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# ANATOMY DRAWING SCHOOL *HUMAN*

*h.f.*ullmann

# INTRODUCTION

Painting living subjects, and drawing compositions and sketches of them, requires an exact knowledge of anatomy – the shape and structure of living organisms – and of the basic principles of morphology (the study of form).

Anatomy is an applied science which underpins fine art; the study of structure is essential for artistic representation. The skeleton, joints and muscular system of a creature determine its proportions and the movements of its body. Sensory organs such as the eyes, nose, ears and mouth, and surface structures such as the skin, fur and claws give every animal its individual character.

Any artist representing a living creature first establishes the outline of the skeleton to give a framework to the composition. Then the muscles are added to form the basic shape which is characteristic of the particular species. Finally, the shape is covered with skin, allowing the artist to depict individuality and a chosen facial expression.

All the greatest artists – Michelangelo, Leonardo da Vinci, Raphael, Titian, Dürer – felt it necessary to study anatomy, since anatomical and biological knowledge are vital in choosing models, finding the most appropriate pose, determining the composition and adding fine detail to the picture. This knowledge also extends the artist's faculty of observation, while enhancing artistic vision and developing the sense of form.

This book offers practical help in acquiring the necessary knowledge by illustrating the anatomy of the human body and that of a few animals, and by making some comparisons between them. The representation of human beings and animals has a number of similarities, but there are also functional and morphological differences.

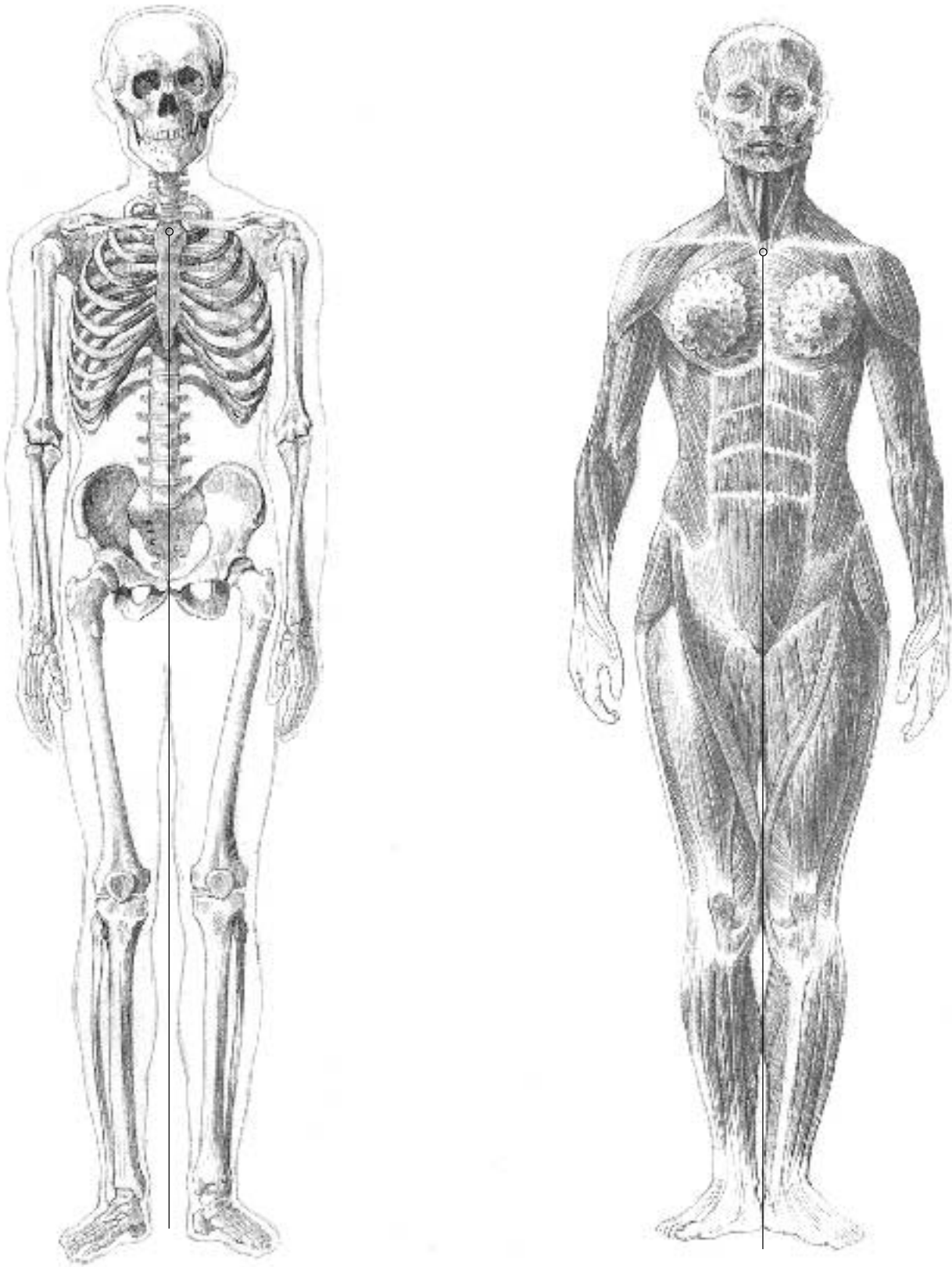
In order to make this book easier to use, a brief summary of the basic concepts needed by the artist is included below. As it is also vital to have a clear knowledge of the bones comprising the skeleton, along with the muscles and joints, there is a more detailed description of these structures and the corresponding organ systems.

