of stone flakes or tools, indicate that this site did not have the same role as the main settlements. This opinion is confirmed by the presence of numerous surface fires : these are not fireplaces, but loosely marked open fires. In all, more than 60 of them were discovered, their original number obviously being larger.

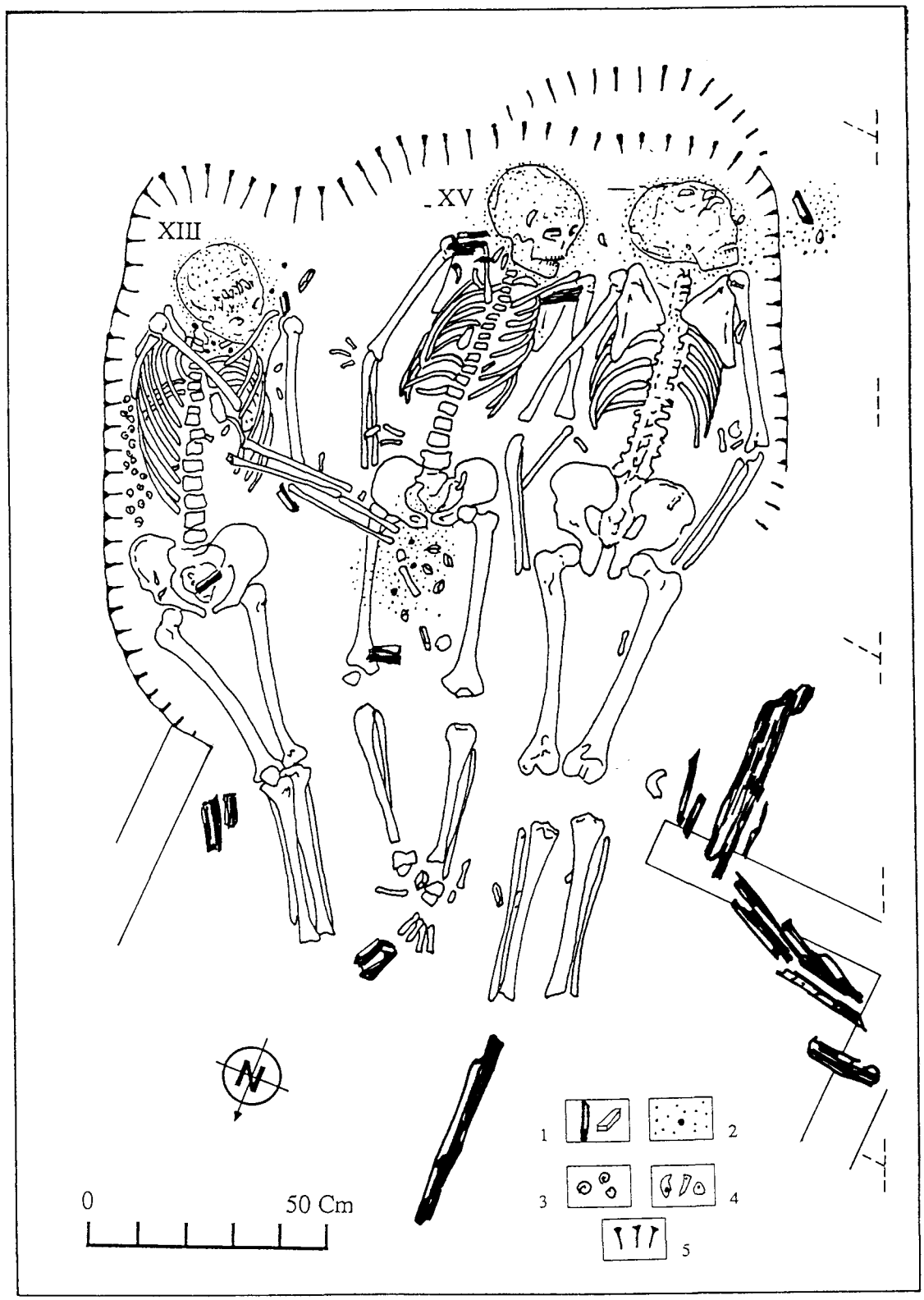

Fig. 3 The triple burial Dolni Vestonice XIII, XIV, XV. 1, charred wood and stone flakes; 2, ochre pigment and pieces of ochre; 3, snail shells; 4, human teeth, drilled animal teeth and other decorations; 5, limit of the shallow grave-bed.

In the opinion of archaeologist B. Klima, the fires were not stratigraphically simultaneous, belonging to at least three groups (verbal communication). Burned chunks of wood, branches and twigs, sometimes with traces of cuts, were frequently found. Wood charred in this way allows us to presume that the fires must have been extinguished quickly, before the wood burned through. They were probably extinguished by dumping earth on them.

Triple Grave

Higher up the slope of the site, nearer to its southern end, in proximity to the larger chunks of burned wood, a discovery of exceptional significance was made on the 13 August 1986 : a triple grave (fig. 3 and 4). Only its upper (southern) part had been slightly dug out, thus creating a kind of shallow bed. The lower parts of the skeletons were found directly on the ancient surface of a low barrow. The skeletons were undoubtedly covered up with the same earth, otherwise they would not be conserved. Stratigraphically, however, it was impossible to distinguish the earth with which the burial was covered, nor the smallest indication of a grave mound. The layer with the burial was poor in finds and the burial itself contained no grave goods. Several articles found there seem to belong to a cultural layer, but not to the burial itself. There were a fragment of marlite with several grooves and a very corroded bone awl, made from an animal ulna.

When considering the shape and fill of the grave, the only starting point for orientation is the stratigraphic situation of the cultural layer. This indicates that the cover must have been a very thin one. Nevertheless, it was largely sufficient enough to protect the burial from wild animals. In this context, it should be pointed out that the two lateral skeletons lack tarsal and metatarsal bones and phalanges of the feet. In the middle, shorter skeleton several of them survived. The situation is quite visible on pictures as well as on the drawing of the grave. The absence of small bones may be the result of scavanger activity.

All three skeletons were laid in an extended position in a south (head) - north (feet) direction. The skeleton on the west side is situated on its ventral side. The spine and shoulderblades are quite visible. The head rests on the left temple and the face, turned westward, is turned away from the other individuals. Its left arm covers the left arm of the middle skeleton. Since the arm of the eastern skeleton also covers the bones of the middle skeleton, it is clear that the first to be put into the grave was the middle individual, and afterwards the other two were laid on each side. All three individuals were buried simultanously.

