MAMMAL BONES AND TEETH

An Introductory Guide to Methods of Identification

SIMON HILLSON

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CONTENTS

LIST OF FIGURES

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INTRODUCTION AND AIMS

This book has developed out of literature for undergraduate courses in zooarchaeology, first at Lancaster University and then at the Institute of Archaeology, University College London. It is designed very much as an introduction and its aim is to help students achieve an initial level of basic knowledge, from which they can expand later. It is intended to be used in conjunction with a reference collection of bones and teeth, and with tuition from a zooarchaeologist. Much work with fragmentary archaeological remains involves recognising small differences in shape and to achieve this, students need to spend many hours handling reference specimens on their own, ideally making their own drawings and notes. This book is intended to help at this early stage by highlighting the main points on which identifications are made. It is not intended to be used on its own without named reference material.

ANIMALS INCLUDED

It is best to start with just a few species and, fortunately, the bulk of the most common large mammal remains on Eurasian and North American sites can be fitted into a compact group. This includes the most widely ranging domestic animals, together with their wild relatives and ancestors, and the wild deer which are found throughout Europe, northern Asia and North America. Domestic animals are a taxonomic minefield, and an arbitrary decision has been taken to follow Corbet & Hill (1986) here:

- **Horse** *Equus ferus* Boddaert, 1785 – wild and domestic forms.
- **Cattle** *Bos primigenius* Bojanus, 1827 – wild and domestic forms (domestic cattle are often differentiated by other authors as *Bos taurus*).
- **Bison**, American Buffalo or Wisent *Bison bison* Linnaeus, 1758 – both American and European forms are here included in one species, but other authors often refer to European bison as *Bison bonasus*, reserving the term *Bison bison* for the American Buffalo.
- **Sheep** *Ovis ammon* Linnaeus, 1758 – wild and domestic forms (domestic sheep are often distinguished elsewhere as *Ovis aries*).
- **Goat** *Capra aegagrus* Erxleben, 1777 – wild and domestic forms (domestic goat are often distinguished by other authors as *Capra hircus*).
- **Moose** or European Elk *Alces alces* Linnaeus, 1758.
- **Caribou** or Reindeer *Rangifer tarandus* Linnaeus, 1758.
- **Red Deer**, Wapiti or North American Elk *Cervus elaphus* Linnaeus, 1758.
- **Fallow Deer** *Cervus dama* Linnaeus, 1758 (distinguished by many other authors as *Dama dama*).
- **Roe Deer** *Capreolus capreolus* Linnaeus, 1758.
- **Pig** *Sus scrofa* Linnaeus, 1758 – wild and domestic forms.
- **Dog** or Wolf *Canis lupus* Linnaeus, 1758 – wild and domestic forms (domestic dogs are frequently referred to as *Canis familiaris* by other authors).
- **Cat** *Felis silvestris* Schreber, 1777 – wild and domestic forms (domestic cat is often called *Felis catus* in the literature).
- **Human** *Homo sapiens* Linnaeus, 1758.

In the text below, the first (bold) name is used.

Cattle, bison, sheep and goat are all anatomically rather similar and, where they are considered all together, their common family name is used – **Bovidae** or **bovids** for short. Cattle and bison are not only very alike in many aspects of the teeth and skeleton, but are both of a similarly large size and robust build and are therefore grouped together as **large bovids** throughout most of the text. In the same way, sheep and goat are very close anatomically, but are smaller in size and slighter in build and can be grouped as **small bovids** for the purposes of this book. It should be pointed out that there are many other bovids, small and large, in the world which are not considered here. Even so, the family as a whole shows relatively little variation throughout the skeleton, except for an exotic variety of horns, and many of the features described here are equally characteristic of other bovids. Distinguishing between cattle and bison, sheep and goat, is a specialist job which is largely

beyond the scope of this introductory book, although it is routinely carried out in zooarchaeological reports. The skull and the bones of the feet provide the simplest distinctions within the large bovid and small bovid categories, and are the only ones to be described in this book. Further details for sheep/goat distinction are given in Boessneck *et al.* (1964), Boessneck (1969), Payne (1969; 1985), Prummel & Frisch (1986) and Clutton-Brock *et al.* (1990). Differences between cattle and American Buffalo are given by Olsen (1960), McCuaig Balkwill & Cumbaa (1992), and Reynolds (1939) is still the best discussion of the differences between wild cattle and the giant fossil bison of Europe.

Similarly, moose, caribou, red deer, fallow deer and roe deer are anatomically alike and are frequently referred to by their shared family name – **Cervidae** or **cervids** for short. There are differences in size. Moose is by far the largest, followed by red deer. Caribou and fallow deer are intermediate in size and roe deer markedly smaller. It is therefore convenient to summarise them as **large**, **intermediate** and **small** cervids. The differences between species are again most apparent in the head region (the antlers) and in the feet, and it is only for these parts of the skeleton that detailed distinguishing features are described here.

Although the descriptions and figures apply specifically to the animals listed above, they include many features which are characteristic of horses (Equidae), bovids, cervids, cats (Felidae), dogs and their relatives (Canidae) and Primates as a whole. It is a only short step from these basic distinctions to a wider range of identifications.

TERMS, ABBREVIATIONS, DIVISIONS AND DIRECTIONS IN THE SKELETON AND DENTITION

Non-perishable remains of mammals are divided into the skeleton (bones) and dentition (teeth). Each has its own system of names.

THE SKELETON

In this book, bones are labelled for all animals as though they are quadrupeds. This is not the normal practice in human anatomy, but is done here to minimise the number of terms used. Using quadrupedal terminology assumes that the feet and palms are flat on the floor, with the thumbs innermost, and that the head is pulled right back so the nose points straight forwards in the direction of travel (Fig. 1). This is a relatively uncommon position for a human being to assume (not to mention an uncomfortable one), and makes a great deal of difference to the terminology of the forelimb (below).

