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HEROLD AND WIMMER'S
HUMAN ANATOMY,

WITH A PREFACE BY

PROF. JAMES E. GARRETSON, M.D.

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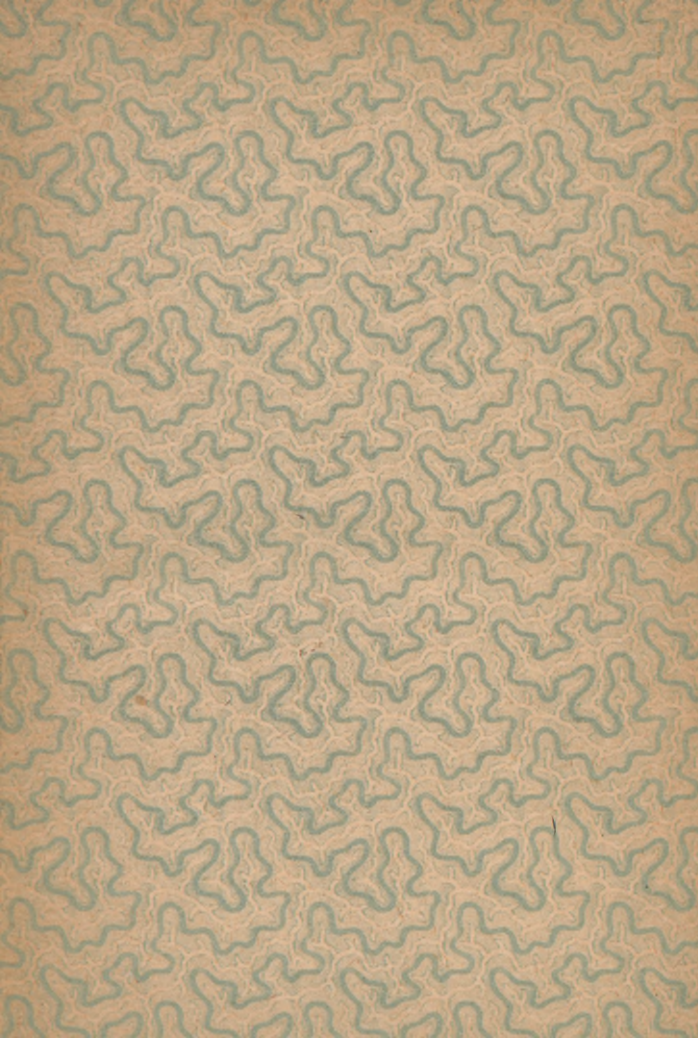
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MEMORANDA AND TABLES
OF
Human Anatomy.


VOLUME I.



BEING

A COMPLETE DESCRIPTION OF THE MUSCLES,
LIGAMENTS, ETC.

For the use of Practitioners and Students of Medicine.



BY


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WITH A PREFACE BY

PROF. JAMES E. GARRETSON, A.M., M.D.

PHILADELPHIA, PA.:

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1894.

PREFACE.

ANATOMY, lying at the foundation of medicine, anything aiding in the memorizing and comprehension of its subjects, is to be greeted warmly by practitioner and student alike.

The work of Drs. Herold and Wimmer, here under review, is suggestive of the fact that many men are of many minds, consequently are of many requirements as to ways and manner of study, thus affording *raison de plus* for variety as to presentation of their themes which characterize the authors of the day.

As a teacher of the subject of anatomy who has taken in the experiences of many years, it is a pleasure to find opportunity afforded to express a highly favorable opinion of the "Memoranda and Tables" here under consideration, and to recommend them as a happy *résumé* of what constitutes a full course, whether as to text-books or lectures, of the matters treated.

It is, of course, understood that "Memoranda and Tables" are not akin with exhaustive discussions, as certainly it could be neither intention nor wish of the writers to have their book displace in any degree that close and necessary study of anatomy in which alone lies its use. The appeal of this volume, as we see it, is in the way of a reminder; this, alike to the practitioner preparing for an operation and the student coming up for his examination. To forget is very easy. It is not, however, that forgetfulness is departure of a thing from one's mind. A thing once known, but forgotten, is a thing in abeyance; to bring it back into place, a hint is all that is needed. Hints constitute the present book and constitute it well. Little is found left out in the way of such hints. It constitutes an agreeable and continuous surprise to note how many are put in. With a view to measuring the book, we have taken up *seriatim* and in detail many of its subjects, with a result of finding exceptionally few omissions.

Used for its purpose and being kept in its place the book is to be treasured as a *vade mecum*.

The authors are to be complimented and thanked, and will be.

JAMES E. GARRETSON, M.D.

Philadelphia, September 30th, 1894.

AUTHOR'S PREFATORY NOTE.

IN a work that treats of the "essentials" of human anatomy, where a correct and choice selection of material is imperiously required, there must be an equal necessity that certain fixed and intelligible principles should be pre-established in the mind of the student, else the true value of such an outline is lost. The necessity of such a book as this, is by no means to supplant any of the larger text-books, for, on the contrary, its object is to contain, as its title proclaims, the essence of those important facts with which the student must be familiar in order to present himself for examination, be it in the quiz-room, college, or before a State Board of Examiners.

With this object constantly before us, we submit this little volume for perusal and study. It has been our aim and purpose to so arrange the muscles, ligaments, etc., that the whole of any one subject (sometimes two or more), shall be presented on one page, or on contiguous pages, as the case might be. The muscle, ligament, and so on, is placed first in solid type or capitals, and numbered, while the description and sub-divisions follow in "braces" immediately after the sections to which they belong. When we consider that the study of human anatomy chiefly employs and exercises the faculty of memory, we can readily appreciate the value of systematizing and condensation. This little book, therefore, is to be the framework upon which the more detailed knowledge may be hung. Having attempted to set forth as briefly as has seemed consistent with clearness, the anatomy of the various parts referred to, and while conscious that many defects in the execution of the "tables," etc., may be apparent to the reader, it is hoped and confidently expected that this outline will prove useful, both to physicians and students, and meet with a corresponding success. The authors have to acknowledge valuable aid derived from the perusal of Gray's well-known work on Anatomy.

JUSTIN HEROLD,
SEBASTIAN J. WIMMER.

New York City, April 13th, 1894.

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THIS VOLUME IS DEDICATED

TO

EBEN J. RUSS, M.D.,

ST. MARY'S, PENNSYLVANIA.

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PART 1.

TABLES OF THE MUSCLES.

I.—CRANIUM AND FACE.

1. Cranial Region. } Occipito-frontalis.
2. Auricular Region. { Attolens aurem.
Attrahens aurem.
Retrahens aurem.
3. Palpebral Region. { Tensor tarsi.
Levator palpebræ superioris.
Corrugator supercillii.
Orbicularis palpebrarum.
4. Orbital Region. { Levator palpebræ superioris.
Rectus superior.
Rectus internus.
Rectus inferior.
Rectus externus.
Obliquus superior.
Obliquus inferior.

- | | | |
|--------------------------------------|---|--|
| 5. Nasal Region. | { | Pyramidalis nasi.
Levator labii superioris alæque nasi.
Dilator naris posterior.
Dilator naris anterior.
Compressor nasi.
Compressor narium minor.
Depressor alæ nasi. |
| 6. Sup. Maxillary Region. | { | Levator labii superioris.
Levator anguli oris.
Zygomaticus major.
Zygomaticus minor. |
| 7. Inf. Maxillary Region. | { | Levator labii inferioris.
Depressor labii inferioris.
Depressor anguli oris. |
| 8. Inter-Maxillary Region. | { | Orbicularis oris.
Buccinator.
Risorius. |
| 9. Temporo-Maxillary Region. | { | Masseter.
Temporal. |
| 10. Pterygo-Maxillary Region. | { | Pterygoideus externus.
Pterygoideus internus. |

II.—NECK.

- | | | |
|-------------------------------|---|---|
| 1. Superficial Region. | { | Platysma myoides.
Sterno-cleido-mastoid. |
|-------------------------------|---|---|

- | | |
|----------------------------------|--|
| 2. Infra-Hyoid Region. | { Sterno-hyoid.
{ Sterno-thyroid.
{ Thyro-hyoid.
{ Omo-hyoid. |
| 3. Supra-Hyoid Region. | { Digastric.
{ Stylo-hyoid.
{ Mylo-hyoid.
{ Genio-hyoid. |
| 4. Lingual Region. | { Genio-hyo-glossus.
{ Hyo-glossus.
{ Lingualis.
{ Stylo-glossus.
{ Palato-glossus. |
| 5. Pharyngeal Region. | { Constrictor inferior.
{ Constrictor medius.
{ Constrictor superior.
{ Stylo-pharyngeus.
{ Palato-pharyngeus. |
| 6. Region of Soft Palate. | { Levator palati.
{ Tensor palati.
{ Azygos uvulæ.
{ Palato-glossus.
{ Palato-pharyngeus. |
| 7. Ant. Vertebral Region. | { Rectus capitis anticus major.
{ Rectus capitis anticus minor.
{ Rectus lateralis.
{ Longus colli. |

8. **Lat. Vertebral Region.** { Scalenus anticus.
Scalenus medius.
Scalenus posticus.
9. **Region of Larynx.** { Crico-thyroid.
Crico-arytænoideus posticus.
Crico-arytænoideus lateralis.
Arytænoideus.
Thyro-arytænoideus.
10. **Region of Epiglottis.** { Thyro-epiglottideus.
Arytæno-epiglottideus superior.
Arytæno-epiglottideus inferior.

III.—BACK, THORAX AND ABDOMEN.

1. **First Layer.** { Trapezius.
Latissimus dorsi.
2. **Second Layer.** { Levator anguli scapulæ.
Rhomboideus minor.
Rhomboideus major.
3. **Third Layer.** { Serratus posticus superior.
Serratus posticus inferior.
Splenius colli.
Splenius capitis.
4. **Sacro-Lumbar Region.** { Erector spinæ.

5. **Dorsal Region.** {
 Sacro-lumbalis.
 Musculus accessorius ad sacro-lumbalem.
 Longissimus dorsi.
 Spinalis dorsi.
6. **Cervical Region.** {
 Cervicalis ascendens.
 Transversalis colli.
 Trachelo-mastoid.
 Complexus.
 Biventer cervicis.
 Spinalis colli.
7. **Fifth Layer.** {
 Semispinalis dorsi.
 Semispinalis colli.
 Multifidus spinæ.
 Rotatores spinæ.
 Supraspinalis.
 Interspinalis.
 Extensor coccygis.
 Intertransversalis.
 Rectus capitis posticus major.
 Rectus capitis posticus minor.
 Obliquus capitis superior.
 Obliquus capitis inferior.
8. **Diaphragmatic Region.** {
 Diaphragm.
9. **Abdominal Region.** {
 Obliquus externus.
 Obliquus internus.
 Transversalis.
 Rectus.
 Pyramidalis.
 Quadratus lumborum.

- | | | |
|----------------------|---|------------------------|
| 10. Thoracic Region. | { | Intercostales externi. |
| | | Intercostales interni. |
| | | Infracostales. |
| | | Triangularis sterni. |
| | | Levatores costarum. |

IV.—UPPER EXTREMITY.

SHOULDER.

- | | | |
|---------------------------|---|-------------------|
| 1. Ant. Thoracic Region. | { | Pectoralis minor |
| | | Pectoralis major. |
| | | Subclavius. |
| 2. Lat. Thoracic Region. | { | Serratus magnus. |
| 3. Acromial Region. | { | Deltoid. |
| 4. Ant. Scapular Region. | { | Subscapularis. |
| 5. Post. Scapular Region. | { | Supraspinatus. |
| | | Infraspinatus. |
| | | Teres minor. |
| | | Teres major. |

ARM.

- | | | |
|-------------------------|---|---------------------|
| 6. Ant. Humeral Region. | { | Coraco-brachialis. |
| | | Biceps. |
| | | Brachialis anticus. |

7. **Post. Humeral Region.** { Triceps.
Subanconeus.

FORE-ARM.

8. **Ant. Brachial Region.** { Pronator radii teres.
Flexor carpi ulnaris.
Palmaris longus.
Flexor carpi radialis.
Flexor sublimis digitorum.
Flexor profundus digitorum.
Flexor longus pollicis.
Pronator quadratus.

9. **Radial Region.** { Supinator longus.
Extensor carpi radialis longior.
Extensor carpi radialis brevior.

10. **Post. Brachial Region.** { Extensor communis digitorum.
Extensor minimi digiti.
Extensor carpi ulnaris.
Anconeus.
Supinator longus.
Extensor ossis metacarpi pollicis.
Extensor primi internodii pollicis.
Extensor secundi internodii pollicis.
Extensor indicis.

HAND.

11. **Radial Region.** { Abductor pollicis.
Opponens pollicis.
Flexor brevis pollicis
Adductor pollicis.

12. Ulnar Region. {
 Palmaris brevis.
 Abductor minimi digiti.
 Flexor brevis minimi digiti.
 Opponens minimi digiti.
13. Mid. Palmar Region. {
 Lumbricales.
 Interossei palmares.
 Interossei dorsalis.

V.—LOWER EXTREMITY.

1. Iliac Region. {
 Psoas magnus.
 Psoas parvus.
 Iliacus.

THIGH.

2. Ant. Femoral Region. {
 Tensor Vaginæ femoris.
 Sartorius.
 Rectus.
 Vastus externus.
 Vastus internus.
 Crureus.
 Subcrureus.
3. Int. Femoral Region. {
 Gracilis.
 Pectineus.
 Adductor magnus.
 Adductor longus.
 Adductor brevis.

HIP.

4. **Gluteal Region.** {
 Gluteus maximus.
 Gluteus medius.
 Gluteus minimis.
 Pyraformis.
 Gemellus superior.
 Obturator internus.
 Gemellus inferior.
 Obturator externus.
 Quadratus femoris.
5. **Post Femoral Region.** {
 Biceps.
 Semitendinosus.
 Semimebranosus.

LEG.

6. **Ant. Tibio-fibular Region** {
 Tibialis articus.
 Extensor proprius pollicis.
 Extensor longus digitorum.
 Peroneus tertius.
7. **Post. Tibio-fibular Region** {
 Gastrocnemius.
 Plantaris.
 Soleus.
 Popliteus.
 Flexor longus pollicis.
 Flexor longus digitorum.
 Tibialis posticus.
8. **Fibular Region.** {
 Peroneus longus.
 Peroneus brevis.

FOOT.

- | | | |
|---------------------|---------------|------------------------------|
| 9. Dorsal Region. | } | Extensor brevis digitorum. |
| | { | Abductor pollicis. |
| | { | Flexor brevis digitorum. |
| | { | Abductor minimi digiti. |
| | { | Flexor accessorius. |
| 10. Plantar Region. | R e-
gion. | Lumbricales. |
| | { | Flexor brevis pollicis. |
| | { | Adductor pollicis. |
| | { | Flexor brevis minimi digiti. |
| | { | Transversus pedis. |
| | { | Interossei. |

NOTES: I.—MUSCLES OF THE SKULL.

I.—OCCIPITO-FRONTALIS.

- | | | |
|--------------|---|--|
| Description. | { | Is bicipital, with a central aponeurosis; the muscular slips being the frontal and occipital portions. |
| Origin. | { | (1) Outer two-thirds of superior curved line of occipital bone. |
| | { | (2) Mastoid process of temporal bone. |
| Insertion. | { | At the eyebrow, where its fibres intermix with those of the following muscles: |
| | { | Pyramidalis nasi. |
| | { | Corrugator supercillii. |
| | { | Orbicularis palpebrarum. |

Actions.	(1) Frontal portion : Raises the skin of the forehead, eyelids, and wrinkles the brow. (2) Occipital portion : Assists in stretching the common aponeurosis.
Nerves.	Frontal portion has the facial, and the occipital portion the posterior auricular branch of facial, and occasionally the occipitalis minor.

2.—ATTOLENS AUREM.

Description.	Thin, tendinous, and fan-shaped ; its fibres converge to their point of insertion.
Origin.	Tendon of occipito-frontalis, just above the external ear.
Insertion.	By a flattened tendon into the upper part of the cranial surface of the pinna.
Actions.	Raises the ear.
Relations.	(a) <i>Externally</i> : With the the skin (b) <i>Internally</i> : With the temporal aponeurosis.
Nerve.	Occipitalis minor.

3.—ATTRAHENS AUREM.

Description.	{	Fibres are pale and indistinct. This is the smallest muscle in the auricular region, and it is thin and fan-shaped.
Origin.	{	Cranial aponeurosis, and posterior part of the zygomatic process.
Insertion.	{	Front part of the helix.
Actions.	{	Draws the ear forward and upward.
Relations.	{	(a) <i>Externally:</i> With the integument. (b) <i>Internally:</i> Is separated from the temporal artery and vein by the temporal fascia.
Nerve.	{	Facial.

4.—RETRAHENS AUREM.

Description.	{	Is located behind the ear, and usually consists of two or more small fleshy fasciculi; its fibres are thin, and somewhat irregular.
Origin.	{	Mastoid process of the temporal bone, above the sterno-mastoid muscle.
Insertion.	{	Lower part of the cranial surface of the concha of the ear.

Actions.	{ If this muscle has any use at all, it would be to draw the ear backward.
Relations.	{ (a) <i>Externally</i> : With the integument. { (b) <i>Internally</i> : With the mastoid process of the temporal bone.
Nerve.	{ Posterior auricular branch of the facial.

5. —ORBICULARIS PALPEBRARUM.

Description.	{ A sphincter muscle seated in the substance of the eyelids. It is thin, broad, and transversely oval. From the points of origin its fibres pass outward, and, by means of a broad, flat layer, covers the temple and upper part of the cheek.
Origin.	{ (1) Internal angular process of the frontal bone. { (2) Ascending process of the superior maxilla. { (3) Tendo oculi.
Insertion.	{ Into the skin of the eyelids, its upper and inner edge being connected with the occipito-frontalis and corrugator supercilii muscles.

Actions.

Closes the eyelids by bringing them together. Compresses the lachrymal sac, forcing the tears into the nasal duct. If the whole muscle is brought into play, it draws the skin of the forehead, temple and cheek inward. Its direct antagonist is the levator palpebræ.

Relations.

(a) *By its Superficial Surface :*

With the integument.

(b) *By its Deep Surface :*

Above—

With the occipito-frontalis and corrugator supercilii ; also the supra-orbital vessels and nerve.

Below—

It covers the lachrymal sac, and the origins of the levator labii superioris, and the levator labii superioris æque nasi muscles.

(c) *Internally :*

It b'ends with the pyramidalis nasi (?).

(d) *Externally :*

Lies on the temporal fascia.

Nerve.

Facial.

6.—CORRUGATOR SUPERCILII.

Description.	{ Small and narrow, of a pyramidal shape; it is situated at the inner end of the eyebrow.
Origin.	{ Inner end of the superciliary ridge.
Insertion.	{ At the middle of the orbicularis palpebrarum muscle.
Actions.	{ Produces the vertical wrinkles of the forehead, by drawing the eyebrow downward and inward.
Relations.	{ (a) <i>Anterior Surface:</i> With the occipito-frontalis and orbicularis palpebrarum muscles. (b) <i>Posterior Surface:</i> With the frontal bone, and supra-trochlear nerve.
Nerve.	{ Facial.

7.—TENSOR TARSI.

Description.	{ Is about three lines broad and six long. Is small and thin, and is located at the inner side of the orbit, passing over the lachrymal sac it divides into two slips.
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Origin.	{ From the crest and the adjacent part of the orbital surface of the lachrymal bone.
Insertion.	{ The two slips are inserted into the tarsal cartilages.
Actions.	{ Draws the eyelids and the extremities of the lachrymal canals inward. It also compresses the lachrymal sac.
Nerve.	{ Facial.

8.—LEVATOR PALPEBRÆ SUPERIORIS.

Description.	{ A long, thin, triangular and flat muscle, situated at the upper part of the orbital cavity.
Origin.	{ Under surface of the lesser wing of the sphenoid, in front of the optic foramen.
Insertion.	{ By an expanded aponeurosis into the upper margin of the superior tarsal cartilage.
Actions.	{ Raises the upper eyelid, draws it backward, and sinks it into the orbit. Its direct antagonist is the orbicularis palpebrarum.

Relations.	}	(a) <i>Upper Surface:</i> With frontal nerve and artery, and the periosteum of the orbit.
		In front, with the inner sur- face of the broad tarsal ligament.
	}	(b) <i>Under Surface:</i> With the superior rectus and in the eyelid, with the con- junctiva.
		A small branch of the motor oculi enters here.
Nerve.	}	Motor oculi. (Third nerve.)

9.—RECTUS SUPERIOR.

Description.	{	Thinnest and narrowest of the recti muscles.
Origin.	{	(1) From the upper border of the optic foramen, beneath the levator palpebræ and superior oblique muscles.
		(2) From the fibrous sheath of the optic nerve.
Insertion.	{	Into the sclerotic coat of the eye three or four lines from the cor- neal margin.
Actions.	}	Turns the eye-ball upward.

Relations.(a) *Upper surface:*

With the levator palpebræ.

(b) *Under surface:*

With the optic nerve.

Ophthalmic artery.

Nasal nerve.

Third nerve.

In front, with the tendon of the superior oblique, and globe of the eye.

Nerve.

{ Motor oculi. (Third nerve.)

10. - RECTUS INFERIOR.**Origin.**

By a tendon (ligament of Zinn) which surrounds the optic foramen, except at the upper and outer parts. The internal rectus also arises in common with this muscle.

Insertion.

Passes forward, and by a tendinous expansion (tunica albuginea) is inserted into the sclerotic coat, three or four lines from the corneal margin.

Actions.

{ Turns the eye-ball downward.

Nerve.

{ Motor oculi. (Third nerve.)

11. — RECTUS INTERNUS.

Origin.	{ In common with the inferior rectus, from the ligament of Zinn.
Insertion.	{ Into the sclerotic coat, by a tendin- ous expansion (tunica albuginea).
Actions.	{ Draws the globe of the eye inward.
Nerve.	{ Motor oculi. (Third nerve.)

12. — RECTUS EXTERNUS.

Description.	{	Has two heads, and by means of a narrow interval encloses the fol- lowing structures :
		Third nerve. Nasal branch of the fifth and sixth nerves. Ophthalmic vein. -

Origin.	{	(a) <i>Upper Head:</i> From the outer margin of the optic foramen, just beneath the superior rectus.
		(b) <i>Lower Head:</i> Partly from the ligament of Zinn. Partly from a small process on the lower margin of the sphenoidal fissure.

Insertion.	{ Into the sclerotic coat, by an expanded tendon (tunica albuginea).
Actions.	{ Draws the eyeball outward.
Nerve.	{ Abducens. (Sixth nerve.)

13.—PYRAMIDALIS NASI.

Description.	{ Small and pyramidal, with its summit upward.
Origin.	{ Is continuous with the occipitofrontalis above.
Insertion.	{ Descending vertically, it terminates at the root of the nose, blending with the compressor nasi.
Actions.	{ The skin of the root of the nose is wrinkled transversely, and draws down the inner angle of the eyebrows.
Relations.	{ (a) <i>Upper Surface</i> : With the skin. (b) <i>Under Surface</i> : With frontal and nasal bones.
Nerve.	{ Facial.

14.—LEVATOR LABII SUPERIORIS ALÆQUE NASI.

Description.	{ Is fleshy, thin and triangular; is placed at the sides of the nose, and extends from the inner margin of the orbit to the upper lip. This muscle divides into two slips.
Origin.	{ Upper part of the nasal process of the superior maxilla.
Insertion.	{ One part in the ala of the nose, and the other part is lost in the upper lip, blending with the orbicularis and levator labii superioris proprius.
Actions.	{ Dilates the nose, and draws the upper lip upward, and the ala of nose.
Relations.	{ (a) <i>In Front</i> : With the integument. (b) <i>Above</i> : With a small part of the orbicularis palpebrarum.
Nerve.	{ Facial.

15.—DILATOR NARES POSTERIOR.

Origin.	{ From the margin of the nasal notch of the superior maxilla, and from the sesamoid cartilages.
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Insertion.	{ Into the skin in proximity to the margin of the nostril.
Actions.	{ Enlarges the nasal aperture.
Nerve.	{ Facial.

16.—DILATOR NARES ANTERIOR.

Description.	{ A thin delicate fasciculus.
Origin.	{ Cartilage of the ala of the nose.
Actions.	{ Enlarges the aperture of the nose.
Relations.	{ The dilator nares posterior is behind this muscle.
Nerve.	{ Facial.

17.—COMPRESSOR NASI.

Description.	{ Small, thin, and triangular.
Origin.	{ Inner part of the canine fossa.
Insertion.	{ Passes to the dorsum of the nose, where it joins the muscle of the opposite side.
Actions.	{ Increases the breadth of the nose.
Nerve.	{ Facial.

18. — COMPRESSOR NARIUM MINOR.

Origin.	{ Alar cartilage.
Insertion.	{ Skin at the end of the nose.
Nerve.	{ Facial.

19. — DEPRESSOR ALÆ NASI.

Description.	{ A short, radiated muscle, which is situated between the mucous membrane and muscular structure.
Origin.	{ Incisive fossa of superior maxilla.
Insertion.	{ Fibres ascend into the septum and back part of the ala of the nose.
Actions.	{ Draws the ala of the nose downward and constricts the aperture of the nares.
Nerve.	{ Facial.

20. — LEVATOR LABII SUPERIORIS.

Description.	{ Thin and quadrilateral, some of its fibres being attached to the superior maxilla, and to the malar bone.
Origin.	{ Lower margin of the orbit, just above the infraorbital foramen.

Insertion.	{ Into the muscular substance of the upper lip.
Actions.	{ Elevates and carries the upper lip a little outward.
Relations.	{ (a) <i>Superficial Surface</i> : With the lower part of the orbicularis palpebrarum. It is subcutaneous below. (b) <i>Deep Surface</i> : Compressor nasi. Levator anguli oris. Infraorbital vessels and nerve.
Nerve.	{ Facial.

21.—LEVATOR ANGULI ORIS.

Origin.	{ From the canine fossa just below the infraorbital foramen.
Insertion.	{ Into the labial commissure, the fibres blending with those of the following muscles : Zygomaticus major et minor. Depressor anguli oris. Orbicularis palpebrarum.
Actions.	{ Raises the angle of the mouth, and draws it inward.

Relations.	}	(a) <i>Superficial Surface:</i> With the levator labii superioris. Infraorbital vessels and nerves.
		(b) <i>Deep Surface:</i> With the superior maxilla, buccinator muscle and the mucous membrane.
Nerve.	}	Facial.

22.—ZYGOMATICUS MAJOR.

Description.	{	A slender rounded muscle, located at the forepart and side of the face.
Origin.	{	Malar bone, in front of the zygomatic suture.
Insertion.	{	Into the labial commissure.
Actions.	{	It raises the upper lip, drawing it outward; its use is principally in laughing.
Relations.	}	(a) <i>Superficial Surface:</i> With the subcutaneous adipose tissue.
		(b) <i>Deep Surface:</i> With the malar bone, masseter and buccinator muscles.
Nerve.	}	Facial.

23.—ZYGOMATICUS MINOR.

Origin.	{ Malar bone, behind the maxillary suture.
Insertion.	{ Intermixes with outer margin of the levator labii superioris, and is inserted into the upper lip.
Actions.	{ Raises and draws the upper lip somewhat outward.
Relations.	{ (a) <i>Superficial Surface</i> : With the skin. The orbicularis is above. (b) <i>Deep Surface</i> : With the levator anguli oris muscle.
Nerve.	{ Facial.

24.—LEVATOR LABII INFERIORIS.

Description.	{ Is thick and conical, and situated on the side of the frænum of the lower lip.
Origin.	{ From the incisive fossa, close to the symphysis menti.
Insertion.	{ Into the integument and hair bulb of the skin.

Actions.	{	Raises and wrinkles the integument of the chin.
Relations.	{	(a) <i>Inner Surface</i> : With the mucous membrane. (b) <i>In the Median Line</i> : Is blended with the muscle of the opposite side. (c) <i>Outer Side</i> : With the depressor labii.
Nerve.	{	Facial.

25.—DEPRESSOR LABII INFERIORIS.

Description.	{	Is small, quadrilateral and thin ; is located on the outer side of the levator labii inferioris.
Origin.	{	Broad, from the external oblique line of the inferior maxilla.
Insertion.	{	Into the skin of the lower lip, its fibres blending with those of the following muscles : Orbicularis palpebrarum. Fellow of the opposite side.
Actions.	{	Pulls the lower lip downward and outward.

Relations.	}	(a) <i>Superficial Surface:</i>
		With part of the depressor anguli oris. With the integument.
Relations.	}	(b) <i>Deep Surface:</i>
		With the mental vessels and nerves.
		Mucous membrane of the lower lip.
		Labial glands. Levator labii inferioris.
Nerve.	}	Facial.

26.—DEPRESSOR ANGULI ORIS.

Origin.	}	Is triangular, and arises from the external oblique line of the inferior maxilla.
Insertion.		{ Angle of the mouth, by a narrow fasciculus.
Actions.	}	Depresses the angle of the mouth; it is the antagonist to the levator anguli oris and zygomaticus major.
Relations.		}
	(b) <i>Deep Surface:</i> With depressor labii inferioris and buccinator.	
Nerve.	}	Facial.

27.—ORBICULARIS ORIS.

Description.

An elliptical muscle situated in the substance of the lips. It consists of two parts corresponding to the upper and lower lips. At the labial commissure the fibres interlace with the other muscles of the parts.

Actions.

To close and corrugate the mouth, and it is the direct antagonist of all the muscles which converge to the lips.

Relations.

(a) *Superficial Surface:*

With the integument.

(b) *Deep Surface:*

With the buccal membrane, labial glands and coronary vessels.

(c) *Outer Circumference:*

Interlaces with the muscles which are in the region of the mouth.

Nerve.

} Facial.

28. —RISORIUS.

Origin.	{ In the fascia over the masseter muscle.
Insertion.	{ Into the oral commissure; it joins the fibres of the depressor anguli oris.
Nerve.	{ Facial.

29. —BUCCINATOR.