The middle and eastern skeletons are on their backs and both arms of the eastern individual are stretched towards the pubic area of the middle individual, where there is a strong concentration of red ochre. We find not only ochre coloured earth, but also tiny solid fragments of ochre and several flint chips. The dislocation of the finger phalanges in various places in the whole triple grave area points to the activity of small, earth-dwelling animals. In connection with the grave contents, the large number of shells of *Ariantha arbustorum* should be mentioned, located between the eastern edge of the grave and the spine of the eastern individual. Some shells were even found in the cultural layer in the immediate environment of the grave. It is therefore difficult to determine whether the snails had concentrated there in search of suitable food in an agreeable microclimate, or whether it is in fact a grave gift, placed there by man. If the snails were there to represent food, it would make this find a very significant one, because so far such food seems to have been unknown to the Gravettian hunters. It could be indicative of a decrease in the availability of traditional game animals. This and similar questions will be clarified by a study of palaeontological finds of game animal remains.

Let us concentrate now on the situation of the red ochre : we have mentioned its concentration in the pubic area of the middle skeleton. A smaller concentration is also to be found in front of the face of the western individual, outside the grave in fact. Finally, there is a strong concentration on all three skulls. Especially on

Fig. 4 The triple burial Dolni Vestonice XIII, XIV, XV. Note that only the upper part of the skeletons are situated in the shallow burial-bed. Note also the missing feet. The right skeleton is situated ventral side down.

the two lateral skulls (DV XIII, DV XIV) the ochre, mixed with earth, creates a kind of skin on the area of the forehead, on whose interior side, fitted to the forehead, we find ornaments that were originally part of a head cover, or part of a headband. In the case of the eastern skeleton (DV XIII), there were two rows of drilled icefox teeth; bigger ones in the upper row, smaller ones in the lower row. Besides these items, additional tiny pendants made of carved mammoth ivory were found there, drilled to be attached or hung. In the vicinity of the middle skull (DV XIV), again in the skin of red coloured clay, there were four drilled wolf fangs. Although the ochre was sprinkled around all three skulls, the earthern skins were expressly created on the forehead areas of the two lateral skulls (DV XIII, XIV). The faces were coloured, but without the clay skin. Therefore we cannot think of any earthen masks (Klima, 1987).

The remains of carbonized wood are important. These not quite burned pieces of wood, the biggest of which is almost 10 cm thick, must have been extinguished with earth and thus prevented from burning totally. The fact that smaller chunks of wood were found under the skeletons, and specifically very close to the southwestern end of the grave, indicates that they formed the grave fill and perhaps even some kind of construction.

The interesting position of the three individuals buried there has given rise to various speculations about the symbolic significance of their positions, for example, the positions of their arms, and even about the presence of the ochre in the pubic area of the middle skeleton, where this colouring is supposed to have signalled the presence of a stillborn baby. Incidently, there were no traces of any stillborn child with the middle skeleton. In such lime-rich earth, preserving even weak bones perfectly, and of course the germs of teeth crowns, at least minimal evidence of a stillborn would have been preserved. Moreover, the concentration of red ochre in the area of the abdomen has been confirmed even in an adult male burial DV XVI. Therefore, there is no reason to suppose that the peculiar position of the skeletons in the grave represents the reconstruction of a failed birth. Not only the placement of the skeletons, but also the situation of the arms can be easily explained by not very careful placement of dead bodies. The supposition that the western male individual (DV XIV) was holding the hand of his female companion giving birth (the middle skeleton) is not plausible if we consider that the western individual was positioned on his abdomen with his face turned away.

As far as the skeletal remains are concerned, age and sex determination is important. We know that determination of age from the condition of the teeth is more reliable than that based on skeletal ossification. We know as well that the dental age of an Upper Palaeolithic man is not substantially different from man today.

Skeleton n° XIV, i.e. the western one, had in its upper jaw both third molars, still in the alveoli, not yet cut through. The roots of both teeth are still open. In the lower jaw, the third molars are not visible. Second molars have just reached occlusion and are slightly smoothed on top of the cusps. Even though the incisors are well worn to the dentine, it is obvious that this is due to their intensive use. In the postcranial skeleton, it is important that the edge of the hip bone is not quite completely fused in. Also the epiphyses of both tibias show traces of epiphyseal lines in the final stage of fusion. These facts indicate that the youth died at 17 - 18 years of age.

Skeleton n° XV has one third uncut molar in its upper jaw (table 1). Another third molar can be found, almost horizontally, in the alveolar process of the jaw. Its crown is slanted against the second molar. In the lower jaw, both third molars are not yet cut through and on the right side the tooth is placed almost horizontally. In the case of this individual too, the incisors are worn to the dentine. By the condition of the teeth and postcranial skeleton, where the crest of the pelvic bone, with the excepton of a small trace, is well fused, we can determine the age of this individual to be between 17 - 21, probably closer to 20 years of age.

As for skeleton n° XIII, the third molar on the left of the upper jaw has cut through, but is unused, since it did not have an opposing tooth. On the right side, the third molar is almost on the occlusal level, but it is also unused, lacking the opposing tooth. In the lower jaw, the left M3 nears the occlusal level, while the right M3 is still in the alveolus, far from cutting through. All the other molars are cut through, but they bear only slight signs of being used. In the postcranial skeleton, a visible groove on the left humerus indicates that the head of the bone has practically fused with the diaphysis. All the other epiphyses of long bones, including the iliac crest, are already perfectly fused, which is indicative of an age between 20 - 21 years.

We have determined that all three individuals were of very similar age. The youngest one, a boy (n° XIV), had the tallest and most robust skeleton. The other two individuals were

Table 1 Dental dimensions of DV XV compared with modern man

		Maxilla						Mandible					
		DV XV		males		females		DV XV		males		females	
			n	X	n	X	n		n	X	n	X	n
Canine	M.-D. r.	85	1	77,7	25	74,1	21	94,1	1	69,6	24	63,5	21
	l.	80	1		s			70,0	1				
	B.-L. r.	92	1	86,6	25	78,7	21	74,0	1	80,8	24	72,4	21
	l.	105	1					91,0	1				
First molar	M.-D. r.	80	1	72,2	24	69,3	23	70,0	1	70,0	24	68,1	19
	l.	74	1					70,0	1				
	B.-L. r.	90	1	95,5	24	91,2	23	88,0	1	79,8	24	77,3	19
	l.	100	1					84,0	1				
Second molar	M.-D. r.	75	1	69,9	24	67,7	23	83,0	1	73,5	24	69,5	22
	l.	74	1					87,0	1				
	B.-L. r.	100	1	97,2	24	92,9	23	92,0	1	85,9	24	80,6	22
	l.	102	1					93,0	1				
Third molar	M.-D. r.	112	1	112,3	27	110,8	21	112,0	1	112,3	27	110,8	21
	l.	119	1					119,0	1				
	B.-L. r.	119	1	106,9	27	105,6	21	119,0	1	106,9	29	105,6	21
	l.	107	1					107,0	1				

All the investigated teeth demonstrate greater dimensions than the mean of the modern European males and far exceed the mean of the females.

roughly of the same age, around 20 years old. The determination of sex in skeleton n° XIV presents no difficulty; the great robustness of the bones is interesting and at such an early age indicates that these characteristics cannot be only the result of physical activity, but that they have a foundation in genetics.

