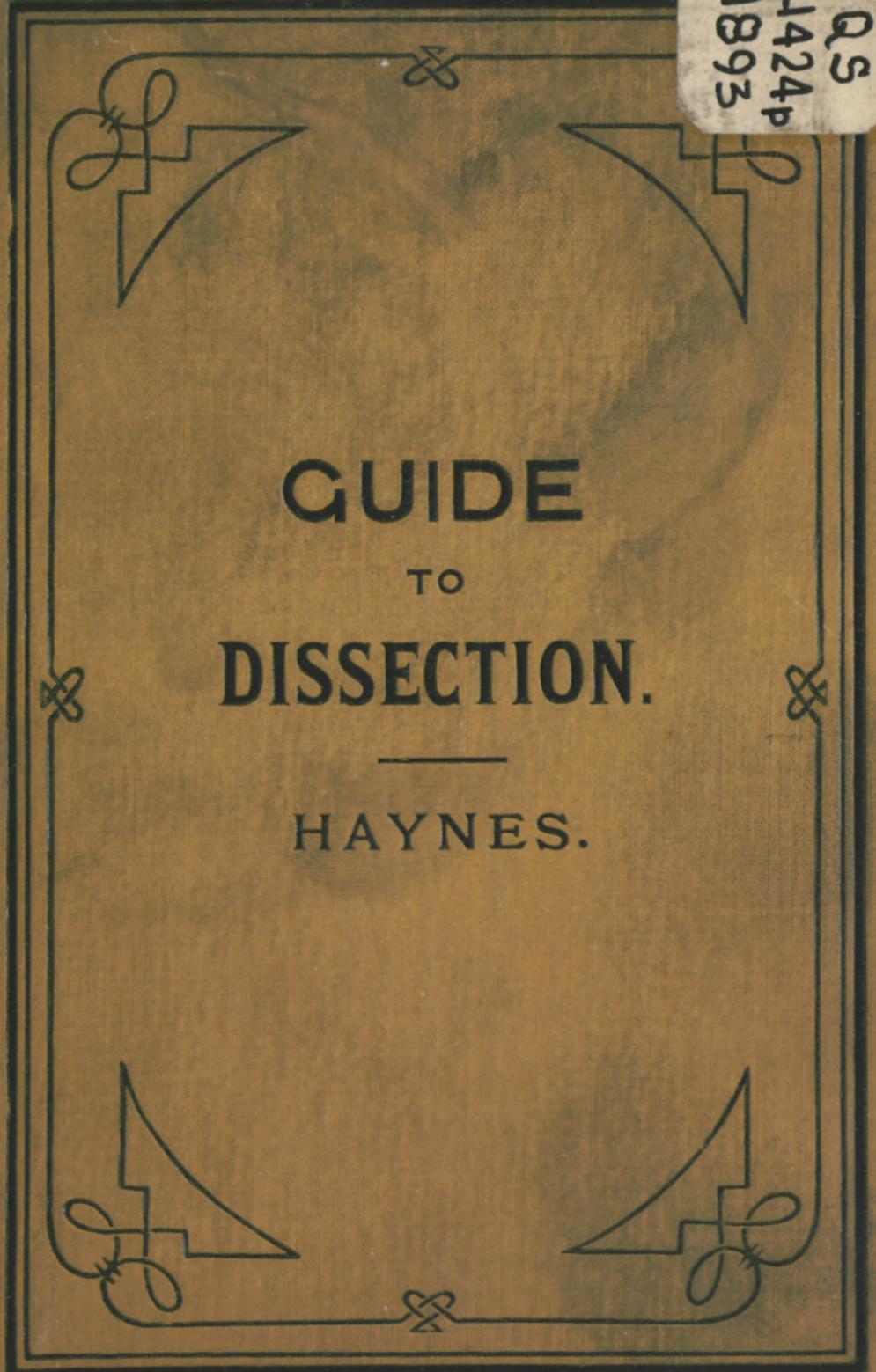


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GUIDE
TO
DISSECTION.
—
HAYNES.

