

CUNNINGHAM'S
MANUAL
OF
PRACTICAL
ANATOMY

VOL. I
HEAD AND NECK
BRAIN



CUNNINGHAM'S MANUAL
OF
PRACTICAL ANATOMY

REVISED AND EDITED BY

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TENTH EDITION

VOLUME THIRD

HEAD AND NECK: BRAIN

*WITH 16 PLATES (INCLUDING 12 RADIOGRAPHS) AND 218 OTHER
ILLUSTRATIONS, MANY OF WHICH ARE COLOURED*

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PREFACE TO THE TENTH EDITION

IN the preparation of this edition, which appears in war-time, no great changes have been made ; but the text has been revised thoroughly. The chief alterations in the text are the outcome of the continued pursuit of objects aimed at in the Ninth Edition.

In each volume, we have made some alterations in the sequence of the dissection and description where that seemed advisable ; and here and there—notably in the description of the deep muscles of the Back—we have cut out descriptive detail that we thought medical students could dispense with or which can be adequately dealt with only in the large text-books.

A few of the old figures have been omitted without sacrifice of the illustration of any important structure ; and a new figure from a drawing by Mr. R. W. Matthews has been added to illustrate the Axillary Region and the Sterno-Clavicular Joint.

Several new radiographs (for which we are indebted to Dr. Robert McWhirter) have been added to the series of Plates ; and new blocks have been made for others. There has been some rearrangement of the Plates ; and some former Plates which were printed on text-pages in the Ninth Edition have been reinstated to permit the secure binding of all the Plates in the volumes.

As the Birmingham Nomenclature is now in common use in this country, the glossary at the beginning of each of the

volumes in the Ninth Edition has probably served its purpose ; but we have retained it in Volume I, for the convenience of those who may still wish to refer to it.

We are grateful to a number of friends and correspondents who have assisted us by making suggestions and by calling attention to discrepancies and omissions—especially to Dr. A. A. Abbie, Dr. G. I. Boyd, Mr. Lewis Graham, F.R.C.S., and Dr. W. F. Johnson of New York.

We owe thanks also to Emeritus-Professor Arthur Robinson, who has shown his continued interest by reading the proofs of all three volumes of this edition of the *Manual* of which he was the Editor for nearly half of its lifetime of fifty-one years. Some of our readers may be interested to note that the *Manual* reached the year of its Jubilee in 1939—or Diamond Jubilee, if the years of its existence as a *Dissector's Guide* (1879–89) are included.

J. C. B.

E. B. J.

DEPARTMENT OF ANATOMY,
UNIVERSITY OF EDINBURGH,
June 1940.

EXTRACTS FROM PREFACE TO THE NINTH EDITION

THE character of the book as a dissector's guide remains unaltered, but we have thought it advisable to make certain changes which we hope will bring the student's work in the dissecting-room into still closer relation with his study of the living body, and will further emphasise the kind of knowledge expected of him in his clinical work.

We have increased the stress laid on the importance of the relations of structures to the surface of the body, have reversed the relative emphasis laid on arteries and nerves and have given a fuller account of lymph-drainage. We have made more frequent reference to function and to the application of anatomical facts in the diagnosis and treatment of disease.

By referring to observations on the living body, we have also tried to correct the impressions of the form and position of viscera which the dissector obtains from the embalmed cadaver. Most of the illustrations of X-ray Anatomy have been replaced by radiographs in negative reproduction, such as the student sees in demonstrations and in clinical practice.

We are aware that our most important reader is the student who has not dissected the part before, and one of our aims has been to lighten his task. We have therefore given him, in Volume I., a General Introduction to the structures met with in a dissection, and, throughout, have striven to avoid putting information before him at a stage when he cannot understand it.