Origin.	{ (1) Superior alveolæ, from the first to the last tooth. (2) Corresponding alveolæ of the lower jaw. (3) Anterior border of the pterygo-maxillary ligament.
Insertion.	{ Labial commissure, the lower fibres crossing the upper ones.
Actions.	{ Presses against the teeth, and assists in mastication, articulation, blowing and sucking.

Relations.

(a) *Superficial Surface* :

Behind, with a mass of fat, which is between it and the ramus of the lower jaw. Anteriorly, with the zygomatici, risorius, levator anguli oris, depressor anguli oris, Steno's duct, facial artery and vein ; is also crossed by branches of the facial and buccal nerve.

(b) *Internal Surface* :

With the buccal glands and mucous membrane of the mouth.

Nerve.

} Facial.

30.—MASSETER.

Muscle consists of two parts :

(a) *Superficial Portion* :

Is thick and tendinous at its point of origin, partly concealing the deep portion in front.

Description.

(b) *Deep Portion* :

Smaller and composed of an intermixture of fleshy and aponeurotic fibres, the course of which is downward and forward to the point of insertion.

Origin.	}	<p>(1) Superficial portion arises from the malar process of the superior maxilla, and from the anterior two-thirds of the lower border of the zygomatic arch.</p> <p>(2) Deep portion; from the posterior third of the lower border and the whole of the inner surface of the zygomatic arch.</p>
Insertion.	}	<p>(1) Superficial portion, into the angle and lower half of the ramus of the inferior maxilla.</p> <p>(2) Deep portion into the upper half of the ramus and outer surface of the coronoid process of the lower jaw.</p>
Actions.	}	<p>Assists in raising the lower jaw.</p>
Relations.	}	<p>(a) <i>Superficial Region:</i> With the integument. Above, with the orbicularis and zygomatici muscles.</p> <p>(b) <i>Deep Surface:</i> With the ramus of the lower jaw, and the buccinator. Its posterior margin is overlapped by the parotid gland. The anterior margin projects over the buccinator muscle.</p>
Nerve.	}	<p>Inferior maxillary.</p>

31.—TEMPORAL.

Description.	{ A broad, flattened triangular muscle, occupying the whole extent of the temporal fossa.
Origin.	{ Temporal fossa, and the temporal aponeurosis.
Insertion.	{ By a strong tendon, which passes under the zygomatic arch into the coronoid process of the inferior maxilla.
Actions.	{ Raises the lower jaw against the upper.
Relations.	<p>(a) <i>Superficial Surface</i> :</p> <p>With the integument. Temporal fascia. Aponeurosis of occipitofrontalis. Attolens aurem. Attrahens aurem. Temporal vessels and nerves. Zygoma and masseter.</p> <p>(b) <i>Deep Surface</i> :</p> <p>With the temporal fossa. External pterygoid. Part of the buccinator. Internal maxillary artery. Temporal nerves.</p>
Nerve.	{ Inferior maxillary.

32.—INTERNAL PTERYGOID.

Description.	{ A thick, quadrilateral muscle, which resembles the masseter.
Origin.	{ (1) Fossa between the pterygoid plates. (2) Hamular process. (3) Tuberosity of the palate bone.
Insertion.	{ After passing downward, backward, and outward, it is inserted into the inner surface of the angle of the lower jaw.
Actions.	{ Raises the lower jaw, carrying it a little forward.
Relations.	{ (a) <i>External Surface:</i> With the ramus of the lower jaw; is separated from it by the external pterygoid, internal lateral ligament, internal maxillary artery and the dental vessels and nerves. (b) <i>Internal Surface:</i> With the tensor palati. Is separated from the superior constrictor of the pharynx by a cellular interval.
Nerve.	{ Internal maxillary.

33.—EXTERNAL PTERYGOID.

Description.

Is thick, short, and somewhat conical in shape. It extends between the zygomatic fossa and the condyle of the jaw.

Toward its point of insertion its fibres have a direction at once horizontally backward and outward.

Origin.

(1) The outer surface of the external pterygoid plate, and the adjoining part of the tuberosity of the palate bone.

(2) Pterygoid ridge on the great wing of the sphenoid bone.

Insertion.

Into the depression of the anterior surface of the neck of the condyle of the lower jaw, and edge of the interarticular cartilage.

Actions.

Assists in opening the mouth, and carries the chin forward. Is a direct agent in the trituration of the food.

Relations.(a) *External Surface:*

With the ramus of the lower jaw.

Internal maxillary artery.

Tendon of the temporal.

Masseter muscle.

(b) *Internal Surface:*

Rest against the upper part of the internal pterygoid; internal lateral ligament, middle meningeal artery, and inferior maxillary nerve.

(c) *Upper Border:*

With the temporal and masseteric branches of the inferior maxillary nerve.

Nerve.

{ Inferior maxillary.

II.—MUSCLES OF THE NECK.**34.—PLATYSMA MYOIDES.****Description.**

{ Is broad, flat, and quadrilateral, the fibres passing obliquely upward and inward by the side of the neck; they are parallel, the most anterior ones interlacing in front of the jaw with the fibres of the opposite side.

- Origin.** { (1) From the clavicle and acromion process.
(2) From the fascia which covers the upper part of the pectoralis major, deltoid, and trapezius muscles.
- Insertion.** { Into the fascia which covers the parotid gland and masseter muscle, the commissure of the lips, and the external oblique line of the inferior maxilla.
- Actions.** { Assists in the depression of the lower jaw, and the angle of the mouth; it also corrugates the skin of the neck.
- Relations.** { (a) *External Surface* :
With the integument.
(b) *Internal Surface* :
With the pectoralis major, deltoid, trapezius, and clavicle.
(c) *In the Neck* :
With the external and anterior jugular veins, the deep cervical fascia, superficial branches of the cervical plexus, and the sternomastoid, sterno-hyoid, omohyoid, and the digastric.
(d) *On the Face* :
With the parotid gland and the facial artery and vein, the masseter and buccinator muscles.

Nerves. { Facial, and superficial branches
of the cervical plexus.

35.—STERNO-MASTOID.

Description. { Is situated at the anterior and lateral part of the neck, between the layers of the deep cervical fascia. The quadrilateral space at the side of the neck is divided by this muscle into two triangles: the anterior and the posterior triangles.

Origin. { (1) Fleishy from the sternal third or more, of the clavicle.
(2) By a rounded tendon, from the first piece of the sternum.

Insertion. { Into the mastoid process of the temporal, and the superior curved line of the occipital bone.

Actions. { Draws the head forward; inclines and rotates it to one side, and when both muscles act, the head is bent directly forward.

Relations.

(a) *Superficial Surface:*

The external jugular vein, the superficial branches of the cervical plexus, and the anterior layer of the deep cervical fascia, separate this surface from the integument and the platysma myoides.

(b) *Deep Surface:*

Is in relation with the sternoclavicular articulation, the deep layer of the cervical fascia, sterno-hyoid, sterno-thyroid, omo-hyoid, posterior belly of the digastricus, levator anguli scapulae, the splenius and the scaleni muscles.

(c) *Below:*

Is in relation with the lower part of the common carotid artery, internal jugular vein, pneumogastric, descendens noni, and the communicans noni; the deep lymphatic glands, spinal accessory nerve, cervical plexus, occipital artery, and part of the parotid gland.

Nerves.

{ Spinal accessory, and deep branches
of the cervical plexus.

36.—STERNO-HYOID.

Description.	{ Is thin, narrow, and riband-like, situated at the anterior part of the neck. Below, this muscle has a large interval between it and its fellow, which converges again in the middle of its course.
Origin.	{ (1) From the inner extremity of the clavicle. { (2) From the upper and posterior part of the manubrium of the sternum.
Insertion.	{ Lower border of the body of the hyoid bone.
Actions.	{ Depresses the hyoid bone.
Relations.	{ (a) <i>Superficial Surface</i> : { Below, with the sternum, sternal end of the clavicle, and the sterno-mastoid muscle. { (b) <i>Deep Surface</i> : { With the sterno-thyroid, crico-thyroid, and thyro-hyoid muscles; the thyroid gland, superior thyroid vessels, and the crico-thyroid and thyro-hyoid membranes.
Nerves.	{ Branches from the loop of communication between the decendens and communicans noni.

37 — STERNO-THYROID.

- Description.** { Is situated at the anterior part of the neck, beneath the sterno-hyoid; it is somewhat shorter and wider than the latter muscle, and is in close contact with its fellow at the lower part of the neck.
- Origin.** { Posterior surface of the manubrium of the sternum, below the sterno-hyoid, and from the first costal cartilage.
- Insertion.** { Oblique line on the outer surface of the thyroid cartilage.
- Actions.** { During contraction, it depresses the thyroid cartilage and hyoid bone, by means of the thyro-hyoid membrane.
- Relations.** { (a) *Anterior Surface:*
With the sterno-hyoid, omohyoid, and sterno-mastoid.
(b) *Posterior Surface:*
(From below upward)
With the trachea, vena innominata, common carotid, arteria innominata (on the right side), the thyroid gland, its vessels, and the lower part of the larynx; on the inner border, is the middle thyroid vein.

Nerves. { Branch from the loop of communication between the descendens and communicans noni.

38.—THYRO-HYOID.

Description. { Is small and quadrilateral, and situated at the anterior and superior part of the neck.

Origin. { From the oblique line on the ala of the thyroid cartilage.

Insertion. { Passes vertically upward to the inferior edge of the body of the hyoid bone, and to part of the great cornu.

Actions. { To approximate the hyoid bone and the thyroid cartilage to each other.

Relations. { (a) *External Surface*:
With the sterno-hyoid and the omo-hyoid.
(b) *Internal Surface*:
With the thyroid cartilage, thyro-hyoid membrane, and the superior laryngeal vessels and nerve.

Nerve. { Hypoglossal.

39.—OMO-HYOID.

Description.

Situated obliquely at the side and front of the neck; it is long, slender, and flat, and is made up of two fleshy bellies with a central tendon, the tendon uniting the two portions about an inch and a half above the clavicle. It is embraced and held in position by a process of the deep cervical fascia. It subdivides the two large triangles at the side of the neck, into two smaller ones.

Origin.

- (1) Superior edge of the scapula, behind the notch.
- (2) Inferior border of the hyoid bone at the junction of the body and cornu.

Insertion.

Into the lower border of the hyoid bone, external to the insertion of the sterno-hyoid.

Actions.

Draws the hyoid bone downward and to one side.

- Relations.** { (a) *Superficial Surface* :
 With the trapezius, subclavius, the clavicle, sternomastoid, deep cervical fascia, platysma, and the skin.
- (b) *Deep Surface* :
 With the scaleni, brachial plexus, sheath of the common carotid artery, internal jugular vein, descendens noni nerve, and the sternothyroid and thyrohyoid muscles.
- Nerves.** { Branches from the loop of communication between the descendens and communicans noni.

40. — DIGASTRIC.

- Description.** { Is thick and fleshy at the extremities, being united by a thin rounded tendon. This muscle divides the anterior superior triangle of the neck into the submaxillary, and the superior carotid triangles.
- Origin.** { The posterior belly arises from the digastric groove on the inner side of the mastoid process of the temporal bone; its direction is downward, forward and inward.

- Insertion.** { The anterior belly is reflected upward and forward to a depression on the inner side of the lower margin of the jaw, the tendon passing through an aponeurotic ring, which is attached to the hyoid bone.
- Actions.** { Depresses the lower jaw, or raises the hyoid bone, as in deglutition.
- Relations.** { (a) *Superficial Surface* :
 With the platysma myoides, sterno-mastoid, trachelo-mastoid, part of the stylo-hyoid muscle, also with the parotid and submaxillary glands.
- (b) *Deep Surface* :
 The anterior belly is in relation with the mylo-hyoid, upon which it rests ; whilst the posterior belly is in close contact with the stylo-glossus, stylo-pharyngeus, and hyo-glossus muscles, the external carotid and its lingual and facial branches, the internal carotid, internal jugular vein, and the hypoglossal nerve.
- Nerves.** { Mylo-hyoid branch of the inferior dental for the anterior belly ; the facial supplying the posterior belly.

41. — **STYLO-HYOID.**

- Description.** { Is located at the superior, anterior and lateral part of the neck. This muscle is slender, and lies in front of and above the posterior belly of the digastricus. It is perforated by the tendon of the latter muscle.
- Origin.** { From the back part of the styloid process, near its apex.
- Insertion.** { Passes downward and forward, and is inserted into the body of the hyoid bone; near its middle it gives passage to the posterior belly of the digastric muscle.
- Actions.** { Raises and draws backward the hyoid bone and the tongue.
- Relations.** { (a) *Superficial Surface:*
With the platysma myoides, parotid and submaxillary glands.
(b) *Deep Surface:*
With the digastricus, stylo-glossus, stylo-pharyngeus, and hyo-glossus, the external carotid artery, and its lingual and facial branches, the internal carotid, internal jugular vein, and the hypoglossal nerve.
- Nerve.** { Facial.

42. — MYLO-HYOID.

- Description.** { A flat triangular muscle, located at the upper and anterior part of the neck, just behind the lower jaw; it forms, with its fellow, a floor for the cavity of the mouth.
- Origin.** { From the mylo-hyoid ridge of the inferior maxilla.
- Insertion.** { Posterior fibres into the body of the hyoid bone; the middle and anterior fibres into a raphé on the median line, and when that does not exist, the muscular fibres of the two muscles blend.
- Actions.** { It raises the hyoid bone carrying it forward, or it depresses the inferior maxilla.
- Relations.** { (a) *Superficial Surface* :
With the platysma myoides, anterior belly of the digastric, supra-hyoid fascia, the submaxillary gland, and the submental vessels.
- { (b) *Deep (Superior) Surface* :
With the genio-hyoid, part of the hyo-glossus, and the stylo-glossus muscles; the lingual and gustatory nerves, sublingual gland, and the buccal mucous membrane, and Wharton's duct.

- Actions.** { Depresses the tongue in the centre, and by means of the posterior and inferior fibres, the base of the tongue is drawn forward.
- Relations.** { (a) *Internal Surface* :
With the muscle of the same name of the opposite side, and by the fibrous septum.
(b) *External Surface* :
With the lingualis, hyo-glossus, stylo-glossus, lingual artery, hypoglossal nerve, gustatory nerve, and the sub-lingual gland.
(c) *Upper Border* :
With the frænum linguæ.
(d) *Lower Border* :
With the genio-hyoid.
- Nerve.** { Hypoglossal.

45.—HYO-GLOSSUS.

- Description.** { Is thin, quadrilateral, and flat ; some anatomists describe it as three distinct muscles, on account of the direction of its various fibres, calling them the basio-glossus, the kerato-glossus, and the chondro-glossus.

Origin. { (1) From the body of the hyoid bone and lesser cornu.
(2) From the whole length of the greater cornu of the hyoid bone.

Insertion. { Into the side of the tongue, between the lingualis and stylo-glossus.

Actions. { Depresses the sides of the tongue, rendering it convex from side to side.

Relations. { (a) *External Surface:*
With the digastric, stylo-hyoid, stylo-glossus, mylo-hyoid muscles, gustatory and hypoglossal nerves, Wharton's duct, and the sublingual gland.

(b) *Deep Surface:*
With the genio-hyo-glossus, lingualis, middle constrictor of the pharynx, lingual vessels, and the glosso-pharyngeal nerve.

Nerve. { Hypoglossal.

46.—LINGUALIS.

Description.

A fasciculus of fibres which extend from the base to the apex of the tongue, the greatest part of the substance of which is formed by this muscle.

Its Various Fibres(1) *The Superficial Fibres:*

Extend longitudinally, beneath the mucous membrane, along the back of the tongue. They are crossed by the fibres of the palato-glossus and hyo-glossus at the sides.

(2) *The Inferior Fibres:*

Located on the under surface of the tongue, in the space between the hyo-glossus and genio-hyo-glossus; this longitudinal band extends from the base to the apex. These fibres are in relation with the ranine artery.

(3) *The Vertical Fibres:*

Are almost parallel with the fibres of the genio-hyo-glossus which is immediately below.

Nerve.	} Chorda tympani.
Actions.	{ Draws the tip of the tongue toward its base, causing it to be convex superiorly.

47.—STYLO-GLOSSUS.

Origin.	{ (1) From the anterior and outside of the styloid process. (2) From the stylo-maxillary ligament.
Insertion.	{ Into the side of the tongue; a second portion of this muscle divides the fibres of the hyo-glossus, to join the transverse fibres of the tongue.
Actions.	{ To draw the tongue backward, and to elevate the lip.
Relations.	{ (a) <i>External Surface:</i> From above downward, with the parotid gland, internal pterygoid, sublingual gland, gustatory nerve, and the mucous membrane of the mouth. (b) <i>Internal Surface:</i> With the tonsil, superior constrictor of the pharynx, and the hyo-glossus muscle.
Nerve.	} Hypoglossa ¹ .

48.—PALATO-GLOSSUS.

Description.	{ A small, fleshy fasciculus (constrictor isthmi faucium), which forms the anterior pillar of the soft palate.
Origin.	{ From the anterior surface of the soft palate, on each side of the uvula.
Insertion.	{ After passing downward, forward and outward in front of the tonsil, it is inserted into the dorsum and side of the tongue. Its fibres blend here with those of the stylo-glossus muscle.
Actions.	{ Serves to draw the base of the tongue upward, during the act of swallowing.
Nerves.	{ Palatine branches of the Meckel's ganglion.

49.—STYLO-PHARYNGEUS.

Origin.	{ Inner side of the base of the styloid process.
Insertion.	{ Into the posterior border of the thyroid cartilage.

Relations.	<p>(a) <i>Externally:</i> With the stylo-glossus muscle, glosso-pharyngeal nerve, external carotid artery, parotid gland, and the middle constrictor of the pharynx.</p> <p>(b) <i>Internally:</i> With the internal carotid, internal jugular vein, the superior constrictor, palato-pharyngeus, and the mucous membrane.</p>
Actions.	<p>{ Draws the sides of the pharynx upward and outward.</p>
Nerve.	<p>{ Branches from the pharyngeal plexus and glosso-pharyngeal nerve.</p>

50.—INFERIOR CONSTRICTOR OF THE PHARYNX.

Origin.	<p>(1) From a triangular interval on the cricoid cartilage, between the crico-thyroid and ary-tænoid muscle.</p> <p>(2) The oblique line, posterior and superior edge, and smaller cornu of the thyroid cartilage.</p>
Insertion.	<p>{ Into the raphé, on the back part of the pharynx.</p>

Actions.

{ Contract the pharynx when deglutition is about to be performed.

(a) *External Surface :*

Is covered by a cellular membrane.

(b) *Behind :*

With the vertebral column and the longus colli muscle.

(c) *Laterally :*

With the thyroid gland, common carotid artery, and the sterno-thyroid muscle.

Relations.(d) *Internal Surface :*

With the middle constrictor of the pharynx, stylo-pharyngeus, palato-pharyngeus, pharyngeal aponeurosis, and the mucous membrane of the pharynx.

Nerves.

{ Branches from the pharyngeal plexus and glosso-pharyngeal nerve, and an additional branch from the external laryngeal and the recurrent laryngeal.

51.—MIDDLE CONSTRICTOR OF THE PHARYNX.

Origin.

- { (1) From the body and the cornua of the hyoid bone.
{ (2) From the stylo-hyoid ligament.

Insertion. { With its fellow of the opposite side
into the posterior median raphé.

Actions. { Contract the pharynx, as in deglu-
tition.

Is separated from the superior con-
strictor by the glosso-pharyngeal
nerve and the stylo-pharyngeus
muscle. The superior laryngeal
nerve separates it from the infe-
rior constrictor muscle.

(a) *Behind:*

It is in relation with the
spinal column, the longus
colli muscle, and the rec-
tus anticus major.

Relations.

(b) *On Each Side:*

With the carotid vessels, a
few lymphatic glands, and
the pharyngeal plexus.

The hyo-glossus covers it, near its
point of origin, the lingual ves-
sels being between, and it rests
upon the superior constrictor,
stylo-pharyngeus, palato-pharyn-
geus, pharyngeal aponeurosis,
and the mucous membrane.

Nerves. { Branches of the pharyngeal plexus
and glosso-pharyngeal.

52.—SUPERIOR CONSTRICTOR OF THE PHARYNX.

- Origin.** {
- (1) From the base of the tongue, being continuous with the genio-hyo-glossus muscle.
 - (2) From the posterior extremity of the mylo-hyoid ridge.
 - (3) Pterygo maxillary ligament.
 - (4) From the lower third of the margin of the internal pterygoid plate.
 - (5) From the petrous bone, by an aponeurotic expansion.
- Insertion.** { Into the median tendinous raphé and pharyngeal spine of the basilar process of the occipital bone.
- Actions.** { Assists in the contraction of the pharynx.
- Relations.** {
- (a) *Outer Surface:*
With the carotid vessels, the spinal column, internal jugular vein, the three divisions of the eighth nerve and the ninth nerve, the middle constrictor of the pharynx, and the stylo-pharyngeus.
 - (b) *Inner Surface:*
It covers the palato-pharyngeus, the tonsil, and is lined by mucous membrane and by the pharyngeal aponeurosis.

Nerves. { Branches from the pharyngeal plexus and glosso-pharyngeal.

53.—LEVATOR PALATI.

Origin. { (1) Narrow and tendinous, from the apex of the petrous portion of the temporal bone.
(2) From the adjoining cartilaginous portion of the Eustachian tube.

Insertion. { Into the substance of the velum palati.

Actions. } Raises the velum palati.

Relations. { (a) *Externally*:
With the tensor palati and the superior constrictor.
(b) *Internally*:
With the pharyngeal mucous membrane.
(c) *Posteriorly*:
With the lining mucous membrane of the soft palate.

Nerves. { Facial, and by means of its connection with the vidian nerve; it is also supplied by the petrosal nerves.

54.—TENSOR PALATI.

Origin.	{	<p>(1) From the scaphoid fossa, at the base of the internal pterygoid plate.</p> <p>(2) Adjoining part of the sphenoid bone.</p> <p>(3) From the anterior aspect of the cartilaginous portion of the Eustachian tube.</p>
Insertion.	{	<p>After ending in a tendon, it is reflected round the hamular process, extending horizontally inward, where it is lost in the aponeurosis palati.</p>
Actions.	}	<p>Stretches the velum.</p>
Relations.	{	<p>(a) <i>Externally</i> : With the internal pterygoid.</p> <p>(b) <i>Internally</i> : It is separated from the levator palati by the superior constrictor of the pharynx and the internal pterygoid plate.</p>
Nerve.	}	<p>A branch from the otic ganglion.</p>

55.—AZYGOS UVULÆ.

Origin.	{	<p>From the posterior nasal spine of the palate bone, and contiguous aponeurosis of the soft palate.</p>
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Insertion.	} Into the uvula.
Relations.	{ Anteriorly, with the expansion of the levatores palati, and, behind, with the mucous membrane.
Nerve.	} Facial.

56.—PALATO-PHARYNGEUS.

Description.	{ This long, fleshy fasciculus, which is narrower in the middle than at either extremity, forms, with the mucous membrane that covers it, the posterior pillar of the soft palate.
Origin.	{ By an expanded fasciculus, from the soft palate; it is divided here into two parts by the levator palati. (1) <i>The Anterior Fasciculus:</i> Is located in the soft palate, between the levator palati and tensor palati; it joins with the corresponding portion of the opposite muscle, in the median line. (2) <i>The Posterior Fasciculus:</i> Also joins the corresponding muscle in the middle line; is in contact with the mucous membrane.

Insertion.	{	Is inserted, in common with the stylo-pharyngeus, into the posterior border of the thyroid cartilage and the pharynx.
Actions.	{	This muscle, with its fellow, is principally used in the act of deglutition; when both act together, they depress the velum and elevate and shorten the pharynx.
Relations.	{	<p>(a) <i>Anterior and Posterior Surfaces:</i> In the soft palate they are covered by mucous membrane, with the palatal glands between.</p> <p>(b) <i>Superior Border:</i> With the levator palati.</p>
Nerves.	{	Palatine branches of Meckel's ganglion.

57.—CRICO-THYROID.

Origin.	{	Fore and lateral parts of the cricoid cartilage.
Insertion.	{	Lower edge and cornu of the thyroid cartilage.
Actions.	{	Regulates the tension of the vocal chords, also elongates them.
Nerves.	{	Superior laryngeal.

58.—CRICO-ARYTÆNOIDEUS POSTICUS.

Origin.	{ From the concave posterior surface of the cricoid cartilage.
Insertion.	{ Into the outer angle of the base of the arytaenoid cartilage.
Actions.	{ Separates the vocal chords and opens the rima glottis.
Nerves.	{ Inferior laryngeal.

59.—CRICO-ARYTÆNOIDEUS LATERALIS.

Origin.	{ From the side of the cricoid cartilage, near its upper margin.
Insertion.	{ Into the outer angle of the base of the arytaenoid cartilage.
Actions.	{ Opens the rima glottidis and relaxes the vocal chords.
Nerves.	{ Inferior laryngeal.

60.—THYRO-ARYTÆNOIDEUS.

Description.	{ This broad, flat muscle lies parallel with the outer surface of the true vocal chord, and it consists of two fasciculi.
Origin.	{ From the inner surface of the thyroid cartilage, and from the cricothyroid membrane.

- Insertion.** { (1) *The Inferior Fasciculus* :
Into the angle of the base of the ary-tænoid cartilage and part of its anterior surface.
- (2) *The Superior Fasciculus* :
Into the anterior surface and outer border of the ary-tænoid cartilage, and it rests upon the outer side of the sacculus laryngis, just beneath its mucous lining.
- Actions.** { Draws the cartilages toward each other and narrows the rima glottidis.
- Nerves.** } Inferior laryngeal.

61.—ARYTÆNOIDEUS.

- This single muscle occupies the posterior concave surface of the ary-tænoid cartilages; it consists of three planes of fibres.
- Description.** { (1) *The Oblique Fibres* :
(Two planes.)
They pass from the base of one cartilage to the other.
- (2) *The Transverse Fibres* :
They are the deepest and the most numerous, and pass from one to the other cartilage.

Origin.	{ From the posterior surface and outer border of one arytaenoid cartilages.
Insertion.	{ Into the corresponding parts of the opposite arytaenoid cartilage.
Actions.	{ Closes the opening of the glottis, by approximating the arytaenoid cartilages.
Nerves.	{ Superior and inferior laryngeal.

62.—THYRO-EPIGLOTTIDEUS.

Origin.	{ From the inner surface of the thyroid cartilage, external to the point of origin of the thyro-arytaenoideus.
Insertion.	{ Into the arytaeno-epiglottidean fold, whilst other fibres are continued to the margin of the epiglottis (depressor epiglottidis).
Actions.	{ Assists in depressing the epiglottis, and also in compressing the sacculi laryngis.
Nerve.	{ Inferior laryngeal.

63.—ARYTÆNO-EPIGLOTTIDEUS SUPERIOR.

Origin.	{ From the apex of the arytaenoid cartilage.
Insertion.	{ Fasciculi are lost in arytaeno-glottidean folds of mucous membrane.
Nerve.	{ Inferior laryngeal.
Actions.	{ When the larynx is drawn upward during deglutition, and the opening closed, it constricts the superior aperture of the larynx.

64.—ARYTÆNO-EPIGLOTTIDEUS INFERIOR.

Origin.	{ From the arytaenoid cartilage, above the attachment of the superior vocal chord.
Insertion.	{ After spreading out upon the inner and upper part of the sacculus laryngis, it is inserted into the margin of the epiglottis.
Actions.	{ With some of the fibres of the thyro-arytaenoidei, it compresses the sacculus laryngis.
Nerve.	{ Inferior laryngeal.

65.—RECTUS CAPITIS ANTICUS MAJOR.

- Origin.** { By four tendinous slips from the anterior tubercles of the transverse processes of the third, fourth, fifth and sixth cervical vertebræ.
- Insertion.** { Into the basilar process of the occipital bone.
- Actions.** { To bend the head and neck forward and a little on one side.
- Relations.** { (a) *Anterior Surface:*
With the pharynx, sympathetic nerve, sheath enclosing the carotid artery, internal jugular vein, and the pneumogastric nerve.
(b) *Posterior Surface:*
With the longus colli muscle, rectus anticus minor, and the upper cervical vertebræ.
- Nerves.** { Suboccipital and deep branches of the cervical plexus.

66.—RECTUS CAPITIS ANTICUS MINOR.

- Description.** { Is short and flat, and located immediately behind the upper part of the preceding muscle.

Origin.	{ From the transverse process of the atlas.
Insertion.	{ After passing obliquely upward and inward, it is inserted into the basilar process of the occipital bone.
Relations.	{ (a) <i>Anterior Surface:</i> With the rectus anticus major. (b) <i>Posterior Surface:</i> With the front of the occipito-atlantal articulation. (c) <i>Externally:</i> With the superior cervical ganglion of the sympathetic.
Actions.	{ Bends the head and neck forward, and a little to one side.
Nerves.	{ Suboccipital, and deep branches of the cervical plexus.

67.—RECTUS LATERALIS.

Origin.	{ From the upper surface of the transverse process of the atlas.
Insertion.	{ Into the inferior surface of the jugular process of the occipital bone.
Actions.	{ Inclines the head to one side.

Relations.	}	(a) <i>Anterior Surface</i> :
		With the internal jugular vein.
		(b) <i>Posterior Surface</i> :
		With the vertebral artery.
		(c) <i>Outer Side</i> :
		The occipital artery lies here.
Nerves.	{	Suboccipital, and the deep branches of the cervical plexus.

68.—LONGUS COLLI.

Description.	}	This long and flat muscle is located at the anterior and superior part of the spinal column; it is broader in the middle than at either extremity, and consists of three fasciculi, <i>e.g.</i> :
		1. Superior oblique portion.
		2. Inferior oblique portion.
		3. Vertical portion.
Origin.	}	(1) <i>The Superior Oblique Part</i> , arises from the anterior transverse tubercles of the third, fourth and fifth cervical vertebræ.
		(2) <i>The Inferior Oblique Portion</i> , arises from the bodies of the three first dorsal vertebræ.
		(3) <i>The Vertical Portion</i> , from the bodies of the three last cervical, and the three superior dorsal vertebræ, and the intermediate ligaments.