## ONTOGENESIS

This process is the origin and development of an individual creature, beginning with conception and ending with death. The different speed of development of different organs results in changes in the proportion of various body parts. For example, the early rapid development of the nervous system means that the eyes and head of a newborn human baby are large, whilst the trunk and limbs are short. After birth the limb bones develop, becoming first longer and then thicker. The number of muscle fibres is fixed but their length and thickness – and their final shape – evolve in parallel with the bones. Finally, the sexual organs assume their final shape and size after puberty, towards the end of the growing period.

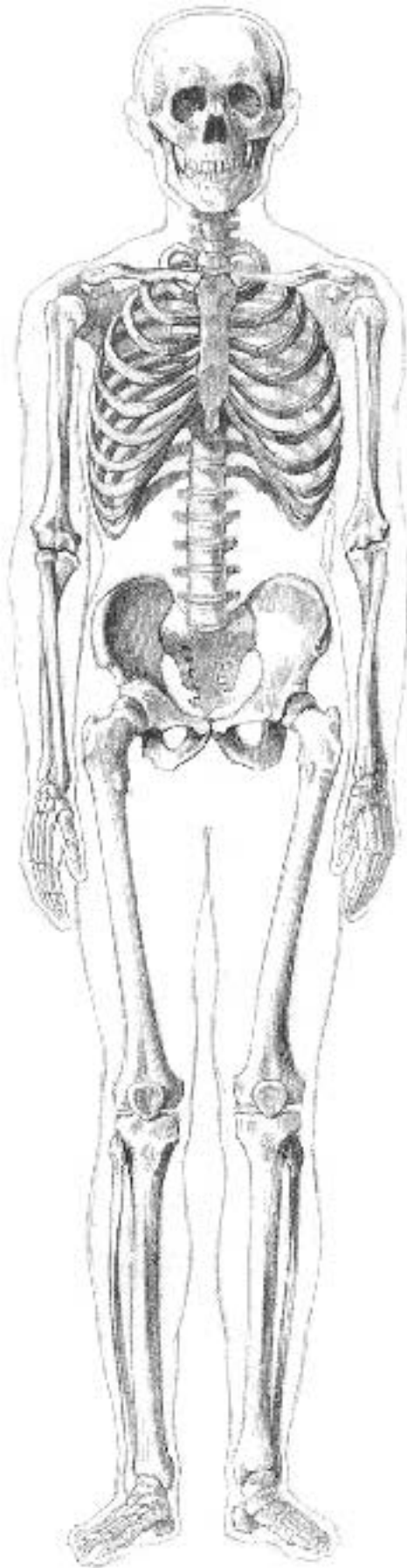
The basic position of any mature living organism is taken to be when it is standing still; changes in the proportion of the body parts are related to this.

# FIGURE DRAWING



An imaginary vertical axis starting from the breast-bone at the level of the collar bones divides the human body into two symmetrical parts. If the model is facing the artist and stands straight, the vertical axis reaches the ground between the legs.

