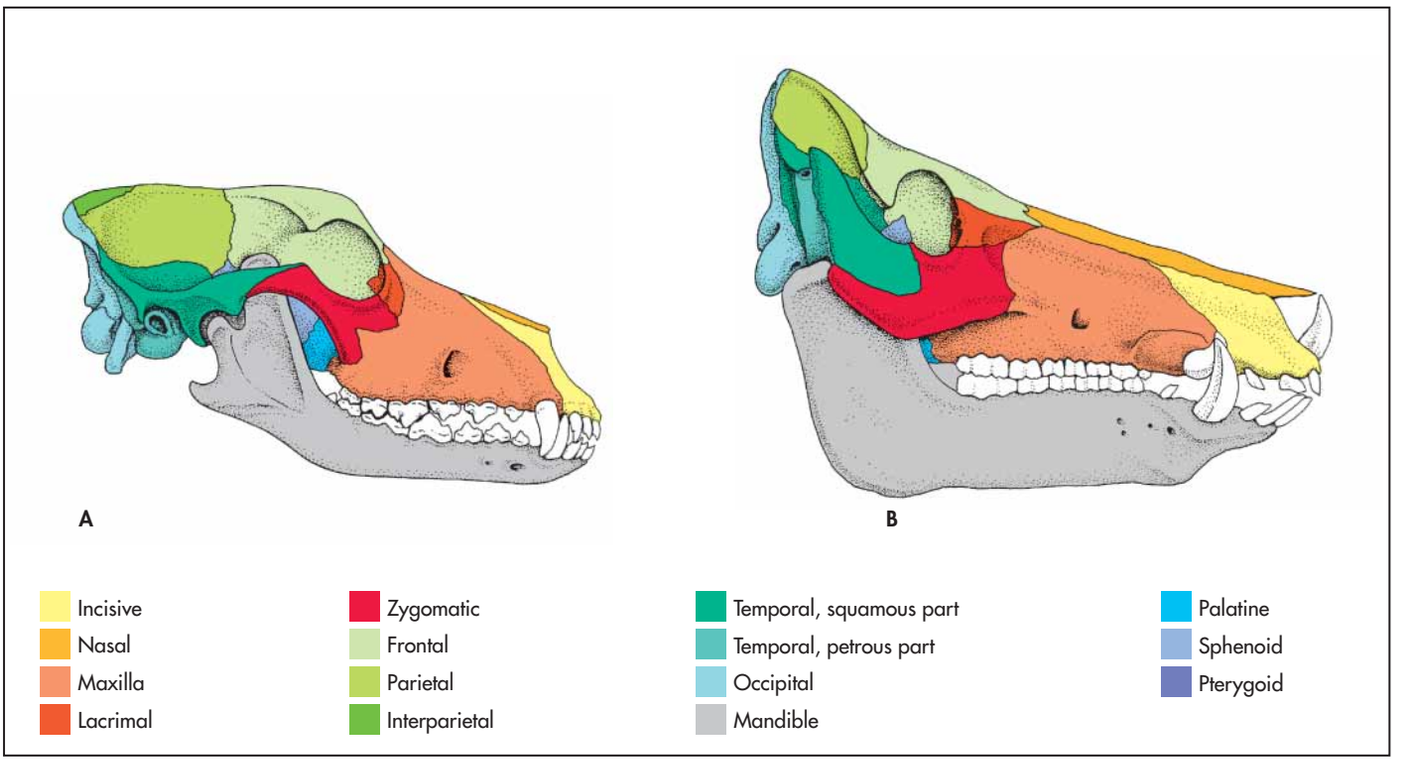

Fig. 1-1. Bones of the skull and mandible of the dog **(A)** and pig **(B)**, (schematic, lateral aspect); after Ellenberger and Baum, 1943.

ling force of the hindlimb, generated by the muscles and the hip joint, is transmitted directly to the rest of the body.

The vertebral column fulfills various additional functions. As movement between the individual vertebrae is limited, it contributes to the maintenance of posture. However, the degree of movability of the individual vertebrae forms the basis for dynamic functions, including the transmission and reduction of forces during walking, running and jumping. The smallest functional unit consists of two successive vertebrae, the intervertebral disc, their articulations, ligaments and muscles. Even small anatomical changes of one of the components will result in a significant disturbance of the locomotory system. The movability of the vertebral column varies in the different segments; for example, it is very rigid in the region of the sacrum, while the caudal vertebrae remain quite flexible.