- Insertion.** { (1) *The Superior Oblique Portion*, ascends obliquely inward to be inserted into the tubercle on the forepart of the atlas.
- { (2) *The Inferior Oblique Part*, ascends obliquely outward to the transverse processes of the fifth and sixth cervical vertebræ.
- { (3) *The Vertical Portion*, is inserted into the front of the axis and third cervical vertebra.
- Relations.** { (a) *Anterior Surface:*
With the pharynx, œsophagus, sympathetic nerve, sheath of the great vessels of the neck, inferior thyroid artery, and the recurrent laryngeal nerve.
- { (b) *Posterior Surface:*
With the cervical and dorsal parts of the spine.
- Actions.** { Rotates the atlas and head, and bends the neck laterally.
- Nerves.** { Branches from the lower cervical.

69. — SCALENUS ANTICUS.

- Description.** { Is situated deeply at the internal and inferior part of the neck, behind the sterno-mastoid; the lower part of the muscle separating the subclavian artery and vein.

- Origin.** { By a narrow flat tendon, from the upper surface of the first rib, at about its middle.
- Insertion.** { Passes vertically upward, to the transverse tubercles of the sixth, fifth, fourth and third cervical vertebræ.
- Actions.** { Bends the neck, and draws it to its side; it also raises the first rib.
- Relations.** { (a) *In Front:*
 With the clavicle, subclavius, sterno-mastoid, and omohyoid muscles, the transversalis colli, ascending cervical arteries, subclavian vein, and the phrenic nerve, which descends diagonally across the anterior surface of the muscle.
- { (b) *Posterior Surface:*
 With the pleura, subclavian artery, and the brachial plexus.
- Nerves.** { Lower cervical.

70.—SCALENUS MEDIUS.

- Description.** { This is the longest and largest of the scalani muscles; it extends along the side of the spinal column, and is separated from the previous muscle by the cervical nerves above and the subclavian artery below.
- Origin.** { First rib, behind the groove for the subclavian artery.
- Insertion.** { Into the posterior tubercles of the transverse processes of the six lower cervical vertebræ.
- Actions.** { Assists in bending the spinal column to one or the other side.
- Relations.** { (a) *Anterior Surface:*
With the sterno-mastoid; the clavicle crosses this muscle, also the subclavian artery and the omo-hyoid muscle.
- { (b) *Outer Side:*
Is in relation with the levator anguli scapulæ and the scalenus posticus muscle.
- Nerve.** { Lower cervical.

71.—SCALENUS POSTICUS.

- Description.** { Is sometimes blended with the scalenus medius. Is the smallest and most deeply seated of the scaleni muscles.
- Origin.** { From the upper edge of the second rib, between its tubercle and angle.
- Insertion.** { By two or three tendons, into the posterior tubercles of the transverse process of the two or three lower cervical vertebræ.
- Actions.** { Can elevate the first two ribs; it assists in bending the neck laterally.
- Nerve.** { Lower cervical.

III.—MUSCLES OF THE BACK.

72.—TRAPEZIUS.

- Description.** { Is broad, flat, triangular, and is located at the upper and back part of the neck and shoulders; it is fleshy in most of its extent, but is tendinous at the points of origin and insertion.

- Origin.** { (1) Internal third of the superior curved line of the occipital bone.
 (2) From the ligamentum nuchæ.
 (3) From the twelve dorsal spinous processes.
 (4) From the last cervical spine.
- Insertion.** { Into the posterior border of the external third of the clavicle; into the superior edge of the spine of the scapula and the acromion process.
- Actions.** { Elevates the shoulders; depresses the head backward and to one side. The glenoid cavity is raised by the superior fibres of this muscle, the inferior rotating the scapula.
- Relations.** { (a) *Superficial Surface:*
 With the skin.
 (b) *Deep Surface:*
 1. *In the Neck.*—With the complexus, splenius, levator anguli scapulæ, and rhomboideus minor muscles.
 2. *In the Back.*—With the rhomboideus major, supraspinatus, infraspinatus, part of serratus posticus, and the vertebral aponeurosis and latissimus dorsi.
 (c) *Anterior Border:*
 The spinal accessory nerve passes under this part, near the clavicle.

Relations.	}	(a) <i>Superficial Surface:</i> Covered by the trapezius at its upper part, the rest being subcutaneous.
		(b) <i>Deep Surface:</i> With the erector spinæ, serratus posticus inferior, lower intercostal muscles, the ribs, serratus magnus, inferior angle of the scapula, rhomboideus major, infraspinatus, and the teres major.
Nerve.	}	Long subscapular.

74.—LEVATOR ANGULI SCAPULÆ.

Description.	{	Is located at the posterior and lateral part of the neck. It is long and flat.
Origin.	{	From the posterior transverse tubercles of the three or four upper cervical vertebræ.
Insertion.	{	Into the superior angle of the scapula, and its posterior edge.
Actions.	{	Raises the superior angle of the scapula, and also depresses the glenoid cavity.

Relations.	}	(a) <i>Anterior (Superficial) Surface:</i> With the skin, trapezius and sterno-mastoid.
		(b) <i>Posterior (Deep) Surface:</i> With the splenius colli, transversalis colli, cervicalis ascendens, serratus posticus superior, transversalis, and posterior scapular arteries.
Nerves.	}	Cervical plexus.

75.—RHOMBOIDEUS MINOR.

Origin.	{	Ligamentum nuchæ, and the spinous processes of the seventh cervical and first dorsal vertebræ.
Insertion.	{	Base of the scapula, opposite to its spine.
Relations.	}	(a) <i>Superficial (Posterior) Surface:</i> With the integument and trapezius.
		(b) <i>Deep (Anterior) Surface:</i> With the serratus posticus superior, posterior scapular artery, part of erector spinæ, intercostal muscles, and the ribs.
Nerve.	}	Fifth cervical.

76.—RHOMBOIDEUS MAJOR.

Description.	{	Is situated just below the rhomboideus minor.
Origin.	{	From the four or five superior dorsal spines, and the supraspinous ligament.
Insertion.	{	Into the base of the scapula, from the spine to the inferior angle.
Actions.	{	Assists in drawing backward the scapula; also depresses the glenoid cavity.
Relations.	{	(a) <i>Superficial (Posterior) Surface:</i> With the skin, and the trapezius, and latissimus dorsi. (b) <i>Deep (Anterior) Surface:</i> With the serratus posticus superior, posterior scapular artery, the intercostal muscles, part of the erector spinæ, and with the ribs.
Nerve.	{	Fifth cervical.

77.—SERRATUS POSTICUS SUPERIOR.

Description.	{	Is situated at the upper and back part of the thorax; it is thin, flat and quadrilateral.
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Origin.	{ From the ligamentum nuchæ, and two or three dorsal spines.
Insertion.	{ Into the second, third, fourth, and fifth ribs, external to the angles.
Actions.	{ To raise the ribs.
Relations.	{ (a) <i>Superficial Surface</i> : With the trapezius, rhomboidei, and the serratus magnus. (b) <i>Deep Surface</i> : With the splenius, part of erector spinæ, intercostals and the ribs.
Nerves.	{ Posterior division of cervical.

78.—SERRATUS POSTICUS INFERIOR.

Description.	{ Is broader and thinner than the serratus posticus superior, and is located at the junction of the dorsal and lumbar regions.
Origin.	{ By an aponeurosis from the spinous processes of the two last dorsal, and three upper lumbar vertebræ; also from the interspinous ligaments.

Insertion.	{	By four flat digitations, into the lower edges of the four inferior ribs, a little beyond their angles.
Actions.	{	Depresses the lower ribs in expiration.
Relations.	{	(a) <i>Superficial Surface</i> : With the latissimus dorsi. (b) <i>Deep Surface</i> : With the lumbar fascia, erector spinæ, ribs, and the intercostals.
Nerves.	{	External branches of the dorsal.

79.—SPLENIUS.

Description.	{	Is located at the back of the neck, and at the upper part of the dorsal region; it is a narrow, pointed, single muscle at its origin, but later on it divides into two parts : 1. Splenius Capitis. 2. Splenius Colli.
Origin.	{	From the spines of the last cervical vertebra, and the five superior dorsal vertebræ; from the supraspinous ligament, and by tendinous fibres from the lower half of the ligamentum nuchæ.

- Divides here into two parts :*
- Insertion.** { 1 *Splenius Capitis :*
 Inserted into the posterior edge of the mastoid process of the temporal bone, and adjoining third of the rough surface of the occipital bone under the superior curved line.
- 2 *Splenius Colli :*
 By tendinous fasciculi, into the posterior transverse tubercles of the three or four upper cervical vertebræ.
- Actions.** { Bends the head and neck backward.
- Relations.** { (a) *Superficial Surface :*
 With the trapezius. Is covered by the sterno-mastoid at its point of insertion.
- (b) *Deep Surface :*
 With the spinalis dorsi, longissimus dorsi, semispinalis colli, complexus, trachelo-mastoid, and the transversalis colli.
- Nerves.** { External posterior branches of the cervical.

80.—ERECTOR SPINÆ.

Description.

This large muscle, together with its prolongations in the dorsal and cervical regions, occupies the vertebral groove on each side of the vertebral column.

1. *In the Lumbar Region* it lies beneath the lumbar aponeurosis, and it forms a large fleshy mass.
2. *In the Dorsal Region* it subdivides into two parts, which are gradually lost in the cervical region; it is covered in this region by the serrati muscles and the vertebral aponeurosis.
3. *In the Cervical Region* a layer of cervical fascia covers it. Here also a number of special muscles are added, which assist in supporting the head upon the spine.

Origin.

From a dense fascia connected with the spines of the sacrum; the posterior third of the iliac crest; the posterior surface of the sacrum, and from the great sacro-sciatic ligament.

- Insertion.** { The outer part (sacro-lumbalis), into the angles of the six or seven lower ribs; the continuation of the sacro-lumbalis is termed the musculus accessorius ad sacro-lumbalem. The inner portion (longissimus dorsi) is inserted into the transverse processes of all of the dorsal and lumbar vertebræ, and into all of the ribs between their tubercles and angles.
- Actions.** { Keeps the spine in the erect posture.
- Relations.** { (a) *Superficial Surface* :
With the trapezius and splenius and the serrati.
(b) *Deep Surface* :
Semispinalis dorsi, semispinalis colli, recti, and obliqui.
- Nerves.** { Dorsal and lumbar.

81.—SACRO-LUMBALIS.

- Description.** { This muscle is the external division of the erector spinæ; is also termed the ilio-costalis.

Origin.	{ From the common mass (erector spinæ).
Insertion.	{ By a tendon, into the six last ribs near their angles.
Actions.	{ Can elevate or depress the ribs, and straighten the vertebral column when bent forward.
Nerves.	{ Lumbar and dorsal.

82.—MUSCULUS ACCESSORIUS AD SACRO-LUMBALEM.

Description.	{ Is a continuation of the last-named muscle.
Origin.	{ From the angles of the six lower ribs by separate tendons.
Insertion.	{ By separate tendons, into the angle of the six upper ribs.
Nerves.	{ Dorsal and lumbar.

83.—CERVICALIS ASCENDENS.

Description.	{ Is the continuation of the accessorius into the neck.
Origin.	{ From the angles of the second, third, fourth or fifth upper ribs.

Insertion.	{ Into the posterior transverse tubercles of the fourth, fifth and sixth cervical vertebræ.
Actions.	{ Assists in maintaining the spine in an erect position; also helps the other muscles of this group to bend the trunk backward.
Nerves.	{ External posterior branches of the cervical.

84.—TRANSVERSALIS COLLI.

Description.	{ Located on the inner side of the longissimus dorsi.
Origin.	{ From the summits of the transverse processes of the third, fourth, fifth and sixth dorsal vertebræ.
Insertion.	{ Into the posterior tubercles of the transverse processes of the lower five cervical vertebræ.
Actions.	{ Same as the erector spinæ.
Nerves.	{ External posterior branches of the cervical.

85.—LONGISSIMUS DORSI.

This muscle is the inner portion of the erector spinæ.

Description.

1. *In the Lumbar Region* it blends with the sacro-lumbalis, some of its fibres being connected to the posterior surface of the transverse processes of the lumbar vertebræ; also to the tubercles of the articular processes, and to the middle layer of the aponeurosis of origin of the transversalis abdominis.
2. *In the Dorsal Region*, at the point of insertion of this muscle, the tendons are long and thin.

Origin.

{ From the common mass (erector spinæ).

Insertion.

{ Into the transverse processes of all of the dorsal and lumbar vertebræ, and into the ribs between their tubercles and angles.

Actions.

{ Similar to those of the other muscles.

Nerves.

{ Dorsal and lumbar.

86.—TRACHELO-MASTOID.

- Description.** { Is situated between the transversalis colli and the complexus muscle. It is the prolongation of the longissimus dorsi to the head, and is also called the complexus minor.
- Origin.** { Transverse processes of the four last cervical and four upper dorsal vertebræ.
- Insertion.** { Posterior margin of the mastoid process of the temporal bone, beneath the splenius and sternomastoid.
- Actions.** } Serves to incline and turn the head.
- Nerves.** } Posterior branches of cervical.

87.—SPINALIS DORSI.

- Description.** { This muscle joins the spinous processes of the upper lumbar and the dorsal vertebræ, by muscular and tendinous slips. It is located at the inner side of the longissimus dorsi, and is united to the semispinalis dorsi, which is beneath it.
- Origin.** { Spinous process of the two upper lumbar and the two last dorsal vertebræ.

- Insertion.** { Into the spinous processes of the six or eight upper dorsal vertebræ.
- Actions.** { Strengthens the spinal column.
- Nerves.** { Posterior branches of the cervical.

88.—SPINALIS COLLI.

- Description.** { This muscle connects the spinous processes of the cervical vertebræ.
- Origin.** { From the spinous processes of the three lower cervical vertebræ.
- Insertion.** { Into the spinous process of the axis, and sometimes into the spinous processes of the two vertebræ just below the axis.
- Nerves.** { Posterior branches of the cervical.

89.—COMPLEXUS.

- Description.** { This muscle is situated beneath the splenius, and is internal to the transversalis colli and trachelomastoid, and near its middle a transverse tendinous intersection traverses it.

Origin.	{ From the transverse and articular processes of three or four inferior cervical, and three or four superior dorsal vertebræ.
Insertion.	{ Into the inner half of the rough surface between the two curved lines of the occipital bones.
Actions.	{ Serves to straighten, incline, and turn the head.
Nerves.	{ Posterior branches of the cervical.

90.—BIVENTER CERVICIS.

Description.	{ Is situated on the inner side of the complexus, being frequently blended with it. This muscle is bicipital, with an intervening tendon, and is sometimes described as several distinct muscles.
Origin.	{ From two to four tendinous slips, from the transverse processes of as many of the upper dorsal vertebræ.
Insertion.	{ Into the superior curved line of the occipital bone, at the inner side of the complexus muscle.
Nerves.	{ External posterior branches of the lumbar and dorsal nerves.

91.—SEMISPINALIS COLLI.

- Description.** { Is thicker than the semispinalis dorsi.
- Origin.** { By tendinous and fleshy fasciculi, from the transverse processes of the five first dorsal vertebræ.
- Insertion.** { Into the spinous processes of the second, third, fourth and fifth cervical vertebræ.
- Actions.** { Extends the neck obliquely backward and to one side.
- Relations.** { (a) *Superficial Surface:*
From below upward, with the longissimus dorsi, spinalis dorsi, splenius, complexus, profunda cervicis artery, princeps cervicis artery, and posterior cervical plexus of nerve.
(b) *Deep Surface:*
With the multifidus spinæ.
- Nerves.** { Posterior branches of cervical.

92.—SEMISPINALIS DORSI.

- Description.** { This muscle is made up of narrow fasciculi, which are fleshy.

Origin.	{ From the dorsal transverse processes, from the fifth to the eleventh.
Insertion.	{ Into the spinous processes of the three upper dorsal and the two inferior cervical vertebræ.
Actions.	{ Extends the spine obliquely backward.
Nerves.	{ Posterior divisions of the dorsal.

93.—MULTIFIDUS SPINÆ.

Description.	{ Consists of fleshy and tendinous fasciculi, which occupy the groove on each side of the spinous processes of the vertebræ, clear to the axis.
Origin.	{ In the sacral region, from the back of the sacrum, and from the aponeurosis of origin of the erector spinæ. In the iliac region, the fasciculi arise from the inner surface of the posterior superior spine of the ilium, and the posterior sacro-iliac ligaments. In the lumbar and cervical regions, from the articular processes. In the dorsal region, from the transverse processes.

- Insertion.** { Each fasciculus passes upward and inward, into the lamina and whole length of the spinous process of one of the vertebræ above.
- Actions.** { Acts upon different parts of the spinal column.
- Relations.** { (a) *Superficial Surface* :
With the longissimus dorsi, spinalis dorsi, semispinalis dorsi, and semispinalis colli.
(b) *Deep Surface* :
With the laminae and spinous processes of the vertebræ, and with the rotatores spinæ.
- Nerves.** { Posterior divisions of the sacral, lumbar, dorsal and cervical.

94.—ROTATORES SPINÆ.

- Description.** { The rotatores spinæ, eleven in number on each side, are situated in the dorsal region of the spine, just beneath the multifidus spinæ. They are small and quadrilateral.
- Origin.** { From the upper and back part of the transverse process.
- Insertion.** { Into the lamina of the vertebra above.

- Actions.** } These small muscles rotate the individual vertebræ on each other.
- Nerves.** } Dorsal.

95.—INTERSPINALIS.

Short, muscular fasciculi, situated between the spinous processes of the vertebræ.

(1) *Cervical Region* :

In this region the fasciculi are most distinct, and are made up of six pairs, consisting of small, narrow bundles, attached above and below to the apices of the spinous processes; the first pair is located between the axis and third vertebra, the last pair being between the last cervical and the first dorsal vertebra.

Description.

(2) *Dorsal Region* :

Here we find the fasciculi between the first and second vertebræ, and below, between the eleventh and twelfth vertebræ.

(3) *Lumbar Region* :

Four pairs of these muscles are situated in this region, in the intervals between the five lumbar vertebræ.

Actions. { Assist in extending the spinal column, and when they act on one side only, incline it a little to one side.

Nerves. { Branches of cervical.

96.—EXTENSOR COCCYGIS.

Description. { A slender fasciculus, located over the lower part of the posterior surface of the sacrum and coccyx, and which is the rudiment of the extensor muscle of the caudal vertebræ in some animals.

Origin. { From the last bone of the sacrum, or first piece of the coccyx.

Insertion. { After passing downward, it is inserted into the lower part of the coccyx.

Actions. { Retains the coccyx in place.

Nerve. { Sacral.

97.—INTERTRANSVERSALES.

They are located between the transverse processes of the vertebræ.

(1) *Cervical Region* :

Are double in this region, and consist of rounded and muscular tendinous fasciculi. These latter pass between the anterior and posterior tubercles of the transverse process of two contiguous vertebræ, and the anterior branch of a cervical nerve separates them. We find seven pairs of these muscles in this region. The first pair is situated between the atlas and axis, and the last is between the seventh cervical and first dorsal vertebræ.

Description.

(2) *Dorsal Region* :

Here the fasciculi are rounded, tendinous cords in the intertransverse spaces of the upper dorsal vertebræ. Between the transverse processes of the lower three dorsal vertebræ they are muscular.

(3) *Lumbar Region* :

There are four in number in this region (fasciculi).

Actions. } To fix the spine, and move it a little.

Nerves. } Posterior branches of the spinal.

98.—RECTUS CAPITIS POSTICUS MAJOR.

Origin. } From the spine of the axis by a pointed tendon.

Insertion. } Broad, into the inferior curved line of the occipital bone.

Actions. } Depresses the head posteriorly.

Relations. { (a) *Superficial Surface*:
 With the complexus, and with the superior oblique muscles.
 (b) *Deep Surface*:
 With the posterior arch of the atlas, posterior occipito-atloid ligament, and with the occipital bone.

Nerves. } Suboccipital and great occipital.

99.—RECTUS CAPITIS POSTICUS MINOR.

Origin. } By a narrow, pointed tendon, from the spine of the atlas.

Insertion.	{ Into the rough surface beneath the inferior curved line of the occipital bone, behind the foramen magnum.
Actions.	{ Depresses the head backward.
Relations.	{ (a) <i>Superficial Surface</i> : With the complexus. (b) <i>Deep Surface</i> : With the posterior occipito-atloid ligament.
Nerve.	{ Suboccipital.

100.—OBLIQUUS CAPITIS INFERIOR.

Origin.	{ From the apex of the spinous process of the axis.
Insertion.	{ Narrow, into the transverse process of the atlas.
Relations.	{ (a) <i>Superficial Surface</i> : With the complexus and the posterior branch of the second cervical nerve, which crosses it. (b) <i>Deep Surface</i> : With the vertebral artery and posterior atlo-axoid ligament.

Actions. { Rotates the atlas and head on the
second vertebra.

Nerve. } Suboccipital.

101.—OBLIQUUS CAPITIS SUPERIOR.

Origin. { Narrow, from the upper part of the
transverse process of the atlas.

Insertion. { Broad, into the rough surface be-
tween the two curved lines of the
occipital bone, external to the
complexus and behind the mas-
toid process of the temporal bone.

Actions. { Bends the head backward and to
one side.

Relations. { (a) *Superficial Surface:*
With the complexus and
trachelo-mastoid muscles.
(b) *Deep Surface:*
With the posterior occipito-
atloid ligament.

Nerve. } Suboccipital.

IV.—MUSCLES OF THE UPPER EXTREMITY.

102.—PECTORALIS MAJOR.

Description.

Is large, flat and triangular, and situated at the anterior part of the chest, in front of the axilla.

Origin.

- (1) From the sternal half of the clavicle.
- (2) Anterior surface of the sternum.
- (3) From the cartilages of all the true ribs, except the first and last.

Insertion.

By a flat tendon, into the anterior lip of the bicipital ridge of the humerus ; by an anterior aponeurosis into the fascia of the forearm, and it sends up an expansion to the head of the humerus, over the bicipital ridge.

Actions.

Draws the arm inward, and also rotates it inwardly. The clavicular part raises the arm, and if this be fixed, the sternal and costal portions will assist in the act of inspiration.

(a) *Anterior Surface* :

With the integument, superficial fascia, platysma myoides and mammary gland.

(b) *Posterior Surface* :

The Thoracic Part is in relation with the sternum, ribs and costal cartilages, subclavius, pectoralis minor, serratus magnus, and intercostal muscles.

(c) *Upper Border* :

Is parallel with the deltoid, the cephalic vein being between.

(d) *Lower Border* :

Is the anterior margin of the axilla.

Relations.**Nerve.**

} Anterior thoracic.

103. PECTORALIS MINOR.**Origin.**

{ From the third, fourth, and fifth ribs, just beyond their cartilages.

Insertion.

{ By a flat tendon, into the anterior border of the coracoid process of the scapula.

Actions.

{ Depresses the glenoid cavity inward, and assists in inspiration.

- Relations.**
- (a) *Anterior Surface:*
With the pectoralis major, superior thoracic vessels and nerves.
 - (b) *Posterior Surface:*
With the ribs, intercostals, serratus magnus, axillary space, axillary vessels and nerves.
 - (c) *Upper Border:*
A triangular space separates this border from the clavicle; the axillary vessels and nerve are in this interval.
- Nerve.** } Anterior thoracic.

104. SUBCLAVIUS.

- Origin.** } By a flat tendon, from the cartilage of the first rib, in front of the rhomboid ligament.
- Insertion.** } External half of the inferior surface of the clavicle.
- Actions.** } Depresses the clavicle and shoulder inwardly, and raises the first rib.

- Relations.** {
- (a) *Upper Surface* :
With the clavicle.
 - (b) *Under Surface* :
Axillary vessels and brachial plexus of nerves.
 - (c) *Anterior Surface* :
Costo-coracoid aponeurosis.

Nerves. } From the fifth and sixth cervical.

105. SERRATUS MAGNUS.

- Description.** {
- This broad, thin, irregularly quadrilateral muscle is divisible into three portions, *e. g.* :
1. Upper portion.
 2. Middle portion.
 3. Lower portion.

- Origin.** {
- (1) *The Upper Portion* arises from the first and second ribs, and the aponeurotic arch between.
 - (2) *The Middle Portion*, by three digitations from the second, third, and fourth ribs.
 - (3) *The Lower Portion*, from the fifth, sixth, seventh, and eighth ribs, by four digitations.

Insertion.

- (1) *The Upper Portion* is inserted into the smooth surface on the inner side of the superior angle of the scapula.
- (2) *The Middle Portion* into the posterior border of the scapula.
- (3) *The Lower Portion* is inserted into the inner surface of the inferior angle of the scapula.

Actions.

- { Draws the scapula forward, and assists in the act of inspiration.

Relations.

- (a) *In Front* :
Pectoral muscles.
- (b) *Behind* :
Subscapularis muscle.
- (c) *Above* :
With the axillary vessels and nerves.
- (d) *Deep Surface* :
With the ribs and intercostals.

Nerve.

- { Posterior thoracic.

106.—DELTOID.**Description.**

Forms the convexity of the shoulder, and is thick, large and triangular. It covers the shoulder-joint in front and behind, and on its outer side, and is very coarse in its texture.

Origin.

- (1) Outer third of the anterior border and upper surface of the clavicle.
- (2) From the anterior edge of the acromion process of the scapula.
- (3) From the lower edge of the spine of the scapula.

Insertion.

Into a rough surface on the outer side of the humerus, near the centre.

Actions.

Raises the arm from the side, or depresses the shoulder.

(a) *Superficial Surface :*

With the integument, superficial fascia, platysma myoides, and supra-acromial nerves.

(b) *Deep Surface :*

A large sacculated synovial bursa separates it from the head of the humerus. Is in relation with the coraco-acromial ligament, pectoralis minor, coraco-brachialis, both heads of the biceps, tendon of the pectoralis major, infraspinatus, teres minor, scapular and external heads of the triceps, circumflex vessels, and nerve and the humerus.

Relations.(c) *Anterior Border :*

A cellular space separates it from the pectoralis major ; this space contains the cephalic vein and descending branch of the thoracico-acromialis artery.

(d) *Posterior Border :*

Lies upon the infraspinatus and triceps muscles.

Nerve.

} Circumflex.

107.—SUBSCAPULARIS.

- Description.** } Occupies the subscapular fossa.
- Origin.** } All the surface and circumference
of the subscapular fossa.
- Insertion.** } By a tendon, into the lesser tuber-
osity of the humerus.
- Actions.** } Rotates the head of the humerus
inward, and it draws the hu-
merus downward, when the arm
is raised.
- Relations.** } (a) *Anterior Surface:*
With the serratus magnus,
coraco-brachialis, biceps,
axillary vessels and
nerves.
- (b) *Posterior Surface:*
With the scapula, subscapular
vessels and nerves, and the
capsular ligament of the
shoulder-joint.
- (c) *Lower Border:*
With the teres major, and the
latissimus dorsi muscles.
- Nerves.** } Upper and lower subscapular.

108.—SUPRASPINATUS.

- Origin.** { Supraspinous fossa and the strong fascia covering its surface.
- Insertion.** { Into the superior facet of the larger tubercle of the humerus.
- Actions.** } To raise and abduct the arm.
- Relations.** { (a) *Upper Surface:*
With the trapezius, clavicle acromion process, coraco-acromial ligament, and deltoid.
- { (b) *Under Surface:*
With the scapula, suprascapular vessels and nerve, and upper part of shoulder-joint.
- Nerve.** } Suprascapular.

109.—INFRASPINATUS.

- Description.** { Occupies most of the infraspinous fossa; is thick and triangular.
- Origin.** { From the inferior surface of the spine and dorsum of the scapula, as far as the posterior of the two ridges on its inferior costa.

- Insertion.** { Into the middle facet of the great tuberosity of the humerus.
- Actions.** { Raises the arm, and draws it backward.
- Relations.** {
- (a) *Anterior Surface:*
Is separated from the scapula by the suprascapular and dorsalis scapulæ vessels; with the capsular ligament of the shoulder-joint.
- (b) *Posterior Surfaces:*
With the trapezius, deltoid, integument, and latissimus dorsi.
- (c) *Lower Border:*
With the teres minor and teres major muscles.
- Nerve.** { Suprascapular.

110.—TERES MINOR.

- Origin.** { From a depression between the two ridges on the inferior costa of the scapula, and from the fascia covering it, and the ligamentous septa.

- Insertion.** { By a tendon, into the inferior facet on the great tuberosity of the humerus.
- Actions.** { Assists in keeping the head of the humerus in position.
- Relations.** { (a) *Posterior Surface:*
With the deltoid, latissimus dorsi, and integument.
(b) *Anterior Surface:*
With the scapula, dorsal branch of subscapular artery, long head of triceps, and shoulder-joint.
(c) *Upper Border:*
With the infraspinatus.
(d) *Lower Border:*
With the teres major.
- Nerve.** } Circumflex.

III.—TERES MAJOR.

- Origin.** { From the rough surface on the inferior angle of the scapula, below the infraspinatus.
- Insertion.** { Into the posterior edge of the bicipital groove of the humerus.

Actions. { Draws the arm downward, backward, and to the side; rotates it inward, and when the arm is fixed, draws forward the inferior angle of the scapula, and raises the glenoid cavity.

Relations. { (a) *Posterior Surface:*
With the skin, latissimus dorsi, and the long head of the triceps.

(b) *Anterior Surface:*
With the subscapularis, latissimus dorsi, coraco-brachialis, short head of biceps, axillary vessels, and the brachial plexus of nerves.

(c) *Upper Border:*
Teres minor muscle.

(d) *Lower Border:*
Forms part of the posterior boundary of the axilla.

Nerve. { Lower subscapular.

112.—CORACO-BRACHIALIS.

Origin. { From the tip of the coracoid process, and tendon of the short head of the biceps.

Insertion. { By a flat tendon into the middle of the inner side of the shaft of the humerus.

Actions. { To raise, draw forward, and rotate the arm outward.

Relations. {

(a) *Anterior Surface:*
With the deltoid and pectoralis major; with the brachial vessels, and median nerve.