# THE BONES, JOINTS AND MUSCLES

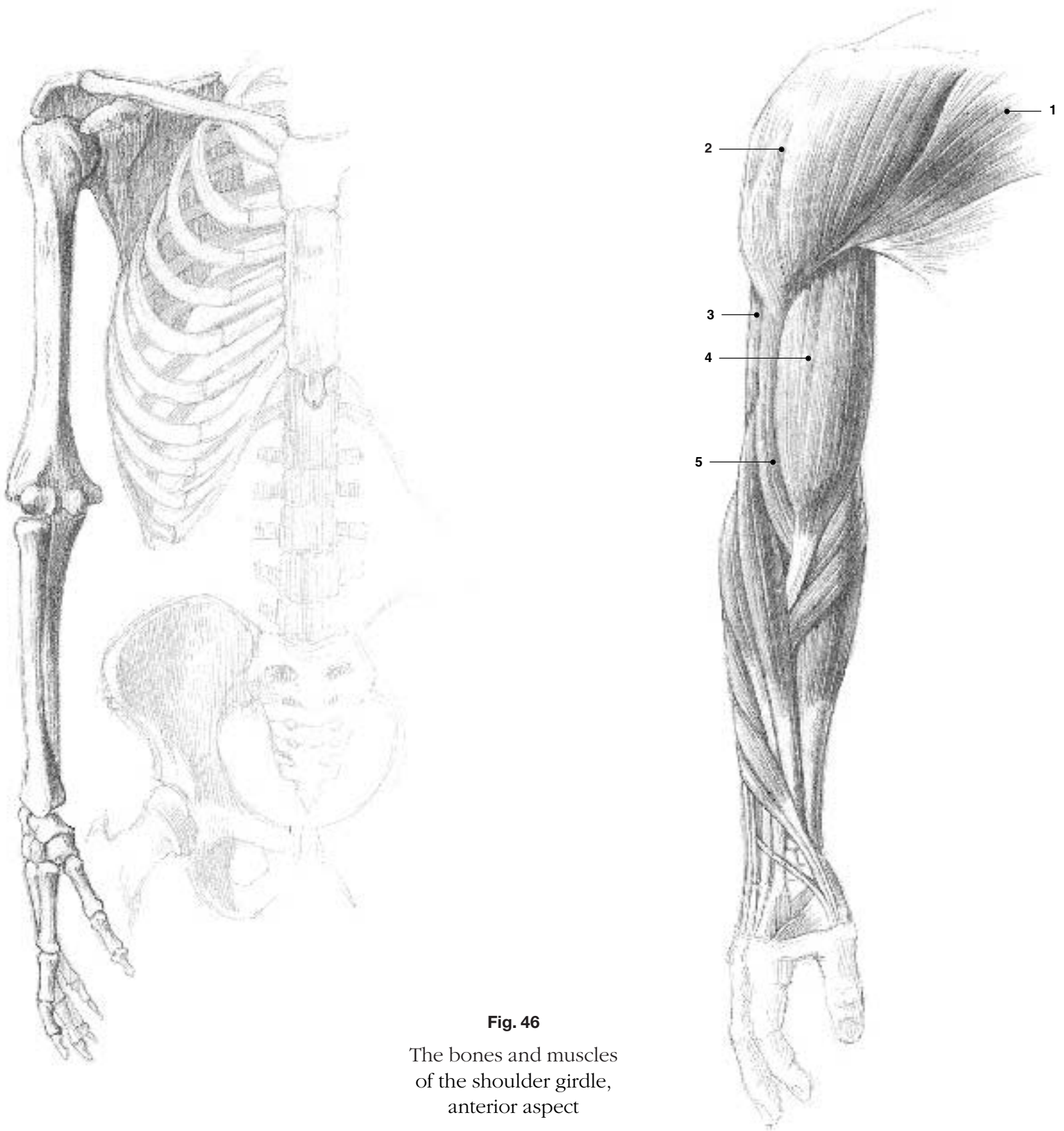


**Fig. 1**

The skeleton

The skeleton forms an internal solid framework for the human body. It protects the internal organs and also makes locomotion possible; the bones act as single or double levers and are moved by the muscles. The total number of bones is 233. There are paired bones of nearly identical shape and also single ones in the median plane (vertebrae). As bones are continuously rebuilt during their life-span, their structure and form change. They may be rigidly linked to each other by ossified or cartilaginous joints, or flexibly linked by muscular or ligamentous joints.