We have replaced the Basle Nomina Anatomica by the anglicised version of a revision of that nomenclature which was adopted by the Anatomical Society at Birmingham in 1933. The advantage of the use of this revision is twofold : it is accepted by all British teachers ; and the anglicised form makes the text easier to read and more easily understood by the dissector—who is the reader for whom the book is primarily written. For the sake of those already familiar with the Basle terms, we have inserted a glossary of the names in the Birmingham Revision that differ radically from the B.N.A.

Most of the old illustrations have been retained unchanged, but a few have been omitted, some have been coloured, and others have been replaced ; and a number of entirely new figures have been added.

J. C. B.

E. B. J.

DEPARTMENT OF ANATOMY,
UNIVERSITY OF EDINBURGH,

June 1935.

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MANUAL

OF

PRACTICAL ANATOMY

HEAD AND NECK

THE dissectors of the Head and Neck begin work as soon as the cadaver is brought into the room. During the first three days, while the body is in the lithotomy position, they study the surface anatomy of the head, and dissect the scalp and the superficial structures of the temple and face. For the convenience of the dissectors of the Abdomen and Limbs, the body is then laid on its back for five days. On the first of those five days, the dissectors of the Head and Neck complete the dissection of the face, and revise the work done; the next four days are devoted to the dissection and study of the posterior triangle of the neck, which is a specially important region to the surgeon, and must be displayed before the dissectors of the Upper Limb have disturbed its posterior boundary.

In order to ensure that the dissection of the scalp, temple and face is completed within the time allotted, apportion the work as follows :—

First Day.—Surface anatomy ; scalp and temple.

Second Day.—Survey of scalp ; superficial muscles of face.

Third Day.—Surface of parotid gland ; vessels and nerves of face.

Fourth Day.—Deeper muscles ; eyelids ; lacrimal apparatus ; nasal cartilages ; review of work done.

SCALP—TEMPLE—FACE

Surface Anatomy.—The dissectors should provide themselves with a dried skull ; and they should examine, on the

living head, the parts mentioned and then identify them on the head of the cadaver.

Examine the *auricle* first (Fig. 5). It is nearer the back of the head than the front, and is at the level of the eye and nose. The *concha* of the auricle is the "well of the ear," and leads into the *external auditory meatus*. The *helix* is the outer rim. It begins in the concha, and ends at the *lobule*, which is the soft, lower end of the auricle. The *tragus* is the small lid that overlaps the concha anteriorly; hairs project backwards from it, and, to some extent, prevent small foreign bodies from entering the external meatus; they become thicker and stronger after middle age.

Turn now to the back of the head. The *external occipital protuberance* is the knob felt in the median line where the back of the head joins the back of the neck. Feel for the *superior nuchal line*—a curved, indistinct ridge that extends in a lateral direction from the protuberance towards the mastoid process; it marks the boundary between the head and the neck at the back. The *mastoid process* is the smooth, rounded bone behind the lower part of the auricle and overlapped by it. Press the finger tip into the hollow below the mastoid process, behind the jaw: the bony resistance felt is due to the tip of the transverse process of the atlas vertebra; the chief soft structures between the finger and the bone are the lower part of a large gland called the *parotid gland* and the anterior border of the *sterno-mastoid muscle*.

Identify the *supramastoid crest* on the skull. It is a blunt ridge that begins immediately above the external auditory meatus and curves upwards and backwards for an inch. Then, find its position on the head by pressing the finger tips on the skin above the posterior part of the root of the auricle. The *parietal eminence* is the region of accentuated convexity where the back of the head meets the top and the side of the head.