(b) *Posterior Surface:*
With the tendons of the subscapularis, latissimus dorsi teres major, the short head of the triceps, the humerus, and the anterior circumflex vessels.

(c) *Inner Border:*
With brachial artery, and median and musculo-cutaneous nerves.

(d) *Outer Border:*
With the short head of biceps and brachialis anticus.

Nerve. { Musculo-cutaneous.

113.—BICEPS OF ARM.

Description.

Is located at the anterior and internal portion of the arm, and extends from the border of the glenoid cavity and from the top of the coracoid process, to the tuberosity of the radius. This muscle consists of two heads, a long and a short. Just before the tendon of insertion is reached, a semi-lunar fascia is given off, which crosses the pronator teres, strengthening the fascia of the fore-arm. The long head of this muscle is embraced by the capsular ligament of the shoulder-joint, being outside of the synovial membrane, which accompanies it some distance. The brachial artery is found on the inner edge of the biceps.

Origin.

- (1) *The Short Head* arises from the apex of the coracoid process with the coraco-brachialis.
- (2) *The Long Head*, from the upper margin of the glenoid cavity by a long tendon, which is connected with the glenoid ligament.

Insertion.

By a strong flat tendon, twisted, into the tubercle of the radius, a synovial bursa being between the tendon and the front of the tuberosity.

Actions.

To bend the forearm upon the arm, to make tense the fascia, and rotate the radius outward. It also depresses the glenoid cavity.

(a) *Anterior Surface:*

With the pectoralis major and deltoid muscle.

(b) *Posterior Surface:*

With the shoulder-joint, upon which it rests; humerus, subscapularis, teres major, latissimus dorsi, brachialis anticus, and the musculo-cutaneous nerve.

Relations.(c) *Inner Border:*

With the coraco-brachialis, brachial vessels, and median nerve.

(d) *Outer Border:*

With the deltoid and supinator longus.

Nerve.

} Musculo-cutaneous.

114.—BRACHIALIS ANTICUS.**Description.**

It covers the elbow-joint and the lower half of the front of the humerus; and is broader in the middle than at either end.

- Origin.** { (1) By two angular slips, which embrace the insertion of the deltoid.
(2) From the fore-part of the humerus to its condyles.
(3) From the intermuscular septa on each side.
- Insertion.** { By a thick tendon, into the coronoid process of the ulna, and the rough surface beyond.
- Actions.** { Flexes the forearm. It also protects the elbow-joint.
- Relations.** { (a) *Anterior Surface:*
With the biceps, brachial vessels, musculo-cutaneous nerve, and the median nerve.
(b) *Posterior Surface:*
With the humerus, front part of elbow-joint.
(c) *Inner Border:*
With the triceps, ulnar nerve, pronator radii teres, the intermuscular septum separating it from the latter muscle.
(d) *Outer Border:*
With the musculo-spiral nerve, radial recurrent artery, supinator longus, and the extensor carpi radialis longior.

Nerves. { Musculo-cutaneous, and musculo-
 { spiral.

115.—TRICEPS EXTENSOR CUBITI.

Description.

This muscle consists of three heads, and is occasionally described as two muscles. Its three heads are:

1. The Middle (Scapular) Head.
2. The External Head.
3. The Internal Head.

Origin.

- (1) *The Middle Head* arises, from a rough triangular depression, just below the glenoid cavity.
- (2) *The External Head*, from the posterior surface of the shaft of the humerus, between the teres minor and the upper part of the musculo-spiral groove; from the external margin of the humerus and the external intermuscular septum.
- (3) *The Internal Head* arises, from the posterior surface of the shaft of the humerus, below the musculo-spiral groove; also from the internal border of the humerus and the internal intermuscular septum.

Insertion. { By a common tendon, into the olecranon process of the ulna, and the fascia of the forearm.

Relations. { (a) *Posterior Surface* :
 With the deltoid.
 (b) *Anterior Surface* :
 With the humerus, musculospiral nerve, superior profunda vessels, and with the back part of the elbow-joint.
 (c) *Middle Head of the Muscle* :
 Is in relation with the deltoid and teres minor muscles behind, and in front, with the subscapularis, latissimus dorsi and teres major.

Nerve. { Musculo-spiral.

116.—SUBANCONEUS.

Description. { Is analogous to the subcrureus, and may be seen after the triceps has been removed.

Origin. { By a few fibres from the humerus above the olecranon fossa.

- Insertion.** { Into the posterior ligament of the elbow-joint.
- Nerve.** { Musculo-spiral.

117—.PRONATOR RADII TERES.

- Description.** { Has two heads at its point of origin, between which passes the median nerve ; the direction of this muscle toward the point of insertion is, obliquely across the forearm from the inner to the outer side, ending in a flat tendon, which passes the outer border of the radius.
- Origin.** { (1) *The Largest (most superficial) Head*, arises from the inner condyle of the humerus ; the inter-muscular septa.
- { (2) *The Smaller (a thin fasciculus)*, arises from the inner side of the coronoid process of the ulna.
- Insertion.** { By a flat tendon, into the ridge at the outer and back part of the centre of the radius.
- Actions.** { Flexes the forearm and rotates the radius inward.

- Relations.** {
- (a) *Anterior Surface* :
 With the deep fascia, supinator longus, the radial vessels and nerve.
- (b) *Posterior Surface* :
 With the brachialis anticus, flexor sublimis digitorum, median nerve, and ulnar artery.
- (c) *Borders* :
 The outer border forms inner boundary of a triangular space, for the brachial artery, median nerve, and tendon of biceps. The flexor carpi radialis is in relation with the inner border of this muscle.
- Nerve.** { Median.

118.—FLEXOR CARPI RADIALIS.

- Description.** {
- It is located on the inner side of the pronator radii teres; its size increases from point of origin to point of insertion, where it is tendinous. This tendon enters a canal, external to the annular ligament, and finally passes through a groove on the trapezium bone to its insertion.

- Origin.** { From the inner condyle and the intermuscular septa.
- Insertion.** { Into the base of the second metacarpal bone of the hand.
- Actions.** { To flex the forearm and hand.
- Relations.** {
- (a) *Superficial Surface* :
With the integument and deep fascia.
 - (b) *Deep Surface* :
With the flexor sublimis digitorum, flexor longus pollicis, and with the wrist-joint.
 - (c) *Outer Border* :
With the pronator radii teres and the radial vessels.
 - (d) *Inner Border* :
Above, with the palmaris longus, and below, with the median nerve.
- Nerve.** { Median.

119.—PALMARIS LONGUS.

- Description.** { Is slender and fusiform in shape.
It is situated on the inner side of flexor carpi radialis muscle.

Origin.	{ By the common tendon, from the inner condyle of the humerus; also from the deep fascia and the intermuscular septa.
Insertion.	{ By a flattened tendon, into the annular ligament.
Actions.	{ Causes the palmar aponeurosis to become tense, and it also flexes the hand.
Relations.	{ <ul style="list-style-type: none"> (a) <i>Superficial Surface</i> : With the deep fascia. (b) <i>Deep Surface</i> : With the flexor sublimis digitorum muscle. (c) <i>Internally</i> : With the flexor carpi ulnaris. (d) <i>Externally</i> : With the flexor carpi radialis.
Nerve.	{ Median.

120.—FLEXOR CARPI ULNARIS.

Description.	{ Is situated on the ulnar side of the forearm, and consists of two heads. On the outer side of the tendon of the muscle we find the ulnar artery.
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- Origin.** { (1) *One of the Heads*, arises from the inner condyle of the humerus.
(2) *The Other Head*, from the inner border of the olecranon; from the upper two-thirds of the posterior margin of the ulna, and from the intermuscular septum.
- Insertion.** { Into the pisiform bone and the base of the fifth metacarpal bone.
- Actions.** { Flexes the hand.
- Relations.** { (a) *Superficial Surface*:
With the deep fascia.
(b) *Deep Surface*:
With the flexor sublimis, the flexor profundus, pronator quadratus, and the ulnar vessels and nerve.
(c) *Outer (Radial) Border*:
Above, with the palmaris longus; below, with the ulnar vessels and nerve.
- Nerve.** { Ulnar.

121.—FLEXOR SUBLIMIS DIGITORUM.

(PERFORATUS.)

Description.

This muscle lies directly under the flexor carpi ulnaris, and at its point of origin has three heads.

Origin.

- (1) *One Head*, arises, by the common tendon, from the internal condyle of the humerus; from the internal lateral ligament of the elbow-joint; and from the intermuscular septum.
- (2) *The Second Head*, from the inner ridge of the coronoid process of the ulna.
- (3) *The Third Head*, arises from the oblique line of the radius.

Insertion.

By four tendons into the fingers. These tendons split at the end of the first phalanx for the passage of the deep flexor tendons; each division then embraces the edges of the corresponding tendon of the flexor carpi ulnaris, forming a sort of sheath, both being inserted in the anterior part of the phalanges of each finger.

Actions.

Flexes the fingers on the hand, and the hand upon the wrist.

Relations.

(a) *In the Forearm (Superficial Surface):*

With the deep fascia, and with all of the superficial muscles of the anterior brachial region.

(b) *Deep Surface:*

With the flexor profundus digitorum, flexor longus pollicis, ulnar vessels and nerve, and the median nerve.

(c) *Its Tendons (in the Hand):*

(a) *In Front:*

With the palmar fascia, superficial palmar arch, and by branches of the median nerve.

(b) *Behind:*

With the tendons of the deep flexor, and lumbricales.

Nerve.

} Median.

122.—FLEXOR PROFUNDUS DIGITORUM.

(PERFORANS.)

Description.

Situated at the ulnar side of the forearm, it being just beneath the superficial flexors. In the palm of the hand, four small muscles, the lumbricales, join with the tendons of this muscle.

- Origin.** { (1) From the anterior three-fourths of the forepart of the ulna and inner ridge of the coronoid process.
- (2) Inner half of the interosseous ligament.
- (3) By a short strip, from the radius, below its tubercle.
- Insertion.** { It is inserted, by four tendons, into the last phalanx of each finger. Each one of these tendons pierce a corresponding tendon of the flexor sublimis digitorum muscle.
- Actions.** { To flex the fingers on the hand, and the hand upon the wrist.
- Relations.** { (a) *Superficial Surface:*
In the forearm, it is in relation with the flexor sublimis digitorum, flexor carpi ulnaris, ulnar vessels and nerve, and the median nerve.
- (b) *Deep Surface:*
In the forearm, with the ulna, interosseous membrane, pronator quadratus. In the hand, with the interossei, adductor pollicis, and deep palmar arch.
- (c) *Ulnar and Radial Borders:*
With the flexor carpi ulnaris, flexor longus pollicis, anterior interosseous vessels.

Nerves. } Ulnar and anterior interosseous.

123.—FLEXOR LONGUS POLLICIS.

Description. } Situated on the radial side of the forearm.

Origin. } (1) From the upper two-thirds of the grooved anterior surface of the shaft of the radius.
(2) From the inner half of the interosseous ligament, and occasionally from the base of the coronoid process of the ulna.

Insertion. } By a tendon, which passes under the annular ligament, and is finally inserted into the base of the last phalanx of the first finger, or thumb.

Actions. } To flex the first finger (thumb).

(a) *Superficial Surface:*
With the flexor sublimis digitorum, flexor carpi radialis, supinator longus, and the radial vessels.

(b) *Deep Surface:*
With the radius, the interosseous membrane or ligament, and the pronator quadratus.

(c) *Ulnar Border:*
With the flexor profundus digitorum, the anterior interosseous vessels and nerve separating them.

Nerve. } Anterior interosseous.

124.—PRONATOR QUADRATUS.

Description. } It passes transversely across the front of the radius and ulna, and is somewhat quadrilateral.

Origin. } From the inferior fifth of the anterior surface of the shaft of the ulna, and also from the surface of bone below it.

Insertion. } Into the anterior surface and inner and outer margins of the lower fourth of the shaft of the radius.

Actions. } Pronates the radius and the hand.

Relations. } (a) *Superficial Surface* :
 With the flexor profundus digitorum, flexor longus pollicis, flexor carpi radialis, and the radial vessels.
 (b) *Deep Surface* :
 With the ulna, radius, and interosseous membrane.

Nerve. } Anterior interosseous.

125.—SUPINATOR LONGUS.

Origin. { (1) From the external ridge of the humerus.
(2) From the intermuscular septum.

Insertion. { Into the styloid process of the radius.

Actions. { Supinates the hand.

Relations. { (a) *Superficial Surface:*
With the integument and fascia, extensor ossis metacarpi pollicis, and extensor primi internodii pollicis.
(b) *Deep Surface:*
With the humerus, extensor carpi radialis longior et brevior, pronator radii teres, and supinator brevis.
(c) *Inner Border (above the elbow):*
Musculo-spiral nerve, radial recurrent artery, brachialis anticus, and brachial artery.

Nerve. { Musculo-spiral.

126.—EXTENSOR CARPI RADIALIS LONGIOR.

Origin.	}	From the lower part of the external condyloid ridge of the humerus, the external condyle, and the external intermuscular septum.
Insertion.	}	The fibres, after becoming tendinous, follow the external border of the radius, beneath the extensor tendons of the first finger (thumb); after passing through a groove, it is inserted into the base of the metacarpal bone of the second finger (the index finger).
Actions.	}	Assists in giving the thumb its extensive motion.
Relations.	}	<p>(a) <i>Superficial Surface</i> : With the supinator longus, and the fascia of the forearm.</p> <p>(b) <i>Outer Side</i> : The extensor tendons of the thumb pass over it.</p> <p>(c) <i>Deep Surface</i> : With the elbow-joint, extensor carpi radialis breviar, and the back part of the wrist.</p>
Nerve.	}	Musculo-spiral.

127.—EXTENSOR CARPI RADIALIS BREVIOR.

Description.	{	This muscle is beneath the one just described, and is slightly thicker.
Origin.	{	From the inferior and posterior part of the external condyle of the humerus, the external lateral ligament, and the intermuscular septa.
Insertion.	{	After passing under the annular ligament, it is inserted into the base of the metacarpal bone of the middle finger, on its radial side.
Actions.	{	Assists in producing supination of the forearm.
Relations.	{	<p>(a) <i>Superficial Surface:</i> With the extensor carpi radialis longior, and with the extensor muscles of the first finger (thumb).</p> <p>(b) <i>Deep Surface:</i> With the supinator brevis, tendon of the pronator radii teres, the radius, and the wrist-joint.</p> <p>(c) <i>Its Ulnar Border:</i> With the extensor communis digitorum.</p>
Nerve.	}	Posterior interosseous.

128.—ANCONEUS.

- Origin.** { From the back part of the outer condyle of the humerus.
- Insertion.** { Into the olecranon process, and the triangular surface on the upper fourth of the ulna.
- Actions.** { Extends the forearm.
- Relations.** { (a) *Superficial Surface*:
With the fascia from the triceps.
(b) *Deep Surface*:
With the elbow-joint, orbicular ligament, ulna, and a small part of the supinator.
- Nerve.** { Musculo-spiral.

129.—EXTENSOR DIGITORUM COMMUNIS.

- Origin.** { By a tendon in common with the extensor carpi radialis brevis, extensor carpi ulnaris, and minimi digiti, from the external condyle of the humerus, and intermuscular septa.

Insertion.

By four tendons, into the phalanges, each of which gives off an expansion from its margins to cover the back of the first phalanx; then, dividing into three portions, sends one to the upper end of the second phalanx, and one on each side of the first joint to the upper end of the last phalanx. Before reaching the phalanges, the three external tendons are joined by transverse slips.

Actions.

} Assist in extending the phalanges.

(a) *Superficial Surface:*

With the fascia of the forearm, fascia of the hand, posterior annular ligament, and the integument.

(b) *Deep Surface:*

With the supinator brevis, extensor muscles of the first finger (the thumb), and those of the index-finger, posterior interosseous vessels and nerve, wrist-joint, carpus, metacarpus, and the phalanges.

Relations.(c) *Radial and Ulnar Borders:*

With the extensor carpi radialis brevior; with the extensor minimi digiti, and the extensor carpi ulnaris.

Nerve. } Posterior interosseous.

130.—EXTENSOR MINIMI DIGITI.

Origin. { From the common tendon, with the extensor digitorum communis, and the extensor carpi ulnaris, from the external condyle of the humerus.

Insertion. { By a broad aponeurosis, into the second and third phalanges of the fifth finger (little finger), like the corresponding tendon of the common extensor.

Actions. } Extends the fifth finger.

Nerve. } Posterior interosseous.

131.—EXTENSOR CARPI ULNARIS.

Origin. { From the external condyle of the humerus, by the common tendon; the middle third of the ulna, fascia, and the septa.

Insertion. { By a tendon, into the carpal end of the fifth metacarpal (little finger).

Actions. { Assists in the extension of the wrist.

Relations.	}	(a) <i>Superficial Surface</i> :
		With the fascia of the forearm.
	}	(b) <i>Deep Surface</i> :
		With the ulna, and with the muscles of the deep layer.
Nerve.	}	Posterior interosseous.

132.—SUPINATOR BREVIS.

Description.	}	Is broad and of a cylindrical form, and it embraces the upper part of the radius. The posterior interosseous nerve penetrates it.
Origin.	}	(1) From the external condyle of the humerus.
		(2) From the external lateral ligament and the annular ligament.
		(3) From a ridge on the ulna, and a triangular fossa in front of it.
Insertion.	}	Into the upper third of the external and anterior surface of the radius, in a line extending obliquely from above its tubercle to the insertion of the pronator radii teres.
Actions.	}	It causes, by contraction, the motion of supination.

- Relations. { (a) *Superficial Surface* :
 With the superficial extensor
 and supinator muscles, the
 radial vessels, and nerve.
- (b) *Deep Surface* :
 With the elbow-joint, inter-
 osseous membrane, and
 the radius.
- Nerve. { Posterior interosseous.

133.—EXTENSOR PRIMI INTERNODII POLLICIS.

- Origin. { From the interosseous membrane,
 and slightly from the ulna.
- Insertion. { Into the back part of the carpal
 end of the first phalanx.
- Actions. { Assists in extension of the hand.
- Relations. { (a) *Superficial Surface* :
 With the extensor communis
 digitorum, extensor mini-
 mi digiti, and fascia of fore-
 arm.
- (b) *Deep Surface* :
 With the ulna, radius, ten-
 dons of extensor carpi
 radialis longior et brevior,
 and radial vessels.

Nerve. } Posterior interosseous.

134.—EXTENSOR OSSIS METACARPI POLLICIS.

Description. } This, the largest of the deep extensors, is the most external of the group, and is occasionally joined to the supinator brevis, below which it lies.

Origin. } It arises from the middle of the posterior part of the surface of the shaft of the ulna, the posterior surface of the radius, and the interosseous ligament.

Insertion. } After passing downward and outward its tendon ends, after running through the groove on the outer side of the styloid process of the radius, at the base of the metacarpal bone of the first finger (thumb).

Actions. } Extends the thumb.

- Relations.** { (a) *Superficial Surface* :
 With the extensor communis digitorum, extensor minimi digiti, and with the fascia of the forearm ; also with the posterior interosseous artery and nerve.
- { (b) *Deep Surface* :
 With the ulna, radius, interosseous ligament, tendons of the extensor carpi radialis longior et brevior, and with the radial vessels.
- { (c) *Upper Border* :
 With the supinator brevis.
- { (d) *Lower Border* :
 With the extensor primi internodii pollicis.
- Nerve.** { Posterior interosseous.

135. — EXTENSOR SECUNDI INTERNODII POLLICIS.

- Origin.** { Arises from the middle third of the back of the ulna, and from the interosseous ligament.
- Insertion.** { Into the base of the last phalanx of the thumb.
- Actions.** { Extensor of the thumb.

Relations.	(a) <i>Superficial Surface:</i> With the extensor communis digitorum, extensor minimi digiti, fascia of the forearm, and the posterior interosseous artery and nerve.
	(b) <i>Deep Surface:</i> With the ulna, interosseous ligament, radius, wrist, radial vessels, and the metacarpal bone of the thumb.
Nerve.	{ Posterior interosseous.

136.—EXTENSOR INDICIS.

Origin.	{ From the middle of the posterior surface of the ulna, and from the interosseous ligament.
Insertion.	{ By slips, into the phalanges of the second (index) finger, joining with the common tendon.
Actions.	{ Extends the forefinger.

Relations.	(a) <i>Superficial Surface</i> :
	With the extensor communis digitorum, extensor minimi digiti, and the fascia of the forearm, together with the posterior interosseous artery and nerve.
	(b) <i>Deep Surface</i> :
	With the ulna, interosseous ligament, radius, wrist, radial vessels, and the metacarpal bone of the first finger (the thumb).
Nerves.	} Posterior interosseous.

137.—ABDUCTOR POLLICIS.

Origin.	{ From the annular ligament and the os trapezium of the hand.
Insertion.	{ By a flat tendon into the radial side of the base of the first phalanx of the thumb.
Actions.	} Abducts the thumb.
Relations.	(a) <i>Superficial Surface</i> :
	With the palmar fascia.
	(b) <i>Deep Surface</i> :
	With the opponens pollicis.
	(c) <i>Inner Border</i> :
	A cellular space separates it from the flexor brevis pollicis.

Nerve. } Median.

138.—OPPONENS POLLICIS.

Origin. } From the palmar surface of the os trapezium of the hand, and the annular ligament.

Insertion. } Into the whole length of the outer edge of the metacarpal bone of the first finger, or thumb.

Actions. } This muscle gives to the first bone of the metacarpus a sort of rotatory movement, which opposes the thumb.

Relations. } (a) *Superficial Surface* :
 With the abductor pollicis.
 (b) *Deep Surface* :
 With the trapezio-metacarpal articulation.
 (c) *Inner Border* :
 With the flexor brevis pollicis.

Nerve. } Median.

139.—FLEXOR BREVIS POLLICIS.

Description.

This muscle, which is larger than the last two muscles described, consists of two parts, the tendon of the flexor longus pollicis being in the space between the two. The two portions of the muscle are :

1. An Anterior (superficial) Portion.
2. A Deeper Portion.

Origin.

(1) *The Anterior Portion* originates at the os trapezium, the lower margin of the annular ligament.

(2) *The Deeper Part* arises from the trapezoid, os magnum, and the base of the third metacarpal bone, and from the sheath of the tendon of the flexor carpi radialis.

Insertion.

By two heads, each one embracing a sesamoid bone, as it runs across the metacarpo-phalangeal joint, into the first phalanx of the thumb, on both sides the bone ; the abductor being on one side, and the adductor muscle on the other.

Actions.

} Flexes the thumb.

- Relations.** { (a) *Superficial Surface* :
With the palmar fascia.
(b) *Deep Surface* :
With the adductor pollicis,
and with the tendon of the
flexor carpi radialis.
(c) *External Surface* :
With the opponens pollicis.
(d) *Internal Surface* :
With the tendon of the flexor
longus pollicis.
- Nerves.** { Median and ulnar.

140.—ADDUCTOR POLLICIS.

- Description.** { Is the most deeply seated of the
muscles in the radial region ; it
is triangular in form.
- Origin.** { Broad, from the metacarpal bone of
the middle finger on its palmar
surface.
- Insertion.** { Into the ulnar side of the base of
the first phalanx of the thumb,
and also into the internal sesa-
moid bone, in common with the
inner tendon of the flexor brevis
pollicis.
- Actions.** { Adducts the thumb.

Relations.	}	(a) <i>Superficial Surface</i> :
		With the flexor brevis pollicis, and the tendons of the flexor profundus, and the lumbricales muscles.
		(b) <i>Deep Surface</i> :
		With the first two interosseous spaces and a strong aponeurosis.
Nerve.	}	Ulnar.

141.—PALMARIS BREVIS.

Origin.	{	From the annular ligament and inner margin of the palmar fascia.
Insertion.	{	Into the skin over the inner margin of the hand.
Actions.	{	Corrugates the skin on the inner side of the hand.
Relations.	}	(a) <i>Superficial Surface</i> :
		With the integument.
		(b) <i>Deep Surface</i> :
		With part of the palmar fascia, the fascia separating the muscle from the ulnar vessels and nerve.
Nerve.	}	Ulnar.

142.—ABDUCTOR MINIMI DIGITI.

- Origin.** { From the pisiform bone of the hand and the annular ligament.
- Insertion.** { By a flat tendon, into the ulnar side of the base of the first phalanx of the little finger.
- Actions.** { Abducts the little finger.
- Relations.** { (a) *Superficial Surface* :
 With the inner part of the palmar fascia, and the palmaris brevis.
 (b) *Deep Surface* :
 With the flexor ossis metacarpi.
 (c) *Inner Border* :
 With the flexor brevis minimi digiti.
- Nerve.** { Ulnar.

143.—FLEXOR BREVIS MINIMI DIGITI.

- Origin.** { From the apex of the unciform process of the unciform bone of the hand ; the annular ligament.
- Insertion.** { In common with the latter muscle, into the base of the first phalanx of the little finger.
- Actions.** { Flexes the little finger.

Relations.	}	(a) <i>Superficial Surface</i> :
		With the internal portion of the palmar fascia, and with the palmaris brevis.
		(b) <i>Deep Surface</i> :
		With the opponens pollicis.
Nerve.	}	Ulnar.

144.—OPPONENS MINIMI DIGITI.

Origin.	}	From the unciform process of the unciform bone of the hand, and the annular ligament.
Insertion.		Into the whole length of the inner edge of the fifth metacarpal bone.
Actions.	}	Carries the fifth metacarpal bone forward and outward.
Relations.		(a) <i>Superficial Surface</i> :
		With the flexor brevis and the abductor minimi digiti.
	(b) <i>Deep Surface</i> :	
		With the interossei muscles in the fourth metacarpal space, the metacarpal bone, and the flexor tendons of the fifth or "little finger."

Nerve. } Ulnar.

145.—LUMBRICALES.

Origin. { From the fore and outer parts of
the tendons of the flexor profundus muscle.

Insertion. { At the outer and posterior side of
the superior extremity of the
first phalanges of the last four
fingers.

Actions. { Flex the fingers on the metacarpus,
and assist the tendons of the
flexor digitorum communis.

Nerves. { The median nerve supplies the two
outer lumbricales, and the ulnar
nerve the others.

146.—DORSAL INTEROSSEI OF HAND.

Description. { These muscles (four in number)
arise by two heads from the op-
posed sides of two metacarpal
bones, and are inserted into the
base of the first phalanges and
the posterior tendinous expan-
sion.

Origin.

- (a) *The First Dorsal Interosseous* (abductor indicis), has two heads at its point of origin :
- (1) *Outer Head*, arises from the upper half of the ulnar border of the first metacarpal bone.
 - (b) *Inner Head*, from the whole of the radial border of the second metacarpal bone.
- (b) *The Second Dorsal Interosseous*, from the second and third metacarpal bones.
- (c) *The Third Dorsal Interosseous*, arises from the third and fourth metacarpal bones.
- (d) *The Fourth Dorsal Interosseous*, from the fourth and fifth metacarpal bones.

Insertion.

The First Dorsal Interosseous is inserted into the radial side of the second finger (the index).

The Second, into the radial side of the base of the first phalanx of the third finger (the middle).

The Third, into the ulnar side of the base of the first phalanx of the third finger (the middle).

The Fourth muscle, into the ulnar side of the base of the first phalanx of the fourth finger (ring-finger).

- Actions.** } Are abductors from the median line of the middle finger.
- Relations.** } A perforating branch from the deep palmar arch passes through a triangular space, situated between the double origin of these muscles, and the radial artery is in relation to the double points of origin of the first dorsal interosseous muscle.
- Nerve.** } Ulnar.

147.—PALMAR INTEROSSEI OF HAND.

- Description.** } These muscles are smaller than those of the dorsal interossei, and are three in number. Their origin is from the whole length of the sides of the metacarpal bones. They are inserted into the first phalanges and the tendinous expansion covering the dorsum of each finger.
- Origin.** } (a) *The First Palmar Interosseous*, originates from the ulnar side of the second metacarpal bone.
- (b) *The Second Palmar Interosseous*, from the radial side of the fourth metacarpal bone.
- (c) *The Third Palmar Interosseous*, arises from the radial side of the fifth metacarpal bone.

Insertion.	{	<i>The First Palmar Interosseous</i> is inserted into ulnar side of the index finger.
	{	<i>The Second</i> , into the ring-finger.
	{	<i>The Third</i> , into the radial side of the fifth, or "little finger."
Actions.	{	These muscles are adductors toward the third, or "middle finger."
Nerve.	{	Ulnar.

V.—MUSCLES OF THE THORAX.

148.—TRIANGULARIS STERNI.

Origin.	{	From the posterior surface and edge of the lower part of the sternum, and the xiphoid appendix.
Insertion.	{	Into the costal cartilages of the second, third, fourth, and fifth ribs.
Actions.	{	Draws down the costal cartilages, and is an expiratory muscle.

Relations.	}	(a) <i>In Front:</i>
		With the sternum, ensiform cartilage, costal cartilages, internal intercostals, and the internal mammary vessels.
		(b) <i>Behind:</i>
		With the pleura, pericardium, and the anterior mediastinum.

Nerve } Intercostals.

149.—INTERCOSTALES EXTERNI.

Description.	{	There are eleven muscles on each side, and they assist in filling up the intercostal spaces.
Origin.	{	From the inferior margin of each rib, beginning at the transverse processes of the vertebræ.
Insertion.	{	Into the superior margin of the rib below, reaching to the costal extremities of the cartilages.
Actions.	{	Raise the ribs, increasing the capacity of the thorax from before backward.

Relations.	}	(a) <i>Outer Surface:</i>
		With the pectoralis major, pectoralis minor, serratus magnus, rhomboideus major, serratus posticus superior, serratus posticus inferior, scalenus posticus, sacro-lumbalis, longissimus dorsi, cervicalis ascendens, transversalis colli, levatores costarum, and the obliquus externus abdominis.
		(b) <i>Inner Surface:</i>
		With a layer of fascia, intercostal vessels and nerve.
Nerve.	}	Intercostal.

150.—INTERCOSTALES INTERNI.