Skeleton n° XV is still - as far as sex determination is concerned - the subject of discussion. The evaluation of the sex of this individual cannot be done apart from an evaluation of his/her pathology. What is most marked is the changed shape of the right femur. Not only is this bone considerably shorter than the left one (table 2), but it is also bent. In its proximal part the body of the bone is flattened and the colodiaphyseal angle between the head, the neck and body of the thigh bone is remarkably changed. These changes are so obvious that they are visible at first glance. Upon more detailed study, all the long bones on the right side are slightly shorter than the average in normal individuals. The theory of porencephalia, leading to paralysis of one side of the body, which was published (Klima, 1987), is no longer seriously

Table 2 Femoral length and femoral head diameter (Dibennardo and Taylor, 1979, 1982; Pettener and Gualandi, 1979)

	DV XV		recent males		recent females	
	right	left	X	n	X	n
Max. femoral length	37,30	38,40	45,00	50	42,30	35
Vertical diameter of the femoral head	46,00	47,50	47,76	101	41,68	101

The right femur is 11 mm shorter than the left one. Both are much shorter than the mean of both recent males and females. Femoral heads are near the male mean and certainly greater than is the female mean.

discussed. Changes in the spine, in the area of lumbar vertebrae, point to changed lordosis. The thorax, according to the way it was situated in the grave, was noticeably narrow. It is possible that this could be bird chest syndrome, characteristic of rachitis, but with the effect of earth pressure being a distinct and possible element, one need approach such an evaluation with prudence. During X-Ray examination of the long bones, Harris's lines were not found. But on the first molars and on the canines, both in the upper and lower jaw, there is evidence of hypoplasy of dental enamel, pointing to a stress on the organism at an early age. Judging from the grooves in the dental enamel, it is possible to estimate that this took place between 1.5 - 2 years of age. These observations lead to the conclusion that the described changes may be consequences of rickets. It seems that the organism's metabolic disorders caused the secondary sexual characteristics of the skeleton to fail to appear clearly during adolescence. I shall mention here some of the morphological characteristics that can, despite all, help in determining the sex of this individual. On the skull the superciliar arches are of medium size, connected by a glabella (Broca IV). They are placed medially. Of course adult female morphology retains paedomorphic shapes. On the contrary, the skull of a male differs from that of a child due to the appearance of more expressive superstructures. If then, in the case of DV XV, the appearance of secondary sexual characteristics was disturbed, as a result of metabolic disorders while coming into adulthood, then the relatively prominent formation of superciliar arches can still be representative of a male individual. What is more, all known female skulls found at Vestonice have a smooth supraorbital area without arches (DV I, II, III). Mastoids on the temporal bones of DV XV are of medium strength and height. Their height is outside the limits of the average female skull and are larger in comparison with skull DV III. The right mastoid of DV XV is quite well preserved. The left one is damaged in its middle section (only the basal part and the apex have survived) and as reconstructed is somewhat shorter than on the right side. Therefore, only the size and shape of the right mastoid is original and reliable. Along the temporal squama runs a moderately strong, short mastoid crest. Again, it is thicker than could be expected if the skull were to belong to a female. The occipital bone has a small but well represented external occipital protuberance (Broca III).

The muscular relief on the nuchal plane is well formed and points to strong neck muscles, unusual in a female. The upper part of the occipital bone (occipital plane) is clearly bun shaped. On the lower jaw, we see a slightly rocking base and a small but characteristic triangular mental prominence, small in dimensions. From the lateral view, it is clearly prominent. The dimensions of the teeth are of interest. The molars are smaller in size than those of the male skull DV XIV. None of these characteristics deviate clearly from the variational width in female individuals. Their appearance, however, concentrated in one individual, point to a male individual with only partially developed secondary male characteristics.

Concentrating on the postcranial skeleton, we can provide the following observations. The following dimensions of the humerus are of illustrative value in determining sexual dimorphism : maximal humerus length, minimal diaphysis circumference, humerus head circumference, maximal transversal diameter of the head and maximal sagittal diameter of the head.

Besides the femur, the lengths and shapes of which are pathologically changed, the right humerus is longer than the left one, meaning that the length ratio is the same as in healthy individuals. The situation is the same for the ulna and radius.

If we compare the maximal sagittal diameter of the humeral head (table 3) of DV XV with the average values of numerous samples of the recent Czech population (Cerny, Kovanda, 1980), we can then see that the dimensions of the individual Dolni Vestonice DV XV by far exceed the values of modern women from today's

population, and on the contrary, compare well with the average of today's men.

Praeauricular sulcus is not formed (table 4). This characteristic is relatively reliable and its absence, except in rare cases, indicates a male pelvis. The sciatic notch is slightly wider in DV XV than in DV XIII or DV XIV, but even

Table 3 Humeral length and humeral head diameter

		DV XV		DV XIV		Czech Cerny	males and	Czech Kovanda	females 1980
		right	lelft	right	lelft	X	n	X	n
M 1	Greatest length	30,20	30,20	37,60	37,20	32,70	454	30,14	306
M 8	Head circumference		14,80	16,20		14,45	411	12,63	259
M 9	Greatest horizontal diameter of the head		44,90	51,20	49,50?	44,20	413	38,60	260
M10	Greatest saggital diameter of the head	50,00	48,00	53,90		48,10	431	42,00	282

The comparison of these dimensions demonstrate that the humeral head of DV XV was bigger than the mean of the male part of the modern Czechoslovak population, even when the stature height as represented by the humeral length was not high. The extremely long and robust humerus of young male DV XIV correspond to other long bone dimensions of this individual.