Surgical Handicraft.

— A MANUAL —

OF

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other matters connected with the
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By WALTER PYE, F.R.C.S.

Surgeon to St. Mary's Hospital and the Victoria Hospital for
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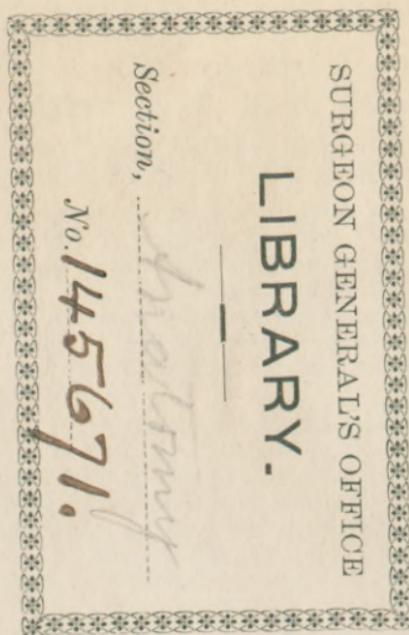
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A PRACTICAL GUIDE

FOR

BEGINNERS TO THE DISSECTION

OF THE

HUMAN BODY

BY

IRVING S. HAYNES, PH.B., M.D.

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PREFACE.

CERTAIN conditions confront every beginner in dissection—namely, his inexperience, the brief time at his disposal with the many demands made upon it and the almost entire absence of directions for dissection in the standard works on descriptive anatomy, as well as their separate grouping of muscles, vessels, nerves, etc. This small volume has been prepared to meet as far as possible the above conditions.

It aims to supply the beginner with definite directions founded on practical experience in the dissecting-room, to economize his time by being short and to the point, to fill the gap between the actual dissection of the cadaver and the descriptive anatomy of the standard text-books, by giving as clearly as possible the *methods* by which structures are to be exposed; and, above all, it aims to answer his constant question, "*What shall I do next?*" thus to supplement, not supplant, the explanations of the instructors and enable the beginner to accomplish the most on one subject in the allotted time.

Methods of exposing the various structures are given in as full detail as is thought necessary; but all description of such structures with their relations, as well as the dissection of the joints and of special organs as the brain, eye, heart, liver, testicle, etc., is intentionally omitted and the student referred to his standard text-books for all such information.

IRVING S. HAYNES.

NEW YORK, January, 1893.

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GENERAL REMARKS.

EVERY student must do his own dissecting. While this is so, in order to facilitate the work he is recommended to have a friend present who will read to him from his text-book the description of the various structures, as they are brought to light. This aids the dissector and prepares the reader for the same part.

The general directions for dissection may be summed up as follows:

Read over the descriptive anatomy of the part in your text-book before beginning work upon it.

Identify the landmarks of the various regions and the relation to them of the deeper organs before making a single incision (see Holden's "Landmarks" in Gray's Anatomy).

Have the bones of the part by you or where you can easily refer to them.

Closely follow the directions of the dissecting manual selected, completing each section in turn before going on with the next. Make the first cut through the skin *alone* and remove it from the area indicated.

Clean muscles from *origin* to *insertion*, saving their nerve and arterial supply.

Remove the connective tissue from vessels and nerves, trace their branches and examine their relations. Proceed carefully. Cut nothing unless absolutely necessary, and not then until the overlying parts have been fully dissected.

When through for the day, replace the parts, fascia and skin, and cover all with a damp cloth.

Keep the fingers and toes wrapped in a damp cloth to prevent drying.

GUIDE TO DISSECTION.

HEAD AND NECK.

FIRST WEEK.—Anterior Region.

FIRST DAY.

Incisions.—1. From the root of the nose in the median line to the occipital protuberance.

2. Horizontally around the head just above the eyebrows and ears.

Be very careful to remove only the skin, which is very thin over the forehead and everywhere closely attached to the muscles beneath.