Description.	}	Are eleven in number, on each side.
Origin.	}	From the sternum, from the inner lip of the lower edge of each cartilage and rib, as far as the angle.
Insertion.		}
Actions.	}	Depress the ribs, turning their lower borders, and thus diminishing the cavity of the thorax.

	(a) <i>External Surface</i> :
Relations.	{ With the external intercostals, the intercostal vessels and nerves.
	(b) <i>Internal Surface</i> :
	{ With the pleura costalis, triangularis sterni, and the diaphragm.
Nerves.	{ Intercostals.

151.—INFRACOSTALES.

Description.	{ Muscular and aponeurotic fasciculi make up this group, which have an obliq. direction similar to the intercostales interni.
Origin.	{ From the internal surface of a rib.
Insertion.	{ Into the internal surface of the first, second, or the third rib below.
Nerves.	{ Intercostals.

152.—LEVATORES COSTARUM.

Description.	{ There are twelve of these slips on each side.
Origin.	{ From the extremity of each transverse process of the dorsal vertebræ.
Insertion.	{ Into the superior margin of the rib below, between the tubercle and the angle.

Actions.	}	Raise the ribs, with the assistance
		of the external intercostals.
Nerves.	}	Intercostals.

VI.—MUSCLES OF THE ABDOMEN.

153.—OBLIQUUS EXTERNUS ABDOMINIS.

Origin.

By eight fleshy digitations, from the eight or nine lower ribs, the five upper serrations intersecting with the serratus magnus, and the others with the latissimus dorsi muscle.

Insertion.

The fibres from the lowest ribs are inserted into the anterior half of the outer lip of the crest of the ilium; the upper and middle fibres into a broad aponeurosis, which, with its fellow opposite, covers the front of the abdomen. The lower part of this aponeurosis (Poupart's ligament) passes from the anterior superior spinous process to terminate by one slip (internal pillar of the external ring) into the symphysis pubis, the other slip (the external pillar of the ring) being inserted into the pubic spine. Gimbernat's ligament is that part which is reflected from Poupart's ligament, and forms the anterior and inferior walls of the inguinal canal.

Actions.

Depresses the ribs, thereby compressing the abdominal viscera ; and if the thorax be fixed, it raises the pelvis, and *vice versa*.

Relations.

(a) *External (Superficial) Surface:*

With the superficial fascia, superficial epigastric, and circumflex iliac vessels.

(b) *Internal (Deep) Surface:*

With the internal oblique, lower part of the eight inferior ribs, intercostals, cremaster, spermatic cord in the male, and the round ligament in the female.

(c) *Posterior Border:*

Latissimus dorsi, and occasionally with the internal oblique muscle.

Nerves.

} Intercostals and first lumbar.

154.—OBLIQUUS INTERNUS ABDOMINIS.**Origin.**

From the fascia lumborum, the anterior two-thirds of the crista ili, and the external half of Poupart's ligament.

Insertion. { Into the cartilages of the seven lower ribs, the ensiform appendix, linea alba, symphysis and upper edge of the pubes, and into the linea ilio-pectinea.

Actions. { Somewhat similar to the external oblique, with which it co-operates.

Relations. { (a) *External Surface*:
With the obliquus externus, latissimus dorsi, the spermatic cord, and the external ring.

{ (b) *Internal Surface*:
With the transversalis, fascia of that muscle, the internal ring, and the spermatic cord.

{ (c) *Lower Border*:
Is the superior boundary of the spermatic canal.

Nerves. { Intercostals and first lumbar.

155.—TRANSVERSALIS.

Origin. { From the fascia lumborum, anterior part of the crest of the ilium, part of Poupart's ligament, and the inner side of the six inferior ribs.

Insertion. { Into the entire length of the linea alba and the upper edge of the pubes.

- Actions.** } Assists the oblique muscles.
- Relations.** } (a) *External Surface* :
 With the internal oblique,
 part of lower ribs, and the
 internal intercostals.
- } (b) *Inner Surface* :
 Is separated from the peri-
 toneum by the fascia trans-
 versalis.
- Nerves.** } Lower intercostals and first lumbar.

156.—RECTUS ABDOMINIS.

- Description.** } This long, flat muscle lies along
 the whole of the front of the ab-
 domen, and is separated from its
 fellow by the linea alba.
- Origin.** } Arises by a double tendon, from
 the pubis, between its spine and
 the symphysis.
- Insertion.** } By three portions, into the ensi-
 form cartilage and costo-xiphoid
 ligament, into the fifth costal
 cartilage, sixth costal cartilage,
 and into the seventh costal car-
 tilage.
- Actions.** } Approximates the pelvis and the
 thorax.

Relations. { This muscle is crossed by the lineæ transversæ, and a sheath encloses it.

Nerves. { Lower intercostals and the first lumbar.

157.—PYRAMIDALIS.

Origin. { The pyramidalis arises by its base (it being triangular) from the pubis and the anterior pubic ligament.

Insertion. { Into the linea alba, between the umbilicus and the pubic bone.

Actions. { Assists the rectus abdominis.

Nerves. { Lower intercostals and first lumbar.

158.—QUADRATUS LUMBORUM.

Description. { It consists of two portions, and is irregularly quadrilateral in shape.

Origin. { (1) One Portion arises from the ilio-lumbar ligament, and about two inches of the crest of the ilium.

{ (2) The Second Portion arises from the upper borders of the transverse processes of the third, fourth, and fifth lumbar vertebræ.

- Insertion.** } Into the lower border of the last rib, and, by four tendons, into the apices of the transverse processes of the third, fourth, and fifth lumbar vertebræ.
 } The next part is inserted into the lower border of the last rib.
- Actions.** } Draws the ribs downward.
- Relations.** } (a) *Anterior Surface:*
 } With the colon, kidney, psoas muscle, and the diaphragm.
 } (b) *Its Posterior Sheath:*
 } Separates the quadratus in front from the erector spinæ behind.
- Nerves.** } Anterior branches of lumbar.

159.—DIAPHRAGM.

- Description.** } Is stretched transversely between the thoracic and abdominal cavities, and has a central tendinous portion, enveloped by muscular fibres. This tendon is situated nearly in the centre of the muscle, and it supports the heart above, being attached to its fibrous pericardium. The centre of the liver is covered by it below.

Origin.

By two crura, the right crus arises from the forepart of the bodies of the four superior lumbar vertebræ. The left crus, from the sides of the two or three upper lumbar vertebræ. Another portion arises from the posterior surface of the ensiform cartilage, and the internal surfaces of the cartilages of the six lower ribs, the external ligamentum arcuatum, and the internal ligamentum arcuatum. This portion is inserted into the central tendon.

Insertion.

The crura are inserted into the posterior border of the cordiform tendon.

Actions.

The principal muscle of inspiration. It takes an important part in sighing, sneezing, coughing, laughing, hiccoughing, singing, vomiting, etc., and it may act as a muscle of expiration, by means of its crura acting and depressing the ensiform cartilage.

Nerves.

{ Phrenic.

VII.—MUSCLES OF THE LOWER PARTS.

160.—PSOAS PARVUS.

Origin.	{ From the bodies of the last dorsal, and the first and, occasionally, the second lumbar vertebræ.
Insertion.	{ Into the ilio-pectineal eminence, by a long, flat tendon.
Actions.	{ Acts upon the vertebral column and pelvis.
Relations.	{ The peritoneum covers it, and, at its point of origin, the ligamentum arcuatum internum, and the psoas magnus is beneath it.
Nerves.	{ Lumbar.

161.—PSOAS MAGNUS.

Description.	{ Situated on the side of the lumbar region of the spine and the margin of the pelvis.
Origin.	{ From the sides of the bodies of the last dorsal, and from the bodies and transverse processes of all of the lumbar vertebræ.
Insertion.	{ Into the inferior part of the lesser trochanter of the femur.
Actions.	{ Flexes the thigh and rotates it outward.

(a) *Anterior Surface (Lumbar Region):*

With the iliac fascia, ligamentum arcuatum internum, kidney, psoas parvus, renal vessels, ureter, spermatic vessels, genito-crural nerve, the colon, common and the external iliac artery and vein.

(b) *Posterior Surface:*

With the transverse processes of the lumbar vertebræ: the quadratus lumborum is separated from it by the anterior lamella of the aponeurosis of the transversalis.

(c) *Inner Side:*

With the bodies of the lumbar vertebræ, lumbar arteries, the ganglia of the sympathetic nerve, their branches of communication with the spinal nerves, the lumbar glands, the inferior vena cava (on the right), and the aorta on the left side.

(d) *In the Thigh (in front):*

With the fascia lata, and, behind, with the capsular ligament.

(e) *Inner and Outer Borders:*

With the pectineus and the femoral artery. The outer border with the ant. crural nerve and iliacus muscle.

Relations.**Nerves.**

{ Lumbar.

162.—ILIACUS.

- Origin.** { (1) From the entire surface of the iliac fossa and the inner margin of the crest.
 (2) Ilio lumbar ligament and the base of the sacrum.
 (3) From the two anterior superior spinous processes.
 (4) From the capsule of the hip-joint, by a few fibres.
- Insertion.** { Into the outer side of the tendon of the psoas magnus, and then into the lesser trochanter of the femur.
- Actions.** } To flex and rotate the thigh outward.
- Relations.** { (a) *Within the Pelvis—*
Anterior Surface:
 The iliac fascia separates it from the peritoneum, and with the external cutaneous nerve. It is in relation, on the right side, with the cæcum, and, on the left, with the sigmoid flexure of the colon.
 (b) *Posterior Surface:*
 With the iliac fossa.
 (c) *Inner Border:*
 With the psoas magnus and the anterior crural nerve.
 (d) *In the Thigh—*
Anterior Surface:
 With the fascia lata, rectus, and the sartorius.
Behind:
 With the capsule of the hip-joint.

Nerve. } Anterior crural.

163.—TENSOR VAGINÆ FEMORIS.

- Description.** { This muscle is situated at the upper and outer part of the thigh. From its point of origin, it passes downward and a little backward.
- Origin.** { By a tendon, it arises from the crista and the anterior superior spinous process of the ilium.
- Insertion.** { It is inserted into the fascia lata between its two lamella, at the upper third of the thigh.
- Actions.** { Makes tense the fascia, and also rotates the thigh inward.
- Relations.** {
- (a) *Superficial Surface* :
With the integument and the fascia lata.
 - (b) *Deep Surface* :
With the gluteus medius, rectus femoris, vastus externus, and the ascending branches of the external circumflex artery.
 - (c) *Anterior Border* :
With the sartorius, being separated from it below by the triangular interval in which is the rectus femoris.
 - (e) *Posterior Border* :
With the gluteus medius.
- Nerve.** } Gluteal.

164.—SARTORIUS.

- Description.** { This is the longest muscle in the body, with the longest fibres, which are not limited, except by the points of origin and insertion.
- Origin.** { From the anterior superior spine of the ilium, and the notch beneath it.
- Insertion.** { By an expanded tendon, into the inner side of the shaft of the tibia, near the tubercle.
- Actions.** { Flexes the thigh, and adducts and rotates it inward. It also flexes the leg on the thigh obliquely.
- Relations.** { (a) *Superficial Surface* :
With the fascia lata and the integument.
(b) *Deep Surface* :
With the iliacus, psoas, rectus, vastus internus, anterior crural nerve, sheath of the femoral vessels, adductor longus, adductor magnus, gracilis, long saphenous nerve, and the internal lateral ligament of the knee-joint.
- Nerve.** { Middle cutaneous of the anterior crural, which often pierces it.

165.—SUBCRUREUS.

Origin.

{ The anterior surface of the shaft of the femur.

Insertion.

{ Into the synovial membrane of the knee-joint.

Actions.

{ Elevates and suspends the synovial sac above the patella, when the joint is in motion.

Nerve.

{ Anterior crural.

166.—QUADRICEPS EXTENSOR.

Description.

{ It consists of four parts, and is situated in the middle of the anterior region of the thigh.

Origin.

- (1) *The Rectus Femoris*, by two tendons, from the anterior inferior spine of the ilium and a rough surface above the brim of the acetabulum.
- (2) *The Vastus Externus*, from the base of the great trochanter of the femur, the outer edge of the linea aspera, the oblique ridge leading to the external condyle, the external surface of the femur, and from the fascia lata.
- (3) *The Vastus Internus*, from the inner side of the linea aspera and the line leading to it, up to the point of insertion of the iliacus; from the anterior part of the femur, and the intermuscular septum.
- (4) *The Crureus*, arises from the anterior and external parts of the femur, and surrounds the front and outer side of the bone.

Insertion.

The rectus femoris, into the upper part of the patella, by the common tendon.

The vastus externus, into the upper and outer part of the patella.

The vastus internus, into the upper and inner part of the patella, and, by an aponeurosis, into the head of the tibia.

The crureus, into the upper and outer edge of the patella, and into the synovial membrane behind it.

Actions.

The rectus femoris extends the leg on the thigh, to flex this on the pelvis. The vastus externus rotates the leg outward, and extends the knee. The vastus internus rotates the leg inward, and extends the knee. The crureus extends the knee.

(a) *Superficial Surface :*

The rectus femoris, with the gluteus minimus, tensor vaginæ femoris, sartorius, and the psoas and iliacus. The vastus externus, with the rectus, tensor vaginæ femoris, gluteus maximus, and the fascia lata. The vastus internus, with the psoas and iliacus, the rectus, sartorius, pectineus, adductors, femoral vessels, and saphenous nerve.

(b) *Posterior and Deep Surfaces :*

The rectus femoris, with the hip-joint, external circumflex vessels, crureus, and vasti muscles. The vastus externus, with the crureus and anterior crural nerve. The vastus internus and crureus, with the femur, subcrureus, and synovial membrane of knee.

Relations.**Nerves.**

} Anterior crural.

167.—GRACILIS.

- Origin.** { From the inner part of the symphysis pubes, from the spine to the ramus of the ischium, internal to the adductor magnus.
- Insertion.** { Into the upper part of the internal surface of the tibia, above the semi-tendinosus.
- Actions.** { Adducts the thigh and leg, bends the knee, and turns the leg inward.
- Relations.** { (a) *Superficial Surface:*
With the fascia lata, the sartorius; the internal saphenous vein crosses its lower part, and the anterior crural nerve.
- { (b) *Deep Surface:*
With the three adductors and the internal lateral ligament of the knee-joint.
- Nerve.** { Obturator.

168.—PECTINEUS.

- Origin.** { (1) From the linea ilio-pectinea, external to the spine of the pubes.
- { (2) From a prolongation from the ligament of Gimbernat.

- Insertion.** { Into a rough ridge leading from the trochanter minor to the linea aspera.
- Actions.** { Assists in the adduction of the thigh.
- Relations.** {
- (a) *Anterior Surface:*
With the fascia lata (pubic portion); this separates it from the femoral vessels and the internal saphenous vein.
 - (b) *Posterior Surface:*
With the hip-joint, adductor brevis, obturator externus, the obturator vessels and nerve being interposed.
 - (c) *Outer Border:*
With the psoas.
 - (d) *Inner Border:*
With the border of the adductor longus.
- Nerves.** { Anterior crural and obturator.

169.—ADDUCTOR LONGUS.

- Origin.** { By a round tendon, from the anterior surface of the body of the pubes, between the spine and the symphysis.

Insertion.	{	Into the inner margin of the linea aspera, at about its middle third.
Actions.	{	Adducts, flexes, and rotates the thigh outward.
Relations.	{	<p>(a) <i>Anterior Surface</i> : With the fascia lata, the femoral artery and vein.</p> <p>(b) <i>Posterior Surface</i> : With the adductor brevis, the adductor magnus, anterior branches of the obturator vessels and nerve, and with the profunda artery and vein.</p> <p>(c) <i>Outer and Inner Borders</i> : With the pectineus and gracilis respectively.</p>
Nerve.	}	Obturator.

170.—ADDUCTOR BREVIS.

Origin.	{	From the front of the pubes, external to the gracilis; from the body and descending ramus.
Insertion.	{	Into the whole length of the line leading from the lesser trochanter to the linea aspera.
Actions.	}	Similar to the adductor longus.

- Relations.** { (a) *Anterior Surface:*
With the pectineus, adductor longus, and the anterior branches of the obturator vessels and nerve.
- (b) *Posterior Surface:*
With the adductor magnus and the posterior branches of the obturator vessels and nerve.
- (c) *Outer and Inner Borders:*
With the obturator externus, tendons of psoas and iliacus. With the gracilis and adductor magnus muscles.
- Nerve.** } Obturator.

171.—ADDUCTOR MAGNUS.

- Description.** { This is a triangular muscle, and it forms a septum between the muscles on the inner and those on the back of the thigh. An opening exists in the adductor magnus, between the two portions of which it is made up, for the transmission of the femoral artery and vein.
- Origin.** { (1) From the descending ramus of the pubes.
(2) From the ascending ramus of the ischium.
(3) From the outer side and lip of the tuberosity of the ischium.

Insertion.

Into a rough ridge, leading from the great trochanter of the femur to the linea aspera and the internal condyle of the femur.

Actions.

} Same as the adductor longus.

Relations.(a) *Anterior Surface:*

With the pectineus, adductor brevis, adductor longus, and the femoral vessels.

(b) *Posterior Surface:*

With the great sciatic nerve, gluteus maximus, biceps, semi-tendinosus, and the semi-membranosus.

(c) *Superior (shortest) Border:*

Is parallel with the quadratus femoris, between which is the internal circumflex artery.

(d) *Internal (longest) Border:*

With the gracilis, sartorius, and with the fascia lata.

(e) *External (attached) Border:*

Is inserted into the femur, the adductor brevis and longus separating it from the vastus internus.

Nerves.

} Obturator and great sciatic.

172.—GLUTEUS MAXIMUS.

Origin.

- (1) From the dorsal surface of the ilium, between the posterior fifth of the crest and the superior curved line.
- (2) From the posterior surface of the last part of the sacrum.
- (3) From the side of the coccyx and the surface of the great sacro-sciatic ligament.
- (4) From the fascia of the gluteus medius muscle.

Insertion.

By a flat tendon, into the fascia lata, over the great trochanter, and the lower third, into the rough ridge leading from the base of the great trochanter to the linea aspera.

Actions.

Is the chief extensor of the hip joint. It extends, abducts and rotates the thigh outward; makes tense the fascia lata, and fixes the pelvis on the lower extremity

Relations.(a) *Superficial Surface* :

A thin fascia separates it from the subcutaneous tissue.

(b) *Deep Surface (from above downward)* :

With the ilium, sacrum, coccyx, great sacro-sciatic ligament, part of the gluteus medius, pyriformis, gemelli, obturator internus, quadratus femoris, tuberosity of the ischium, great trochanter of femur, origin of the biceps, semitendinosus, semimembranosus, and the adductor magnus.

(c) *Upper Border* :

The fascia lata connects this with the gluteus medius.

(d) *Lower Border* :

Forms the fold of the nates, having a direction toward the perineum.

Nerves.

} Small sciatic and gluteal.

173.—GLUTEUS MEDIUS.**Origin.**

{ From the dorsal surface of the ilium, between the superior and middle curved lines and the fascia covering it.

Insertion.	{	Into the oblique line, passing downward and forward on the outer surface of the great trochanter.
Actions.	{	Abducts the thigh, the posterior fibres rotate the limb outward, and the anterior inward.
Relations.	{	<p>(a) <i>Superficial Surface</i> : With the gluteus maximus behind, the tensor vaginae femoris, and deep fascia in front.</p> <p>(b) <i>Deep Surface</i> : With the gluteus minimus, the gluteal vessels, and the superior gluteal nerve.</p> <p>(c) <i>Anterior Border</i> : Is blended with the gluteus minimus.</p> <p>(d) <i>Posterior Border</i> : The gluteal vessels are situated between it and the pyriformis muscle, the border being parallel with the latter.</p>
Nerve.	{	Superior gluteal.

174.—GLUTEUS MINIMUS.

Origin.	{	From the inferior semicircular ridge on the dorsum of the ilium, and the rough surface between it and the edge of the acetabulum.
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Insertion.	{ Into the upper and anterior part of the great trochanter of the femur.
Actions.	{ Similar to the gluteus medius.
	(a) <i>Superficial Surface:</i> With the gluteus medius, the gluteal vessels, and the superior gluteal nerve.
	(b) <i>Deep Surface:</i> With the ilium, reflected tendon of the rectus fe- moris, and the capsular ligament of the hip-joint.
Relations.	(c) <i>Anterior Margin:</i> Blends with the gluteus me- dius muscle.
	(d) <i>Posterior Margin:</i> Sometimes it is joined to the tendon of the pyriformis.
Nerve.	{ Superior gluteal.

175.—PYRIFORMIS.

Origin.	{ (1) From the anterior surfaces of the second, third and fourth divisions of the sacrum.
	{ (2) From the anterior surface of the great sciatic ligament, and also from the upper part of the notch.
Insertion.	{ By a rounded tendon, into the up- per part of the great trochanter of the femur.

Actions.

{ Abducts and rotates the thigh out-ward.

(a) *Anterior Surface (in the Pelvis):*

With the rectus, sacral plexus of nerves, and the internal iliac vessels.

External to the pelvis, it is in relation with the innominate bone and the capsular ligament of the hip-joint.

(b) *Posterior Surface (in the Pelvis):*

With the sacrum.

External to the pelvis, with the gluteus maximus muscle.

Relations.

(c) *Upper Border:*

With the gluteus medius, the gluteal vessels and sup. gluteal nerve separating them.

(d) *Lower Border:*

With the gemellus superior, coccygeus, sciatic vessels and nerves, internal pudic vessels and nerve, and the nerve to the obturator internus muscle.

Nerves.

{ Sacral plexus.

176.—OBTURATOR INTERNUS.

- Description.** { Like the pyriformis, this muscle is partly within the pelvic cavity. It leaves it by the lesser sciatic foramen, being joined by the gemelli muscles.
- Origin.** { Within the pelvis, from the anterior surface of, and behind, the obturator foramen, and part of the membrane; also from the fibrous arch, completing the canal for the obturator vessels.
- Insertion.** { Into the upper border of the great trochanter, in front of the pyriformis muscle.
- Actions.** { To abduct and rotate the thigh outward.
- Relations.** { (a) *Anterior Surface (in the Pelvis):*
With the obturator membrane and the inner surface of the anterior wall of the pelvis.
- (b) *Posterior Surface:*
With the pelvic and obturator fasciæ; is crossed by the internal pudic vessels and nerve. The ischio-rectal fossa has this surface for its outer boundary.
- (c) *Anterior Surface (External to the Pelvis):*
The great sciatic nerve covers it, and also the gluteus maximus muscle.

Nerves. } Sacral plexus.

177.—GEMELLI.

Description.

{ The gemelli muscles are accessory fibres of the obturator internus; they are called superior and inferior.

Origin.

- { (1) *The Gemellus Superior*, from the outer surface of the spine of the ischium and margin of the small sciatic notch.
(2) *The Gemellus Inferior*, from the upper and back part of the tuberosity of the ischium.

Insertion.

{ They embrace the obturator tendon, and are inserted into the top of the great trochanter of the femur.

Actions.

{ They are external rotators, abducting and rotating the thigh outward.

(a) *Superficial Surface:*

Of the gemellus superior, is in relation with the gluteus maximus and the sciatic vessels and nerves.

Of the gemellus inferior, is in relation with the same structures mentioned above.

(b) *Deep Surface:*

Of the gemellus superior, with the capsule of the hip-joint. The gemellus inferior having the same relations.

Relations.(c) *Upper Border:*

Of the gemellus superior, with the lower border of the piriformis muscle.

Of the gemellus inferior, with the tendon of the obturator internus muscle.

(d) *Lower Border:*

The gemellus superior, with the tendon of the obturator internus; the gemellus inferior being in relation with the tendon of the obturator externus and the quadratus femoris.

Nerves.

} Sacral plexus.

178.—QUADRATUS FEMORIS.

- Origin.** { From the outer border of the tuberosity of the ischium, and occasionally from the ramus of that bone.
- Insertion.** { Into the linea quadrati, on the posterior surface of the great trochanter of the femur, just above the adductor magnus. It is separate from the latter muscle by the internal circumflex artery.
- Actions.** { Adducts and rotates the thigh outward.
- Relations.** {
- (a) *Anterior Surface:*
With the tendon of the obturator externus, trochanter minor, and the capsule of the hip-joint.
 - (b) *Posterior Surface:*
With the gluteus maximus and the sciatic vessels and nerves.
 - (c) *Upper Border:*
With the gemellus inferior.
 - (d) *Lower Border:*
The terminal branches of the internal circumflex vessels separate this border from the adductor magnus muscle.

Nerves. } Sacral plexus.

179.—OBTURATOR EXTERNUS.

- Description.** } It covers the outer surface of the anterior wall of the pelvis, and is flat and triangular.
- Origin.** } From the inferior surface of the obturator membrane, and from the outer surface of the body and rami of the pubes.
- Insertion.** } After running along a groove between the acetabulum and the tuberosity of the ischium, it is finally inserted into the digital fossa of the femur.
- Actions.** } An external rotator, flexor and adductor ; it supports the hip-joint.
- Relations.** } (a) *Anterior Surface* :
 With the psoas, iliacus, pectineus, adductor longus, adductor brevis, and the gracilis muscles. It is in relation also with the neck of the femur and the capsule of the hip-joint.
- (b) *Posterior Surface* :
 With the obturator membrane and the quadratus femoris.
- Nerve.** } Deep division of the obturator.

180.—BICEPS FLEXOR CRURIS.

Description.

This muscle arises by two heads, a long and a short one, and is situated on the posterior and outer aspect of the thigh.

Origin.

- (1) *The "Long Head"* arises from the lower and inner part of the tuberosity of the ischium, with the semitendinosus muscle.
- (2) *The "Short Head"* from the outer lip of the linea aspera of the femur, and the upper part of the line running from it to the outer condyle and intermuscular septa.

Insertion.

Both heads join, forming a tendon which finds insertion in the upper and outer part of the head of the fibula. The tendon so formed expands to strengthen the external lateral ligament of the knee-joint and the fascia of the leg.

Actions.

Assists in the extension of the hip-joint, flexion of the knee-joint, and is an external rotator of the latter joint.

Relations.	(a) <i>Superficial Surface</i> :
	With the gluteus maximus, fascia lata, and the integument.
	(b) <i>Deep Surface</i> :
	With the semimembranosus, adductor magnus, vastus externus, great sciatic nerve, popliteal artery and vein, external head of the gastrocnemius, plantaris, superior external articular artery, and the external popliteal nerve.
Nerve.	} Great sciatic.

181.—SEMITENDINOSUS.

Origin.	{ From the tuberosity of the ischium, in common with the long head of the biceps flexor cruris muscle.
Insertion.	{ Into the inner surface of the tibia, beneath the expanded tendon of the sartorius, and below the tendon of the gracilis.
Actions.	{ Flexes the knee and rotates the leg inward ; it also extends the thigh.

	(a) <i>Superficial Surface</i> :
	With the gluteus maximus and fascia lata.
	(b) <i>Deep Surface</i> :
Relations.	With the semimembranosus, adductor magnus, inner head of the gastrocnemius, and the internal lateral ligament of the knee-joint.
Nerve.	} Great sciatic.

182.—SEMIMEMBRANOSUS.

Origin.	{ From the upper and outer of the two surfaces on the back of the tuberosity of the ischium.
Insertion.	{ By three portions: 1st, into the head of the tibia; 2d, into the fascia covering the popliteus muscle; 3d, into the external condyle of the femur, crossing the knee-joint, and forming the ligamentum posticum Winslowii.
Actions.	{ Extends the thigh, flexes the knee, and rotates the leg inward.

	(a) <i>Superficial Surface</i> :
	With the semitendinosus, biceps, and the fascia lata.
	(b) <i>Deep Surface</i> :
Relations.	With the popliteal vessels, adductor magnus, and gastrocnemius.
	(c) <i>Inner and Outer Borders</i> :
	With the gracilis ; with the great sciatic nerve, and its internal popliteal branch.
Nerve.	{ Great sciatic.

183.—TIBIALIS ANTICUS.

	(1) From the upper two-thirds of the external surface of the crest of the tibia, as far as the outer tuberosity.
Origin.	(2) From the adjoining part of the interosseous ligament.
	(3) From the fascia of the leg and septa.
Insertion.	Into the tubercle on the first cuneiform bone, and base of the first metatarsal bone of the foot.
Actions.	{ Flexes the ankle, adducts the foot, raising its inner edge from the ground.

- Relations.** {
- (a) *Anterior Surface:*
With the annular ligament and the fascia,
 - (b) *Posterior Surface:*
With the interosseous ligament, tibia, ankle-joint, inner side of the tarsus, and it overlaps the anterior tibial vessels and nerve.
 - (c) *Inner Surface:*
With the tibia.
 - (d) *Outer Surface:*
With the extensor longus digitorum, extensor proprius pollicis, and the anterior tibial vessels and nerve.
- Nerve.** } Anterior tibial.

184.—EXTENSOR PROPRIUS POLLICIS.

- Origin.** { From the anterior surface of the fibula, being covered by the extensor communis digitorum; it also arises slightly from the interosseous ligament.
- Insertion.** { After crossing the anterior tibial vessels near the bend of the ankle, it is inserted into the base of the last phalanx of the great toe.

Actions.	{ Extends the great toe, and flexes the ankle.
	(a) <i>Anterior Border:</i> With the fascia and the anterior annular ligament.
	(b) <i>Posterior Border:</i> With the interosseous ligament, fibula, tibia, ankle-joint, and the extensor brevis digitorum.
Relations.	(c) <i>Outer Side:</i> With the extensor longus digitorum above, the dorsalis pedis vessels and the anterior tibial nerve below.
	(d) <i>Inner Side:</i> With the tibialis anticus, and the anterior tibial vessels above.
Nerve.	{ Anterior tibial.

185.—EXTENSOR LONGUS DIGITORUM.