Table 4 Sex characteristics of the pelvis of DV XV skeleton / Adapted from Acsadi and Nemeskeri (1971) and Ferembach (1980)

Feature	Weight	Hyperfemale	Female	Indifferent	Male	Hypermale
Praeauricular sulcus	3	deep, well represented	more flat less represented open	slight	very week	absent
Sciatic notch	3	broadly open V shaped	open V shaped	transitional shape	U shaped	narrow, well U shaped
Symphysis pubis	2	very low	low	transitional	high	very high
Subpubic angle	2	100 or more	90 - 100	60 - 90	45 - 60	less than 45
Iliac bones	2	low, broad with stretched wings and weak tuberosities	weak presentation of female charact.	transitional form	weak présentation of male charact.	high, narrow with stong muscular tuberosities
Foramen obturatum	2	triangular with sharp edges	triangular	transitional from	oval	oval with round edges
Corpus of ischiatic bone	2	very narrow with slight ischiatic tuberosity	narrow	middle	broad	very broad with strong ischiadic tuberosities
Iliac crest	2	very flat S shaped	flat S shaped	middle	clearly S shaped	strongly S shaped
Iliac fossa	1	very low, broad	low, broad	middle high middle broad	high narrow	very high narrow
Pelvis major	1	very broad	broad	middle	narrow	very narrow
Pelvis minor	1	very broad oval	broad oval	middle rounded	narrow heart shaped	very narrow heart shaped

then it is narrower than that of the average female pelvis. This fact is further illustrated even in a composed arc (according to Novotny, 1982), connecting the ventral side of the auricular facies and the branch of the sciatic notch by a simple curve, as is the case for male pelvises. The subpubic angle is lower than 90°, and thus belongs to the indifferent angles. This angle in females is greater than 90°, in the case of the male pelvis it is less than 60°. The iliac bone is of small dimensions. This characteristic points to a female, but the size is not itself decisive in sex determination. As to the low and opened iliac wings, they point to an inexact reconstruction in the sacroiliacal joint, where even a small mistake markedly changes the position of the iliac wings. Nevertheless, even in case of proper setting of the iliac bones and the sacrum, the iliac bone is nearer to a female form. The other individual characteristics are indifferent, or else lean slightly towards those of a male. Quite marked are differences in the width of the pelvic exit which are much below the female average. Also the acetabular diameter falls within the scope of male diameters. The muscle attachments on the iliac bones are stronger than in female individuals. Thus after consideration, it is impossible to make a final decision in sexing this individual. The shape of the sacrum (table 5) is quite extraordinary. It consists of six vertebrae, but its unusually narrow shape is not caused by this circumstance. The frontal direct width is markedly smaller than in the average of female sacral bones. The difference is significant.

It is clear from the above observations that DV XV is not, due to metabolical disorders, an undeveloped female individual, nor in fact a hermaphrodite, as was suggested in some expert discussions (Novotny, 1989 , verbal communication). This is incompatible with the degree of supraorbital relief and with other metric and morphological data.

Among the attempts at interpreting the triple burial, one opinion claimed that these individuals were related. (Vlcek, report to the Congress of Czechoslovakian Anthropologists in Humpolec, 1989). This opinion is based on some similarities in the morphology of the shoulderblades and the cranial sinuses. Determination of family relationship is difficult, as is well known from paternal disputes. Aside from those characteristics however rare but recurrent in compared individuals, such as epigenetic skeletal variants, only a larger number of similar characteristics point to the probability of family relationship. In the case of the Vestonice triple burial this situation does not exist. Although the lower edges of the orbits in DV XIII and DV XV are similar, and the acromions of the shoulder blades also have similar morphology, in kind and appearance other epigenetic characteristics do not point to a family relationship between those buried. The sinus cavities in the skull occur only on the left side of the frontal bone in two individuals (DV XV, DV XIII); in the case of the third individual they are, however, formed on both sides. Such a situation is certainly not proof

Table 5 Comparison of the breadth and anterior length of the DV XV sacrum with the corresponding dimensions of the modern Czech population (According to Stradalova).

		DV XV		Czech males		Czech females	
			n	X	n	X	n
M2	Ventral length of sacrum	108	1	117,25	72	114,98	56
M5	Breadth of sacrum	90	1	101,43	72	98,47	56

These dimensions demonstrate the extremly narrow sacrum of DV XV. Because this sacrum is composed of six vertebrae, its long and narrow shape is even more striking.

of kinship. The open sinus in the forehead of DV XV is not a result of pathological process because upon detailed inspection we find no traces of inflammation. Damage to the external part of the frontal bone is post-mortal.

On skulls DV XIII and DV XVI we also find other interesting characteristics. On the frontal bone of DV XIII, between the right frontal boss and the medial sagittal plane, there is an approximately 2 cm long perfectly healed depression of traumatic origin. The wound, caused by a blunt object, disturbed the upper layer of the bone, but did not penetrate into the skull cavity. Another similarly healed wound can be found on the right parietal bone, in its bregmatic angle. The bone was not broken through here either and the wound healed perfectly. Also on the forehead of skull DV XVI, there are three depressions - healed injuries. Similar finds of healed injuries in the frontal and parietal regions are not rare in male Palaeolithic skulls. In the case of skull DV XI/XII, a similar large healed injury was described over the right superciliar arch, and in the skull Brno II there are other healed lesions : a 2 cm boss in the obelion region and another small depression on the forehead.

We know therefore that injuries in the frontal and parietal part of the braincase were frequent. Undoubtedly, these are not incidental injuries, but injuries caused by man. If such frequent injuries were to be the result of life within the population, it would indicate a degree of aggressiveness which is improbable. This is in contradiction with some observations derived from the study of Palaeolithic art (Jelinek, 1990). A more plausible explanation is that they are the results of conflicts with members of other populations.

However, returning to the postcranial skeleton, attention should be paid to the shoulder blades, especially to the shape of their axial margins. In the assemblage of shoulder blades belonging to eight individuals (four from Predmosti and four from Dolni Vestonice), a variability of *sulcus dorsalis* is quite visible, to which is attached *m. terres minor* and *sulcus ventralis*, to which is attached *m. subscapularis*. Their shapes do not correspond to the simple model proposed for *Homo sapiens sapiens* nor to the model proposed for *Homo sapiens neanderthalensis* (Trinkaus, 1979). On the contrary, they constitute a most varied transition between them.