# THE MUSCLES OF THE UPPER LIMBS

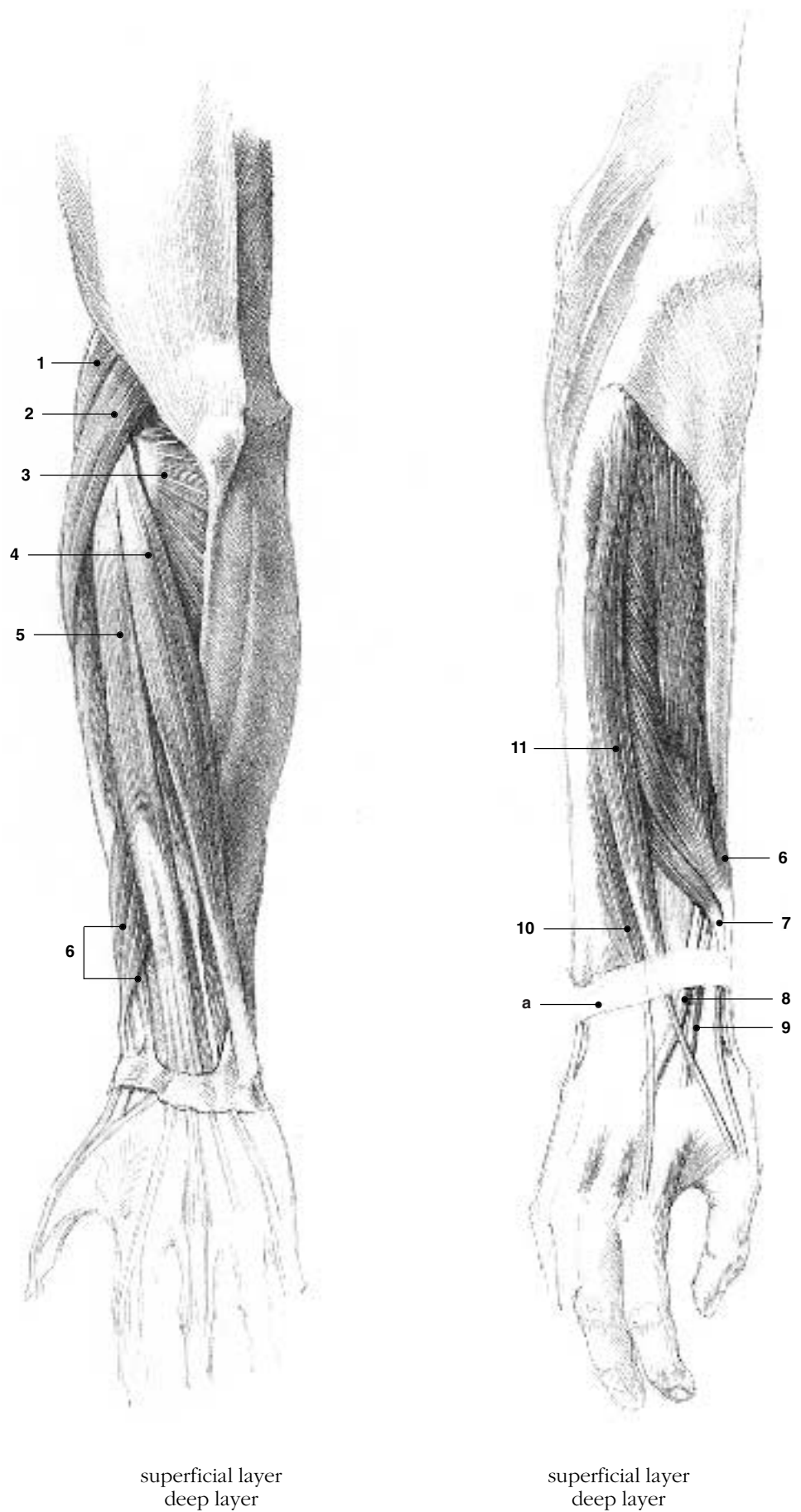


**Fig. 46**

The bones and muscles  
of the shoulder girdle,  
anterior aspect

- 1 Pectoralis major muscle (27/1)
- 2 Deltoideus muscle (43)
- 3 Triceps brachii muscle (52)
- 4 Biceps brachii muscle (51)
- 5 Brachialis muscle (50)





**Fig. 59**

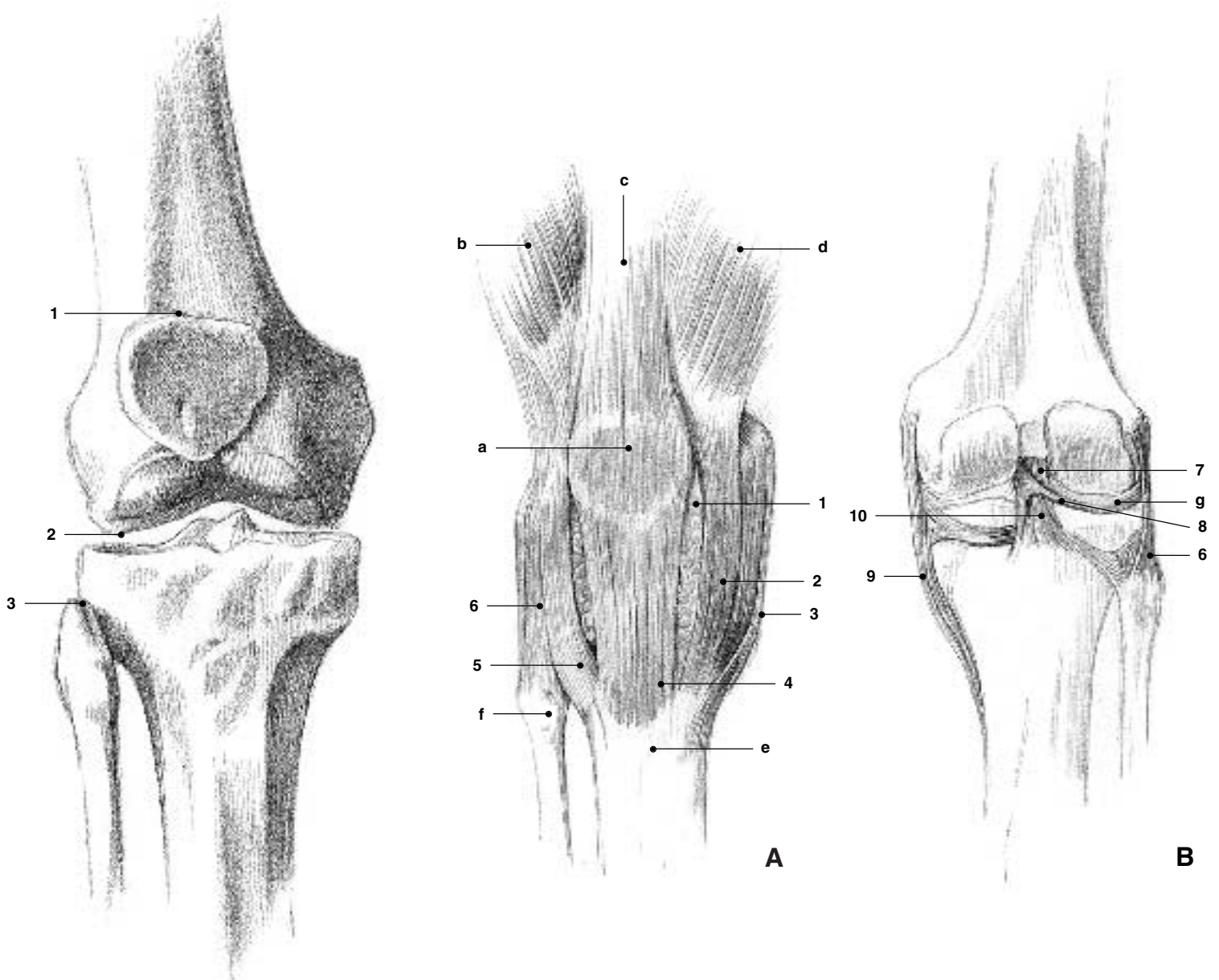
The muscles of the forearm,  
dorsal aspect

