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Variability of mammoth images in Paleolithic art

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The most characteristic traits of mammoth images in Paleolithic art are the outlines of the front end and uppermost parts of the animal. As a rule the actual contour of the mammoth body was hidden to a considerable degree by a thick hair cover that influenced the features of images. The variability of mammoth images, on the one hand, appears to depend on the kinds of art techniques (painting, engraving, sculpture) and peculiarities of the regional, local or even personal style. On the other hand, this variability also may have resulted from the individual exterior of portrayed animals that differed in age, sex, or condition.

Variatie binnen mammoetafbeeldingen in Paleolithische kunst – De contouren van de voorkant en van de rugzijde van mammoeten vormen de meest karakteristieke kenmerken van afbeeldingen van deze dieren in Paleolithische kunst. De contour van het lichaam was gewoonlijk grotendeels verborgen achter een dikke vacht. De variatie binnen de afbeeldingen is enerzijds afhankelijk van de gebruikte techniek (schildering, gravure, beeldhouwwerk) en van bijzonderheden van de regionale, plaatselijke of zelfs persoonlijke stijl, anderzijds van het door leeftijd, geslacht of conditie bepaalde uiterlijk van de dieren.

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INTRODUCTION

An examination of the variation of mammoth images in the Paleolithic art, in my opinion, must be based primarily on knowledge of paleontological reconstructions of its body shape. The paleontological criteria allow us to distinguish both realistic and stylistic features of the mammoth drawings and also their peculiarities (Lioubine 1991, Lyubin 1995). Up to now investigations of numerous mammoth remains and carcasses from Siberian permafrost areas have yielded clear evidence about the mammoth's appearance. Judging by these data the most important characteristics of the body appear to be the outlines of its head, neck and back including the hair cover

(V. Garutt 1960, 1964, N. Garutt 1987, Vereshchagin 1979, Vereshchagin & Tikhonov 1990).

THE BODY PROFILE

In contrast with the skulls of modern elephants that of the mammoth is more narrow in transverse section and also higher owing to more developed neurocranium. Because of flatness or sometimes the concave shape of the forehead in side-view, the crown of the mammoth head looks tapered (Fig. 1, no. 14). From the front the mammoth skull manifests another shape and its upper part is rather rounded (Fig. 1, no. 13; V. Garutt 1960).