Dolni Vestonice XVI

On 28 April 1987, another grave (DV XVI) was discovered in Vestonice II, on the western slope of the site. The cultural layer was not rich in the immediate vicinity. Some few stone flakes were found there, together with a few tools. Several shallow or surface open fires were found nearby, similar to the fires near the triple burial. The cultural layer here contained the remains of dwelling structures. There were some isolated tertiary shells and small pieces of red ochre. The skeleton was situated in a shallow bed on its right side, with contracted limbs. The top of the head was directed eastward and the legs westward. The skull and mainly the abdominal region were covered with a considerable amount of red ochre.

In the layer associated with this burial there was a circular fireplace measuring approximately 100 cm in diameter. Besides charcoal and ashes, the fireplace also contained small limestones. Another small fireplace was located farther away (approx. 110 cm). The cultural layer in the grave area was similar to the layer elsewhere on the site and there were no finds in the grave that could be designated as grave goods. As already mentioned, the skeleton was found in a crouched position (legs). The arms were alongside the body. The condition of the skeleton was relatively good, but not as good as that of the skeletons in the triple grave. The cranial sutures were open; only in the obelion was there a beginning of an obliteration. It is therefore obvious that the age of this individual at the time of death was around 40. In connection with this fact, the condition of the teeth was bad, with traces of advanced use. Both upper third

molars had, however, unworn crowns, despite the fact that they were cut through and that their crowns were higher than the crowns of the other molars. There were no opposing teeth in the lower jaw. The third molar on the right side had its crown horizontally inside the jaw. On the left side, the third molar was not established. The second upper molars in the upper jaw were heavily worn, but at least parts of heavily worn crowns remained. On the other teeth, used for mastication, only their roots remained. Buccaly, under the mesial root of M1, was a large cyst, probably the result of a baring of the pulpar cavity and infection. Also, in both frontal incisors, we find traces of granuloma within the dental alveol. Although the crowns of the first and second molars in the lower jaw were heavily worn, the roots still held together. In the first molar on the right side, the pulpar cavity was opened and buccally under the distal root there were traces of a large cyst. Other teeth were so worn that mastication continued on their roots. There also, the alveoli of all four incisors bore traces of granuloma. This advanced attrition of the incisors conforms with the conditions of the teeth in the three skeletons of the triple grave. There also, even though they were young individuals, advanced use of frontal teeth appeared, unlike the teeth that had cut through later. Certainly the kind of food and the intensity in using one's teeth had played a role here. As for sex determination, it is clear at first sight that this was a robust, adult male : supraorbital relief was very well formed (superciliar arches). The glabella is somewhat lower than the superciliar arches which exceed it. From a frontal view then, the glabella created a weak depression between them. In their middle part, the arches were strongest and merged gradually and laterally into a flat supraorbital trigonum. In a lateral view, the supraorbital relief was separated from the forehead by a weak supraorbital sulcus. The forehead was well arched but not too high. The temporal lines were well formed but limited only to the frontal bones. There were none on the parietal bones. A relatively strong processus zygomaticus was continued on the temporal bone by a supramastoidal ridge which had the shape of a short rounded mound. The mastoid process was wide and strong, characteristic of a strong male individual. The external occipital protuberance had a strong beak-like shape yet constituted a blunt boss, from which strong and rounded supreme nuchal lines ran laterally in both directions. The nuchal planum had a strong relief. On the very robust lower jaw, from a side view we see a rocking base and a rounded chin. In a frontal view this chin is relatively small, although mental tubercles are evident. All things considered, we are dealing with a very robust man with several morphological characteristics corresponding to other robust Gravettian male skulls from Predmosti III, Brno II and Pavlov.

As far as healed injuries are concerned, we find three on the forehead. The first one is a shallow healed depression of approximately 1 cm in diameter, located roughly 3 cm in front of the bregma. Two other injuries, approximately 1 cm and 1.5 cm long grooves, can be found on both sides of the right boss of the forehead. In all three cases, the exocranial bone had been only damaged, not fractured. The injuries were completely healed without complications. A fourth case of a healed injury can be found on the facial skeleton on the lower edge of the right cheek bone.

Conclusion

New excavations in the Gravettian site of Dolni Vestonice II have brought to light three very well preserved skeletons DV XIII, DV XIV and DV XV from a unique triple burial, a calotte of an adult male DV XI/XII and a skeleton of an adult male DV XVI. They have provided valuable information, not only on the physical type of South-Moravian, Gravettian hunters, but also on their life style and environment. Together with the finds from Brno and Predmosti, they make the Moravian, Gravettian population the best anthropologically documented Upper Palaeolithic population in Europe (table 6). The purpose of this preliminary study is to point out its signification.

Tab. 6 The Early Upper Palaeolithic human remains from Moravia (Gravettian / Pavlovian cultural tradition).