Parts Exposed.

Occipito-frontalis.

Auricular muscles.

Supra-trochlear and orbital nerves.

Supra-orbital artery.

Frontal artery.

Temporal arteries.

Facial and auriculo-temporal nerves.

1. Occipito-frontalis.—This shows as a thin layer of muscular fibres in two portions, an anterior and posterior, connected by a broad aponeurosis (galea capitis). For posterior, see later.

2. Auricular muscles.—Superficial to the aponeurosis of the occipito-frontalis and just above and in front of the ear, are located insignificant remnants of large muscles in animals—the superior and anterior auricular muscles.

3. Supra-trochlear and orbital nerves. Frontal and supra-orbital arteries.—Near the median line in front you will find the supra-trochlear nerve, the frontal artery, (a little external) the supra-orbital nerve and artery coming out through the supra-orbital notch or foramen and all ascending over the forehead.

4. Temporal artery. Facial and auriculo-temporal nerves.—Laterally in the temporal region you will see the temporal artery and its two branches, the anterior and posterior. Also look for terminal branches of the temporal portion of the facial nerve and a branch or two of the auriculo-temporal nerve.

SECOND DAY.

Incisions.—**1.** Continue the median incision to the point of the chin.

2. From the last point carry a cut backward along the lower border to the angle of the jaw and upward to the lobe of the ear.

Reflect the flap from before backward. Much care will have to be exercised in removing the integument from the face, as it is very thin, especially so over the eyelids, and closely attached to the facial muscles, which are thin, pale and indistinct.

Parts Exposed.

Orbicularis palpebrarum.

Pyramidalis nasi.

Corrugator supercillii.

Supra-orbital notch.
 Levator palpebræ superioris.
 Tendon and pulley of superior oblique.
 Temporal fascia and muscle.
 Superior labial muscles.
 Infra-orbital foramen, nerve and artery.
 Facial nerve.
 Temporal and orbital arteries.
 Facial vein.
 Inferior labial muscles.
 Facial artery and branches.
 Parotid gland and Stenson's duct.
 Transverse facial artery.
 Masseter and buccinator muscles.

5. *Orbicularis palpebrarum*.—This is the broad sphincter muscle of the eye. It consists of a thin layer of muscular fibres arranged concentrically, and blends above with the occipito-frontalis.

6. *Pyramidalis nasi*.—This muscle is a continuation downward on to the side of the nose of the inner fibres of the occipito-frontalis.

Divide the aponeurosis of the occipito-frontalis in the median line and also over the vertex of the head from ear to ear.

Reflect the triangular portion downward and forward; when near the orbital arch the following muscle will be exposed:

7. *Corrugator supercilii*.—This small muscle is found running from the internal angular process outward and upward beneath and blending with the occipito-frontalis.

Turn the occipito-frontalis still farther downward.

8. Supra-orbital foramen and contents.—This will ex-

pose the supra-orbital notch or foramen and the artery and nerve of the same name issuing through it. The course of the artery and nerve can be traced upward through the fibres of the occipito-frontalis.

Reflect the posterior half of the occipito-frontalis—you have now exposed the temporal fascia; clearly make out its attachments. Cut it away from its upper attachment and turn it downward.

9. Temporal muscle.—The temporal portion of the temporal muscle is now seen, one of the most important of the muscles of mastication.

Return the temporal fascia and occipito-frontalis to their natural positions.

Cut through the orbicularis palpebrarum along the margin of the orbit, and open the socket of the eye.

10. Levator palpebræ superioris.—By scratching in the middle of the upper lid the levator palpebræ superioris will be exposed.

11. Superior oblique and pulley for tendon.—Also find the superior oblique and follow its tendon until you come to the pulley for the same.

The contents of the orbit may now be removed by dividing the above muscles and all other muscles, arteries, and nerves, as close to the wall of the orbit as possible. The eye may be dissected at the student's leisure.