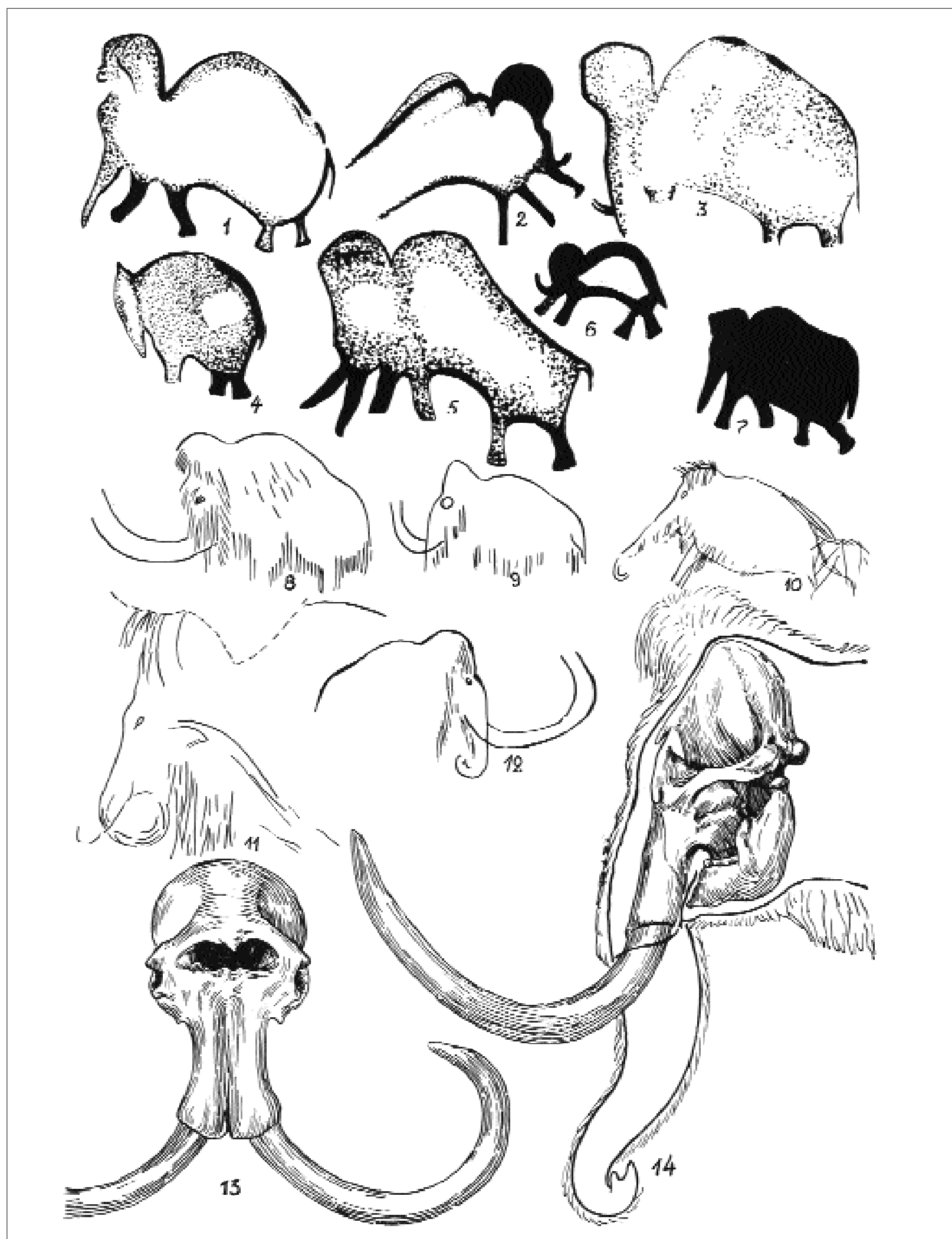


Figure 1 - Nos. **1-7**: mammoth drawings from Kapova. Nos. **1-4**: the First, Second, Third and the Fourth mammoths from the Eastempanel. Nos. **5-7**: the Fifth, Sixth and the Seventh mammoths from the Westempanel (after Lioubine 1991). Nos. **8, 9, 12** mammoth drawings from Rouffignac (**8**: 'Patriarche', **9**: 'Solitaire', **12**: 'Mammouth de la Decouverte'; after Nougier 1978). Nos. **10, 11**: mammoth drawings from Gönnersdorf (after Bosinski & Fischer 1980). No. **13**: mammoth skull from the front (after V. Garutt 1960). No. **14**: mammoth skull and reconstruction of its exterior from side-view (after N. Garutt 1987). Scales are various.

The most important peculiarities of the mammoth's complete contour in profile are worth examining, and particularly the outline of its anterior and upper parts. In the section around the trunk and forehead are two clearly visible angles. One angle resulted from the protruding process of the nasal bones, while the other is the beginning of the flexible part of the trunk (Fig. 2, nos. 2, 3, 4, 6; Lioubine 1991). As distinct from modern elephants the mammoths are characterized also by longer (up to 3-4 m) and often spiral-like tusks. The enormous heaviness of the head with such tusks must have created a great load on the cervical and thoracic vertebrae. As a result there was an increase in the length of the spinous processes of the last cervical and anterior thoracic vertebrae, the development of a 'shoulder' hump, and a shortening of the neck. So in profile the neck manifests itself as a narrow saddle-like depression separating the head from the humped back. From the hump or withers the spinal profile steeply sinks from the shoulder to the sacrum (V. Garutt 1960, 1964).

According to Vereshchagin & Tikhonov (1990), however, the hump was also partly shaped by the thicker hair cover on the withers. In general the 'overcoat' had a considerable effect on the mammoth exterior. 'Very long locks of wool (about 1 m or more) hung down almost to the ground from the shoulders, sides and belly. (...) The coarse hair falling on the forehead was inclined forward' (Vereshchagin 1979: 26-27). On the top of its forehead and the crown of the mammoth head there was a shock of matted or curly (?) hair (Vereshchagin & Tikhonov 1990: 29).

The size and main features of the mammoth exterior vary, of course, depending on the sex and individual age of the animals. In comparison with the adults, mammoth calves and young had shorter, rounder, or globe-shaped bodies with relatively longer legs. The calves were born shaggy and possessing very small (3-4 cm long) milk tusks. Adult males differed from females primarily in having a heavier head

with longer, more curved tusks, and a more strongly expressed back hump. The legs of the adult individuals were relatively short and pillar-shaped, with almost the same thickness from torso to the ground. The limb joints were hardly visible when the animal was standing still (V. Garutt 1960, 1964).

PALEOLITHIC DEPICTIONS OF THE BODY PROFILE

The paleontological data about the mammoth exterior must be compared with Paleolithic depictions of the animal. The overwhelming majority of depictions are made in profile, perhaps because that position was most often observable, more easily rendered, and the most informative. The contours of mammoth figures usually include the hair cover of the animal, and as a result the figures often look heavy, corpulent and short-legged, such as the depictions at Font-de-Gaume (Fig. 2, no. 2), Avdevo (Fig. 3, no. 12), Kapova (Fig. 1, nos. 3, 4), Kostenki (Fig. 4, nos. 1-6), and some others. In certain cases the wool locks were pictured by means of numerous lines, such as, for example, at Rouffignac (Fig. 1, nos. 8, 9), Gönnersdorf (Fig. 1, no. 11), La Madeleine (Fig. 2, no. 6), Bernifal (Fig. 2, no. 1), and Font-de-Gaume (Fig. 2, no. 2; Bosinski & Fischer 1980, Breuil 1974; Capitan *et al.* 1910, Nougier 1978, Nougier & Robert 1959).

The images of the mammoth head are variable. In the majority of figures the shape is rounded because it includes the forelocks of hair concealing the flatness of the forehead. This type of head profiling is seen, for instance, in the caves Font-de-Gaume (Fig. 3, nos. 5, 7-10), La Martine (Fig. 3, no. 6), Rouffignac (Fig. 1, no. 12), Ignatievskaya (Fig. 3, no. 13) and from the sites Malta (Fig. 4, no. 7), Avdevo (Fig. 2, no. 3; Fig. 3, no. 12), Kostenki (Fig. 4, nos. 2-6), Berelekh (Fig. 4, no. 9) and some others. The frequency of such portrayals of the mammoth head has led some scholars to the perhaps erroneous notion that the rounded skull (*la crane bombe*) is one characteristic trait of *Mammuthus primigenius* (Bandi 1984: fig.1).

