

HABITUAL ATTITUDES OF ANIMALS CONSIDERED AS A DEPARTMENT OF COMPARATIVE ZOOLOGY.

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The possible existence of a field for investigation in what may, perhaps, be called, taking words in their broadest sense, the geometry of character, must be assumed, and one or two aspects, however superficial, of obvious facts within its precincts be glanced at before the author's imperfect suggestions on the subject of the present contribution can be intelligently considered.

A well known and universally recognized instance of correspondence between the inter-relation of lines and angles and the character of the organisms they measure is, of course, found in the gnathic index, popularly called the facial angle, the angle formed by two straight lines, one extended from the most prominent part of the forehead in a skull (the nasofrontal suture) to the front edge of the upper jaw, at the insertion of the teeth, and the other from this point to the middle of the opening for the ear (the basion). The skull being so placed as to bring the second line into a horizontal position, the significant angle is formed that directs the other line, like an infallible hand upon the cosmic dial, to the rank and order in creation which the animal owning such a cranium must necessarily hold.

In the ideally perfect human skull, wherein is developed the greatest symmetrical capacity for the highly organized brain that occupies it, the hand upon the dial is vertical and orthognathus to the horizontal line; in skulls of a lower order it is proportionately depressed. But I cannot help thinking that there is, perhaps, no very good reason for calling a halt here, and that as the principle holds in one instance, it may be worth trying in another. If, for example, these two lines and their included angle can be used as a test in estimating the grade of intellectual capacity represented by any given specimen of a human skull, it seems possible we may find in them the measure of a man as to his whole physical organism.

Certainly to homo sapiens an erect posture is more natural and habitual than to any other mammal, far more so than any of the apes, whom the bears surpass in this respect, and he covers in standing a smaller portion, in proportion to his size and bulk, of the surface that supports him than any other animal. As to his complete frame, as well as to his skull, he represents the vertical line. Standing with his back to a flat wall, and stretching out his arms laterally at a right angle to his body, he touches the surface behind him with his head, his heels and all projecting parts, such as the calves of his legs and his shoulders, as well as with his arms and hands. From finger tip on one hand to finger tip on the other a perfectly formed man, in such a position, covers a line exactly equal to one extending from the crown of his head to the soles of his feet. The measure of a man is four square, and the simplest expression of his framework is a Latin cross. It scarcely need be said that this measure and attitude is peculiarly his own. No other mammal is capable of sharing it, for no other mammal has the power of such lateral movement at the shoulder joints combined with a perfectly upright position. In ordinary quadrupeds, as dogs and horses for instance, the limbs extend from the body parallel to the mesial plane, and when the animal is forced to take an erect posture, project forward and cannot be spread out to take a straight line across the back. In the highest of the anthropoidea, the great apes, a nearer approach to this crucial attitude is doubtless possible, but, as was long ago pointed out by Prof. Owen,* the manner in which the skull is placed upon the bones of the neck, the shortness and comparative weakness of the loins and the position of the bones in which the thighs are articulated, almost in a line with the spine, make it practically impossible for these mammals to stand unsupported bolt upright upon the soles of their feet. A more or less semi-erect position, however, is characteristic of all the most distinctively manlike apes, and bending at the knees and the loins and the head, as they do, diagrams portraying the simplest possible expression of their distinctive attitudes would, instead of depicting a full faced aspect, as in the case of a human being, necessarily have to represent a profile view, and this is also true of all the lower mammals. Space would be wanting in a much longer and more elaborate article than the present one to follow out this phase of the subject or even to notice, however cursorily, the curious results obtained by measuring the comparative length and graduated obliquity of lines produced by and expressing the habitual attitudes of mammals, neither reclining, crouching nor sitting, but

resting in as erect a posture as is natural to them, from the vertical, assumed by man alone, to the horizontally prone position of the moles and the duckbill, and again descending to the depressed oblique in sloths, to end in the antithesis of that of the bimana, the reversed situation of the several parts of the body in their relation to each other that is habitual to bats, when not in action, as they rest hanging suspended, head downward.* It is worth remarking, as indicating