- 1 Brachioradialis muscle (63)
- 2 Extensor carpi radialis muscle (64)
- 3 Anconeus muscle (53)
- 4 Extensor carpi ulnaris muscle (65)
- 5 Extensor digitorum communis muscle (66)
- 6 Abductor digiti I<sup>st</sup> longus (70) and brevis (76) muscles
- 7 Extensor digiti I<sup>st</sup> muscle (71)
- 8 Extensor carpi radialis brevis muscle (64)
- 9 Extensor carpi radialis longus muscle (64)
- 10 Extensor digiti II<sup>nd</sup> muscle (72)
- 11 Flexor digiti I<sup>st</sup> longus muscle (60)
- a Extensor retinacular ligament

**Fig. 76**

The knee joint

The knee joint is composed of the femoro-patellar (1) and femoro-tibial (2) joints. The tibio-fibular joint (3) is situated below the lateral surface of the knee joint.



**Fig. 77**

The ligaments of the knee joint; anterior (A) and posterior (B) aspects

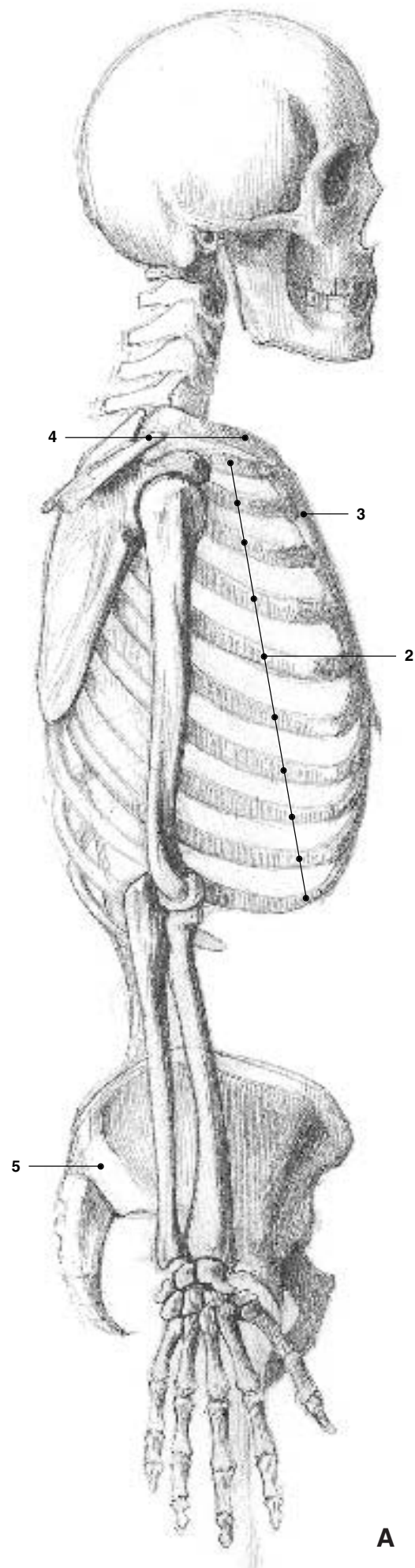
- |   |                                   |
|---|-----------------------------------|
| 1 Articular capsule                       | 10 Cruciatum posterior ligament   |
| 2 Medial straight ligament                | a Patella                         |
| 3 Inner collateral ligament               | b Vastus lateralis muscle (112/4) |
| 4 Intermediate straight patellar ligament | c Rectus femoris muscle (112/1)   |
| 5 Lateral straight patellar ligament      | d Vastus medialis muscle (112/2)  |
| 6 Outer collateral ligament               | e Tuberosity of the tibia         |
| 7 Cruciatum craniale ligament             | f Head of the fibula              |
| 8 Lateral meniscofemoral ligament         | g C-shaped meniscus               |
| 9 Inner collateral ligament               |                                   |