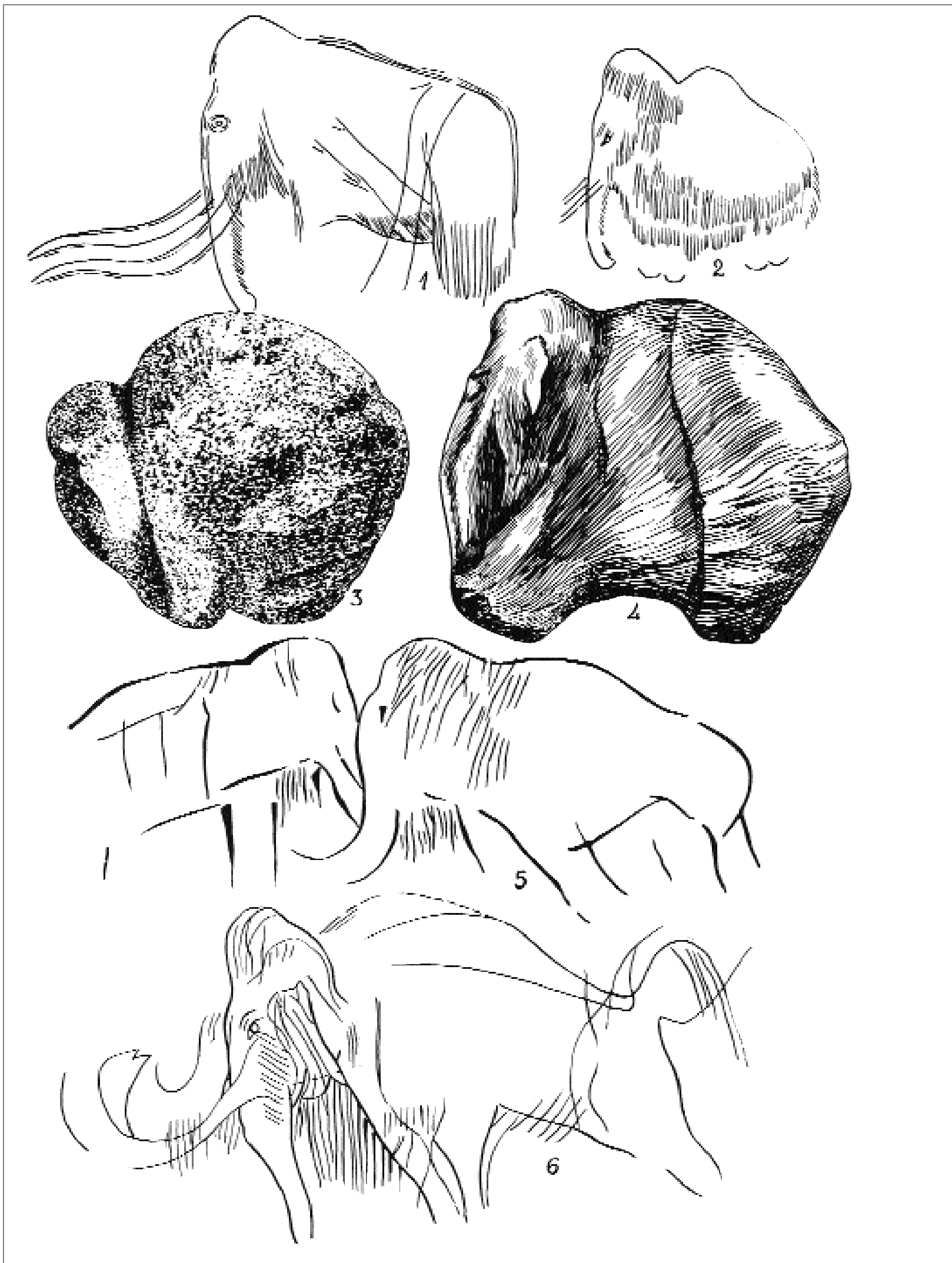


Figure 2 No. **1**: mammoth drawing from Bernifal (after Breuil 1974). No. **2**: mammoth drawing from Font-de-Gaume (after Capitan *et al.* 1910). No. **3**: mammoth statuette from Avdeevo (Russia; after Gvozdover 1952). No. **4**: mammoth statuette from Predmosti (after Maska *et al.* 1912). No. **5**: mammoth drawing from Laugerie-Haute (after Leroi-Gourhan 1971). No. **6**: mammoth drawing from La Madeleine (after Capitan *et al.* 1910). Scales are various.