Passing forwards over the top of the head, you come to the *frontal eminence*, where the top, the front and the side of the head meet. On the side of the head, feel for the *temporal line*. It is the narrow, curved ridge that marks the upper limit of the temporal region. The only part of the line that can be felt distinctly is its anterior part, which separates the forehead from the temple. The line begins at a prominence felt at the lateral end of the eyebrow, arches upwards and

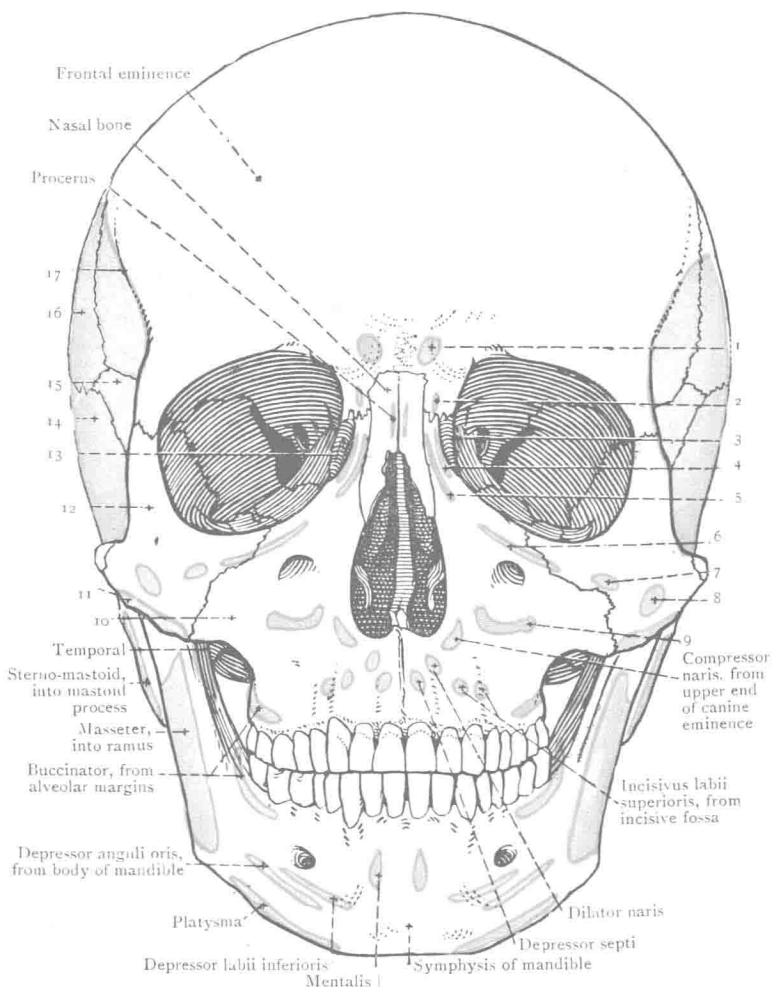


FIG. 1.—Anterior View of Skull showing Muscular Attachments.

- | | |
|---|---|
| 1, 2, 3, 4. Orbicularis oculi. | 11. Masseter, from zygomatic arch. |
| 5. Levator labii superioris alæque nasi. | 12. Frontal process of zygomatic bone. |
| 6. Levator labii superioris. | 13. Lacrimal bone and fossa. |
| 7. Zygomaticus minor } from zygomatic bone. | 14. Squamous temporal |
| 8. Zygomaticus major } | 15. Greater wing of sphenoid } temporal muscle. |
| 9. Levator anguli oris, from maxilla. | 16. Parietal bone |
| 10. Zygomatic process of maxilla. | 17. Temporal line. |

backwards, passing a little below the parietal eminence, and, finally, turns downwards to run into the supramastoid crest.

On the face, the outstanding feature is the *external nose* (the term "nose" includes also the cavities that extend backwards from the nostrils into the head for two or three inches to communicate with the pharynx). Grasp the nose between finger and thumb. Its lower part is movable, as it is made chiefly of skin and cartilage. The upper part has a skeleton of bone, and is therefore rigid. The bones are : (1) The pair of *nasal bones*, which lie side by side in the bridge of the nose ; and (2), behind each nasal bone, the *frontal process of the maxilla*. Note that the skin is adherent to the cartilages, but can be moved over the bones. The part of the cavity of the nose immediately above each nostril is called the *vestibule of the nose*. The lateral wall of the vestibule is slightly expanded, and is called the *ala* of the nose. The vestibule is lined with skin from which hairs grow to guard the entrance.