The dissection of the face is now to be resumed. The curved scissors—curved on the flat—will be found best adapted to cleaning the fatty tissue from the facial muscles, cutting in the direction of the fibres of the muscles.

Be careful to preserve the branches of the facial nerve and artery wherever found. As soon as a nerve or artery is discovered, trace it out both ways as far as possible, and when several structures are thus isolated from each other,

the intervening tissue may be carefully pulled and cut away. Concerning the labial groups of muscles the origin, insertion, and action may be carefully read, and the nerve supply learned.

12. Superior labial muscles.—Below the orbit and from the nose outward recognize the following muscles:

a. Levator labii superioris alæque nasi—elevator of the upper lip and wing of the nose.

b. Levator labii superioris proprius—chief elevator of the upper lip—closely blends with the above.

c. Zygomaticus major and sometimes, between it and the preceding, the

d. Zygomaticus minor.

e. Beneath this layer of muscles you will find the levator anguli oris—elevator of the angle of the mouth.

f. Orbicularis oris. See No. 18 *d*.

13. Infra-orbital foramen, artery and nerve.—Just above the origin of the levator anguli oris you will find the infraorbital foramen transmitting the artery and nerve of the same name.

FOURTH DAY.

14. Parotid fascia, gland and duct.—Covering the parotid gland is a dense layer of fascia which also covers the masseter muscle under the name of masseteric fascia. It is derived from the first layer of the cervical fascia and reaches as high as the zygomatic arch.

Be very careful in removing this fascia to save all the filaments of the facial nerve.

The duct of the gland—Stenson's—runs forward and passes through the buccinator muscle. Usually a small detached portion of the parotid is found on the masseter muscle—the glandula socia parotidis,

15. Temporal, transverse facial and orbital arteries.—Just above Stenson's duct and then passing downward is the transverse facial artery. Trace it carefully beneath the gland until you reach the temporal from which it rises. Follow the temporal artery upward and find its orbital branch, which passes to the outer part of the orbit.

16. Facial nerve.—Crossing the face are the temporal, malar and infra-orbital branches of the temporo-facial division of the seventh nerve. Trace these branches into the parotid gland to the point where the facial divides into the upper division just mentioned and the lower or cervico-facial division.

This radiation of branches is called the *pes anserinus*.

Follow forward the buccal and supra-maxillary branches of the cervico-facial division.

17. Facial vein.—The facial vein begins below the orbit and passes straight downward to just behind the facial artery, where it curves over the lower jaw.

18. Inferior labial muscles.—Dissect out the following muscles:

a. *Levator labii inferioris*, or *levator menti*. To find this little muscle divide the tissues of the chin in the median line and separate them.

b. *Depressor labii inferioris*.

c. *Depressor anguli oris*.

d. *Orbicularis oris*. The sphincter muscle of the mouth into which all the other oral muscles are inserted.

e. *Platysma myoides*. The upper portion that is inserted into the angle of the mouth may be removed, but do not disturb the part attached to the lower jaw.

19. Facial artery and branches.—The facial artery and all its facial branches are now to be dissected out.

Begin where the artery curves over the lower jaw at the

junction of its middle and posterior thirds, and trace the artery in its devious course around the angle of the mouth up by the side of the nose until it anastomoses at the inner angle of the eye with the nasal branch of the ophthalmic.

In its course the facial gives off the following branches:

- a. Muscular (masseter and buccinator).
- b. Inferior labial.
- c. Inferior coronary.
- d. Superior coronary.
- e. Lateralis nasi.
- f. Angular (last portion of facial).

20. Masseter and buccinator.—Clean the surface of the masseter and buccinator of all remaining tissue.

Note the two portions of the former, and where Stenson's duct pierces the latter muscle.

21. Mental foramen, nerve and artery.—Find the mental foramen in the lower jaw and the mental nerve and artery issuing from it.

FIFTH DAY.

Incisions.—**1.** Carry the median incision to the top of the sternum.