Origin.	(1) From the outer tuberosity of the tibia. (2) From the upper three-fourths of the anterior surface of the shaft of the fibula. (3) From the interosseous ligament. (4) From the deep surface of the fascia, and the intermuscular septa between it and the tibialis anticus and the peronei muscles.
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- Insertion.** { Into the last phalanges of the four outer toes.
- Actions.** { Extends the toes and flexes the ankle.
- Relations.** { (a) *Anterior Surface*:
With the fascia and the annular ligament.
- { (b) *Posterior Surface*:
With the fibula, interosseous ligament, ankle-joint, and the extensor brevis digitorum.
- { (c) *Inner Side*:
With the tibialis anticus, extensor proprius pollicis, and the anterior tibial vessels and nerve.
- { (d) *Outer Side*:
With the peroneus longus and brevis muscles.
- Nerve.** { Anterior tibial.

186.—PERONEUS TERTIUS.

- Origin.** { (1) From the lower fourth of the anterior surface of the fibula, on its outer side.
- { (2) From the intermuscular septum.
- { (3) From the lower part of the interosseous ligament.

Insertion.	{ Into the dorsal surface of the base of the metatarsal bone of the little toe, at its inner side.
Actions.	{ To flex the ankle, raise its outer edge, and abduct the foot.
Nerve.	{ Anterior tibial.

187.—GASTROCNEMIUS.

Origin.	{ Arises by two heads, the Inner Head from the rough part at the posterior aspect of the inner condyle; the Outer Head, from a point on the outer surface of the external condyle.
Insertion.	{ Into the lower and back part of the os calcis of the foot.
Actions.	{ Extends the ankle-joint, to raise the body in walking; also flexes the knee-joint.
Relations.	(a) <i>Superficial Surface</i> : It is separated from the external saphenous vein and nerve by the fascia of the leg.
	(b) <i>Deep Surface</i> : With the posterior ligament of the knee-joint, popliteus, soleus, plantaris, popliteal vessels, and the popliteal nerve.

Nerve. } Internal popliteal.

188.—SOLEUS.

Origin. { (1) From the back part of the head of the fibula, by tendinous fibres.
 (2) From the upper third of the internal surface of the shaft of the fibula.
 (3) From the oblique line of the tibia, and from the middle third of its internal border.

Insertion. { Into the lower and back part of the os calcis of the foot.

Actions. { In action, it resembles the gastrocnemius, but it has no action on the knee-joint.

Relations. { (a) *Superficial Surface:*
 With the gastrocnemius, and with the plantaris.
 (b) *Deep Surface:*
 With the flexor longus digitorum, flexor longus pollicis, tibialis posticus, and the posterior tibial vessels and nerve.

Nerve. } Internal popliteal.

189.—PLANTARIS.

Origin.	{ From above the external condyle of the femur, and the line going to it.
Insertion.	{ Into the inner side of the os calcis.
Actions.	{ Assist the gastrocnemius muscle.
Nerve.	{ Internal popliteal.

190.—POPLITEUS.

Description.	{ Forms part of the floor of the popliteal space, being covered by a tendinous expansion from the semimembranosus.
Origin.	{ From a depression on the outer condyle of the femur.
Insertion.	{ Into the triangular surface of the tibia, above the oblique line.
Actions.	{ To flex the knee.
Relations.	{ (a) <i>Superficial Surface</i> : With the deep fascia, gastrocnemius, plantaris, popliteal vessels, and the internal popliteal nerve. (b) <i>Deep Surface</i> : With the superior tibio-fibular articulation, and the back of the tibia.

Nerve. } Internal popliteal.

191.—FLEXOR LONGUS POLLICIS.

Origin. { From the lower two-thirds of the fibula, interosseous membrane, and the intermuscular septa.

Insertion. { Into the last phalanx of the great toe.

Actions. } Flexes the great toe.

Relations. { (a) *Superficial Surface* :
With the soleus, the deep fascia separating it from the tendo-Achillis.
(b) *Deep Surface* :
With the fibula, tibialis posticus, peroneal vessels, and the ankle-joint.
(c) *Outer and Inner Borders* :
With the peronei; with the tibialis posticus and flexor longus digitorum.

Nerve. } Posterior tibial.

192.—FLEXOR LONGUS DIGITORUM.

(PERFORANS.)

Origin. { From the posterior surface of the tibia, between the popliteus to within three inches above the inner malleolus of the foot.

- Insertion.** { Into the last phalanges of the four smaller toes.
- Actions.** { To flex the toes; assists in the extension of the ankle, and in raising the body from the ground.
- Relations.** { (a) *Superficial Surface (in the leg)*:
With the soleus; it is separated from the posterior tibial vessels and nerve, by the deep fascia.
- { (b) *Deep Surface*:
With the tibia, and tibialis posticus.
- { (c) *In the Foot*:
Is covered by the abductor pollicis, and the flexor brevis digitorum.
- Nerve.** { Posterior tibial.

193.—TIBIALIS POSTICUS.

- Origin.** { (1) From the posterior internal part of the fibula.
- { (2) Upper part of the tibia.
- { (3) From the interosseous ligament.
- Insertion.** { Into the inferior and internal tuberosity on the scaphoid, the internal cuneiform and cuboid bones, and the second and third metatarsals.

Actions. { Extends the ankle, raising the inner edge of the foot from the ground.

Relations. { (a) *Superficial Surface:*
With the soleus, flexor longus digitorum, posterior tibial vessels and nerve, peroneal vessels, the deep fascia separating them.

(b) *Deep Surface:*
With the interosseous ligament, tibia, fibula, and ankle-joint.

Nerve. } Posterior tibial.

194.—PERONEUS LONGUS.

Origin. { From the upper two-thirds of the outer surface of the fibula, the fascia of the leg, and from the intermuscular septa.

Insertion. { Its tendon crosses the foot, and is lodged in a groove in the cuboid bone, and is inserted into the tarsal end of the metatarsal bone of the great toe.

Actions. { Extends the ankle, turns the foot outward, and assists in raising its outer edge.

- Relations.**
- (a) *Superficial Surface* :
With the fascia and with the integument.
 - (b) *Deep Surface* :
With the fibula, peroneus brevis, os calcis, and the cuboid bone of the foot.
 - (c) *Anterior Border* :
An intermuscular septum is between it and the extensor longus digitorum.
 - (d) *Posterior Border* :
Is separated from the soleus above, and the flexor longus pollicis below, by an intermuscular septum.

Nerve. { Musculo-cutaneous branch of the external popliteal.

195.—PERONEUS BREVIS.

- Origin.** { From the lower half of the outer and posterior surface of the fibula, internal to the peroneus longus.
- Insertion.** { The tendon runs through the same groove as the peroneus longus, and is inserted into the dorsal surface of the base of the metatarsal bone of the little toe.

Actions.	{	Resemble those of the peroneus longus.
Relations.	{	(a) <i>Superficial Surface</i> : With the peroneus longus, and the fascia of the leg and foot. (b) <i>Deep Surface</i> : With the fibula, and with the outer side of the os calcis.
Nerve.	{	Musculo-cutaneous.

196.—EXTENSOR BREVIS DIGITORUM.

Origin.	{	(1) From the outer side of the os calcis. (2) From the external calcaneo-astragaloid ligament. (3) From the anterior annular ligament.
Insertion.	{	By four tendons, the innermost being inserted into the first phalanx of the great toe; the remaining three into the outer sides of the extensor tendons of the second, third, and fourth toes.
Actions.	{	Extends the phalanges of the four inner toes, acting only on first phalanx of the great toe.

Relations.	}	(a) <i>Superficial Surface</i> :
		With the fascia of the foot, the tendons of the extensor longus digitorum, and extensor proprius pollicis.
	}	(b) <i>Deep Surface</i> :
		With the tarsal and metatarsal bones, and dorsal interossei muscles.
Nerve.	}	Anterior tibial.

197.—ABDUCTOR POLLICIS.

Origin.	}	(1) From the inner tubercle of the calcaneum or os calcis.
		(2) From the internal annular ligament and plantar fascia.
Insertion.	}	By a tendon, into the inner side of the base of the first phalanx of the great toe.
Actions.	}	Abducts the great toe.
Relations.	}	(a) <i>Superficial Surface</i> :
		With the plantar fascia.
		(b) <i>Deep Surface</i> :
		With the flexor brevis pollicis, flexor accessorius, the tendons of the flexor longus digitorum, flexor longus pollicis, tibialis anticus, tibialis posticus, the plantar vessels and nerves, and the tarsal articulations.

Nerve. } Internal plantar.

198.—FLEXOR BREVIS DIGITORUM.

(PERFORATUS.)

Origin. { (1) From the inferior and internal part of the os calcis, between the tubercles.

(2) From the plantar fascia, and the intermuscular septa.

Insertion. } Into the four smaller toes by slips.

Actions. } Flexes the four external toes.

(a) *Superficial Surface* :
With the plantar fascia.

(b) *Deep Surface* :
With the flexor accessorius, lumbricales, the tendons of the flexor longus digitorum, external plantar vessels and nerve.

Nerve. } Internal plantar.

199.—ABDUCTOR MINIMI DIGITI.

Origin. { (1) From the outer tubercle of the os calcis ; also from its under surface in front of the tubercle.

(2) From the plantar fascia and the intermuscular septum.

- Insertion.** } Into the outer side of the base of
the first phalanx of the little toe.
- Actions.** } Abducts the little toe.
- Relations.** { (a) *Superficial Surface* :
With the plantar fascia.
(b) *Deep Surface* :
With the flexor accessorius,
flexor brevis minimi digiti,
long plantar ligament, and
the tendon of the peroneus
longus muscle.
(c) *Inner Side* :
With the external plantar
vessels and nerve, a ver-
tical partition of fascia
separating the flexor brevis
digitorum from this part
of the muscle.
- Nerve.** } External plantar.

200.—FLEXOR ACCESSORIUS.

- Origin.** { By two heads : The muscular head
arises from the inner part of the
os calcis ; the tendinous head
from the outer side of the os
calcis.
- Insertion.** { Into the outer part of the tendon of
the flexor longus digitorum.

Actions. } Flexes the toes.

Relations. { (a) *Superficial Surface* :
Is separated from the muscles of the superficial layer by the external plantar vessels and nerves.

(b) *Deep Surface* :
With the os calcis and the long calcaneo-cuboid ligament.

Nerve. } External plantar.

201.—LUMBRICALES.

Origin. { There are four of these muscles. Their origin is from the tendons of the flexor longus digitorum.

Insertion. { Into the internal side of the first phalanges of the four smaller toes.

Actions. { Functions are the same as in the hand.

Nerves. { The two internal muscles, by the internal plantar; the two external, by the external plantar nerve.

202.—FLEXOR BREVIS POLLICIS.

Origin. { From the inner border of the cuboid bone, and from the external cuneiform bone and tendon of the tibialis posticus muscle.

Insertion. { By two divisions, into the outer and inner border of the base of the first phalanx of the great toe.

Actions. } Adducts and flexes the great toe.

Nerve. } Internal plantar.

Relations. {

(a) *Superficial Surface* :
With the abductor pollicis, the tendon of the flexor longus pollicis, and the plantar fascia.

(b) *Deep Surface* :
With the tendon of the peroneus longus and the metatarsal bone of the great toe.

(c) *Inner and Outer Borders* :
With the abductor pollicis and with the adductor pollicis respectively.

203.—ADDUCTOR POLLICIS.

- Origin.** { (1) From the cuboid bone and the base of the second, third and fourth metatarsal bones.
(2) From the sheath of the peroneus longus muscle.
- Insertion.** { Into the outer side of the base of the first phalanx of the great toe.
- Actions.** } Adducts the thumb.
- Nerve.** } External plantar.

204.—FLEXOR BREVIS MINIMI DIGITI.

- Description.** { This muscle is located on the metatarsal bone of the little toe; it resembles one of the interossei.
- Origin.** { (1) From the base of the metatarsal bone of the little toe.
(2) From the sheath of the peroneous longus muscle.
- Insertion.** { By a tendon, into the base of the first phalanx of the little toe.

Relations. { (a) *Superficial Surface* :
 With the plantar fascia, and
 with the tendon of the ab-
 ductor minimi digiti,
 (b) *Deep Surface* :
 With the fifth metatarsal
 bone.

Nerve. { External plantar.

205.—TRANSVERSUS PEDIS.

Description. { A narrow fasciculus stretched across
 the heads of the metatarsal bones.

Origin. { (1) From the under surface of the
 head of the fifth metatarsal
 bone.
 (2) From the transverse ligament
 of the metatarsus.

Insertion. { Into the outer side of the first pha-
 lanx of the great toe.

Relations. { (a) *Under Surface* :
 With the tendons of the long
 and short flexors and lum-
 bricales.
 (b) *Upper Surface* :
 With the interossei.

Nerve. { External plantar.

206.—INTEROSSEI OF FOOT.

Description.

There are seven interossei, similar to those in the hand; three on the sole of the foot, and four upon its dorsum; the former being adductors, and the latter abductors. The median line of the second toe is taken as the "fixed point."

Origins.

- (1) *The First Plantar Interosseous*, arises from the inner side of the third metatarsal bone.
- (2) *The Second*, from the inner side of the fourth metatarsal bone.
- (3) *The Third*, from the fifth metatarsal bone.
- (4) *The First Dorsal Interosseous*, arises from the internal side of the second metatarsal bone, and the outer side of the first.
- (5) *The Second*, from the opposite side of the second and third metatarsal bones.
- (6) *The Third Dorsal Interosseous*, from the opposite sides of the third and fourth metatarsal bones.
- (7) *The Fourth*, arises from the opposite sides of the fourth and fifth metatarsal bones.

Insertions.

The First Plantar Interosseous muscle is inserted into the base of the first phalanx of the third toe.

The Second, into the inner side of the first phalanx of the fourth toe.

The Third, into the inner side of the base of the first phalanx of the fifth toe.

The First Dorsal Interosseous is inserted into the inner side of the base of the first phalanx of the second toe.

The Second Dorsal Interosseous, into the outer side of the first phalanx of the second toe.

The Third, into the outer side of the first phalanx of the middle toe.

The Fourth Dorsal Interosseous, into the outer side of the first phalanx of the fourth toe.

Nerves.

} External plantar.

207.—SPHINCTER ANI.**Origin.**

{ By a narrow tendinous band, from the tip of the coccyx, and the ano-coccygeal ligament.

Insertion.

{ Into the raphé, the superficial fascia, and the central point of the perinæum.

Actions.	}	To close the anus.
		(a) <i>Superficial Surface</i> : With the integument.
	}	(b) <i>Deep Surface</i> :
Relations.		With the internal sphincter, loose areolæ tissue being between it and the levator ani muscle.
Nerve.	}	Pudic.

208.—SPHINCTER INTERNUS.

Description.	}	This muscle encircles the lower part of the rectum, being an inch from the margin of the anus.
Nerve.		}

209.—ERECTOR PENIS.

Origin.	}	Fleshy and tendinous, from the inner surface of the tuberosity of the ischium.
Insertion.		By a tendinous expansion, into the fibrous membrane of the crus penis.
Actions.	}	Erects the penis, by forcing the blood forward.
Nerve.		}

210.—ACCELERATOR URINÆ.

Origin.	{ (1) From the central tendon, and raphé of the perinæum. (2) From the posterior part of the triangular ligament.
Insertion.	{ The anterior fibres surround the body of the penis. The middle fibres surround the bulb, and lower fibres are inserted into the triangular ligament.
Actions.	{ Compresses the bulb and corpus spongiosum urethræ to expel their contents. The anterior fibres compress the dorsal veins of the penis.
Nerve.	{ Pudic.

211.—TRANSVERSUS PERINÆI.

Origin.	{ From the inner and fore-side of the tuberosity of the ischium.
Insertion.	{ Into the central tendinous point of the perinæum, between the accelerator urinæ and the sphincter ani.
Actions.	{ It fixes the central point of the perinæum.
Nerve.	{ Pudic.

212.—LEVATOR ANI, IN THE FEMALE.

- Origin.** } Like that of the male.
- Insertion.** { It surrounds the vagina, forming a loop; it also surrounds the urethra and rectum.
- Actions.** { Raises and draws forward the lower extremity of the rectum.
- Nerve.** } Sacral.

TABLES OF THE MUSCLES.

ARRANGED ACCORDING TO THEIR
ACTIONS.

THE HEAD IS MOVED

Forward by

Platysma myoides,
Sterno-mastoid,
Rectus anticus major et minor.
(When the lower jaw is fixed :)
Mylo-hyoid,
Genio-hyoid,
Genio-hyo-glossus,
Digastrici.

To Each Side

Platysma myoides,
Sterno-mastoid,
Part of trapezius,
Splenius capitis,
Splenius colli,
Trachelo-mastoid,
Complexus.

Backward by

Part of trapezius,
Splenius capitis,
Complexus,
Trachelo-mastoid,
Rectus posticus major et minor,
Obliquus capitis superior.

THE NECK IS MOVED

Forward by

Platysma myoides,
 Sterno-cleido-mastoid,
 Digastric,
 Mylo-hyoid,
 Genio-hyoid,
 Genio-hyo-glossus,
 Omo-hyoid,
 Sterno-hyoid,
 Thyro-hyoid,
 Rectus anticus minor,
 Longus colli.

Backward by

Part of trapezius,
 Rhomboideus minor,
 Serratus posticus superior,
 Splenius capitis,
 Splenius colli,
 Complexus,
 Trachelo-mastoid,
 Transversalis colli,
 Interspinalis colli,
 Semispinalis colli,
 Rectus posticus major et minor,
 Obliquus capitis superior et inferior,
 Scaleni postici,
 Levator scapulæ.

Laterally by

Several of the muscles which separately move it forward and backward, assisted by the following:
 Scaleni,
 Intertransversales,
 Recti laterales.

THE SCAPULA IS MOVED

Upward by	{	Trapezius, Levator scapulæ, Rhomboidei.
Downward by	{	Lower part of trapezius, Latissimus dorsi, Pectoralis minor.
Forward by	{	Pectoralis minor, Serratus magnus.
Backward by	{	Part of trapezius, Rhomboidei, Latissimus dorsi.

THE TRUNK IS MOVED

Forward by	{	Rectus abdominis, Pyramidalis, Obliquus externus abdominis, Obliquus internus, Psoas magnus et parvus.
Backward by	{	Trapezius, Rhomboideus major, Latissimus dorsi, Serratus posticus superior, Serratus posticus inferior, Sacro-lumbalis, Longissimus dorsi, Spinales dorsi, Semispinales dorsi, Multifidus spinæ, Intertransversales dorsi et lum- torum.

Laterally by { Obliquus externus et internus,
 Quadratus lumborum,
 Longissimus dorsi,
 Sacro-lumbalis,
 Serrati postici,
 Latissimus dorsi.

THE HUMERUS IS MOVED

Forward by { Part of deltoid,
 Part of pectoralis major.

Backward by { Part of deltoid,
 Teres major et minor,
 Long head of triceps,
 Latissimus dorsi.

Inward by { Part of pectoralis major,
 Latissimus dorsi.

Rotated Inward by { Subscapularis. Sometimes by :
 Pectoralis major,
 Latissimus dorsi,
 Teres major.

Rotated Outward by { Supraspinatus,
 Infraspinatus,
 Teres minor.

THE FOREARM IS MOVED

- Forward by** { Biceps,
Brachialis anticus,
Pronator radii teres.
And assisted by :
Flexor carpi radialis,
Flexor sublimis,
Flexor ulnaris,
Supinator longus.
- Backward by** { Triceps,
Anconeus.
- Rotated
Inward by** { Pronator radii teres,
Flexor carpi radialis,
Palmaris longus,
Flexor sublimis digitorum,
Pronator quadratus.
- Rotated
Outward by** { Biceps,
Supinator brevis,
Extensor secundi internodii.

THE CARPUS IS MOVED

- Forward by** { Flexor carpi radialis,
Palmaris longus,
Flexor sublimis digitorum,
Flexor carpi ulnaris,
Flexor profundus,
Flexor longus pollicis.

Backward by { Extensor carpi radialis longior,
 Extensor carpi radialis brevior,
 Extensor secundi internodii,
 Indicator,
 Extensor communis digitorum,
 Extensor proprius pollicis.

Outward by { Flexor carpi radialis,
 Extensor carpi radialis longior,
 Extensor carpi radialis brevior,
 Extensor ossis metacarpi,
 Extensor primi internodii.

Inward by { Flexor sublimis digitorum,
 Flexor carpi ulnaris,
 Flexor profundus digitorum,
 Extensor communis digitorum,
 Extensor minimi digiti,
 Extensor carpi ulnaris.

THE THUMB IS MOVED

Inward and Forward, across the Palm, by { Opponens pollicis,
 Flexor brevis,
 Flexor longus.

Outward and Backward by { Extensor ossis metacarpi pollicis,
 Extensor primi internodii,
 Extensor secundi internodii.

Upward and Forward, away from the other Fingers, by { Abductor pollicis,
 Part of flexor brevis.

Backward and Inward, to the other Fingers, by { Adductor pollicis,
Extensor primi internodii,
Extensor secundi internodii.

THE FINGERS ARE

Flexed by { Flexor sublimis,
Flexor profundus,
Lumbricales,
Interossei,
Flexor brevis digiti minimi,
Abductor minimi digiti.

Extended by { Extensor communis,
Extensor minimi digiti,
Indicator.

Moved Outward by { Abductor indicis,
Abductor minimi digiti,
Interossei.

Moved Inward by { Abductor minimi digiti,
Interossei.

THE THIGH IS ROTATED

Inward by { Tensor vaginæ femoris,
Part of the gluteus medius.

Outward by

Gluteus maximus,
 Part of gluteus medius,
 Piriformis,
 Gemellus superior,
 Obturator internus,
 Gemellus inferior,
 Quadratus femoris,
 Obturator externus,
 Psoas magnus,
 Iliacus,
 Adductor longus et brevis,
 Adductor magnus,
 Biceps cruris.

THE THIGH IS MOVED

Forward by

Psoas magnus,
 Iliacus,
 Tensor vaginæ femoris,
 Pectineus,
 Adductor longus,
 Adductor brevis.

Backward by

Gluteus maximus,
 Part of gluteus medius,
 Piriformis,
 Obturator internus,
 Part of adductor magnus,
 Long head of biceps,
 Semitendinosus,
 Semimembranosus.

Inward by

Psoas magnus,
 Iliacus,
 Pectineus,
 Gracilis,
 Adductor longus,
 Adductor brevis,
 Adductor magnus,
 Obturator externus,
 Quadratus femoris.

Outward by

Tensor vaginæ femoris,
 Gluteus maximus,
 Gluteus medius,
 Gluteus minimus,
 Piriformis.

THE LEG IS**Flexed by**

Semitendinosus,
 Biceps cruris,
 Semimembranosus,
 Gracilis,
 Sartorius,
 Popliteus.

Extended by

Rectus,
 Crureus,
 Vastus externus,
 Vastus internus.

THE FOOT IS

Flexed by { Tibialis anticus,
Extensor proprius pollicis,
Extensor longus digitorum,
Peroneus tertius.

Extended by { Gastrocnemius,
Plantaris,
Soleus,
Flexor longus digitorum,
Flexor longus pollicis,
Tibialis posticus,
Peroneus longus et brevis.

**Inclined
Inward by** { Extensor proprius pollicis,
Flexor longus digitorum,
Flexor longus pollicis,
Tibialis posticus.

**Inclined
Outward by** { Peroneus longus,
Peroneus brevis,
Extensor longus digitorum,
Peroneus tertius.

THE TOES ARE

Flexed by { Abductor pollicis,
Flexor brevis digitorum,
Abductor minimi digiti,
Flexor longus pollicis,
Flexor digitorum,
Flexor accessorius,
Lumbricales,
Flexor brevis pollicis,
Adductor pollicis,
Flexor brevis minimi digiti,
Interossei.

Extended by { Extensor longus digitorum,
Extensor proprius pollicis,
Extensor brevis digitorum.

**Inclined
Inward by** { Abductor pollicis,
Interossei.

**Inclined
Outward by** { Abductor pollicis,
Abductor minimi digiti,
Interossei.

213.—LEVATOR PALPEBRÆ SUPERIORIS.

Origin.	{ From under surface of lesser wing of sphenoid, in front of the optic foramen.
Insertion.	{ Broad, into the upper margin of the sup. tarsal cartilage.
Actions.	{ Raises upper eyelid; antagonist of orbicularis palpebrarum.
Relations.	{ (a) <i>Upper Surface</i> : With frontal artery and nerve; periosteum of orbit. In front, with inner surface of the broad tarsal cartilage. (b) <i>Under Surface</i> : With sup. rectus, and, in the lid, with the conjunctiva; a small branch of the third nerve enters this surface.
Nerve.	{ Third (motor oculi).

214.—OBLIQUUS OCULI SUPERIOR.

Origin.	{ Foramen opticum (inner margin).
Insertion.	{ Sclerotic coat, between sup. and ext. rectus.
Actions.	{ Rotates eyeball downward and outward.

Relations.	}	(a) <i>Upper Surface</i> :
		With periosteum covering roof of orbit; with fourth nerve.
		(b) <i>Under Surface</i> :
		With nasal nerve; upper margin of int. rectus.
Nerve.	}	Fourth (pathetic).

215.—OBLIQUUS OCULI INFERIOR.

Origin.	}	Orbital edge of sup. maxilla.
Insertion.	{	Into the sclerotic coat between it and the ext. rectus.
Actions.	{	Assists obliquus sup. in rotation of eyeball on its antero-posterior axis.
Relations.	}	(a) <i>Upper Surface</i> :
		With globe of eye; inferior rectus.
		(b) <i>Under Surface</i> :
		With periosteum covering floor of orbit; with ext. rectus muscle.
Nerve.	}	Third (motor oculi).

216.—SUPRASPINALES.

Description. } Are composed of a series of fleshy
 bands, which rest upon the
 spinous processes in the cervical
 region of the spine.

Nerves. } Internal post. branches of cervical.

TABLES AND NOTES ON THE LIGAMENTS.

I.—COMMON VERTEBRAL ARTICULATION.

Ligaments.	{ Anterior common, Posterior common, Intervertebral substance, Ligamenta subflava, Capsular, Interspinous, Supraspinous, Intertransverse.
Bony Formation.	{ By the opposed surfaces of the bodies of the vertebræ, connected by the intervertebral substance and the articular processes.
Kinds of Articulations.	{ The articulations formed by the bodies of the vertebræ with each other, are amphiarthrodial joints; those between the articular pro- cesses, a series of arthrodial joints.
Actions.	{ The movements allowed in the spine are, flexion, extension, lateral movement, circumduction, and rotation.

(1) Anterior Common Ligament.

Situation: Along the front of the spinal column, from axis to sacrum.

Description: A broad and strong band of fibres, which is thicker in the dorsal than in the cervical or lumbar regions. These dense longitudinal fibres of which it is composed, adhere intimately to the intertebral substance and margins of the vertebræ. At the middle of the bodies, the fibres are very thick, filling up the cavities on the anterior surfaces.

Attachments: Above, to the body of the axis, and below, to the upper part of the sacrum.

(2) Posterior Common Ligament.

Situation: Within the spinal canal.

Description: At the upper part of the spinal column it is broader than at the lower, and is thicker in the dorsal than in the cervical region or lumbar region. It is composed of longitudinal fibres, which are smooth and more compact than are those of the anterior common ligament.

Attachments: Are along the posterior surface of the bodies of the vertebræ within the spinal canal.

Relations: Some loose filamentous tissue separates it from the dura mater of the cord. It is separated from the bodies by the venæ basis vertebræ.

(3) Intervertebral Substance.

Situation: Between the bodies of all the vertebræ except the atlas and axis.

Description: The disks, of which this cartilage is composed, are lenticular in shape, and correspond with the surfaces of the bodies of the different vertebræ. In the cervical region, they are oval, like-wise in the lumbar; in the dorsal region, they are round.

Attachments: Between the adjacent surfaces of the bodies of the vertebræ joining them together.

(4) Ligamenta Subflava.

Situation: Between the laminæ of the vertebræ, from the axis to the sacrum.

Description: Consist of yellow elastic tissue, varying in texture, being in the cervical region, thin; thicker, in the dorsal region; very thick in the lumbar. Each ligament is composed of two lateral portions, but they do not exist in the articulation between the occiput and atlas, nor between the atlas and axis. They are highly elastic.

Attachments: Between the laminæ.

(5) Capsular Ligaments.

Situation: Surround the articular surfaces of the vertebræ.

Description: Are thin ligamentous sacs, being loose and longer in the cervical than in the dorsal or lumbar regions.

Attachments: To the contiguous margins of the articular processes, being completed internally by the ligamenta subflava.

(6) Interspinous Ligaments.

Situation: Between the spinous processes of the dorsal and lumbar regions.

Description: Are thin and membranous, being narrow and elongated in the dorsal region, whilst in the lumbar region, they are thicker and quadrilateral in form.

Attachments: From the root to near the summit of each spinous process, connecting their margins.

(7) Supraspinous Ligament.

Situation: From the seventh cervical to the spine of the sacrum.

Description: A strong fibrous cord, which is thicker and broader in the lumbar than in the dorsal region.

Attachments: Connect the summits of the spinous process, from the seventh cervical vertebræ.

(8) Intertransverse Ligaments.

Situation: Between the transverse processes of the vertebræ.

Description: These ligaments are composed of a few fibres which are well scattered. In the cervical region, they are mostly absent; they are found as rounded cords in the dorsal region, whilst, in the lumbar region, we find them thin and membranous.

II.—ATLO-AXOID ARTICULATION.

Bony Formation. { By the anterior portion of the canal of the atlas, and the odontoid process of the axis.

Ligaments. { Anterior atlo-axoid (2),
Posterior atlo-axoid,
Transverse,
Capsular (2).

Kinds of Articulations. { A ginglymus joint (lateral), is formed by the articulation of the anterior arch of the atlas with the odontoid process of the axis; a double arthrodia is the result of the joining of the articulating processes of the two bones.

Actions. { The mobility of this joint is very extensive; it permits the rotation of the atlas and cranium upon the axis. The odontoid ligaments limit this movement.

(1) Anterior Atlo-Axoid Ligaments.

Situation: In the median line.

Description: There are two of these ligaments, a superficial and a deeper one. The former is rounded into a cord, whilst the latter is a membranous layer.

Origin: The superficial ligament, from the tubercle on the anterior arch of the atlas. The deeper ligament, from the lower border of the anterior arch of the same bone.