Examine the *lips* and the *cheeks*. They are composed chiefly of muscle and fat covered with skin and lined with mucous membrane. The space that separates the lips and cheeks from the teeth and gums is called the *vestibule of the mouth*. It is seldom that all the *teeth* are present in a dissecting-room cadaver. A full set of adult teeth comprises 16 teeth in each jaw ; in each half of the jaw, counting from before backwards, there are 2 *incisors*, 1 *canine*, 2 *premolars* and 3 *molars*. The *oral fissure*, between the lips, is opposite the upper teeth near their biting edges ; the corner or *angle* of the mouth is opposite the first premolar tooth. The median groove on the upper lip is called the *philtrum*. Evert the lips, and note that, in the median plane, between the root of the lip and the gum, the mucous membrane is raised up into a ridge or fold called the *frenulum of the lip*.

Feel the *body of the mandible* below the lower lip and the cheeks, and trace its lower border backwards to the *angle* of the mandible, which is a point often used as a landmark. Identify the position of the *mental foramen*. It is about an inch and a half from the median plane, and about midway between the gum and the lower border of the mandible. The finger tip placed firmly on that spot in the living person can make out the foramen as a slight depression. The *oblique line* of the mandible is a blunt ridge that begins near the mental foramen, and extends backwards and upwards ;

to feel it, press firmly on the body of the mandible. The *ramus* of the mandible is the wide, flat plate that extends

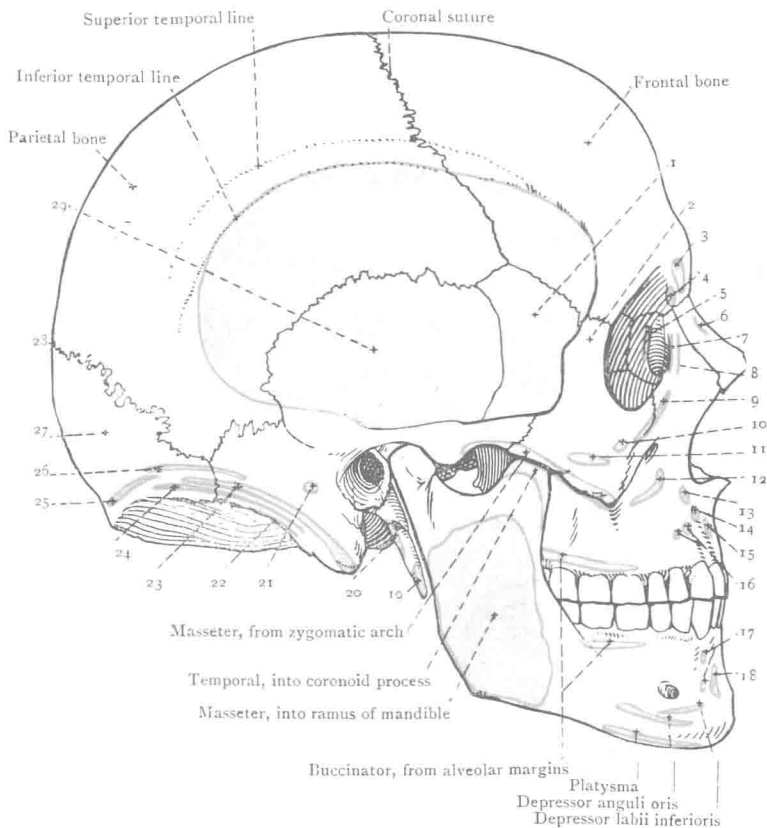


FIG. 2.—Lateral View of Skull showing Muscular Attachments.