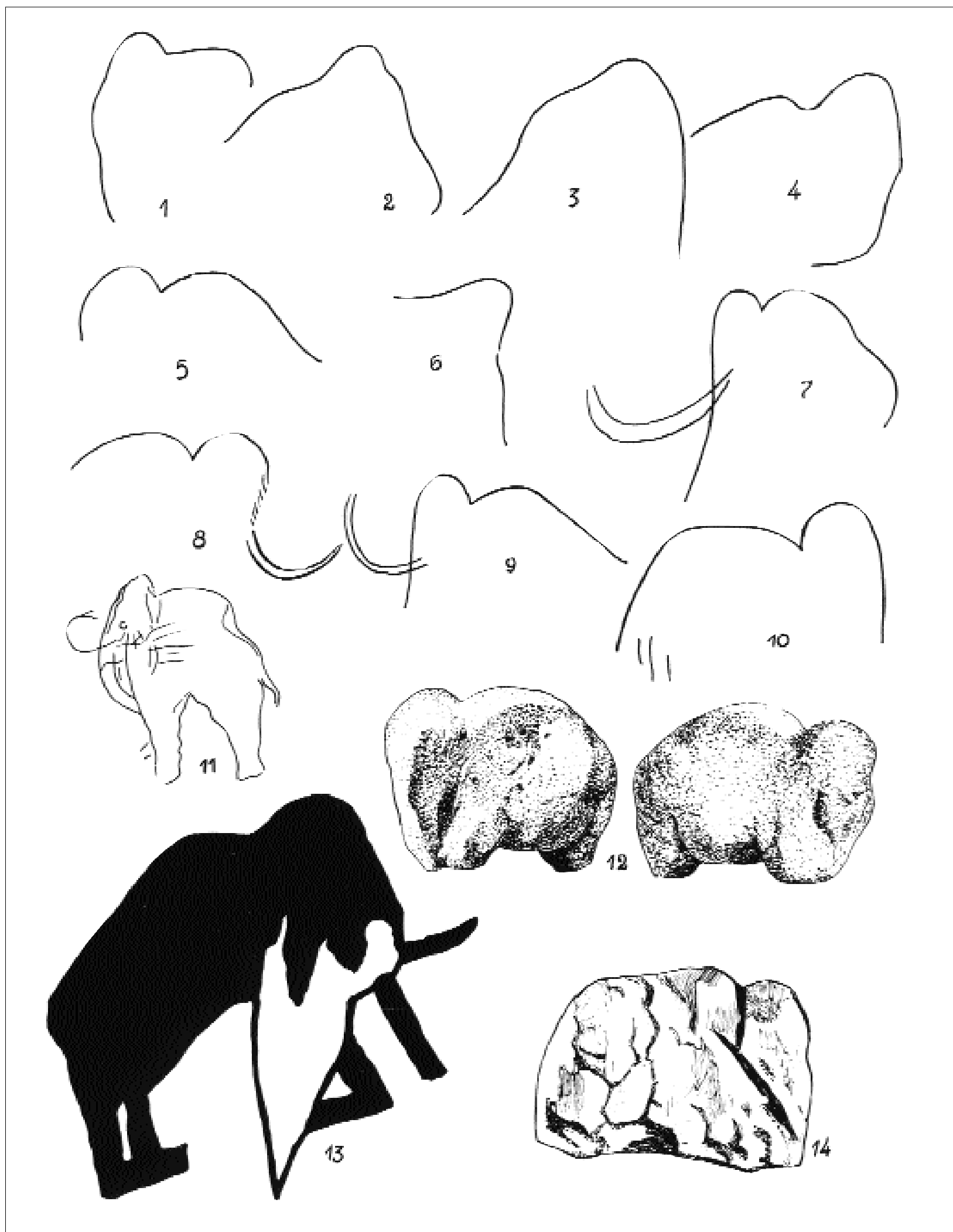


Figure 3 Nos. **1-10**: reduced drawings of mammoths. No. **1**: Chabot (after Combier *et al.* 1959). Nos. **2-4**: Pech-Merle (after Delluc & Delluc 1983). Nos. **5, 7-10**: Font-de-Gaume (after Capitan *et al.* 1910). No. **6**: La Martine (after Delluc & Delluc 1983). No. **11**: mammoth drawing from Pair-non-Pair (after Breuil 1974). No. **12**: mammoth statuette from Avdeevo (after Gvozdover 1983). No. **13**: mammoth drawing from the Ignatievskaya Cave, Ural (after Petrin & Sirokov 1991). No. **14**: mammoth statuette from Eliseevichi (after Grekhova 1980). Scales are various.