# THE BONES OF THE TRUNK

**Fig. 105**

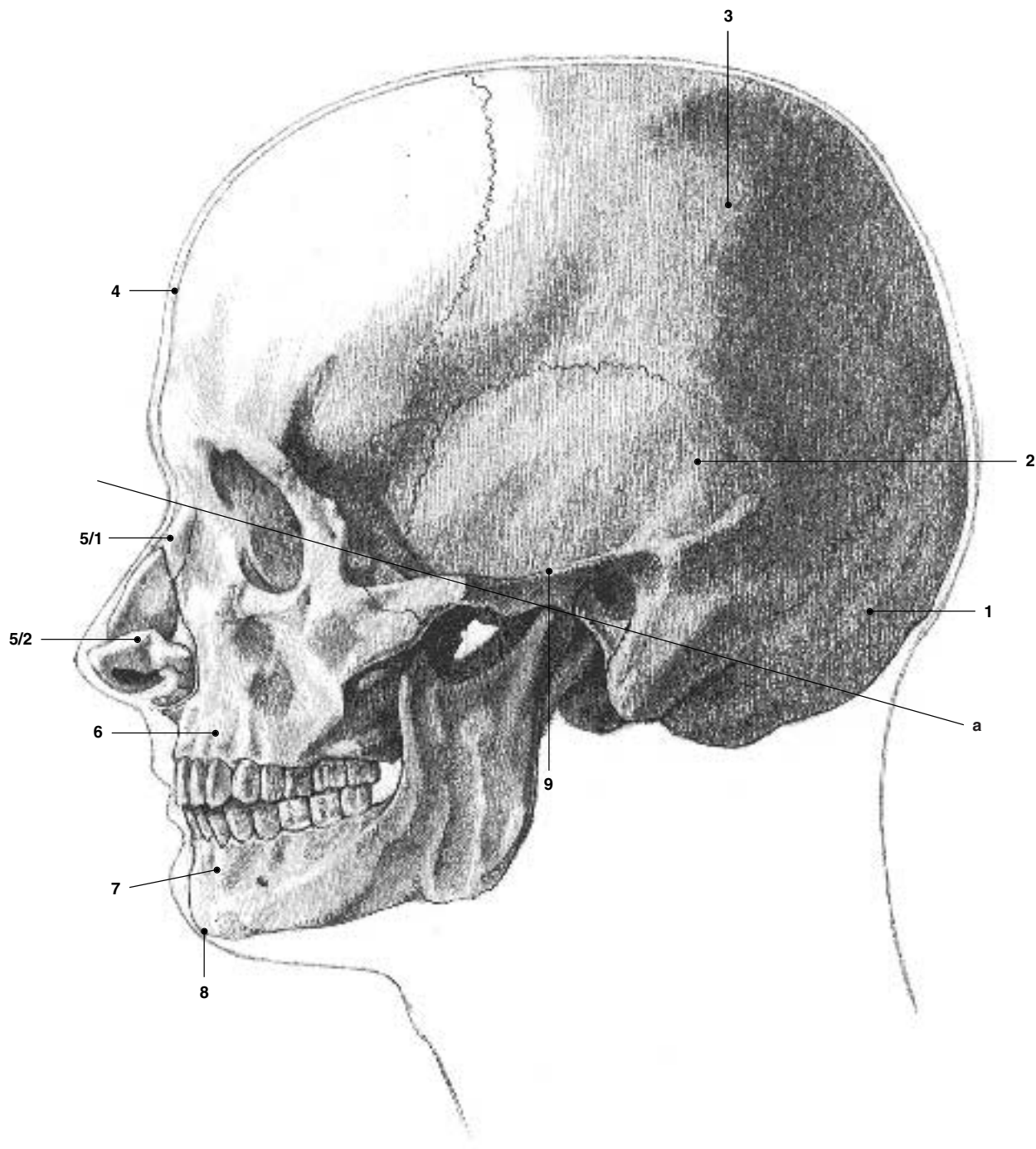
The bones of the trunk; lateral (A) and anterior (B) aspects

The bony structure of the trunk is composed of the vertebral column (1), the ribs (2) and the sternum (3), complemented above and below by the bones of the shoulder (4) and pelvic girdles (5). Between the closed chest and the bony pelvis the abdominal region has a bony framework only at the back; laterally and anteriorly it has a muscular wall. Anteriorly the clavicle, xiphoid process of the sternum, costal arch, deltoideus muscles, thoracic muscles, anterior serrate muscle, borders of the rectus abdominis muscle and anterior iliac spines can be seen through the skin. Posteriorly, the contours of the trunk are formed by the scapular spine, trapezius muscle, spinous processes of the thoracic and lumbar vertebrae and the bulging gluteal muscles.