The vertebral column in the thoracic and lumbar region allows movement in three directions. Small movements of the individual intervertebral joints cause dorsal, ventral and lateral flexion of the whole column. Considerable lateral, dorsal and ventral movements are possible in the neck.

Thorax

The rib cage is composed of the **thoracic vertebrae** (vertebrae thoracicae) dorsally, the **ribs** (costae) laterally and the **sternum** ventrally. They form the bony components of the thoracic wall and are joined functionally by a variety of ligaments, chondral junctions and true articulations. The rib cage encloses the **thoracic cavity** (cavum thoracis) and is kept under tension by its surrounding muscles. The thorax of the domestic mammals has the shape of a laterally compressed, truncated cone, with its apex pointing cranially and its base caudally. It has a **cranial** and a **caudal aperture** (apertura thoracis cranialis et caudalis).

Skeleton of the head

Skull, neural part (cranium, neurocranium)

The bones of the neural or cranial part of the skull enclose the **cranial cavity** (cavum cranii), including the brain, its meninges and blood vessels. The structure of the cranium is a collection of many smaller bones, that fit together in a species specific construction. Skulls differ largely, not only between different species and breeds, but also between individuals of the same breed, age and sex. The basic anatomical architecture of the neural part of the skull will be described, with species specific variations emphasised. The cranium is formed by the same bones in all domestic mammals:

- **the floor is composed of the**:
  - unpaired basioccipital bone (pars basilaris ossis occipitalis),
  - unpaired basisphenoid and presphenoid bones (os basisphenoidale et os presphenoidale),
- **the nuchal wall is composed of the**:
  - unpaired supraoccipital bone (squamous part, squama occipitalis),
  - exoccipital bones (lateral parts, partes laterales),