Insertion: The superficial ligament, into the base of the odontoid process and body of the axis. The deeper one, is similarly inserted.

Relations: In front, with the recti antici majores muscles.

(2) Posterior Atlo-Axoid Ligaments.

Description: A broad and thin membranous layer, which supplies the place of the ligamenta subflava.

Origin: From the lower border of the posterior arch of the atlas.

Insertion: Into the upper edge of the laminae of the axis.

Relations: Behind, with the inferior oblique muscles.

(3) Transverse Ligaments.

Description: This ligament crosses the ring of the atlas, and is a thick and strong band. It is flat from before backward, and not very thick at the extremities. This ligament divides the ring of the atlas into two parts, the anterior part containing the odontoid process of the axis, whilst the posterior part transmits the spinal cord and membranes.

Origin: From a tubercle on each side of the oblique process of the atlas, and then passing over the back of the odontoid process of the axis.

Insertion : Into the opposite side of the atlas.

(4) **Capsular Ligaments.**

Situation : Between the articulating surfaces of each bone.

III.—OCCIPITO-ATLOID ARTICULATION.

Ligaments.	{	Anterior occipito-atloid (2), Posterior occipito-atloid, Lateral occipito-atloid (2), Capsular (2).
Bony Formation.	{	By the condyles of the occipital bone, and the superior articular process of the atlas.
Kind of Articulation.	{	A double arthrodia.
Actions.	{	The movements in this joint are flexion and extension, with slight lateral motion; there is also a slight rotatory motion.

(1) **Anterior Occipito-Atloid Ligaments.**

Description : Of the two anterior ligaments, the anterior superficial one is rounded into a strong narrow cord. The deeper ligament is broad and thin, being a membranous layer.

Origin : The superficial part, from the basilar process of the occipital bone. The deeper ligament from the anterior edge of the foramen magnum of the occipital bone.

Insertion: The superficial, into the tubercle on the anterior arch of the atlas. The deeper one, into the upper edge of the atlas, anterior to the articular processes.

Relations: In front, with the recti antici minores; behind, with the odontoid ligament.

(2) Posterior Occipito-Atlöid Ligament.

Description: This thin membranous lamina is broad, forming with the superior intervertebral notch, the opening for the vertebral artery and suboccipital nerve.

Origin: From the posterior edge of the foramen magnum of the occipital bone.

Insertion: Into the upper edge of the atlas, behind the articular processes.

Relations: *In front,* with the dura mater of the cord; *behind,* with the recti postici minores, and obliqui superiores muscles.

(3) Lateral Ligaments.

Description: These strong fibrous bands are directed obliquely upward and inward.

Origin: From the jugular processes of the occipital bone.

Insertion: Into the transverse process of the atlas.

(4) Capsular Ligaments.

Description: The capsular ligaments are rather imperfect; they enclose a synovial membrane, and are thin and loose capsules.

Attachments: They encircle the condyles of the occipital bone, and join with the articular surface of the atlas.

IV.—OCCIPITO-AXOID ARTICULATION.

Ligaments. { Occipito axoid.
 { Odontoid (three).

(1) Occipito-Axoid Ligament.

Situation : At the upper part of the front surface of the spinal canal.

Description : This ligament (*Apparatus ligamentosus colli*) is a broad and strong ligamentous band, and seems to be a prolongation of the posterior common ligament.

Origin : From the lower part of the basilar process of the occipital bone, posterior to the odontoid process.

Insertion : Into the posterior surface of the body of the axis.

Relations : *The anterior surface*, with the transverse ligament, to which it is joined; *the posterior surface*, with the dura mater.

(2) Odontoid Ligaments.

Description : These strong fibrous bands form a triangular space, between which is seen the ligamentum suspensorium.

Origin : From the sides of the head of the odontoid process of the axis.

Insertion : Into the rough impressions on the inner side of the condyles of the occipital bone.

Actions : Are termed "check ligaments," because they limit the extent of rotation of the head.

V.—TEMPORO-MAXILLARY ARTICULATION.

Ligaments.	{	External lateral, Internal lateral, Stylo-maxillary, Capsular, Interarticular fibro-cartilage.
Bony Formation.	{	By the glenoid cavity of the temporal bone, and the condyle of the inferior maxillary bone.
Kind of Articulation.	{	An arthrodial joint.
Actions.	{	The jaw may have the following movements: may be depressed or elevated, carried forward or backward, carried from side to side.
Nerves of Joint.	{	Are from the auriculo-temporal and the masseteric branches of the inferior maxillary.

(1) External Lateral Ligament.

Description: This short, thin, narrow fasciculus is broad above, having its fibres running in a parallel direction. Its direction is obliquely downward and backward.

Origin: From the tubercle on the outer side or margin of the transverse root of the zygoma of the temporal bone.

Insertion: Into the outer side of the neck of the condyle of the lower jaw.

Relations: *Externally*, it is covered by the skin and parotid gland. *Internally*, it is in relation with the interarticular fibro cartilage and the synovial membrane.

(2) Internal Lateral Ligament.

Origin: From the spinous process of the sphenoid bone.

Insertion: Into the lower part of the circumference of the inferior dental foramen.

Relations: *The outer surface* (above), with the external pterygoid muscle; the internal maxillary artery is between it and the condyle of the jaw; it is also in relation with the inferior dental vessels and nerve, which separates it from the ramus of the jaw. *Internally*, it is related with the internal pterygoid muscle.

(3) Stylo-Maxillary Ligament.

Origin: From the styloid process of the temporal bone.

Insertion: Into the inner surface of the angle of the lower jaw.

Relations: Is between the masseter and internal pterygoid muscles; it separates the parotid from the submaxillary gland, and is also in relation with the stylo-glossus muscle.

(4) Capsular Ligament.

Origin: From the zygomatic eminence and the glenoid fissure of the temporal bone.

Insertion: Into the neck of the condyle of the lower jaw; it is perforated by the external pterygoid muscle.

(5) Interarticular Fibro-Cartilage.

Situation: Horizontally, between the condyle of the inferior maxilla and the glenoid cavity.

Description: *The upper surface* is concave from before backward, and is also convex transversely; it assists in the division of the joint into two cavities. *The under surface* is concave where it articulates with the condyle; is smooth, and also assists in the division of the joint. *The circumference* is connected externally with the external lateral ligament; internally, with the capsular ligament.

VI.—COSTO-SPINAL ARTICULATION.

Ligaments between Heads of Ribs and the Bodies of the Vertebrae.	{	Anterior costo-vertebral, Capsular, Interarticular.
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Ligaments of the Necks and Tubercles of Ribs, with Transverse Processes	{	Anterior costo-transverse. Middle costo-transverse. Posterior costo-transverse. Capsular.
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- Bony Formation.** { The heads and tubercles of the ribs, with the bodies and transverse processes of the vertebræ.
- Kind of Articulation.** { The set which joins the heads of the ribs with the bodies of the vertebræ are ginglymoid joints.
- Actions.** { The movements that the first three ligaments permit in these joints are limited to elevation, depression, and a slight movement forward and backward. The movements which take place in the articulations of the necks and tubercles of the ribs, with the transverse processes, are slight gliding motions of the articular surfaces upon one another.

(1) Anterior Costo-Vertebral Ligament.

Description: This stellate ligament consists of three flat bundles of fibres. The superior fasciculus ascends to be joined with the body of the vertebra above; the inferior fasciculus goes to the body of the vertebra below; the middle one passes horizontally inward to the intervertebral substance.

Origin: From the anterior part of the head of the rib.

Insertion: Into the sides of the bodies of the vertebræ above and below, and to the intervertebral substance.

Relations: In front, with the thoracic ganglion of the sympathetic, the pleura, and on the right side with the vena azygos major. Behind, it is in relation with the interarticular ligament, and synovial membranes.

(2) Capsular Ligament.

Description: This ligament surrounds the joint between the head of the rib, and the articular cavity that the junction of the vertebræ forms. It is well marked at the upper and lower parts of the articulation, and is made up of a thin and loose ligamentous bag.

Relations: Is connected with the anterior ligament.

(3) Interarticular Ligaments.

Situation: Within the joint.

Description: A short band of fibres, flattened from above downward, and which divides the joint into two cavities, which have a distinct synovial membrane; these cavities have no communication. The ligament does not appear in the first, tenth, eleventh or twelfth ribs.

Origin: From the sharp crest on the head of the rib.

Insertion: Intervertebral disk.

(4) Anterior Costo-Transverse Ligament.

Description: Is broader below than above, and is more prominent in front than behind. It is formed of a strong band of fibres, which become thinner and broader between the lower ribs. The first and last ribs are *minus* this ligament.

Origin: Neck of each rib.

Insertion: Into the transverse process of the vertebra above.

Relations: *In front*, with the intercostal vessels and nerves; *behind*, with the longissimus dorsi muscle. An aperture, for the passage of the posterior branches of the intercostal vessels and nerves, is completed by the *internal border* of this muscle. The *external border* joins a thin aponeurosis, which is above the external intercostal muscle.

(5) Posterior Costo-Transverse Ligament.

Description: This ligament is not to be found in the eleventh or twelfth ribs. It is strong, short and thick, being more oblique in its direction, in the upper than in the lower ribs.

Origin: Summit of the transverse process.

Insertion: Into the rough non-articular part of the tubercle of the rib.

(6) Middle Costo-Transverse Ligament.

Description: Connects the neck of the rib to the contiguous transverse process. It is rudimentary in the eleventh and twelfth ribs.

VII.—COSTO-STERNAL ARTICULATION.

- Ligaments.** { Anterior costo-sternal,
Posterior costo-sternal,
Capsular.
- Synovial Membranes.** { An interarticular ligament joins the cartilage of the second rib with the sternum, and is provided with two synovial membranes; that of the third rib likewise; but a single synovial membrane is provided for that of the fourth, fifth, sixth, and seventh ribs.
- Actions.** { The movements, only to a slight extent, are limited to elevation and depression.
- Kinds of Articulations.** { Arthrodiial joints.

(1) Anterior Costo-Sternal Ligaments.

Description: The cartilage of the first rib has no synovial membrane, but is continuous with the bone. This ligament is a thin and broad membranous band, which passes from the inner extremity of the true ribs to the anterior surface of the sternum; fasciculi, of which it is composed pass in different directions; the superior fasciculi have a direction obliquely upward; the inferior and middle pass obliquely downward and horizontally respectively.

Relations: The superficial fibres, which are the longest, are in relation with the fibres of the ligaments above and below them; also with the tendinous fibres of origin of the pectoralis major muscle.

(2) Posterior Costo-Sternal Ligament.

Description: Its fibres radiate from the posterior surface of the sternal end of the cartilages of the true ribs, to the posterior surface of the sternum; they intermix with the periosteum. This ligament is not as distinct as the anterior.

(3) Capsular Ligament.

Situation: Surrounds the joints formed between the cartilages of the true ribs and the sternum.

Description: Is very thin; a few fibres, at the upper and lower parts of the articulation, strengthen it. These fibres pass from the cartilage to the side of the sternum. The anterior and posterior ligaments are blended with this ligament, and it protects the synovial membranes.

VIII.—LIGAMENTS OF THE STERNUM.

Ligaments.	{ Anterior sternal, Posterior sternal, Costo-xiphoid.
Kind of Articulation.	{ The gladiolus is joined to the manubrium of the sternum, either by an amphiarthrodial, or a diarthrodial joint.

(1) Anterior Sternal Ligament.

Description: Its layer of fibres are longitudinal in direction, and intermix with the fibres of the anterior costo-sternal ligaments on both sides and with the aponeurosis of origin of the pectoralis major muscle. The ligament is thicker at the lower part of the bone than at the upper, and is rough and irregular.

(2) Posterior Sternal Ligament.

Description: The disposition of the fibres of this ligament is the same as that of the anterior ligament, although they are not so apparent; it is not as thick as the preceding ligament, and is traversed by numerous small blood-vessels.

(3) Costo-Xiphoid Ligament.

Description: A small, and very elongated, thin fasciculus, which descends obliquely inward to its insertion. It is covered by the rectus abdominis muscle.

Origin: From the lower edge of the cartilage.

Insertion: By an expansion over the anterior surface of the sternal appendage joining that of the opposite side.

IX.—ARTICULATION OF THE PELVIS WITH THE SPINE.

Ligaments. { Lumbo-sacral,
 { Ilio-lumbar.

(1) Lumbo-Sacral Ligament.

Description: This short, thick, and triangular fasciculus passes outward, and is blended with the anterior sacro-iliac ligament.

Origin: From the lower and front part of the transverse process of the last lumbar vertebra.

Insertion: The lateral surface of the base of the sacrum.

Relations: *In front,* with the psoas muscle.

(2) Ilio-Lumbar Ligament.

Description: Externally, it is broad and thin; internally, triangular, narrow, and thick.

Origin: Apex of the transverse process of the last lumbar vertebra.

Insertion: Into the crest of the ilium, in front of the sacro-iliac articulation.

Relations: *In front,* with the psoas muscle; *behind,* with the muscles in the vertebral groove; *above,* with the quadratus lumborum.

X.—SACRO-ILIAC ARTICULATION.

Ligaments. { Anterior sacro-iliac,
Posterior sacro-iliac.

Bony Formation. { Lateral surfaces of the sacrum and
ilium.

Kind of Articulation. { Amphiarthrodial.

(1) Anterior Sacro-Iliac Ligament.

Description: Composed of many thin ligamentous bands; they connect the anterior surfaces of the sacrum and ilium.

(2) Posterior Sacro-Iliac Ligament.

Situation: In a deep depression between the sacrum and ilium behind.

Description: Is the principal connection between the sacrum and ilium, and consists of strong fasciculi, three of which are of large size. The third fasciculus, which is oblique in direction, is frequently termed the *oblique sacro-iliac ligament*.

Origin: The *two superior horizontal fasciculi* arise from the first and second transverse tubercles on the posterior surface of the sacrum. The *third fasciculus*, from the third transverse tubercle on the same surface of the sacrum.

Insertion: The *two superior fasciculi*, into the rough, uneven surface of the posterior part of the inner surface of the ilium. The *third fasciculus*, into the posterior superior spine of the ilium.

XI.—LIGAMENTS BETWEEN THE SACRUM AND ISCHIUM.

Ligaments. { Great sacro-sciatic (posterior),
 { Lesser sacro-sciatic (anterior).

(1) Great Sacro-Sciatic Ligament.

Situation: At the lower and back part of the pelvis.

Description : In form it is flat, thin and triangular, being broader at the extremities than at the middle part. Its direction from point of origin is downward, outward, and forward, where it also increases in breadth.

Origin : From the posterior inferior spine of the ilium ; fourth and fifth transverse tubercles of the sacrum ; lateral margin of the sacrum ; and from the coccyx.

Insertion : Pointed, into the spine of the ischium.

Relations : The anterior surface is joined to the lesser sacro-sciatic ligament ; posterior surface has some fibres of the gluteus maximus muscle attached to its whole extent ; the superior border forms the lower boundary of the lesser sciatic foramen ; the lower border, part of the boundary of the perineum. The obturator fascia is joined to the free concave margin of the ligament, and forms a groove for the internal pudic vessels and nerve. The coccygeal branch of the sciatic artery pierces the lower border.

(2) Lesser Sacro-Sciatic Ligament.

Description : Is thin, and also triangular in form ; its fibres intermingling with those of the greater ligament.

Origin : By its apex, from the spine of the ischium.

Insertion : By its broad base, into the lateral margin of the sacrum and coccyx, anterior to the attachment of the greater ligament.

Relations: Anteriorly, with the coccygeus muscle; posteriorly, with the posterior ligament, which covers it, the internal pudic vessels and nerve crossing it; the superior border forms the lower boundary of the great sacro-sciatic foramen; its inferior border forms part of the lesser sacro-sciatic foramen.

XII.—SACRO-COC CYGEAL ARTICULATION.

Ligaments.	{	Anterior sacro-coccygeal, Posterior sacro coccygeal, Interposed fibro-cartilage.
Bony Formation.	{	By the oval surface on the apex of the sacrum, and the base of the coccyx.
Kind of Articulation.	{	An amphiarthrodial joint.
Actions.	{	The movements permitted between the sacrum and coccyx are a slightly forward and backward motion. This increases during pregnancy.

(I) Anterior Sacro-Coccygeal Ligament.

Description: Its few irregular fibres pass from the anterior surface of the sacrum to the front of the coccyx. They blend with the periosteum.

(2) Posterior Sacro-Coccygeal Ligament.

Origin: From the margin of the lower orifice of the sacral canal.

Insertion: Into the posterior surface of the coccyx.

Relations: *In front*, with the arachnoid membrane of the sacral canal; a part of the sacrum; nearly all of the posterior surface of the coccyx. *Behind*, with the gluteus maximus muscle.

(3) Interposed Fibro-Cartilage.

Description: Is situated between the contiguous surfaces of the two bones. Is thicker in front and behind than at the sides.

XIII.—ARTICULATION OF THE PUBES.

Ligaments.	{	Anterior pubic, Posterior pubic, Superior pubic, Sub-pubic, Interposed fibro-cartilage.
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Bony Formation.	{	By the two oval articular surfaces of the pubic bone.
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Kind of Articulation.	{	An amphiarthrodial joint.
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(1) Anterior Pubic Ligament.

Description: Consists of superficial and deep fibres. The former pass obliquely from one bone to the other, interlacing with fibres of the ext. oblique muscle. The deep fibres extend transversely across the symphysis, interlacing with the fibro-cartilage.

(2) Posterior Pubic Ligament.

Description: A few thin fibres, which join the two pubic bones posteriorly, make up this ligament.

(3) Superior Pubic Ligament.

Description: It joins together the two pubic bones superiorly.

(4) Sub-Pubic Ligament.

Description: It connects the two pubic bones below, and forms the upper boundary of the pubic arch.

(5) Interposed Fibro-Cartilage.

Description: Two oval-shaped plates. The external surface of each plate is joined to the bone by several processes, and an intermediate, elastic, fibrous tissue connects their opposed surfaces. Various ligaments about the joint connect their circumference.

XIV.—STERNO-CLAVICULAR ARTICULATION.

Ligaments.	{	Anterior sterno-clavicular, Posterior sterno-clavicular, Interclavicular, Costo-clavicular (rhomboid), Interarticular fibro-cartilage.
Bony Formation.	{	Sternal end of the clavicle ; upper and lateral part of the first piece (manubrium) of the sternum ; cartilage of the first rib.
Kind of Articulation.	{	An arthrodial joint.
Actions.	{	Admits of unlimited motion : up- ward, downward, backward, for- ward, and circumduction.

(1) Anterior Sterno-Clavicular Ligament.

Origin: Upper and front part of the inner end of the clavicle.

Insertion: After passing downward and inward, it is inserted, below, into the front and upper part of the manubrium of the sternum.

Relations: *In front*, it is covered by the sternal part of the sterno-cleido-mastoid and the integument. *Behind*, the two synovial membranes and the interarticular fibro-cartilage are in relation. This ligament covers the anterior surface of the articulation.

(2) Posterior Sterno-Clavicular Ligament.

Origin: Posterior part of the inner extremity of the clavicle; it then passes obliquely downward and inward.

Insertion: Into the upper and posterior part of the sternum.

Relations: *In front*, with the interarticular fibro-cartilage and synovial membranes. *Behind*, with the sterno-hyoid and sterno-thyroid muscles. This ligament covers the posterior surface of the joint.

(3) Interclavicular Ligament.

Description: A flattened band. It passes from the upper part of the inner end of one clavicle to the other.

Relations: *In front*, with the skin. *Behind*, with the sterno-thyroid muscles.

(4) Costo-Clavicular Ligament.

Attachments: *Below*, to the upper and inner part of the cartilage of the first rib; after ascending obliquely backward and outward, it is attached, *above*, to the rhomboid depression on the clavicle.

Relations: *In front*, with the tendon of origin of the subclavius muscle. *Behind*, with the subclavian vein.

(5) Interarticular Fibro-Cartilage.

Attachments: *Above*, to the upper and posterior margin of the clavicle. *Below*, to the cartilage of the first rib, where it joins the

sternum. *By its circumference*, to the anterior and posterior sterno-clavicular ligaments. It divides joint into two cavities.

XV.—SCAPULO-CLAVICULAR ARTICULATION.

Ligaments.	{ Superior acromio-clavicular, Inferior acromio-clavicular, Coraco-clavicular, { Trapezoid, Conoid. Interarticular fibro-cartilage.
Bony Formation.	{ Outer end of clavicle ; upper edge of the acromion process of the scapula.
Kind of Articulation.	{ An arthrodial joint.
Actions.	{ Two kinds of motion : (a) Gliding of the articular extremity of the clavicle on the acromion process of the scapula. (b) Rotation of the scapula forward and back- ward upon the clavicle.

(1) Superior Acromio-Clavicular Ligament.

Description : It covers the superior part of the articulation.

Origin : Upper surface of the acromion process.

Insertion : Upper part of the outer extremity of the clavicle.

Relations: Its fibres interlace with those of the trapezius and deltoid muscles. *Below*, it is in contact with the synovial membranes and interarticular fibro-cartilage.

(2) Inferior Acromio-Clavicular Ligament.

Description: It is joined to the under surface of each bone.

Relations: It covers the under part of the articulation. *Above*, it is in relation with the interarticular fibro-cartilage, when it exists, and the synovial membranes. *Below*, with the tendon of the supraspinatus muscle.

(3) Coraco-Clavicular Ligament.

Description: Is divided into the trapezoid and conoid ligaments. (a) *The trapezoid ligament* is attached above to an oblique line on the clavicle, and below to the upper part of the coracoid process of the scapula. This ligament is the anterior and external fasciculus. (b) *The conoid ligament* is the posterior and internal fasciculus. Its base is attached to the conoid tubercle on the inferior surface of the clavicle, whilst its apex is connected to a rough depression at the base of the coracoid process.

Relations: *In front*, with the subclavius muscle. *Behind*, with the trapezius muscle.

Actions: Limit rotation of the scapula forward and backward.

Bony Formation. { Globular head of the humerus ;
glenoid cavity of scapula.

Kind of Articulation. { An enarthrodial joint.

Actions. { This joint can be moved in every
direction — forward, backward,
abduction, adduction, circum-
duction, rotation.

Nerve Supply. { From the circumflex and supra-
scapular.

Arterial Supply. { Articular branches of the anterior
and posterior circumflex, and
suprascapular.

Muscles in Relation with Joint. { *Above*, the supraspinatus ; *below*,
long head of triceps ; *internally*,
the subscapularis ; *externally*,
the infraspinatus and teres mi-
nor ; *within*, the long head of
the biceps. The articulation is
covered by the deltoid muscle on
its outer side, in front and behind.

(1) Capsular Ligament.

Description : It generally has three openings :

- (a) One at the inner side, below the coracoid process ; (b) one at the outer part ; (c) the third is in the lower border of the ligament, between the tuberosities, and affords passage

to the long tendon of the biceps. The first opening communicates with the synovial membrane of joint and a bursa beneath the tendon of the subscapularis.

Origin: From the circumference of the glenoid cavity, beyond the glenoid ligament.

Insertion: Around the anatomical neck of the humerus. It is strengthened by the coracohumeral ligament; also by prolongations from the supraspinatus, long head of biceps, tendons of the infraspinatus and teres minor, and subscapularis muscles.

(2) Coraco-Humeral Ligament.

Origin: Outer border of coracoid process.

Insertion: After passing obliquely downward and outward, into front of the great tuberosity of the humerus.

Relations: With the upper and inner part of the capsular ligament, which it strengthens, and is united to in most of its extent.

(3) Glenoid Ligament.

Description: Is attached round the margin of the glenoid cavity, and is continuous above with the long tendon of the biceps. The glenoid cavity is deepened by this ligament.

XVIII.—THE ELBOW-JOINT.

Ligaments.

{	Anterior,
	Posterior,
	Internal lateral,
	External lateral.

Bony Formation. { Trochlear surface of humerus ;
greater sigmoid cavity of the
ulna.

**Kind of
Articulation.** { Ginglymus joint.

Actions. { The articulation is made up of three
portions: (a) The joint between ul-
na and humerus ; (b) that between
the head of radius and humerus ;
(c) superior radio-ulnar articula-
tion. A simple hinge-joint ex-
ists between the ulna and hu-
merus, the movements permitted
being flexion and extension only.
Between the head of the radius
and the radial head of the hu-
merus, we have an arthro-dial
joint ; and were it not for the
articular ligament which binds
the head of the radius firmly to
the sigmoid cavity of the ulna,
movement in all directions would
be permissible.

Nerve Supply. { From the ulnar, and a few fila-
ments from the musculo-cuta-
neous.

Arterial Supply.

From the communicating branches between the superior profunda, inferior profunda, and the anastomotic branches of the brachial, with the anterior, posterior, and interosseous recurrent branches of the ulnar, and the recurrent branch of the radial.

Muscles in Relation with Joint.

In front, the brachialis anticus; *behind*, the triceps and anconeus; *externally*, supinator brevis and the common tendon of origin of the extensor muscles; *internally*, the common tendon of origin of the flexor muscles, flexor carpi ulnaris, and the ulnar nerve.

(1) Anterior Ligament.

Attachments: To the front of humerus, above the coronoid fossa. Below, to the anterior surface of the coronoid process of the ulna and orbicular ligament. It is continuous on each side with the lateral ligaments. *The superficial fibres*, which are oblique, extend from the inner condyle of the humerus outward to the orbicular ligament. *The middle fibres*, which have a vertical direction, extend from the upper part of the coronoid depression. *The transverse fibres* intersect the others.

Relations: *In front*, with the brachialis anticus muscle; *behind*, with the synovial membranes.

(2) Posterior Ligament.

Attachments: *Above*, to the lower extremity of the humerus, above the olecranon fossa; *below*, to the margin of the olecranon.

Relations: *In front*, with the synovial membrane; *behind*, with the tendon of the triceps and anconeus muscles.

(3) Internal Lateral Ligament.

Attachments: (a) *The Anterior Portion*, *above*, to the front part of the internal condyle of the humerus; *below*, by its broad base, to the inner margin of the coronoid process. (b) *The Posterior Portion*, *above*, by its apex, to the lower and back part of the internal condyle; *below*, to the inner margin of the olecranon process.

Relations: *Internally*, with the triceps, and flexor carpi ulnaris, and with the ulnar nerve.

(4) External Lateral Ligament.

Attachments: *Above*, to the external condyle of the humerus; *below*, to the orbicular ligament. Some of the fibres here pass over this ligament to the outer margin of the ulna.

XIX.—SUPERIOR RADIO-ULNAR ARTICULATION.

Ligament.	{ Orbicular (annular).
Bony Formation.	{ Inner side of circumference of head of radius; lesser sigmoid cavity of ulna.
Kind of Articulation.	{ A lateral ginglymus joint.
Actions.	{ Limited to a rotatory movement of radial head within orbicular ligament, upon the lesser sigmoid cavity of ulna. <i>Pronation</i> is rotation forward; <i>supination</i> , rotation backward.

(1) Orbicular Ligament.

Description: This flat, strong band of ligamentous fibres surrounds the head of the radius; it retains it in connection with the lesser sigmoid cavity of the ulna. The ext. lateral ligament of the elbow strengthens the outer surface. The inner surface is lined with synovial membrane. Part of the supinator brevis muscle arises from the outer surface.

XX.—MIDDLE RADIO-ULNAR ARTICULATION.

Ligaments. { Oblique (round).
 { Interosseous.

(1) Oblique Ligament.

Description: This small, round, fibrous cord passes obliquely downward and outward, from the tubercle of ulna (at the base of the coronoid process) to the radius, below the bicipital tuberosity. Its fibres have an opposite direction to those of the interosseous ligament.

(2) Interosseous Ligament.

Description: Its broad and thin plane of aponeurotic fibres pass obliquely downward and inward, from the interosseous ridge on the radius to that on the ulna. The ant. interosseous vessels pass through an oval aperture just above its lower margin. An aperture also exists between its upper border and the oblique ligament, for the post. interosseous vessels.

Relations: *In front*, with the flexor longus pollicis on the outer side; with the flexor profundus digitorum on the inner side. Its lower fourth is in relation with the pronator quadratus. *Behind*, with the supinator brevis, extensor ossis metacarpi pollicis, extensor primi internodii pollicis, extensor

secundi internodii pollicis, extensor indicis, and near the wrist, with the ant. interosseous artery and post. interosseous nerve.

XXI.—INFERIOR RADIO-ULNAR ARTICULATION.

Ligaments.	{	Anterior radio-ulnar, Posterior radio-ulnar, Triangular interarticular fibro-cartilage.
Bony Formation.	{	Head of the ulna; sigmoid cavity at inner side of the lower end of radius.
Kind of Articulations.	{	Lateral ginglymus joint.
Actions.	{	Movement in this joint is limited to rotation of the radius round the head of the ulna. Rotation forward is called <i>pronation</i> ; rotation backward, <i>supination</i> . The arrangement in this joint is the reverse of that between the two bones above.

(1) Anterior Radio-Ulnar Ligament.

Attachments: From the anterior margin of the sigmoid cavity of the radius to the anterior surface of the head of the ulna.

(2) Posterior Radio-Ulnar Ligament.

Attachments: Are between similar points on the posterior surface of the articulation.

(3) Triangular Interarticular Fibro-Cartilage.

Description: The centre of the circumference of this cartilage is thin, and sometimes perforated. By its apex, it is attached to the depression which separates the styloid process of the ulna from the head of that bone; and, by its base, to the margin of the radius. The margins are joined to the ligaments of the wrist-joint. The upper surface is contiguous with the head of the ulna, the lower surface with the cuneiform bone.

XXII.—RADIO-CARPAL (WRIST-JOINT) ARTICULATION.

Ligaments.	{	External lateral (radio-carpal), Internal lateral (ulno carpal), Anterior, Posterior.
Bony Formation.	{	Lower end of radius; scaphoid, semilunar, and cuneiform bones.
Kind of Articulation.	{	An arthrodial joint.
Actions.	{	This articulation permits of the following movements: flexion, extension, abduction, adduction, and circumduction.