# THE BONES AND MUSCLES OF THE HEAD

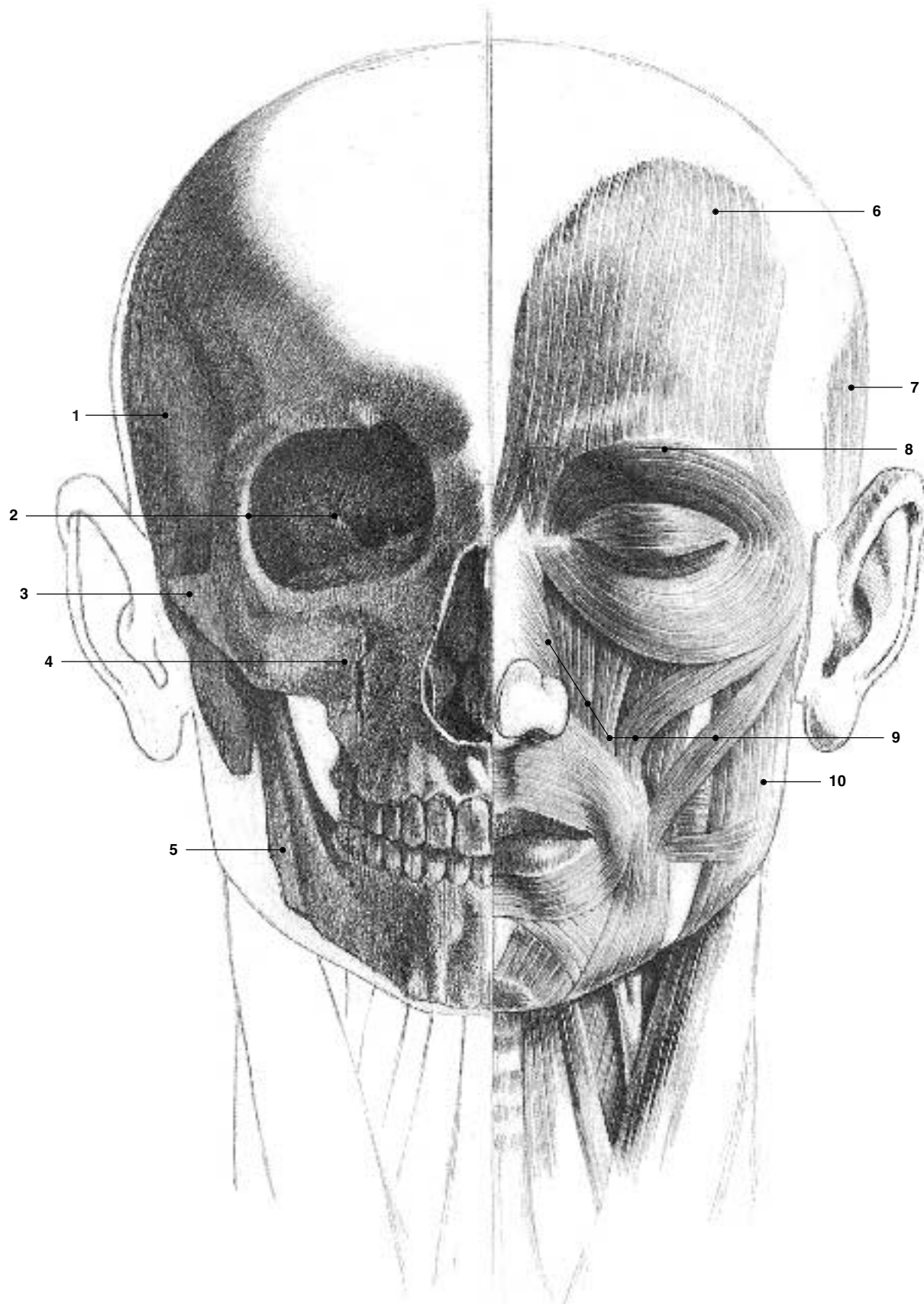


**Fig. 136**

The skull

The root of the nose, the axis of the orbit and the external auditory canal lie in an oblique plane (a). Above this plane the neurocranium is composed of the occipital (1), temporal (2), parietal (3) and frontal (4) bones, rigidly attached to each other by sutures. Below this plane the nasal bones (5/1) are small and their cartilages

form the apex of the nose (5/2). The teeth are located in the maxillary (6) and mandibular (7) dental alveoli. The chin is defined by the mental protuberance (8). The temporal fossa is bordered laterally by the zygomatic arch (9).

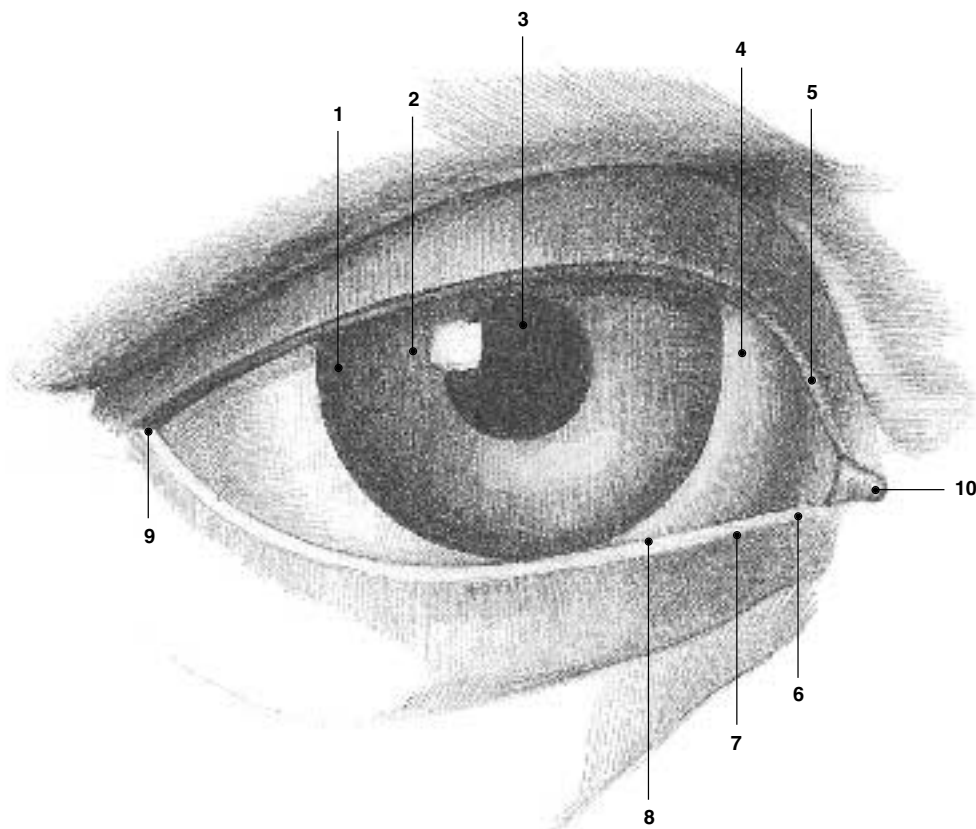


**Fig. 142**

The skull and muscles of the head, anterior aspect

From this view the shape of the head is determined by the frontal, superior and temporal (1) parts of the skull, as well as by the shape of the orbital (2), zygomatic (3), nasomaxillary (4) and mandibular (5) parts of the face. The frontal bone is covered by the thin frontalis muscle (6), the