- | | |
|--|--|
| 1. Greater wing of sphenoid bone. | 16, 17. Incisive muscles. |
| 2. Frontal process of zygomatic bone. | 18. Mentalis, from body of mandible. |
| 3, 4. Orbicularis oculi, from frontal bone. | 19. Stylo-glossus } from styloid process. |
| 5. Orbicularis, from lacrimal crest. | 20. Stylo-hyoid } |
| 6. Procerus and nasal bone. | 21. Auricularis posterior } on mastoid temporal. |
| 7. Orbicularis, from frontal process of maxilla. | 22. Longissimus capitis } |
| 8. Levator labii superioris alaeque nasi. | 23. Sterno-mastoid. |
| 9. Levator labii superioris. | 24. Splenius capitis } on superior nuchal line. |
| 10. Zygomaticus minor } from zygomatic bone. | 25. Trapezius } |
| 11. Zygomaticus major } | 26. Occipital belly of occipito-frontalis. |
| 12. Levator anguli oris, from maxilla. | 27. Squamous part of occipital bone. |
| 13. Compressor naris. | 28. Lambda. |
| 14. Dilator naris. | 29. Temporal muscle and squamous temporal. |
| 15. Depressor septi. | |

upwards from the posterior part of the body. It can be felt only indistinctly ; for it is covered with a thick muscle, called the *masseter*, that can be felt hardening when the jaws are clenched. But the *condyloid process* can be distinctly felt. It stands up from the posterior part of the ramus, and includes the neck and head of the mandible. The *neck* is the bone felt immediately in front of the lobule of the auricle ; the *head* is in front of the tragus. Place your finger tip in front of your own tragus, and open your mouth : the head of the mandible is felt gliding downwards and forwards.

The *tubercle of the root of the zygoma* is often used as a landmark. It is the bone felt immediately in front of the top of the head of the mandible when the mouth is shut, and immediately above it when the mouth is open. The *zygomatic arch* is the bony bridge that spans the interval between the ear and the eye. It begins at the tubercle of the zygoma ; and the *zygoma* (or zygomatic process of the temporal bone) forms the narrow, posterior part of the arch. The wide, anterior part is the *zygomatic bone*, which is below and lateral to the eye, and forms the hard, prominent part of the cheek. In thin people, the zygomatic bone and arch are conspicuous.

The *orbit* is the socket for the eyeball. Its opening on the face is nearly four-square, and is slightly oblique. Examine the margins of the opening in the skull and in the body—both living and dead. The lower margin is formed by the *zygomatic bone* and the *maxilla*. Look and feel for the *infra-orbital foramen* a few millimetres below the orbit and a finger's breadth from the side of the nose. The lateral margin of the orbital opening is formed chiefly by the *frontal process of the zygomatic bone*. The medial margin is chiefly the *frontal process of the maxilla*, which forms part of the skeleton of the nose also. On the skull, look for a shallow, fairly wide, vertical groove on the medial wall of the orbit close behind the orbital margin. It is called the *lacrimal groove* because it accommodates a membranous bag called the lacrimal sac ; it is continuous inferiorly with a short, wide passage, called the *naso-lacrimal canal*, which leads down into the cavity of the nose. The upper boundary of the orbital opening is the *supra-orbital margin* of the frontal bone, which forms also the upper parts of the lateral and medial boundaries. Its lateral end is the *zygomatic process of the frontal bone*—an important landmark which has been referred to already as

the prominence felt at the lateral end of the eyebrow. Look and feel for the *supra-orbital notch*—a small dent on the supra-orbital margin about two finger-breadths from the median plane. In the living head, it is felt more easily when pressure is made from below. Occasionally it is converted into a foramen by a spicule of bone, and then cannot be felt.

The *eyebrow* is the fold of skin that covers the supra-orbital margin. The hairs that spring from it have a lateral inclination; in elderly people—especially men—they are thicker and longer than in young people. The *superciliary arch* is the thick, curved ridge of bone placed a little above the medial part of the supra-orbital margin. It is poorly marked (or even absent) in women, but is strongly marked in men, and is seen better when the eyebrow is drawn down. The smooth area between the right and left arches is called the *glabella*.