Find	age	year of discovery	found by	state of preservation
Predmosti I	20 - 25	1894	K. Maska	well preserved skeleton
Predmosti II	7	1894	K. Maska	well preserved skeleton
Predmosti III	35 - 40	1894	K. Maska	well preserved skeleton
Predmosti IV	35 - 40	1894	K. Maska	well preserved skeleton
Predmosti V	15 - 16	1894	K. Maska	well preserved skeleton
Predmosti VI	2 - 3	1894	K. Maska	part of a skeleton
Predmosti VII	12 - 14	1894	K. Maska	well preserved skeleton
Predmosti VIII	3 - 4	1894	K. Maska	well preserved skeleton
Predmosti IX	20 - 25	1894	K. Maska	well preserved skeleton
Predmosti X	20 - 25	1894	K. Maska	well preserved skeleton
Predmosti XI	6 months	1894	K. Maska	fragments of skeleton
Predmosti XII	4 months	1894	K. Maska	fragments of skull
Predmosti XIII	2 months	1894	K. Maska	fragments of skull
Predmosti XIV	40 - 50	1894	K. Maska	well preserved skeleton
Predmosti XV	child	1894	K. Maska	mandibular fragment
Predmosti XVI	child	1894	K. Maska	cranial fragments
Predmosti XVII	child	1894	K. Maska	mandibular fragments
Predmosti XVIII	20	1894	K. Maska	cranial fragments
Predmosti XIX	adult	1894	K. Maska	mandibular part
Predmosti XX	9 - 10	1894	K. Maska	arm bones and two teeth
Predmosti XXI	25 - 30	1894	J. Wankel	mandibular half
Predmosti XXII	9 - 10	1895	M. Kriz	skeletal fragments
Predmosti XXIII	subadult	1903	M. Kriz	skeletal fragments
Predmosti XXIV	8 - 10	1903	M. Kriz	mandibular fragment
Predmosti XXV	10 - 12	1903	M. Kriz	mandibular fragment
Predmosti XXVI	adult	1903	M. Kriz	mandibular fragment
Predmosti XXVII	adult	1928	K. Absolon	postcranial skeleton
Predmosti XXVIII	adult	1903	M. Kriz	right femoral fragment
Predmosti XXIX	adult	1903	M. Kriz	left femoral fragment
Brno II	40 - 50	1891	A. Makowsky	skull and postcranial fragments
Dolni Vestonice I	20 - 30	1925	K. Absolon	skull cap
Dolni Vestonice II	20 - 30	1930	K. Absolon	skull cap
Dolni Vestonice III	30 - 40	1949	B. Klima	skeleton
Dolni Vestonice IV	child	1927	K. Absolon	cremated skull fragments
Dolni Vestonice V		1925	K. Absolon	frontal bone fragment
Dolni Vestonice VI		1925	K. Absolon	frontal and occipital fragments
Dolni Vestonice VII	adult	1927	K. Absolon	two teeth
Dolni Vestonice VIII	adult	1934	K. Absolon	incisor
Dolni Vestonice IX	adult	1949	B. Klima	two molars, canine
Dolni Vestonice X	child	1951	B. Klima	deciduous molar
Dolni Vestonice XI/XII	40 - 45	1986	B. Klima	calva
Dolni Vestonice XIII	17 - 21	1986	B. Klima	well preserved skeleton
Dolni Vestonice XIV	15 -17	1986	B. Klima	well preserved skeleton
Dolni Vestonice XV	17 -21	1986	B. Klima	well preserved skeleton
Dolni Vestonice XVI	40 -45	1987	J. Svoboda	skeleton
Dolni Vestonice XVII		1986	B. Klima	two burned fragments of parietal bone
Dolni Vestonice XVIII		1986	B. Klima	fragment of humeral head
Dolni Vestonice XIX	adult	1986	B. Klima	patella
Dolni Vestonice XX	adult	1986	B. Klima	femoral head
Dolni Vestonice XXI	adult	1986	B. Klima	femoral head
Dolni Vestonice XXII	adult	1987	B. Klima	femoral shaft fragment
Dolni Vestonice XXIII		1927	K. Absolon	two burned skull fragments
Dolni Vestonice XXIV		1936	K. Absolon	parietal fragment
Dolni Vestonice XXV			K. Absolon	small cranial fragment
Dolni Vestonice XXVI	adult	1948	B. Klima	canine
Dolni Vestonice XXVII	child	1948	B. Klima	deciduous canine
Dolni Vestonice XXVIII		1924	K. Absolon	two skull fragments
Dolni Vestonice XXIX	child	1924	K. Absolon	deciduous canine
Dolni Vestonice XXX		1924	K. Absolon	skull fragment
Dolni Vestonice XXXI	adult	1974	B. Klima	two molars
Dolni Vestonice XXXII	adult	1974	B. Klima	molar
Dolni Vestonice XXXIII	adult	1987	B. Klima	premolar
Dolni Vestocice XXXIV		1987	B. Klima	phalanx

References

ABSOLON, K., 1938, Vyzkum diluvialni stanice lovcu mamuto v Dlonich Vestonicich na Pavlovskych kopcich na Morave, *Pracovni zprava za rok* 1924, Brno.

ABSOLON, K., 1938, Vyzkum diluvialni stanice lovcu mamuto v Dlonich Vestonicich na Pavlovskych kopcich na Morave, *Pracovni zprava za druhy rok* 1925, Brno.

ABSOLON, K., 1945, Vyzkum diluvialni stanice lovcu mamuto v Dlonich Vestonicich na Pavlovskych kopcich na Morave. Pracovni zprava za treti rok. Die Erforschung der diluvialen Mammutjäger-Station von Unter-Wisternitz in den Pollauer Bergen in Mähren. Brno, 1945.

CERNY, M. and KOVANDA, S., 1980, Sexual Diagnosis by the Measurement of Humerus and Femur, *Sbornik praci pedagogicke fakulty University Palackeho v Olomouci, Biologie*, 2, pp. 147-167.

HAVLICEK, P. et KOVANDA, J., 1985, Nove vyzkumy kvarteru v okoli Pavlovskych kopcu, *Anthropozoikum*, 16, pp. 21-59.

JELINEK, J., 1987, A New Palaeolithic Triple-Burial Find, *Anthropologie*, 25/2, pp. 189-190.

JELINEK, J., 1987, New Upper Palaeolithic Human Remains in Dolni Vestonice, Czechoslovakia, *Rivista di Antropologia*, 55, pp. 421-422.

JELINEK, J., 1987, Considérations sur l'art paléolithique mobilier de l'Europe Centrale. *L'Anthropologie* (Paris), 92, 1, pp. 203-238.

JELINEK, J., 1990, Art in the Mirror of Ages. The Beginnings of Artistic Activities, *Anthropos*, Brno.

KLIMA, B., 1963, *Doni Vestonice*, Praha, Akademia.

KLIMA, B., 1987, Mladopaleoliticky trojhrob v Dolnich Vestonicich, *Archeologicke Rozhledy*, 39, Praha, pp. 241-254, 353-357.

KLIMA, B., 1987, Das jungpaläolithische Massengrab von Dolni Vestonice. Vorläufige Mitteilung, *Quartär*, 37/38, pp. 53-62.

OLIVA, M., 1988, A Gravettian Site with Mammoth Bone Dwelling in Milovice, Southern Moravia, *Anthropologie*, 26/2, pp. 105-112.

TRINKAUS, E. and HOWELLS, W.W., 1979, The Neanderthals, *Scientific American*, 241, pp. 118-133.

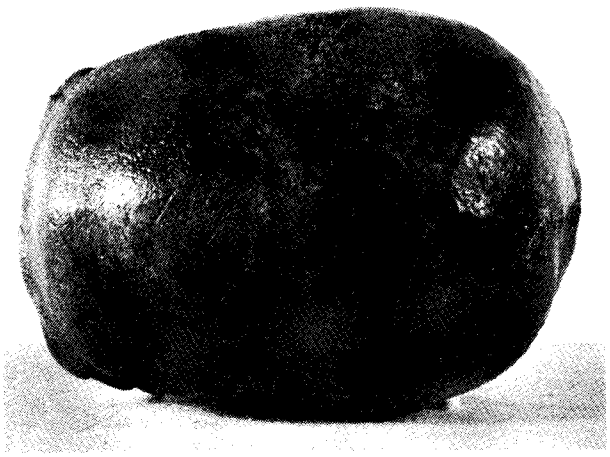

Fig. 5 The skull Dolni Vestonice XV in vertical view.