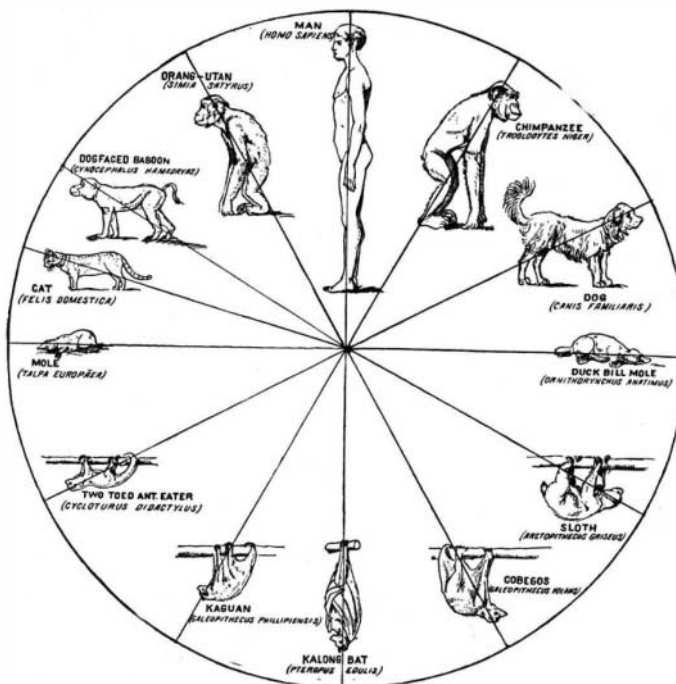


DIAGRAM SHOWING NATURAL ATTITUDE OF CERTAIN MAMMALIA. THE LINE PASSES THROUGH EAR AND HEEL.

some possible, if very remote and not easily understood, relation between such widely separated animals, that certain groups of birds, as the crossbills and the parrots, show a tendency to assume this attitude, particularly the genus Coryllus or bat parrots, as they are called. When sleeping, or even when feeding, these birds hang head downward from the branch upon which they roost or from the wires of their cages. More extraordinary still are the colies or mouse birds (Collina capensis), which, like certain species of bats, are said invariably to sleep head downward, congregated into globular masses, each consisting of a number of birds.

The power of curling up into compact balls possessed by certain mammals is undoubtedly a sign either of a low grade of organization or of an inferior ancestry. It

capensis) and the sloths. Strange to say, the lemurs, a family placed among the primates or highest order of mammals, on account of a certain resemblance, largely external, they bear to the monkey tribes, have, to a certain extent, inherited this habitual posture, which, together with affinities they show in other respects to inferior types of animals, seems obscurely to point to a lowly organized ancestry.

Indeed, habitual attitudes assumed by certain animals bear so evident a relation to extinct forms that some sort of connection between the two is strongly suggested. The so-called snake bird of Florida (P. ahinga), as it swims beneath the surface, its body concealed in the water and its long neck drawn back ready to dart upon its prey, irresistibly reminds one of the restored figure and conjectural description of the habits of certain extinct reptiles of the Cretaceous period, some one of the smaller species, perhaps, those of long necked aquatic lizards, the plesiosaurus with birdlike head, beakshaped jaws, swimming, not by means of its tail, as did the fish lizards, the Ichthyosauri, but its paddles, "arching back its long neck," says Prof. Hutchinson, "like a swan, occasionally darting it down at the fish which happened to swim within its reach," its body sometimes submerged and sometimes floating at the surface of the water. Let the reader compare this with the excellent description given by Dr. Brewer of the American snake bird: "It lives principally upon fish, which it seizes by rapidly darting upon them with its toothed and sharply pointed beak. In this movement the neck, which is very long, is thrust forward with the force of a spring by the large and well developed muscles in the lower and anterior portions of the neck. It is the best of fresh water divers, disappearing beneath the surface with the quickness of thought, leaving scarcely a ripple upon the spot, and reappearing, perhaps, with its head only above water for a moment, at a place several hundred yards distant. When swimming and unmolested it is buoyant and moves with its whole body above water; but when in danger it sinks its body, leaving only the head and neck out of the water, presenting the appearance of a portion of a large snake."