Nerve Supply.	{ From the ulnar and post. interosseous.
Arterial Supply.	{ Ant. and post. carpal branches of the radial and ulnar; ant. and post. interosseous; a few ascending branches from the deep palmar arch.
Relations of Joint	{ <i>In front</i> , it is covered by the flexor tendons; <i>behind</i> , by the extensor tendons. The radial and ulnar arteries are also in relation.

(1) External Lateral Ligament.

Origin: Summit of the styloid process of the radius.

Insertion: Outer side of the scaphoid; by a few fibres into the annular ligament and trapezium.

(2) Internal Lateral Ligament.

Origin: Extremity of the styloid process of the ulna.

Insertion: After dividing into two fasciculi, it is inserted into the inner side of the cuneiform bone, and into the pisiform bone and annular ligament.

(3) Anterior Ligament.

Description: A broad membranous band, made up of three fasciculi. Many apertures for vessels perforate it.

Origin: Anterior border of lower extremity of radius, also its styloid process, and the ulna.

Insertion: Into the palmar surface of the scaphoid, semilunar, and cuneiform bones.

Relations: *In front*, with the tendons of the flexor profundus digitorum and flexor longus pollicis; *behind*, with the synovial membrane of the joint.

(4) Posterior Ligament.

Origin: Posterior margin of lower extremity of radius, and fibro-cartilage.

Insertion: Into dorsal surface of scaphoid, semilunar, and cuneiform bones.

Relations: *In front*, with the synovial membrane of wrist; *behind*, with the extensor tendons of the fingers.

XXIII.—ARTICULATIONS OF THE FIRST ROW OF CARPAL BONES.

Ligaments.	{ Dorsal (2), Palmar (2), Interosseous (2).
Kind of Articulation.	{ Arthrodial joints.

(1) Dorsal Ligaments.

Description: Situated behind the bones of the first row. These ligaments join the scaphoid and semilunar, and the semilunar and cuneiform bones.

(2) Palmar Ligaments.

Description: Are located beneath the anterior ligament of the wrist, and connect the scaphoid and semilunar, and the semilunar and cuneiform bones.

(3) Interosseous Ligaments.

Description: These ligaments join the semilunar bone; on one side with the scaphoid, and on the other with the cuneiform bone.

XXIV.—ARTICULATIONS OF THE SECOND ROW OF CARPAL BONES.

Ligaments.	{	Dorsal (3), Palmar (3), Interosseous (2).
Kind of Articulation.	{	Arthrodial joints.

(1) Dorsal Ligaments.

Description: These three ligaments join the trapezium with the trapezoid, the trapezoid with the os magnum, and the latter bone with the unciform. They pass transversely from one bone to the other on the dorsal surface.

(2) Palmar Ligaments.

Description: Here the arrangement is similar to that of the latter ligaments on the palmar surface.

(3) Interosseous Ligaments.

Description: Are situated on each side of the os magnum. They join the latter bone with the trapezoid externally, and the unciform internally.

XXV. — ARTICULATIONS OF THE TWO ROWS OF CARPAL BONES WITH EACH OTHER.

Ligaments. { Palmar (anterior),
 { Dorsal (posterior),
 { Lateral (external and internal).

(1) Palmar Ligaments.

Description: These short fibres have an oblique direction between the bones of the first and second row on the palmar surface.

(2) Dorsal Ligaments.

Description: The arrangement is similar to the palmar ligaments on the dorsal surface of the carpus.

(3) Lateral Ligaments.

Description: They are situated on the radial side, from the scaphoid to the trapezium; on the ulnar side, from the cuneiform bone to the unciform. These ligaments are very short, and are continuous with the lateral ligaments of the wrist-joint.

XXVI.—ARTICULATION OF METACARPAL BONE OF THUMB WITH THE TRAPEZIUM.

Ligament. { Capsular.

Kind of
Articulation. { An arthrodial joint.

(1) Capsular Ligament.

Description: A loose, thick capsule, which extends from the circumference of the upper extremity of the metacarpal bone to the margin bounding the articular surface of the trapezium.

XXVII.—ARTICULATIONS OF METACARPAL BONES OF FINGERS WITH THE CARPUS.

Ligaments. { Dorsal,
 { Palmar,
 { Interosseous.

(1) Dorsal Ligaments.

Description: They join the carpal and metacarpal bones on their dorsal surface. Two fasciculi pass to the second metacarpal bones, one from the trapezium and the other from the trapezoid bone; the third metacarpal has one from the os magnum; the fourth metacarpal, one from the os magnum and one from the unciform bone; the fifth metacarpal, one from the unciform bone.

(2) Palmar Ligaments.

Description: These ligaments have a like arrangement, excepting the third metacarpal bone, which has an external fasciculus from the trapezium (above the sheath of the tendon of the flexor carpi radialis); a middle fasciculus from the os magnum, and an internal one from the unciform bone.

(3) Interosseous Ligaments.

Description: They join the contiguous inferior angles of the os magnum and unciform bones with the adjacent surfaces of the third and fourth metacarpal bones.

XXVIII.—ARTICULATIONS OF METACARPAL BONES WITH EACH OTHER.

Ligaments.	{	Dorsal, Palmar, Interosseous.
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(1) Dorsal and Palmar Ligaments.

Description: They extend transversely from one to the other bone, on the dorsal and palmar surfaces.

(2) Interosseous Ligaments.

Description: They extend beneath the articular facets of these bones, between their contiguous surfaces.

XXIX.—METACARPO-PHALANGEAL ARTICULATIONS.

Ligaments.	{	Anterior (glenoid ligaments of Cruveilhier), Lateral (2).
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Bony Formation.	{	Rounded head of metacarpal bone; extremity of first phalanx.
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Kinds of Articulation. { Ginglymus joints.

Actions. { Movements permitted are flexion, extension, adduction, abduction, and circumduction. Lateral motion limited.

(1) Anterior Ligaments.

Description: Thick and dense, being fibro-cartilaginous. Are situated on the palmar surface of the joint, and are joined to the lateral ligaments. (a) Their *Palmar Surface* is blended with the transverse ligament; a groove here gives passage to the flexor tendons. (b) Their *Deep Surface* forms part of the articular surface for the head of the metacarpal bone.

(2) Lateral Ligaments.

Description: These rounded cords are situated on each side of the joint, one end of each being joined to the tubercle on the side of the head of the metacarpal bone; the other extremity is attached to the contiguous end of the phalanx.

XXX.—ARTICULATIONS OF THE PHALANGES.

Ligaments. { Anterior,
{ Lateral (2).

- Kinds of Articulation.** { Ginglymus joints.
- Actions.** { Movements permitted are flexion and extension.

Note: See the metacarpo-phalangeal articulations, as the arrangement of these ligaments is similar.

XXXI.—THE HIP-JOINT.

- Ligaments.** { Capsular,
Ilio femoral (accessory),
Ligamentum teres,
Cotyloid,
Transverse.
- Bony Formation.** { Acetabulum, and head and part of the neck and femur.
- Kind of Articulation.** { An enarthrodial joint.
- Actions.** { The movements are flexion, extension, abduction, adduction, circumduction, and rotation.
- Nerve Supply.** { Articular branches from the sacral plexus, great sciatic, obturator, and accessory obturator.
- Arterial Supply.** { From the obturator, sciatic, internal circumflex, and gluteal.

Muscles in Relation with Joint.

In front, the psoas and iliacus; *above*, straight head of rectus and gluteus minimus; *internally*, the obturator externus and pectineus; *behind*, the pyriformis, gemellus superior, obturator internus, gemellus inferior, obturator externus, and quadratus femoris.

(1) Capsular Ligament.

Origin: Circumference of the acetabulum and transverse ligament.

Insertion: Below the root of the great trochanter of the femur, the anterior inter-trochanteric line, and posteriorly to the middle of the neck of the femur.

(2) Ilio-Femoral Ligament.

Origin: Anterior inferior spine of the ilium.

Insertion: Into the anterior inter-trochanteric line (Y-ligament).

(3) Ligamentum Teres.

Origin: From the depression a little behind and below the center of the head of the femur.

Insertion: By two bundles of fibres, into the margins of the notch at the bottom of the acetabulum, and also into the transverse ligament.

(4) Cotyloid Ligament.

Description : A circular fibro-cartilaginous band, which is joined to the margin of the acetabulum, the cavity of which it deepens.

(5) Transverse Ligament.

Description : A flattened band of fibres, attached to the opposite points of the notch, converting it into a foramen, for the passage of the nutrient vessels of the joint.

XXXII.—THE KNEE-JOINT.**Ligaments.***Exterior Ligaments :*

Ligamentum patellæ (anterior),
 Ligamentum posticum Winslowii (posterior),
 Internal lateral,
 External lateral (2),
 Capsular.

Interior Ligaments :

External crucial (anterior),
 Internal crucial (posterior),
 Semilunar fibro-cartilages (2),
 Transverse,
 Coronary,
 Ligamentum mucosum,
 Ligamenta alaria.

Bony Formation.	{ Condyles of femur, above; the head of tibia, below; the patella, in front.
Kind of Articulation.	{ A ginglymus joint.
Actions.	{ Movements permitted are flexion, extension, and a slight rotation inward and outward.
Nerve Supply.	{ From the obturator, anterior crural, ext. and int. popliteal.
Arterial Supply.	{ From the anastomotic branch of the femoral, articular branches of the popliteal, and recurrent branch of the anterior tibial.

(1) Ligamentum Patellæ.

Origin: Apex of the patella, and the rough depression on its posterior surface.

Insertion: Into the lower part of the tuberosity of the tibia. Its superficial fibres are continuous with those of the quadriceps extensor.

(2) Ligamentum Posticum Winslowii.

Description: It covers the back part of the joint, and is made up of a central and two lateral parts.

Origin: Inner condyle of tibia, passes upward and outward.

Insertion: External condyle of the femur.

(3) Internal Lateral Ligament.

Origin: Inner tuberosity of the femur.

Insertion: Inner tuberosity and inner surface of the shaft of the tibia.

Relations: The aponeurosis of the sartorius muscle crosses its lower part, also the tendons of the gracilis and semi-tendinosus muscles, a synovial bursa being interposed. Its *Deep Surface* covers the anterior part of the tendon of the semi-membranosus, the synovial membrane of the joint, and the inf. internal articular artery and nerve.

(4) Long External Lateral Ligament.

Origin: Outer tuberosity of the femur.

Insertion: Into the outer part of the fibula.

Relations: The *Outer Surface* is covered by the tendon of the biceps; the tendon of the popliteus muscle and the inf. external articular vessels and nerve pass beneath it.

(5) Short External Lateral Ligament.

Origin: Lower part of the outer tuberosity of the femur.

Insertion: Into the summit of the styloid process of the fibula.

Relations: Is connected with the capsular ligament. The tendon of the popliteus muscle passes under it.

(6) Capsular Ligament.

Description: Is attached to the femur above its articular surface; below, to the upper margin and sides of the patella, and the borders of the head of the tibia and interarticular cartilages. It is continuous behind with the posterior ligament.

(7) External Crucial Ligament.

Origin: Inner side of the depression in front of the spine of the tibia.

Insertion: Into the inner and back part of the outer condyle of the femur.

(8) Internal Crucial Ligament.

Origin: Back part of the depression behind the spine of the tibia; popliteal notch; posterior extremity of the external semilunar fibrocartilage.

Insertion: Outer and forepart of the inner condyle of the femur.

Relations: *In front*, with the anterior crucial ligament; *behind*, with the ligamentum posticum Winslowii.

(9) Semilunar Fibro-Cartilages.

Description: Are joined to the borders of the head of the tibia. Their circumference is thick and concave.

(10) Transverse Ligament.

Description: It passes across from the ant. extremity of one ext. semilunar cartilage to that of the other.

(11) Coronary Ligaments.

Description: They connect the convex border of the semilunar cartilages with the circumference of the head of the tibia, and with the other ligaments surrounding the joint.

(12) Ligamentum Mucosum.

Origin: Fatty substance behind the ligamentum patella; passes upward and backward.

Insertion: Into the notch between the condyles of the femur.

(13) Ligamenta Alaria.

Description: These alar folds of the sigmoid membrane are on each side of the patella.

XXXIII.—SUPERIOR TIBIO-FIBULAR ARTICULATION.

Ligaments.

{ Anterior superior tibio-fibular.
{ Posterior superior tibio-fibular.

Kind of

Articulation.

{ An arthrodial joint.

(1) Anterior Superior Tibio-Fibular Ligament.

Description: It passes obliquely upward and inward from the head of the fibula to the outer tuberosity of the tibia.

(2) Posterior Superior Tibio-Fibular Ligament.

Description: This single, thick, broad band passes from the back part of the head of the fibula to the back part of the outer tuberosity of the tibia. The tendon of the popliteus covers it.

XXXIV.—MIDDLE TIBIO-FIBULAR ARTICULATION.

Description: Consists of a strong band of fibres (interosseous ligament), lying between the contiguous margins of the tibia and fibula. A large oval aperture at its upper part gives passage to the ant. tibial artery, and, at its lower part, an opening exists for the ant. peroneal vessels.

- *Relations:* *In front*, with the tibialis anticus, extensor longus digitorum, extensor proprius pollicis, peroneus tertius, and the ant. tibial vessels and nerve; *behind*, with the tibialis posticus and flexor longus pollicis.

XXXV.—INFERIOR TIBIO-FIBULAR ARTICULATION.

Ligaments. { Inferior interosseous,
Anterior inferior tibio-fibular,
Posterior inferior tibio-fibular,
Transverse.

Bony Formation. { Convex surface of inner side of
lower end of fibula; rough surface on outer side of tibia.

Actions. { Limited to a very slight gliding motion.

(1) Inferior Interosseous Ligament.

Description: Strong fibrous bands pass between the contiguous rough surfaces of the tibia and fibula.

(2) Anterior Inferior Tibio-Fibular Ligament.

Description: It extends obliquely downward and outward between the adjacent margins of the tibia and fibula.

Relations: *In front*, with the peroneus tertius, aponeurosis of the leg, and the integument; *behind*, with the inf. interosseous ligament.

(3) Posterior Inferior Tibio-Fibular Ligament.

Description: Has a similar arrangement as the ant. inf. ligament, on the posterior surface of the articulation.

(4) Transverse Ligament.

Description: Is continuous with the preceding. It passes across the back of the joint from the ext. malleolus to the tibia.

XXXVI.—THE ANKLE-JOINT.

Ligaments. { Tibio-tarsal (anterior),
Internal lateral (deltoid),
External lateral (3).

Bony Formation. { Lower end of tibia; external malleolus of fibula; the astragalus.

Kind of Articulation.	{ A ginglymus joint.
Actions.	{ Chiefly flexion and extension, with some slight lateral motion, when the toes are pointed.
Nerve Supply.	{ From the anterior tibial.
Arterial Supply.	{ From the malleolar branches of the anterior tibial and peroneal.
Structures in Relation with Joint.	<p><i>In front</i> (from within outward), the tibialis anticus, extensor proprius pollicis, ant. tibial vessels, ant. tibial nerve, extensor communis digitorum, and peroneus tertius; <i>behind</i> (from within outward), the tibialis posticus, flexor longus digitorum, post. tibial vessels, post. tibial nerve, flexor longus pollicis; <i>in the groove behind the ext. malleolus</i>, the tendons of the peroneus longus and brevis.</p>
Structures which Support the Arch of the Foot.	<p>The inferior calcaneo-scaphoid ligament; the long and short calcaneo-cuboid; the tendon of the tibialis posticus; tendon of the peroneus longus (?); plantar fascia; tonus of the muscles of the sole.</p>

(1) **Tibio-Tarsal Ligament.**

Origin: Margin of the articular surface of the tibia.

Insertion: Into the margin of the astragalus.

Relations: *In front*, with the extensor tendons of the toes, with the tendons of the tibialis anticus and peroneus tertius, and with the ant. tibial vessels and nerve; *behind*, the synovial membrane is in contact.

(2) Internal Lateral Ligament.

Description: Consists of a superficial and deep layer. The *former* is attached above, to the apex and anterior and posterior borders of the inner malleolus. Its anterior fibres are inserted into the scaphoid, the middle into the os calcis, and the posterior fibres into the inner side of the astragalus. The *deep layer* passes from the apex of the malleolus to the inner surface of the astragalus.

Relations: Is covered by the tendons of the tibialis posticus and the flexor longus digitorum muscles.

(3) External Lateral Ligament.

Description: Consists of three fasciculi, an anterior, posterior, and middle.

Origin: Inner surface of the external malleolus above its point; the *anterior fasciculus* passes forward, and is *inserted* into the upper and outer part of the astragalus; the *middle* passes downward, backward, and inward, into the os calcis; the *posterior fasciculus* passes backward and inward into the back part of the astragalus.

XXXVII.—ARTICULATIONS OF FIRST ROW OF TARSAL BONES.

Ligaments. { External calcaneo-astragaloid,
 { Posterior calcaneo-astragaloid.
 { Interosseous.

**Kinds of
 Articulation.** { Arthrodial joints.

Actions. { Limited to a gliding motion of the
 { astragalus and os calcis upon
 { each other, from before back-
 { ward, and from side to side.

(1) External Calcaneo-Astragaloid Ligament.

Description: It extends from the outer edge of the astragalus to the outer edge of the os calcis. It lies in front of the middle fasciculus of the ext. lateral ligament of the ankle-joint.

(2) Posterior Calcaneo-Astragaloid Ligament.

Description: This ligament joins the posterior end of the astragalus with the upper contiguous surface of the os calcis.

(3) Interosseous Ligament.

Description: Is very thick and strong, thus serving to join the os calcis and astragalus solidly together. One extremity is attached to the groove between the articulating surfaces of the astragalus, the other being joined to a corresponding depression on the superior surface of the os calcis.

XXXVIII.—ARTICULATIONS OF SECOND ROW OF TARSAL BONES.

Ligaments. { Dorsal,
 { Plantar,
 { Interosseous (4).

Actions. } Limited to a very slight motion.

(1) Dorsal Ligaments.

Description: The small bands of fibres of which these ligaments are composed are parallel, and extend from each bone to the ones with which it articulates.

(2) Plantar Ligaments.

Description: The arrangement is similar to the last, on the plantar surface.

(3) Interosseous Ligaments.

Description: They extend between the rough non-articular surfaces of adjoining bones. One is located between the sides of the scaphoid and cuboid bones; a second is between the internal and middle cuneiform bones; between the middle and external cuneiform is another; the fourth lying between the external cuneiform and cuboid bones.

XXXIX.—ARTICULATIONS OF THE TWO ROWS OF THE TARSUS WITH EACH OTHER.

Ligaments Connecting Os Calcis with Cuboid. { Superior calcaneo-cuboid,
Internal calcaneo-cuboid (inter-
osseous),
Long calcaneo-cuboid,
Short calcaneo-cuboid.

Ligaments Connecting Os Calcis with Scaphoid. { Superior calcaneo-scaphoid,
Inferior calcaneo-scaphoid.

(1) Superior Calcaneo-Cuboid Ligament.

Description: Is thin and narrow, and extends between the contiguous surfaces of the os calcis and cuboid bones, on the dorsal surface of the joint.

(2) Internal Calcaneo-Cuboid Ligament.

Origin: From the os calcis, in a deep groove between it and the astragalus.

Insertion: Inner side of the cuboid bone.

(3) Long Calcaneo-Cuboid Ligament.

Description: It converts the groove on the inferior surface of the cuboid bone into a canal, for the tendon of the peroneus longus.

Attachments: To the under surface of the os calcis, as far forward as the anterior tubercle. Its fibres are then attached to the ridge on the inferior surface of the cuboid bone, whilst the more superficial fibres are continued onward to the bases of the second, third, and fourth metatarsal bones.

(4) **Short Calcaneo-Cuboid Ligament.**

Attachments: It extends from the tubercle and depression on the forepart of the under surface of the os calcis to the inferior surface of the cuboid bone.

(5) **Superior Calcaneo-Scaphoid Ligament.**

Description: It arises from the groove between the astragalus and os calcis; then passing forward from the inner side of the anterior extremity of the os calcis to the outer side of the scaphoid bone.

(6) **Inferior Calcaneo-Scaphoid Ligament.**

Description: It passes forward and inward from the anterior and inner extremity of the os calcis to the under surface of the scaphoid bone. It supports the head of the astragalus.

XL.—TARSO-METATARSAL ARTICULATIONS.

Ligaments.	{	Dorsal; Plantar, Interosseous (3).
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Bony Formation. { Internal, middle, and external cuneiform bones, the cuboid ; metatarsal bones of the five toes.

Kinds of Articulation. { Arthrodial joints.

Actions. } A slight gliding.

(1) Dorsal Ligaments.

Description : They connect the tarsal with the metatarsal bones. A single broad, thin, fibrous band connects the first metatarsal to the internal cuneiform bone. The second metatarsal bone has three dorsal ligaments, one for each cuneiform bone. The cuboid sends out two bands, one each for the fourth and fifth metatarsal bones.

(2) Plantar Ligaments.

Description : The tarsal and metatarsal bones are joined by these ligaments.

(3) Interosseous Ligaments.

Description : The *internal ligament* extends from the outer extremity of the internal cuneiform to the adjacent angle of the second metatarsal. The *middle one* joins the external cuneiform with the adjacent angle of the second metatarsal bone. The *external ligament* joins the external angle of the outer cuneiform bone with the adjacent side of the third metatarsal.

XLI.—ARTICULATIONS OF THE METATARSAL BONES WITH EACH OTHER.

Ligaments. { Dorsal,
Plantar,
Interosseous.

Description: These ligaments connect the bases of the metatarsal bones together, with the exception of that of the first. The *dorsal and plantar ligaments* extend from one metatarsal bone to the other, and the *interosseous ligaments* are deeply situated. The *transverse metatarsal ligament* unites the digital extremities of the metatarsal bones.

XLII.—METATARSO-PHALANGEAL ARTICULATIONS.

Ligaments. { Plantar,
Lateral (2).

Actions. { Flexion, extension, abduction, and
adduction.

Note: The arrangement of these ligaments is identical with the corresponding parts in the hand.

XLIII.—ARTICULATIONS OF THE PHALANGES OF THE FOOT.

Ligaments. { Plantar,
Lateral (2).

Note: Arrangement similar to those found in the hand.

TABLE OF THE DIFFERENT KINDS OF ARTICULATIONS.*

Dentata: Having tooth-like processes.

As in interparietal suture.

Serrata: Having serrated edges, like the teeth of a saw.

As in interfrontal suture.

Limbosa: Having beveled margins, and dentated processes.

As in fronto-parietal suture.

Squamosa: Formed by thin beveled margins, overlapping each other.

As in squamo-parietal suture.

Harmonia: Formed by the opposition of contiguous rough surfaces.

As in intermaxillary suture.

Sutura vera (true): Articulate by indented borders.

Sutura: Articulate by processes and indentations interlocked together.

Sutura notha (false): Articulate by rough surfaces.

Schindylesis: Articulation formed by the reception of a thin plate of one bone into a fissure of another.

As in articulation of rostrum of sphenoid with vomer.

Gomphosis: Articulation formed by the insertion of a conical into a socket.

The Teeth.

Synarthrosis, or Immoveable Joint: Surfaces separated by fibrous membrane, without any intervening synovial cavity, and immovably connected with each other.

As in joints of cranium and face (except lower jaw).

Amphiarthrosis:
Mixed articulation.

1. Surfaces connected by fibro-cartilage, not separated by synovial membrane, and having limited motion. As in joints between bodies of vertebræ.
2. Surfaces covered by fibro-cartilage; lined by a partial synovial. As in sacro-iliac and pubic symphyses.

Arthrodia: Gliding joint; articulations by plane surfaces, which glide upon each other. As in sterno- and acromio-clavicular articulations.

Enarthrosis: Ball-and-socket joint; capable of motion in all directions. Articulations by a globular head received into a cup like cavity. As in hip- and shoulder-joints.

Diarthrosis:
Movable joint.

Ginglymus: Hinge joint; motion limited to two directions, forward and backward. Articular surfaces fitted together so as to permit of movement in one plane. As in elbow, ankle, and knee.

Diarthrosis Rotatoria or Lateral Ginglymus: Articulation by a pivot process turning within a ring, or ring around a pivot. As in superior radio-ulnar articulation, and atlo-axoid joint.

* From Gray's "Human Anatomy."

SYNOVIAL MEMBRANES.

Varieties of Membranes : *Articular* (found in freely-movable joints); *bursal* (interposed between surfaces which move upon each other). Subdivided into *bursæ mucosæ* and *synovial bursæ*; vaginal (synovial sheaths).

Atlo-Axoid Articulation : *Four synovial membranes :* One on inner side of each capsular ligament; one between anterior surface of odontoid process of axis, and the anterior arch of atlas; one between posterior surface of odontoid process and the transverse ligament.

Temporo-Maxillary Articulation : *Two membranes :* The *upper membrane* is continued from the cartilaginous surface of the zygomatic eminence and glenoid cavity over the upper surface of the fibro-cartilage; the *lower one* covers the inferior surface of the fibro-cartilage and the condyle of the jaw.

Costo-Sternal Articulation : Synovial membranes are found between the cartilages and sternum, with the exception of the first.

Articulations of Necks and Tubercles of Ribs with Transverse Processes : The capsular ligament encloses a small synovial membrane.

Sacro-Iliac Articulation : The articular surfaces of this joint are lined by a delicate membrane.

Interchondral Articulations: Synovial membranes line each interchondral articulation.

Sacro-Coccygeal Articulation: Sometimes a membrane is found (especially during pregnancy) when the coccyx is very movable.

Sterno-Clavicular Articulation: *Two synovial membranes:* One extends from sternal end of clavicle over adjacent surface of the fibro-cartilage, and cartilage of first rib; the other is interposed between the articular surface of sternum and adjacent surface of the fibro-cartilage.

Scapulo-Clavicular Articulation: When a complete interarticular cartilage exists there are two membranes; usually there is but one.

Shoulder-Joint: The border of the glenoid cavity, together with its fibro-cartilaginous rim, are lined with synovial membrane. From here it extends over the inner surface of the capsular ligament, being continued to the head of the bone. A tubular sheath from this membrane embraces the long tendon of the biceps. Communication exists between it and a large bursal sac under the tendon of the subscapularis, and occasionally another bursal sac (beneath tendon of infraspinatus) is in relation.

Elbow-Joint: The articular surface of the humerus is covered with synovial membrane; it lines the coronoid and olecranon fossæ, and then extends over the anterior, posterior, and lateral ligaments. Between the lesser sigmoid cavity, internal surface of the orbicular ligament, and the circumference on the head of the radius, a pouch is formed.

Superior Radio-Ulnar Articulation: The bone-surfaces entering into the formation of this joint are invested with a duplicature of synovial membrane. This membrane is continuous with that of the elbow-joint.

Inferior Radio-Ulnar Articulation: The synovial membrane (*membrana sacciformis*) of this articulation passes over the margin of the anterior surface of the head of the ulna, whence it extends to the radius, forming a *cul-de-sac*; from here it passes over the superior surface of the fibro-cartilage.

Wrist-Joint: The synovial membrane lines the inferior surface of the inter-articular fibro-cartilage above, and the internal surfaces of the following ligaments: ext. and int. lateral, and the anterior and posterior.

Articulations of First Row of Carpal Bones: The synovial membrane from the wrist-joint lines the superior surfaces of the inter-osseous ligaments, there being a separate one for the articulation of the pisiform-cuneiform bones.

Articulations of the Two Rows of Carpal Bones with Each Other: The common synovial membrane of the carpus passes beneath the scaphoid, semi-lunar, and cuneiform bones, shooting off two prolongations between their contiguous surfaces; it then passes over the bones of the second row, sending down three prolongations between them, which embraces the carpal ends of the four inner metacarpal bones. A separate membrane exists between the pisiform-cuneiform bones.

Articulation of Metacarpal Bone of Thumb with

Trapezium: The capsular ligament is lined with a separate membrane, whilst the trapezium articulates with the metacarpal bone of the thumb by a distinct capsule and synovial membrane.

Articulations of the Metacarpal Bones of Fingers

with the Carpus: The synovial membrane here is an off-shoot of that between the two rows of the carpal bones. The articulation of the unciform with the fourth and fifth metacarpal bones sometimes has a separate membrane.

Articulations of Metacarpal Bones with Each Other :

The membrane here is a reflection of that found between the two rows of carpal bones ; it lines the lateral facets of the metacarpal bones.

Metacarpo-Phalangeal Articulations:

The anterior ligaments (glenoid ligaments of Cruveilhier) are lined with synovial membrane.

Hip-Joint:

The synovial membrane lines the interior of the joint, and is very extensive. It envelops the anterior and posterior surfaces of the neck of the femur, and the mass of fat contained in the fossa of the acetabulum, where it forms a sheath around the ligamentum teres, as far as the head of the femur. Sometimes it communicates with the bursa beneath the psoas and iliacus muscles.

Knee-Joint:

The synovial membrane in the knee-joint is the largest in the body. Beginning at the superior margin of the patella, it forms a large *cul-de-sac* beneath the extensor muscles of the thigh ; it is reflected in the form of tubes over the crucial

ligaments, covering both surfaces of the semi-lunar cartilages; it also covers the tuberosities of the femur for some distance, being lower on the inner one; it lines the capsular ligament; sends a tube round the tendon of the popliteus; between the tibia and patellæ it lies on a mass of fat, sending off the *ligamentum mucosum*. Sometimes the membrane is continued into the sup. tibio-fibular articulation.

Superior Tibio-Fibular Articulation: Is lined by a synovial membrane, which sometimes is continuous with that of the knee-joint.

Inferior Tibio-Fibular Articulation: The ankle-joint furnishes the membrane which lines the articular surface of this articulation.

Ankle and Foot: *Synovial membranes:* One at the ankle-joint proper; one in the posterior calcaneo-astragaloid articulation; another in the anterior calcaneo-astragaloid articulation and the astragalo-scaphoid; another between the os calcis and cuboid bones; another between the first metacarpal and the three internal cuneiform bones; another between the cuboid and the fourth and fifth metatarsal bones; between the scaphoid and the three cuneiform bones; between the cuneiform bones, and between their anterior extremities and the bases of the second and third metatarsal bones.





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