Complete the study of the surface anatomy of the head by examining the eyeball and the eyelids.

The white of the eye is called the *sclera*. The clear front of the eye is the *cornea*. The coloured part seen through the cornea is the *iris*. The black spot in the centre of the iris is a circular aperture called the *pupil*. All the visible part of the sclera is covered with a moist, transparent membrane called the *conjunctiva*, which is reflected off the sclera on to the eyelids, and lines their deep surfaces. The angle of reflexion, above and below, is named a *fornix* of the conjunctiva. The conjunctiva, as a whole, forms the *conjunctival sac*.

The *eyelids* or *palpebræ* are the movable curtains that protect the front of the eyeball; they join each other at the *lateral* and *medial angles* of the eye. The upper lid is more movable than the lower; it is also larger, and the upper fornix is therefore deeper than the lower. When the eye is open, the eyelids merely overlap the cornea above and below; the margins of the lids are slightly concave, and the *palpebral fissure* (*rima palpebrarum*) is therefore elliptical. When the eye is closed, the fissure is a nearly horizontal line; and, since the upper lid is the larger and more movable, the fissure is below the pupil—nearly opposite the lower margin of the cornea.

The medial part of the fissure, when open, is a small triangular space called the *lacus lacrimalis*. The *lacrimal caruncle* is the reddish, fleshy-looking elevation in the centre

of the lake ; a few fine hairs project from its surface. Look for a small, curved, vertical fold or ridge of the conjunctiva that slightly overlaps the eyeball immediately lateral to the caruncle (Fig. 3). It is called the *plica semilunaris*, and is a rudimentary representative of the nictitating membrane (or third eyelid) possessed by some animals.

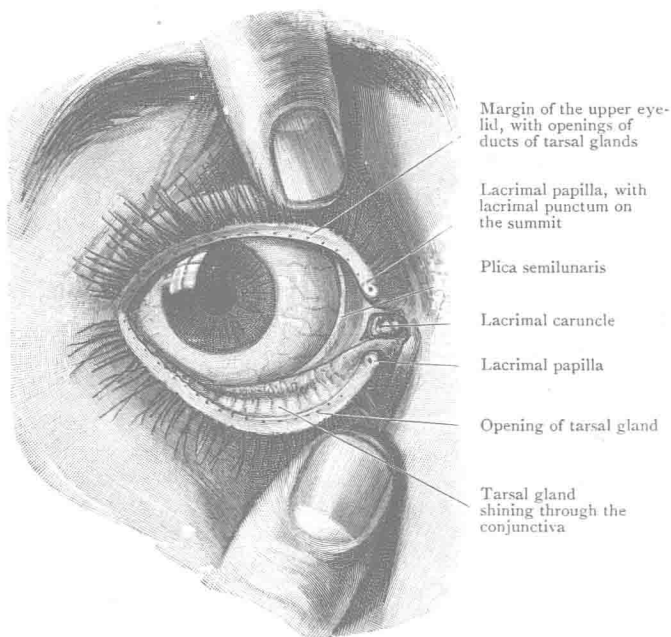


FIG. 3.—Eyelid slightly everted to show the Conjunctiva.

Evert the lids. The lower lid is easily turned inside out ; and, since it is small, the lower fornix can be seen when the eye is turned up. The upper lid is turned with difficulty, and, even when it is everted, the upper fornix cannot be seen. Look at the deep surface of a lid. A number of yellowish, parallel streaks are seen through the conjunctiva (Fig. 3). These are small glands called the *tarsal glands*. Examine the free margin of a lid. The portion that bounds the lacus is smooth and rounded. This portion ends laterally in a small eminence called the *lacrimal papilla*. On the summit