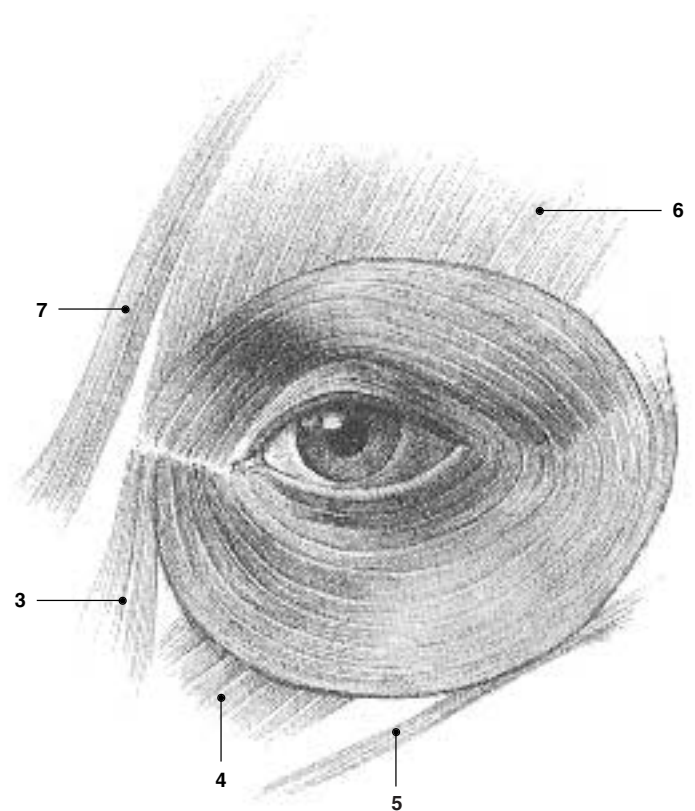
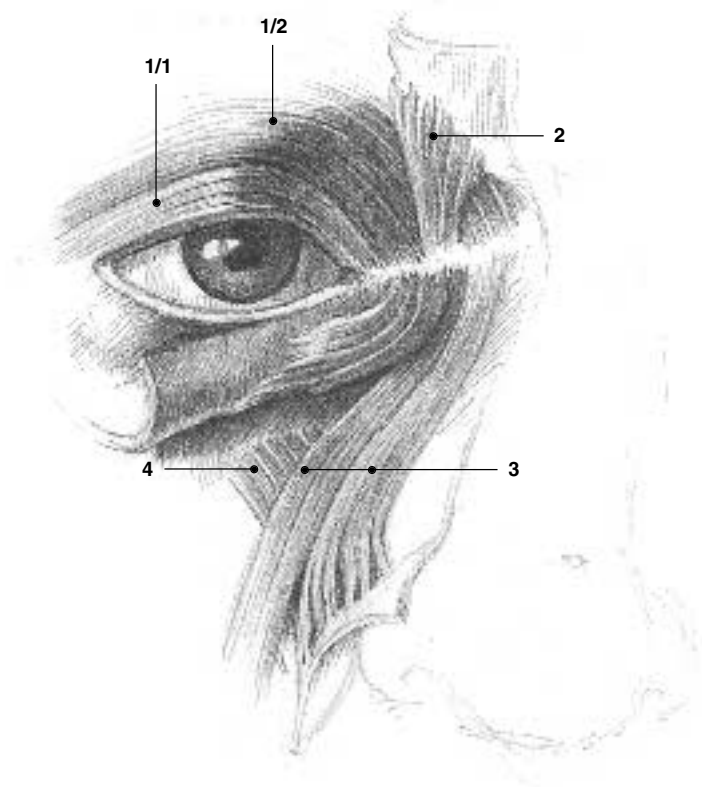
temporal bone by the temporalis muscle (7) and the orbit is surrounded by the orbicularis oculi muscle (8). The muscles of the nose and the lips (9) are largely responsible for facial expression. Only the body and ramus of the mandible are covered by the masseter muscle (10).



**Fig. 153**

The eye

Through the cornea (1) the iris (2), which is responsible for the colour of the eye, can be seen with the black pupil in the center (3). In the open palpebral fissure the sclera appears white (4). The larger upper (5) and smaller lower (6) eyelids are wrinkled. On their inner margins (8) the tarsal glands open. On their outer margins (7) are the eyelashes. The outer canthus is pointed (9), the inner one is rounded (10).



**Fig. 154**

The muscles of the eye

- 1 Orbicularis oculi muscle (155)
  - 1/1 Palpebral part
  - 1/2 Orbital part
- 2 Corrugator supercilii muscle (156)

- 3 Levator labii superioris muscle (medial part) (168)
- 4 Levator labii superioris muscle (lateral part) (168)

- 5 Zygomatikus parvus muscle (174)
- 6 Frontalis muscle (140)
- 7 Procerus muscle (140/1)

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