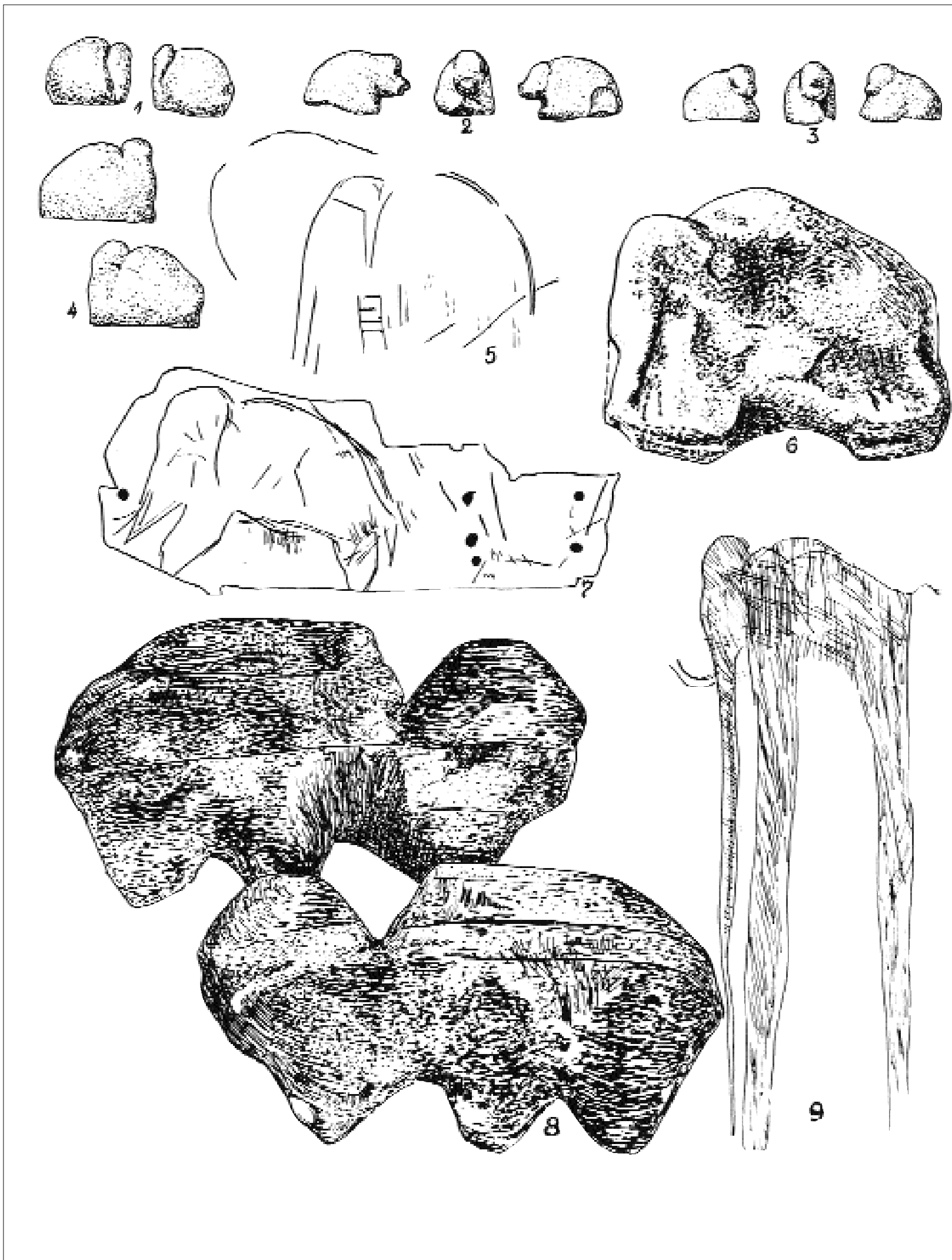


Figure 4 Nos. **1, 4, 6**: mammoth statuettes from Kostenki I (after Efimenko 1958, Praslov 1986). Nos. **2, 3**: mammoth statuettes from Kostenki II (after Rogachev 1962). No. **5**: mammoth drawing from Kostenki 2I (after Praslov 1985). No. **7**: mammoth drawing from Malta, Siberia (after Gerasimov 1931). No. **8**: mammoth statuette from Ust-Kova, Siberia (after Vasilievski & Drozdov 1983). No. **9**: mammoth drawing from Berelekh, Siberia (after Bader & Flint 1977). Scales are various.

In other cases there is an approximate right angle between the forehead and the clearly flat crown, seen, for example, on the figures from Kapova (Fig. 1, nos. 5, 7) and Predmosti (Fig. 2, no. 4). This feature may be explained as another mode of picturing the forehead together with the overhanging forelocks.

More realistic images of the mammoth head in profile are not common, but can be seen in depictions from La Madeleine (Fig. 2, no. 6), Pair-non-Pair (Fig. 3, no. 11), and Rouffignac (Fig. 1, no. 9). The flatness of the forehead and the bulge of the forelocks covering the upper forehead are clearly visible in the drawing of the old (?) mammoth (the so-called 'Patriarche') from Rouffignac (Fig. 1, no. 8) and in certain engravings from Gönnersdorf (Fig. 1, nos. 10, 11). The forelocks painted with several touches of the brush can be discerned on the First Mammoth from Kapova cave, too. One of these locks is evidently curled (Fig. 1, no. 1).

As regards the profile of the mammoth as a whole, the line 'trunk - head - neck - back' must have seemed so characteristic and recognizable to ancient artists that they sometimes reduced drawings only to these outlines or even to no more than the anterior section of it (Fig. 3, nos. 1-10). In the section 'trunk-forehead' the two angles mentioned above were often pictured. The upper of these angles (the protruding process of the nasal bones) is observable in almost all figures of mammoth. The second angle indicating the beginning of flexible trunk is found more rarely in Paleolithic art. This bend may be seen, for instance, in figure from La Madeleine (Fig. 2, no. 6) and in cases where the trunk is also depicted, it is held low and close to the forelegs as in the statuettes from Predmosti (Fig. 2, no. 4) and Avdevo (Fig. 2, no. 3).

DEPICTIONS OF ANIMALS OF DIFFERENT AGES

Some differences in mammoth images (such as in relative sizes, peculiar outlines, or details) seemed to have resulted from the individual ages of pictured animals. In the Kapova Cave (South Ural region), for instance, among the mammoth drawings the adults, one calf and probably one young animal are recognizable. The calf is distinguished by its relatively small size and globe-shaped body (Fig. 1, no. 6). Other drawings (except one figure) appear to represent adults characterized by corpulent bodies with noticeable humps, heavy heads, and relatively short legs (Fig. 1, nos. 1, 3, 5, 7). The absence of tusks (Fig. 1, nos. 1, 4, 7) or their unusually small size (Fig. 1, nos. 3, 5) may be a reflection of a local stylistic preference (Bader 1965, Liubine 1991). The particular outline of the Fourth Mammoth (Fig. 1, no. 4), distinguished by its shortened body and extraordinarily narrow head, may have been shaped by a very limited wall area with solution crevices (Fig. 5). In general the heavy body and short legs of this figure suggest that it probably represents an adult individual as well. Finally, one of the mammoth images of Kapova differs from others in having a relatively lean body and thin trunk (Fig. 1, no. 2), indicating possibly this animal's young age.

According to Vereshchagin & Tikhonov (1990), these three age groups and also animals of different sexes are recognizable among the engraved mammoth images from Gönnersdorf.

Vereshchagin & Tikhonov (1990) believe a large part of the engravings represent young females, pictured with thin bald trunks, small tusks, and slightly convex (but unhumped) backs.

Mammoth calves from Gönnersdorf are characterized by a thick hair cover depicted with numerous lines and by the absence of the neck flexure, such that their heads and backs are joined with single bow-shaped lines (Vereshchagin & Tikhonov 1990). It should be noted that in the art of the Franco-Cantabrian region, mammoth calf images are rare (Baffier & Girard 1995: 215, fig. 6).

