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HORNS AND ANTLERS

THEIR EVOLUTION, OCCURRENCE AND FUNCTION IN THE MAMMALIA*

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Illustrations from photographs made in the Zoological Park unless otherwise noted.

PART I.

DEFINED in the broadest sense, horns are hard, exrescent growths upon the heads of mammals. This definition would include as horns all of the special outgrowths used for defense and offense (as well as those which have no utilitarian function), and associates the hollow horns of the cattle with the solid antlers of the deer. In a stricter sense, true horns are characterized by the following features; they are hollow, permanent and not shed during the lifetime of the animal, are unbranched, and are usually found in both sexes. In contradistinction, antlers are solid, deciduous (shed annually by the living animal), more often branched than simple, and usually worn only by males. An exception to the above definition of true horns is the horn of the American pronghorn which is hollow, deciduous, and branched. As further variants from the restricted definition might be cited the horns of the giraffe and of the rhinoceros, the former animal having low bony growths covered by soft skin and unmodified hair, the latter with a dense, formidable structure of specialized, agglutinated hairs. As an animal product, a horn is an epidermal structure, a hardened and thickened manifestation of the cuticle, of the same nature as claws, hoofs, nails, and the scales of the pangolin. An antler is true bone. It is the purpose of this article to single out some of the most interesting points in connection with these different

types of growths upon the heads of mammals and to trace something of their evolution, occurrence, and function. The term "horn" will be used for all protrudent growths of an epidermal character, as distinguished from those structures of a bony nature which will be termed "antlers."

Apparently there has always existed on the part of mankind a great interest in the horns of animals. It is easy to discover the evidences of this interest in our English language. In the Century Dictionary there are no fewer than 179 definitions and compound words based upon the word "horn." We have expressions such as "to come out at the little end of the horn," "to pull in one's horns," "by the great horn spoon," "horn of plenty," et cetera. The debator manoeuvres to confront his adversary with a dilemma and asks him upon which of the two horns he wishes to impale himself.

Primitive man had a great respect for horns when worn by the living mammal and found a wide variety of uses for horns taken from dead animals. The larger bovines, among others, were dangerous adversaries because of horns, and the wearing of horns was synonymous with strength. It is a not uncommon attribute of pagan gods, the possession of horns, and various peoples represented one or more of their deities with horns. Jupiter Ammon is commonly figured with the horns of a ram. The Greek god Pan wore the horns of a goat. A copper statue head has recently

*The section of this account which deals with antlers will appear in the January-February number of the Bulletin.



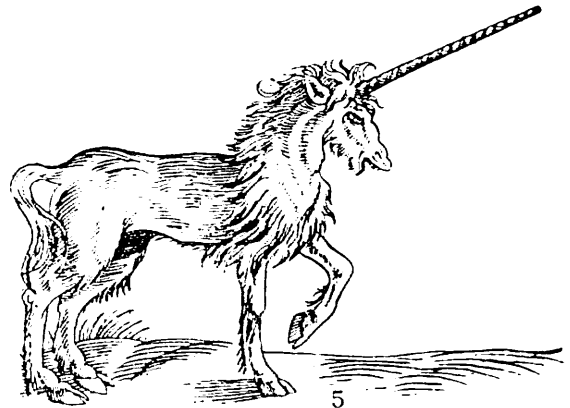
giraffe, has similar low, paired horns but lacks the median protuberance.

The giraffe horn represents a primitive, incipient type from which could be evolved the more complex structures found in the antelope, for example. This horn can have no value as a weapon of defense or offense, nor is it a manifestation of sex since females have it as well as males. The giraffe and okapi have the potentiality for horn development but, for some reason or other, have not carried the process beyond an early stage, or through long disuse have lost any earlier advanced development. The frontal bone of the giraffe shows great development of the sinuses and the whole upper structure of the skull seems designed to take care of shocks which might come upon the horns. This architecture provides a cushioned and reinforced horn base and argues for a function which the known facts of the giraffe life history tell us is never called into use. The inflated skull roof may be an inheritance from ancestors that used horns more vigorously than their descendants.