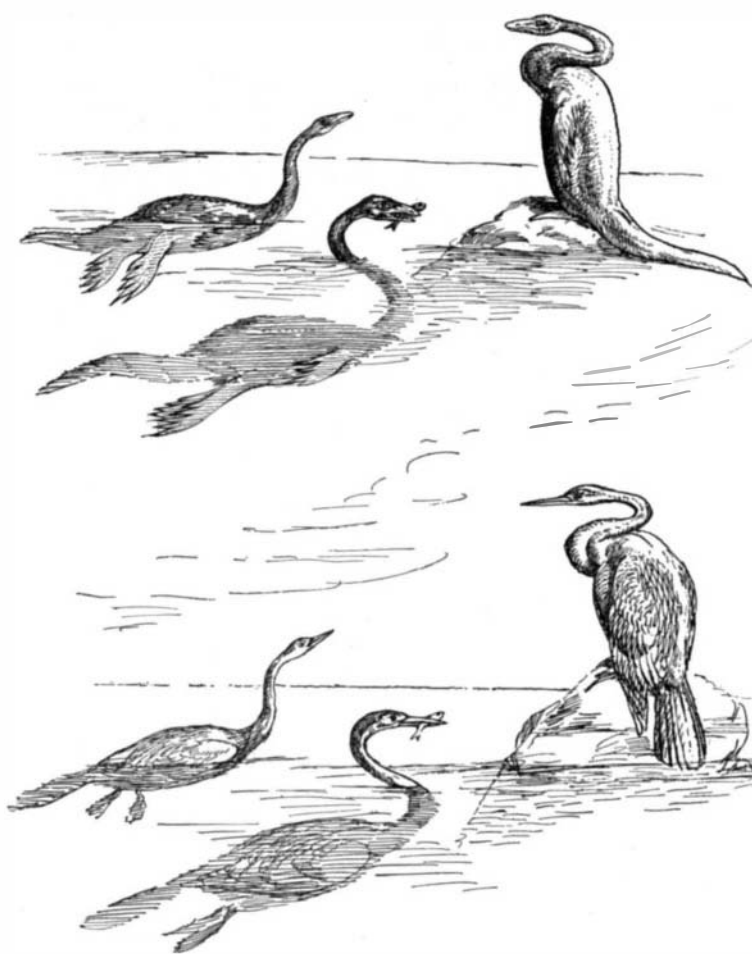
In the two sketches given, the ahinga or snake bird, in three characteristic attitudes, affords a suggestion in restoring corresponding ones of the extinct long-necked aquatic lizard, the plesiosaurus, on the basis of the general truth that similarity of construction both follows and implies similar habits, as whales and dolphins have come to resemble fish, and also that such resemblance in conformation and arrangement of parts involves and renders unavoidable a proportional similarity in characteristic attitudes, as is seen indeed in many cases, for instance, in the swift and swallow, which, though belonging to different families, are almost identical in postures and manner of flight. There is nothing to show that the long-necked plesiosaurus, though essentially aquatic, was exclusively so. The proportional large size and development of both pairs of so-called flippers as compared with those of its contemporary the ichthyosaurus, or fish lizard, or to the fins of the whales or sirena, seem to indicate other uses than those of mere paddles. Certainly, as far as its anatomical structure is concerned, the plesiosaurus seems as well fitted to go ashore as walrus and fur seals, and there can be little doubt, I think, that these animals left the water occasionally, at least during the breeding season. In fact, among the myriad inhabitants of the water we know no long-necked animal that is exclusively aquatic or any that has well developed flippers, whether these flippers have claws or not, that does not come ashore; the tail, too, stout and shaped like that of many of the old dinosaurs or the modern kangaroos, suggests its use, as in the animals mentioned, for support in sitting upright. It may now be definitely asserted that it is altogether probable the digits were well marked and separated.

No attempt has been made to indicate respective sizes of bird and reptile, the plesiosaurus being perhaps as many feet as the bird is inches in length.

Although, of course, any attempt to connect this bird and reptile by the methods ordinarily used by comparative anatomists would be futile, the great similarity in the general plan of construction in the two animals, and the consequent identity of their characteristic postures, ought to aid greatly in forming a vivid mental picture of creatures extinct long before the light of the sun portrayed images of nature upon the human brain.

In another instance, however, the bridge between the extinct and surviving form is not so completely broken down, and not only the characteristic attitudes, but the anatomy of the bird, points too distinctly to extinct reptilian ancestors to be otherwise interpreted.

(To be continued.)



PLESIOSAURUS AND SNAKE BIRD—THEIR SIMILAR ATTITUDES.

is found in the greatest perfection in the duckbill mole (Ornithorhynchus anativus) and the armadillos. It is also possessed by the porcupine echidna (Echidna hystrix) and to some extent by the armadillo (Orycteropus

* Of course such lines and measurements cannot be made to apply to aquatic mammals that are either footless, as the whales, or that do not rest or support themselves upon legs and feet, as the seals, nor to those, to use a Hibernicism, whose standing position is a sitting one, as is the case with the kangaroos and the jumping mice. These require a different system of diagrams, as do birds, reptiles, batrachia and insects.

* Richard Owen on the osteology of the chimpanzee and orang-outang. Transactions of the Zoological Society, 1, page 343.