Fig. 6 The skull Dolni Vestonice XV in lateral view.

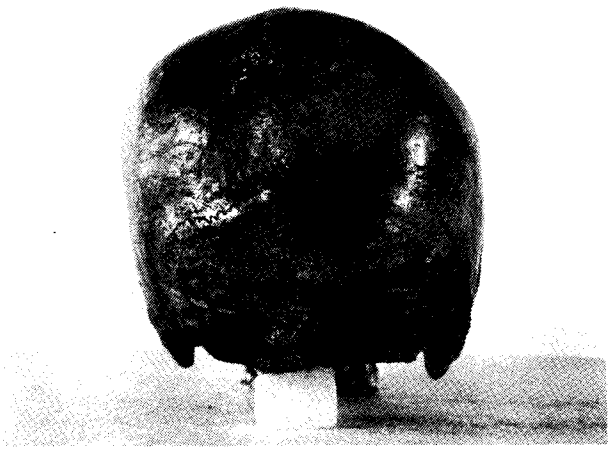

Fig. 7 Occipital view of the skull Dolni Vestonice XV.

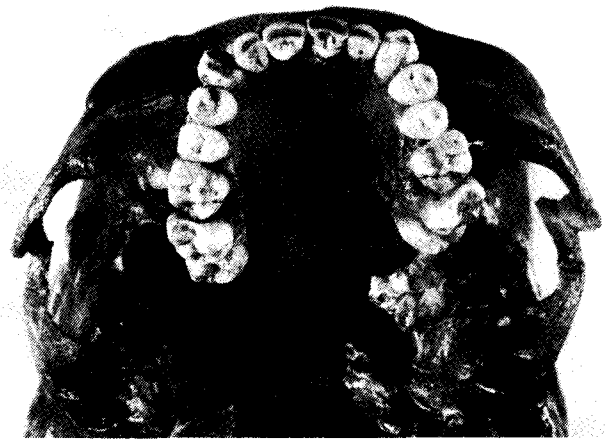

Fig. 8 Detail of the dental arch of Dolni Vestonice XV.

Fig. 9a, b Comparison of the pelvic morphology of DV XV (a) and DV XIV male (b).

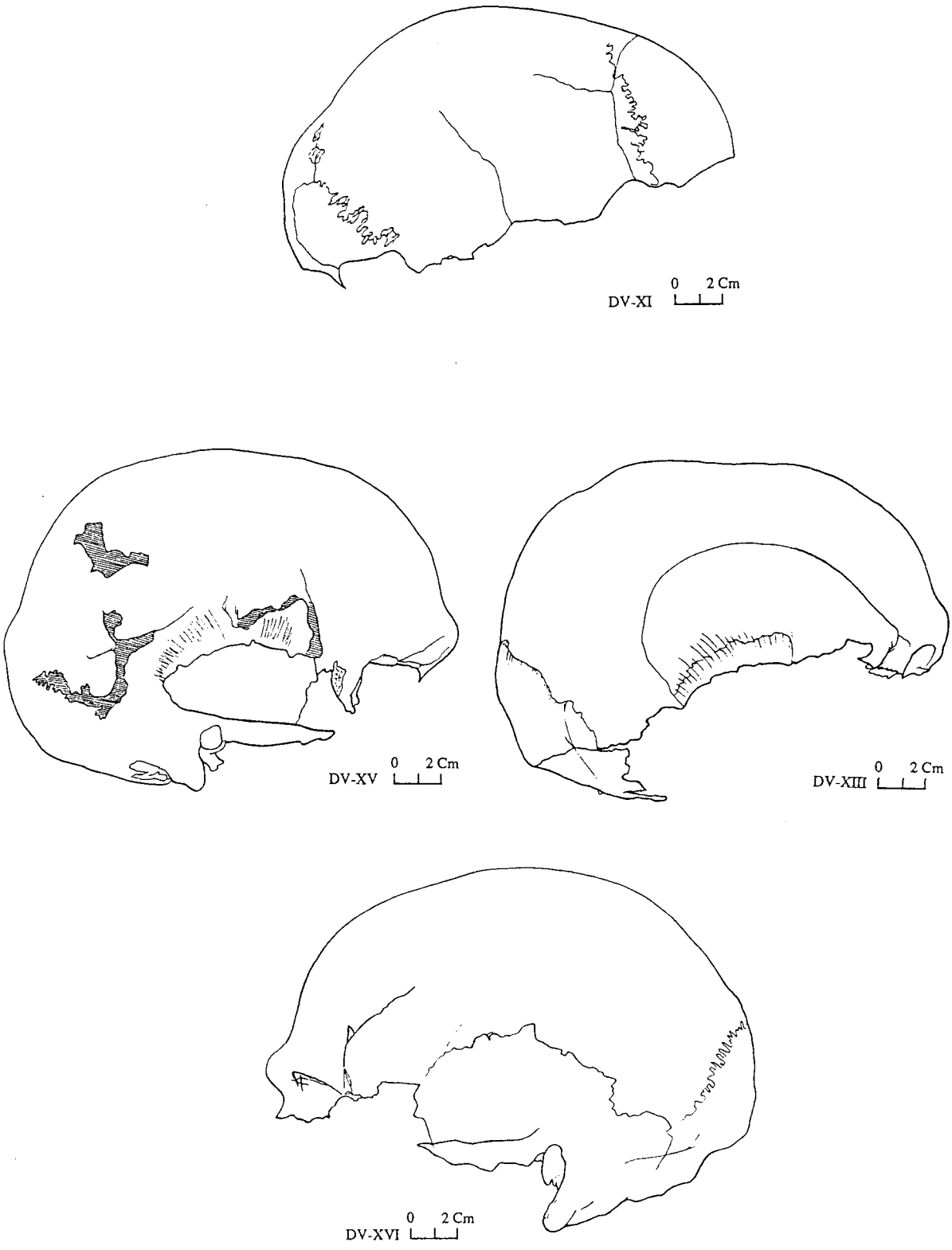

Fig. 10 Comparison of the braincases of DV XI, XIII, XV and XVI.

Fig. 11a, b Comparison of DV XV (a) and DV XIV male (b) hip bones. Compare the shape of the sciatic notch and the position of acetabula.