As mentioned above, a majority of mammoth figures in Palaeolithic art is shown in profile; their appearance from the front may be observed almost exclusively in statuettes, such as from Kostenki (Rogachev 1962), Avdeevo (Gvozdover 1952, 1983), Predmosti (Maska *et al.* 1912). Among the drawings I know there is only a single case in Kapova where one of the mammoths appeared to be depicted partially from a side-view of the body and partially from the front of the head (Fig. 1, no. 3). This interpretation of the head posture is based on a comparison of its outlines with those of two skull views (Fig. 1, nos. 13, 14). Another unusual method of portraying a mammoth is known from La Baume-Latron where a combination of a profile figure with unusually turning tusks can be seen (Breuil 1974).

Foreshortening in mammoth drawings is very rare as well. This mode of picturing seems to have been used for the Seventh Mammoth of Kapova. The perspective includes some shortening of the figure, partial superposition of its shoulder on the head, and a corresponding

decrease of flexure between the neck and back. As a result, this mammoth looks as if it is going away from the observer (Fig. 1, no. 7).

CORRECTIONS AND SUPERPOSITIONING

Here I will only touch upon variability in correction modes and image superposition. On the shale plates from Gönnersdorf, for example, additions and (probable) corrections were made to the contours of the mammoth heads, backs and bellies, by means of additional lines or small scratches (Bosinski & Fischer 1980: plates 15, 16, 25). Similar attempts to correct the contours of backs, heads, and tusks by adding other continuous lines are noticeable, also, in the sites Rouffignac, La Madeleine, Malta and so on.

As regards cases of superposition they are various, but three main kinds can be distinguished. First, there are mammoth drawings covered with tectiforms (e.g., Font-de-Gaume, Bernifal). Second, sometimes the mammoth images were superimposed on those of other

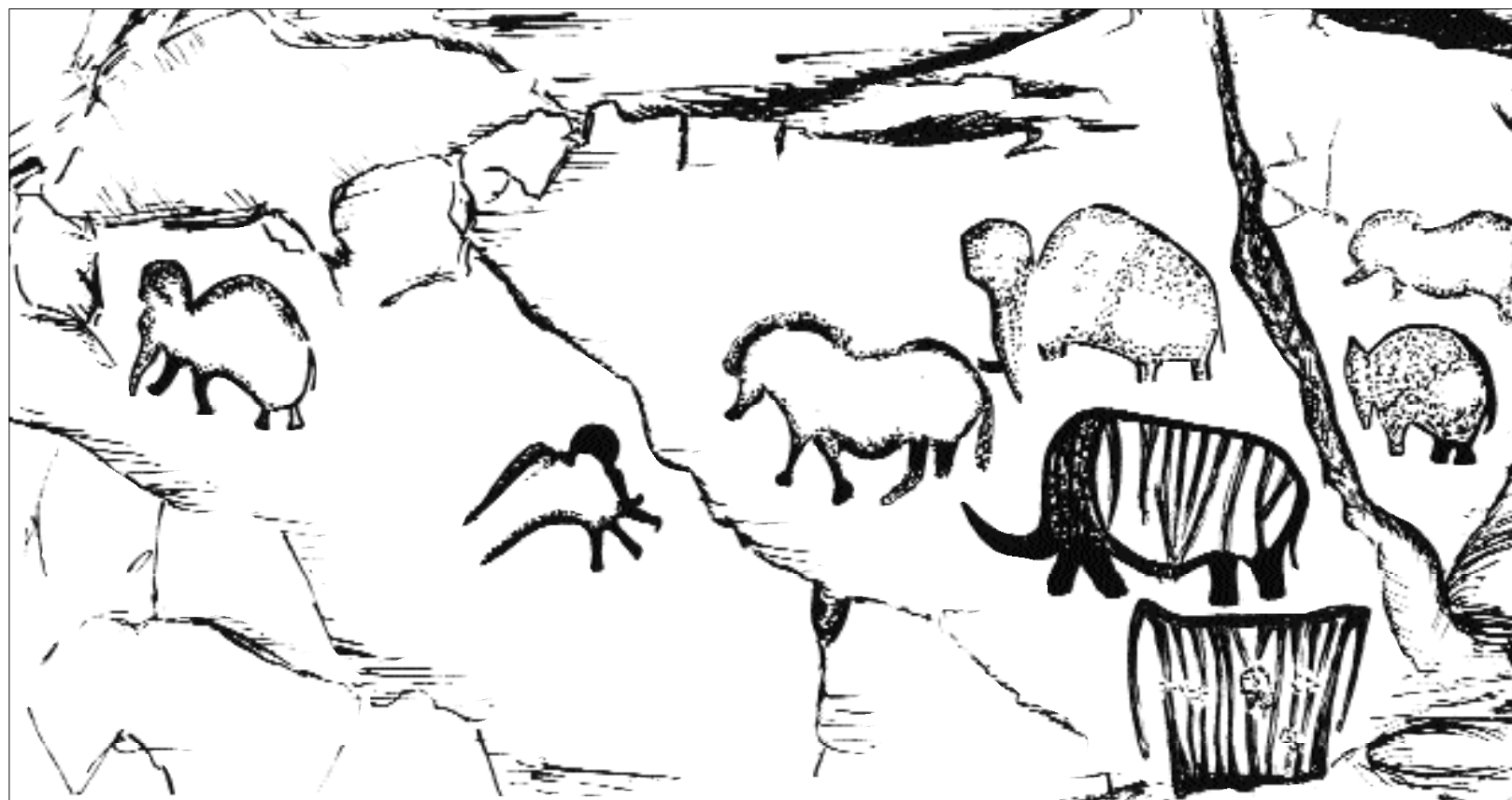


Figure 5 Kapova Cave, the Eastern panel (on the left side - the First and the Second mammoths; in the center - the Ryumin' Horse, the Third Mammoth, the rhinoceros and geometric figure; on the right side - the horse and the Fourth Mammoth). Scale is about 30 cm to 1 cm (after Lioubine 1990, 1991).