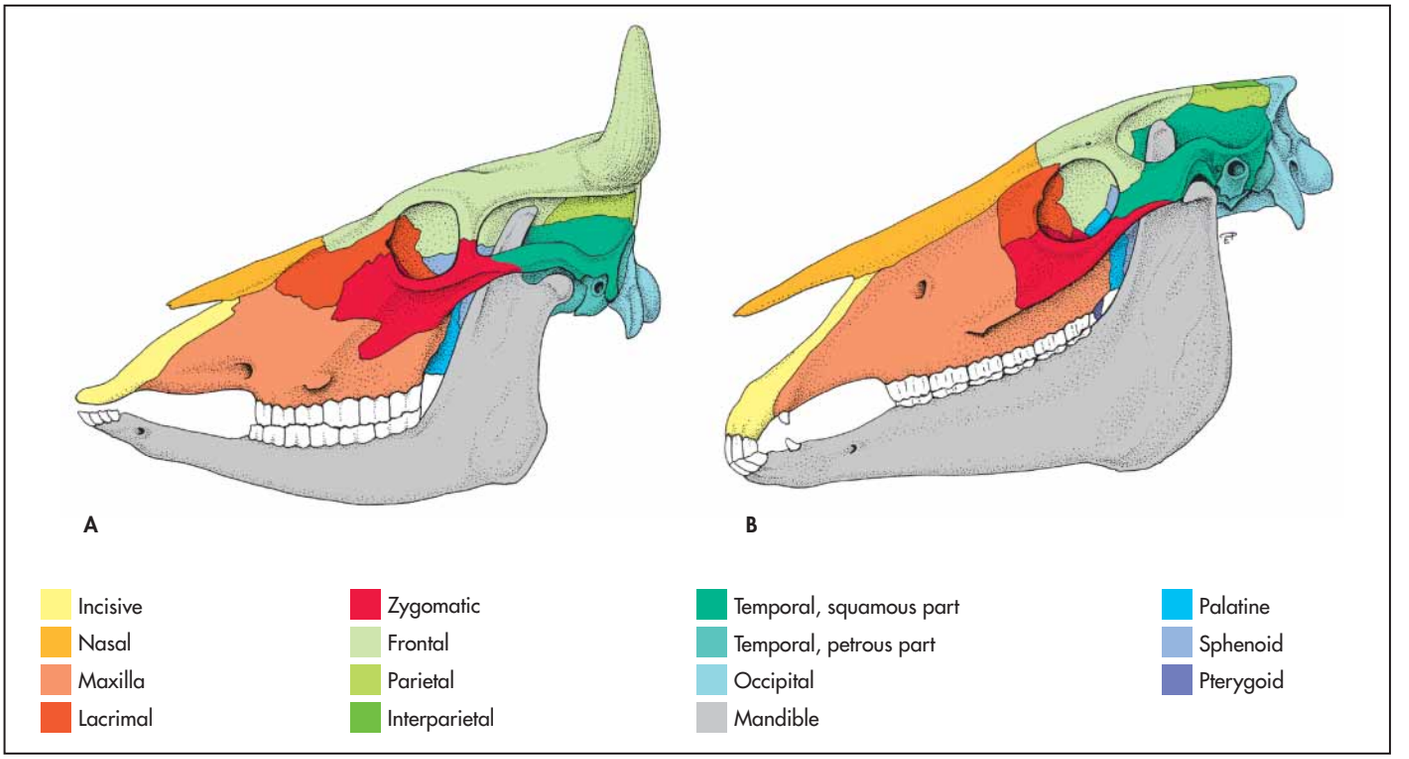

Fig. 1-2. Bones of the skull and mandible of the ox **(A)** and horse **(B),** (schematic, lateral aspect); after Ellenberger and Baum, 1943.

- **the lateral walls are composed of the:**
  - paired temporal bone (os temporale),
- **the roof is composed of the:**
  - paired frontal bone (os frontale),
  - paired parietal bone (os parietale),
  - unpaired interparietal bone (os interparietale),
- **the nasal wall is composed of the:**
  - unpaired ethmoid bone (os ethmoidale).

Occipital bone (os occipitale)

The occipital bone forms the nuchal wall of the skull and can be divided into the **basilar part**, the **squamous part** and the **lateral parts** (Fig. 1-1 to 4). These bones form a ring surrounding the spinal cord, the **foramen magnum**.

The **basilar part** (pars basilaris, basioccipital bone) constitutes the caudal part of the base of the cranium. It is situated rostral to the foramen magnum, where it is joined to the basisphenoid by a cartilagenous suture (Fig. 1-4). On the ventral surface are the paired **muscular tubercles** (tubercula muscularia) for the attachment of the flexors of the head and neck. The surface of this bone is concave, forming the **caudal cranial fossa** (fossa cranii caudalis) (Fig. 1-5), which is subdivided into rostral and caudal depressions. The rostral depression encompasses the pons (impressio pontina) and the caudal depression encompasses the medulla oblongata (impressio medullaris).

The **jugular foramen** (foramen jugulare) is located on either side of the basilar part, adjacent to the tympanic bullae. In the pig and the horse the sharp and thin lateral borders of the basilar part form the deep **petro-occipital fissure** (fissura petro-occipitalis) together with the petrosal part (pars petrosa) of the temporal bone where the foramen lacerum is built (Fig. 1-40 and 41).

The **squamous part** (pars squamosa, supraoccipital bone) is situated dorsal to the **lateral parts** (partes laterales ossis occipitalis) and the **occipital condyles** (condyli occipitales), completing the foramen magnum dorsally (Fig. 1-3 and 4). Its **external surface** (lamina externa) is demarcated by a sharp-edged ridge, the **nuchal crest** (crista nuchae) (Fig. 1-4, 9 and 11). In ruminants, the nuchal crest is reduced to the prominant **nuchal line** (linea nuchae). The nuchal crest is easily palpable and can be used as a landmark, together with the wings of the atlas, for the collection of cerebrospinal fluid.

The well-defined median ridge, the **external sagittal crest** (crista sagittalis externa), arises from the nuchal crest in carnivores and the horse (Fig. 1-4, 9 and 11). The **external occipital protuberance** (protuberantia occipitalis externa) (Fig. 1-13 and 91) are median triangular projections with the base pointing towards the base of the cranium, and provides attachments for the **nuchal ligament** (ligamentum nuchae). In carnivores, the poorly defined external occipital crest extends from the external occipital protuberance to the foramen magnum (Fig. 1-4).

The **internal surface of the cranium** (lamina interna) has many shallow depressions, which conform to the surface of the cerebellum (impressiones vermiales) and the basal blood vessels (sulci sinus transversi). The internal surface is marked by the **internal occipital protuberance** (protuberantia occipitalis interna). Carnivores and horses have an additional process, the tentorial process (processus tentoricus), which forms the tentorium cerebelli osseum (Fig. 1-5 and 10), together with like-named processes of the parietal and interparietal bones.