Fig. 12 a, b Dorsal and ventral side of DV XV sacrum. Compare the upper breadth with fig. 13 a, b.

Fig. 13 a, b Dorsal and ventral side of DV XIV male sacrum.

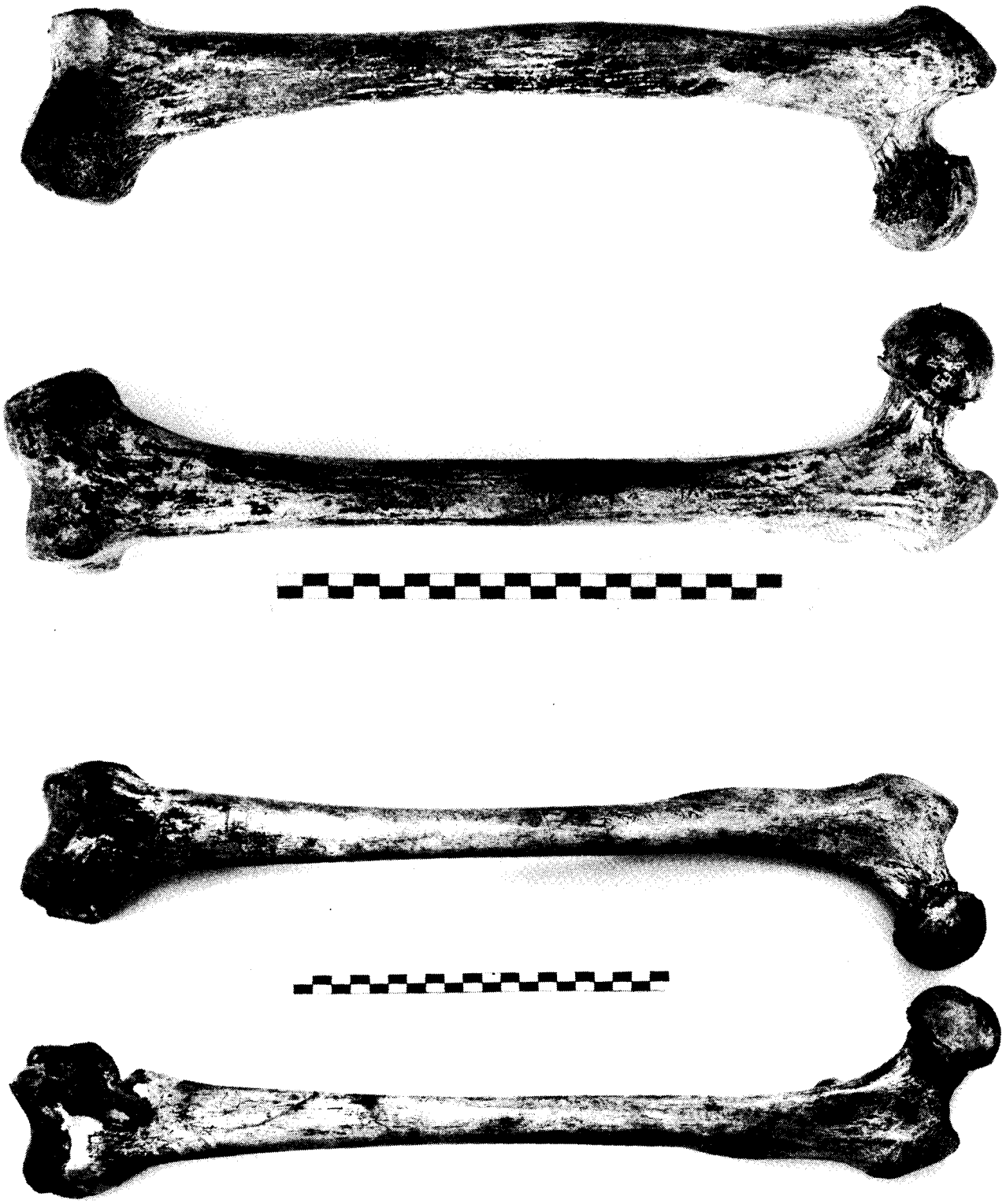

Fig. 14 a, b Comparison of DV XV (a) and DV XIV male (b) femora. Note the difference in length, in the position of trochanter major, in the shape of the subtrochanteric part of the shaft and in the collo-diaphyseal angle.

Fig. 15 a, b Frontal view (a) of right and left tibiae of DV XV compared with the frontal view of both DV XIV male tibiae (b).

Fig. 16 a, b Both humeri of DV XV : a, posterior view; b, medial view. Note the distal end of the bone.

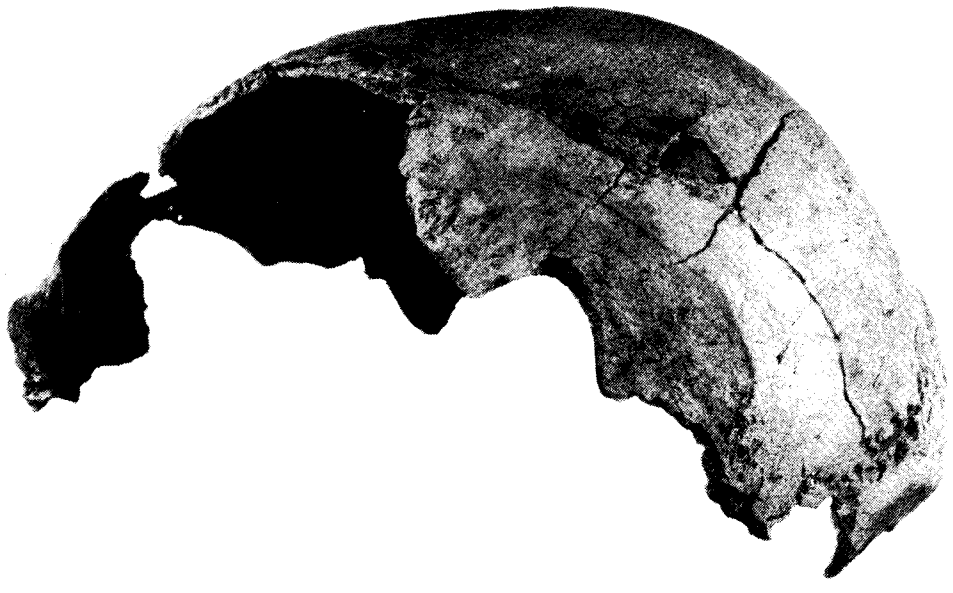

Fig. 17 Lateral view of DV XI / XII.