Figure 6 Kapova Cave, the West panel (from left to the right: the Fifth, Sixth and the Seventh mammoths). Scale is about 20 cm to 1 cm (after Lioubine 1990, 1991).

animals, such as on the Great Frieze of Font-de-Gaume, where there are complex superpositions of drawings of mammoth, bison, and horse or deer covering each other. And third, there are also superpositions of different images of the mammoths themselves (Gönnersdorf, Chabot and some other sites).

One of the most unusual variants of such superpositions may be seen in Berelekh (Siberia). In this site there are two figures, and the larger of them is superimposed on the smaller, so that the crown of the latter is formed by the rounded bulge in the flexure between the head and the back of the former (Fig. 4, no. 9; Bader & Flint 1977). A similar prominent fold between the head and hump of the Second Mammoth from Kapova Cave (Fig. 1, no. 2) may or may not also represent a superpositioned second mammoth.

One of the most important kinds of variability in mammoth images is the picturing of the animals in postures of either immobility or locomotion. Drawings of evidently moving mammoths were found in La Madeleine (Fig. 2, no.

6), Laugerie-Haute (Fig. 2, no. 5), Combarelles (Capitan *et al.* 1924, Leroi-Gourhan 1971) and some others. Nevertheless in general such drawings are not frequent in the Franco-Cantabrian region. In many cases the lower part of the body was not pictured at all, or in place of legs only the long locks of wool were painted. The mammoth drawings from Kapova are remarkable for the movement suggested with all the figures. This impression is produced by means of postures of their bodies and legs. Some limbs are depicted as if making a step (Fig. 1, nos. 1, 4, 5, 7) or galloping (Fig. 1, nos. 2, 6). In two cases the feet and bending leg joints were depicted (Fig. 1, nos. 1, 7). The same features of the mammoth legs and feet may be even more clearly visible in engravings from Gönnersdorf (Bosinski & Fischer 1980: fig. 12, plate 13, 32, and some others). Two figures from Kapova are distinguished by their strained bodies, inclination of the belly lines, considerably lower levels of the hind feet relative to forefeet and pelvis relative to shoulder. These two mammoths seem to be climbing (Fig. 1, nos. 5, 7). Among the drawings of Kapova there is one figure entirely coated with

red paint (Fig. 1, no. 7) and another that is partially covered (Fig. 1, nos. 2, 6). The head of the Second Mammoth resembling a mitre was painted so that it produces the effect of a three-dimensional portrait (Fig. 1, no. 2; Bader 1965, Lioubine 1991). Painted over mammoth figures were found also in another South-Uralian cave named Ignatievskaya (Fig. 3, no. 13; Petrin & Sirokov, 1991). This manner of picturing mammoths, as far as I know, is not met in the Franco-Cantabrian region and should be regarded as a local feature of the Uralian Paleolithic art.

REALISM AND STYLE

In general the variability of mammoth images appears to proceed from both realistic and stylistic differences. At Gönnersdorf for example, according to G. Bosinski (1995), the image of each animal is rendered as individually as it appeared in nature and there is no expressed stylistic convention. However, a considerable part of the mammoth images from many other sites (for example, Chabot, Font-de-Gaume, La Baume-Latrone, Rouffignac, Kostenki and so on) show the evident stylistic convention and local characteristics of a true art style (Fig. 2, nos. 1-5; Fig. 3; Fig. 4; Capitan *et al.* 1910, Combier *et al.* 1959, Rogachev 1962, Leroi-Gourhan 1971, Nougier 1978, and others). Sometimes stylistic variability may be observed even within a single site. For instance, the drawings of Kapova, despite some individual features (see above), seem to manifest certain stylistic differences between the Eastern panel (Fig. 1, nos. 1-4; Fig. 5) and the Western one (Fig. 1, nos. 5-7; Fig. 6) when depicting heads and backs.

CONCLUSION

In this short contribution only some aspects and some cases of the variability in mammoth images have been described. For an elaboration of the problem, including making distinctions between stylistic and realistic features, it is necessary in my opinion always to take into consideration and to study more carefully the

variability of mammoth bodies in reality, as conditioned by factors such as geographical and inter-population variations, sexual dimorphism, and individual and geological age (including the differences separating early and late types of *Mammuthus primigenius*). It is clearly of importance to be able to understand changes in mammoth bodies, but equally it is important also to be able to understand how Paleolithic people changed their ways of depicting this species over time.