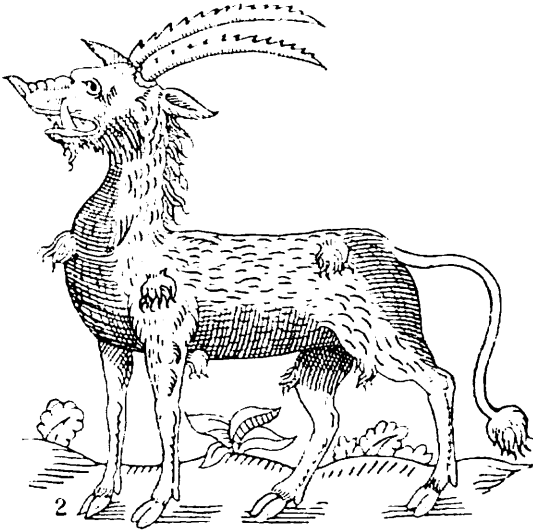


Another simple type of horn, but one that has reached an advanced stage of efficiency as a weapon, is that of the rhinoceros. This horn is strictly a fabrication of materials derived from the epidermis, in effect it is made up of agglutinated hairs. The rhinoceros has lost the hair from most of its body, the skin being practically hairless, but on its rostrum the hairs have ceased to function solely as a covering, and matting together as fibers they have built up a dense, hard horn that is a very capable weapon. As a seat for the horn, a bony boss or thickening has developed upon the nasal elements of the skull. This boss does not represent a new structure in the skull but rather a growth increase of an element already present. There is no need for this bony base to increase in length and function

as a hard core inside the horn, the substance of the horn is amply strong to serve without any stiffening structure. Needless to say, the rhinoceros horn contains no blood vessels or nerves and is incapable of sensation. The animal frequently wears grooves or furrows in its horns because of constant rubbing against grass and other vegetation, but this gives no pain to the rhinoceros. Under circumstances when a charging rhinoceros must be turned, if



Horned mammals in heraldry; 1 and 5. The unicorn (possibly the single-horned rhinoceros is the prototype of this fictitious beast); 3. Satyr. "Amongst the rest there is a beast called PAN; who in his head, face, horns, legs resembleth a Goat" (Topsell).



possible without killing it, as when it is hunted with the camera, the usual recourse is to fire a bullet into the thick part of the horn near the base. The full shock of the bullet is delivered upon the head of the rhinoceros and it is dazed and bewildered. The bullet does not penetrate to a vital part, the horn being so tough that it checks the projectile, but the animal swerves from its course, and in a short space of time recovers from the experience.

Rhinoceros horns may be single or double; in living rhinoceroses they are never paired, but the second horn is placed on the midline near the first. The great Indian rhinoceros has a single horn. Some of the ancestral rhinoceroses had paired horns, but none of these have survived into recent times.

The titanotheres evolved horns that ranged from low, insignificant growths to a single great structure with paired lateral projections which were fused at the base on the midline. The titanotheres horn at the peak of its development had more than a mere thickened boss of bone, the base of the horn rose

in a tall, prolonged structure that may have played a part homologous with the horn-cores of modern bovines. The nature of the external covering of this bony mass is not known, but it seems most likely that the covering did not add materially to the height of the horns. It may have been unmodified skin or a tough horny covering; it almost certainly was not like the horn of a living rhinoceros.

It has been stated earlier in this account that the horns of most mammals are carried upon the frontal bones of the skull, but this is not invariably the case. Modern hollow-horned mammals all possess frontal horns, but fossil types show that other elements of the skull have possessed the faculty for horn growth. The position of the titanotheres horn varied somewhat but was in the rostral region.

The untatheres showed an accelerated capacity for horn growth in developing no less than three pairs of bony cores or horn bosses, a posterior pair over the occiput, a middle pair over the eyes, and an anterior pair on the end of the rostrum. The foremost pair of these may have carried an epidermal horn like that of the rhinoceros, the others probably were covered with unmodified skin. The present-day rhinoceroses carry the single or double horn upon



Horned mammals in heraldry; 2. Heraldic antelope, said to cut down small trees with its saw-like horns; 4. Musimon or Tityrus. A fabulous cross between goat and ram; 6. A variant of No. 2, with tusk growing from nose.



Two stages in the growth of the rhinoceros horns. The upper photograph shows an immature stage of the same individual figure below, an African black rhinoceros. On the young rhinoceros the horns appear as low buds and early assume the character and appearance of the adult horns, differing from them only in the matter of size.