One key concept in the system is the *median sagittal plane*. This is the imaginary plane which would divide the skeleton into two equal, mirror image, left and right halves. Any one bone in the skeleton has six surfaces, or orientations in which it can be viewed. The names for four of these surfaces are common throughout most of the skeleton:

Medial – facing towards the median sagittal plane.

Lateral – facing away from the median sagittal plane.

Cranial – facing towards the front of the skull.

Caudal – facing towards the tip of the tail.

Axial skeleton

The axial skeleton comprises the *skull*, the *vertebral column*, the *ribs* and the *sternum* or breastbone. Two additional names apply to this part of the skeleton:

Dorsal – facing towards the back.

Ventral – facing towards the belly.

Appendicular skeleton

This consists of the two pairs of limbs, the more cranially placed are here called the left and right *forelimbs*, and the more caudally placed, the left and right *hindlimbs*. Each forelimb is attached to the axial skeleton at the sternum by the *clavicle* or collar bone. This is joined at the shoulder to the *scapula* (shoulder blade), which is held in position against the dorsal part of the ribcage by muscles. Also joining the scapula at the shoulder is the *humerus*, which in turn joins the paired *radius* and *ulna* at the elbow. The extremity of the forelimb is called the *manus* (*carpals*, *metacarpals* and manus *phalanges*) or wrist and hand. Each hindlimb is attached to the axial skeleton by one of the *innominate bones* which, together with the base of the vertebral column, form the *pelvic girdle*. This is connected at the hip joint to the *femur*, which in turn joins the paired *tibia* and *fibula* at the knee. The extremity of the hindlimb is called the *pes*

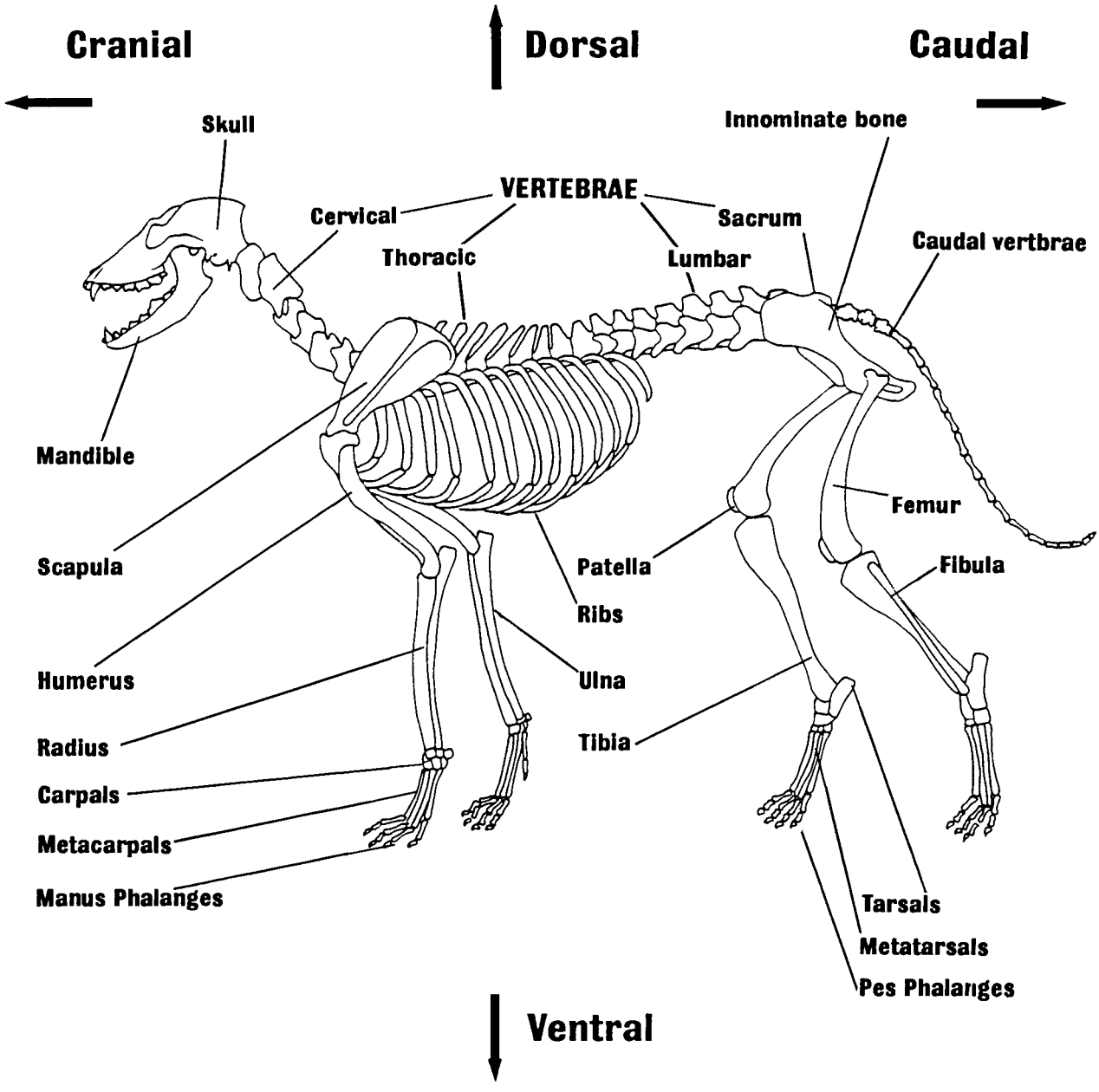

FIGURE 1. THE SKELETON OF THE DOG