REFERENCES

- Bader, O.N., 1965 - The Kapova Cave (in Russian) - Izdatelstvo 'Nauka', Moskva
- Bader, O.N. & Flint, V.E., 1977 - Engraving on the mammoth tusk from Berelekh (in Russian) - Trudy Zoologicheskogo Instituta AN SSSR 72: 68-72
- Baffier, D. & Girard, M., 1995 - Grande grotte d'Arcy-sur-Cure (Yonne). Second sanctuaire paléolithique Bourguignon - L'Anthropologie 99: 212-220
- Bandi, H.-G., 1984 - Contribution de la zoologie et de l'ethnologie à l'interprétation de l'art des peuples-chasseurs préhistoriques - L'Anthropologie 88: 563-571
- Bosinski, G., 1995 - Exterior of mammoth in the images from Gönnersdorf (Rhine, Germany) - in: Baryshnikov, G., Kuzmina, I. & Saunders, J. (eds.) - Abstracts of Papers Presented at the First International Mammoth Conference, 16-22 October 1995, St Petersburg, Russia. Cytology 37: 666
- Bosinski, G. & Fischer, G., 1980 - Mammot-und Pferdedarstellungen von Gönnersdorf - Franz Steiner Verlag, Wiesbaden
- Breuil, H., 1974 - Quatre cents siècles d'art pariétal. Les cavernes ornées de l'âge du Renne - Editions Max Fourny Art et Industrie, Paris
- Capitan, L., Breuil, H. & Peyrony, D., 1910 - La caverne Font-de-Gaume aux Eyzies (Dordogne) - Monaco
- Capitan, L., Breuil, H. & Peyrony, D., 1924 - Les Combarelles aux Eyzies (Dordogne) - Paris
- Combier, J., Drouot, E. & Huchard, P., 1959 - Les grottes solutréennes à gravures pariétales du canyon inférieur de l'Ardèche - Mémoires de la Société Préhistorique Française 5: 61-117
- Delluc, B. & Delluc, G., 1983 - Les grottes ornées de Domme (Dordogne); La Martine, Le Mammouth et le Pigeonnier - Gallia préhistoire 26: 7-80

- Efimenko, P.P., 1958 - Kostenki I (in Russian) - Izdatelstvo Akademii nauk SSSR, Moscow
- Garutt, N., 1987 - On reconstruction of exterior of the extinct elephants (in Russian) - Trudy Zoologicheskogo Instituta AN SSSR 168: 100-107
- Garutt, V., 1960 - Picturing of mammoth by the Upper Palaeolithic people (in Russian) - Materialy issledovaniya po arheologii SSSR 79: 150-163
- Garutt, V., 1964 - Das Mammot (*Mammuthus primigenius* Blumenbach) - A. Ziemsen Verlag, Wittenberg
- Gerasimov, M.M., 1931 - Malta, the Palaeolithic site (in Russian) - Irkutski Kraevoy Muzey, Irkutsk
- Grekhova, L.V., 1980 - Figure of mammoth from the site Eliseevichi (in Russian) - Trudy Istoricheskogo Muzeya 51: 4-7
- Gvozdover, M.D., 1952 - Sculptural image of mammoth from the Palaeolithic site Avdeevo near Kursk (in Russian) - Uchenye zapiski Moskovskogo Gosudarstvennogo Universiteta 158: 211-216
- Gvozdover, M.D., 1983 - Novye nakhodki iz Avdeeva (in Russian) - Voprosy Antropologii 71: 42-63
- Leroi-Gourhan, A., 1971 - Préhistoire de l'art occidental - Edition de l'art Lucien Masenod, Paris
- Lioubine, V.P., 1990 - Drawings of mammoths in the Kapova Cave (in Russian) - in: Devlet, M. (ed.) - Problemy izucheniya naskalnykh izobrazeniy v SSSR – pp: 56-64. Institute of Archaeology of Academy of Sciences of USSR, Moscow
- Lioubine, V.P., 1991 - Images of mammoths in Palaeolithic art (in Russian) - Sovetskaya Arkheologiya 1: 20-42
- Lyubin, V.P., 1995 - Variations in Mammoth drawings in Palaeolithic art - in: Baryshnikov, G., Kuzmina, I. & Saunders, J. (eds.) - Abstracts of Papers Presented at the First International Mammoth Conference, 16-22 October 1995, St Petersburg, Russia. Cytology 37: 686-687
- Maska, C., Obermaier, H. & Breuil, H., 1912 - La statuette de Mammouth de Predmosti -L'Anthropologie 23: 273-285
- Nougier, L.-R., 1978 - Rouffignac. La grotte aux cent mammoths - Les éditions du Périgord Noir
- Nougier, L.-R. & Robert, R., 1959 - Rouffignac I. Galerie Henri Breuil et Grand Plafond - Firenze, Sansoni
- Petrin, V.I. & Sirokov, V.V., 1991 - Die Ignatievskaya-Höhle (Ural) - Jahrbuch des Romisch-Germanischen Zentralmuseums 38: 17-31
- Praslov, N.D., 1986 - Sculptural image of mammoth from the excavation area of 1985 at Kostenki I (in Russian) - Trudy Zoologicheskogo Instituta AN SSSR 149: 107-108
- Praslov, N.D., 1985 - Engraved images of animals at the Gmelinskaya Site (Kostenki 21) (in Russian) - Trudy Zoologicheskogo Instituta AN SSSR 131: 114-118
- Rogachev, A.N., 1962 - Schematic statuettes of animals from Kostenki (in Russian) - Svod arkheologicheskikh istochnikov A: 78-80
- Vasilievski, R.S. & Drozdov, N.I. 1983 - Palaeolithic statuettes from Eastern Siberia (in Russian) - in: Vasilievski, R. (ed.) - Plastika i risunki drevnikh kultur – pp. 59-65. Novosibirsk
- Vereshchagin, N.K., 1979 - Causes of extinction of mammoths (in Russian) - Izdatelstvo 'Nauka', Leningrad
- Vereshchagin, N.K. & Tikhonov, A.N., 1990 - Exterior of Mammoth (in Russian) - Institut merzlotovedeniya Sibirskogo otdeleniya AN SSSR, Yakutsk

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