

*B* and castrate *C* and *D* in a different way. *B* was very often beaten and driven away while the domination of *A* over castrate *C* and *D* was shown only at the feeding trough. The demonstration of position over castrates was mild and limited to a threatening stance at the trough.

#### DISCUSSION AND CONCLUSIONS

The conclusions from the present observations are in agreement with those of Lincoln *et al.* (1970) that herd hierarchy depends on the stage and size of the antlers. On the other hand, observations presented above do not confirm the opinion expressed by Lincoln *et al.* (1970) that males with hard antlers always dominate over those with antlers in velvet.

The hierarchy among deer was also investigated by Hediger (1946) who ascribed to the antlers the function of an impressive organ. This statement is in agreement with the present paper. Hediger held the opinion that the male who lost his dominating position by shedding his antlers will try to recover in accordance with the growth of new antlers. The results obtained in the present work indicate that the deer who casts his antlers falls to the bottom of the hierarchy and can not return to his previous position if the loss of antlers is permanent. This suggests that permanent loss of antlers caused permanent changes in the hierarchy and confirms the assumption of Bubenik (1966) that herd hierarchy is formed during the growth of antlers and depends on the actual mass of the growing antlers.

The present observations indicate that the size of the antlers is important factor for the establishment of herd hierarchy. The slow changes as during the period of antler growth cause the social changes probably with a delay.

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 Institute of Genetics and Animal Breeding, Polish Academy of Sciences, Jastrzębiec, Poland. Accepted, May 31, 1974.

I. Ja. PAVLINOV

#### ATAVISTIC PATTERNS IN UPPER MOLAR OF THE PINE MARTEN

#### ATAWISTYCZNE WZORCE GÓRNEGO TRZONOWCA U KUNY LESNEJ

Two cases of an atavistic pattern in the first upper molar of the pine marten, *Martes martes* (Linnaeus, 1758), were found when the collection of carnivores in the Zoological Museum of Moscow University was examined. These cases are very interesting because they provide precise information on the evolution of the pine marten's molars.

In a typical  $M^1$  of *M. martes* the inner part of the trigon is represented by only one crista (homologous with the epicrista) running disto-lingually from the mesial cingulum. The internal end of this crista, therefore, corresponds to the epicone. The teeth under consideration are distinguished from typical ones by having a well developed trigonal structure (Fig. 1a). The inner part of the trigon is completely developed. Besides the epicrista, there is a distinct plagiocrista, connecting the distal cingulum with the epicone. Both these crests are equally well developed, bearing two conules the epiconule and the plagiocconule, respectively. Other parts of  $M^1$  namely the external cones and talon, do not differ from those of normal marten.

Comparison of the atavistic teeth with upper molars of some fossil Mustelides (for example, with  $M^1$  of *Mionictis* Matthew, Fig. 1b) shows that the structure seems to be accounted for by atavistic mutation, rather than by developmental phenotypic factor, and resembles that stage in the evolution of first upper molar of *Mustelidae*, in which trigon was completely developed.

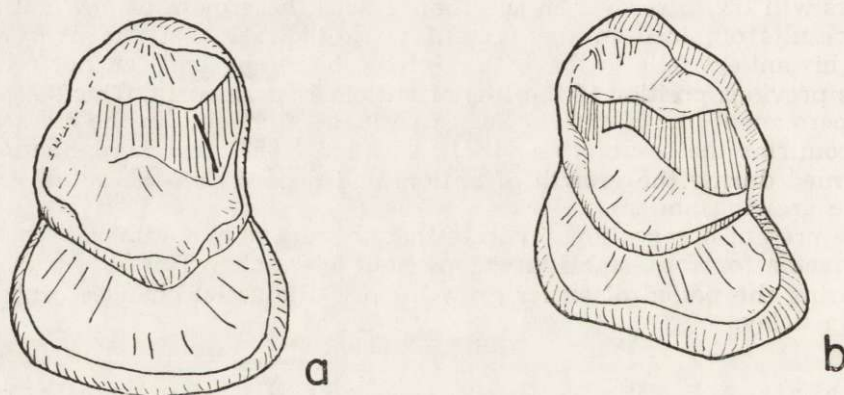


Fig. 1. Comparison of an atavistic  $M^1$  of *Martes martes* (coll. no. S-68095 ZMMSU) — (a) and that of *Mionictis* Matthews from Lower Miocene — (b).

The absence, of a correlation between the change of the inner part of the trigon and that of the shape of talon may be interpreted in two ways. It may be supposed that the talon, as the most important part of  $M^1$  was more strongly genetically fixed in ontogenesis as compared with the inner part of the trigon. It may be also possible that an evolutionary reduction of the inner part of the trigon of the upper molar of *Martes* began after the talon had already developed more or less completely, as is indicated by paleontological findings. This abnormal returning to ancient condition would have been too small to cause any change in the relationship between the development of the trigon and that of the talon.

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