2. Make a transverse one to this out along the clavicle to the point of the shoulder. (Same for upper extremity, p. 30, incision 2.)

Reflect the integument from above downward and as far backward as possible. Be sure to remove the skin only.

Parts Exposed.

Platysma. Nerve supply. Cervical fascia.

22. Platysma myoides.—After making out its attachments, begin below and carefully raise it from the struc-

tures underneath, being sure to leave them untouched. Roll the muscle up on to the lower jaw.

In raising it you will find its nerve supply, which recognize and divide.

You now have exposed the first layer of the deep cervical fascia.

Its facial portions have already been mentioned as the parotid and masseteric fasciæ.

Study the description of the deep cervical fascia as given in the text-books.

Parts Exposed.

External and anterior jugular and facial veins.

Submaxillary gland.

Superficial nerves.

Sterno-cleido-mastoid.

Trapezius.

Spinal accessory and cervical branch to trapezius.

Facial, submental and submaxillary arteries.

Digastric.

Stylo-hyoid.

Mylo-hyoid nerve.

23. External and anterior jugular and facial veins.—Trace the external jugular from the parotid gland to where it empties into the subclavian. Clean the facial vein and its communications. Follow the anterior jugular to its termination in the subclavian.

24. Submaxillary gland.—Recognize the submaxillary gland and note its relations (as the dissection is carried deeper), as it must often be incised for abscess, removed for strumous or tubercular disease, and is one of the important guides to ligation of the lingual artery.

25. Superficial nerves.—The following nerves are to be sought for and cleaned.

If not readily found note their position in the plate of your text-book and then scratch through the fascia in the direction of the nerve, in several places if necessary until found. Also by tracing the nerves most easily found back to the trunk from which they spring, you will locate the trunk and find its other branches.

a. Infra-maxillary branch of the cervico-facial division of the seventh cranial nerve.

b. Auricularis magnus. Which appears curving over the posterior border of the sterno-mastoid muscle above its middle and passes vertically upward to the parotid gland, where it gives off branches.

c. Superficial cervical. Passes transversely across the sterno-mastoid.

Nerves **b** and **c** arise from the second and third cervical nerves.

d. Small occipital. Issues from the same place as the last two and ascends along the posterior border of the sterno-mastoid to the side of the head behind the ear. This comes from the second cervical nerve.

e. Several nerves are found passing downward to supply the integument over the upper part of the sternum, clavicle and acromion. They take the name of the region they supply. They are branches of the third and fourth cervical nerves.

26. Sterno-cleido-mastoid.—Clean the surface of the sterno-cleido-mastoid from origin to insertion. Study well its relations and the part it plays in forming the triangles of the neck.

27. Trapezius.—Clean the anterior portion of the trapezius.

Between the last two muscles and bounded below by the clavicle is the posterior triangle of the neck.

This space is filled with dense fascia in which you want to find the two nerves below.

28. Spinal accessory and muscular branch to trapezius.—The spinal accessory nerve issues from the posterior, middle border of the sterno-cleido-mastoid and passes downward and backward to the anterior surface of the trapezius. It is closely followed in its course by the muscular branch from the third and fourth cervical nerves to the trapezius.

29. Digastric and stylo-hyoid muscles.—Dissect out the anterior belly of the digastric and as much of its posterior belly with the stylo-hyoid as possible. Note that the latter muscle is pierced by the tendon of the posterior part of the digastric.

30. Facial, submaxillary and submental arteries.—Trace the facial artery as far as possible and recognize its submaxillary branches to the gland and the course of its submental branch.

31. Mylo-hyoid nerve.—By drawing the gland downward and looking a little deeper than the submental artery and immediately below the lower jaw, you will find the small mylo-hyoid nerve passing forward. Trace its distribution.

This completes the dissection for the first five days; the sixth day of the week is left to complete any unfinished part.

Nothing is said about removing the brain, as generally it is useless, it having by this time become unfit for dissection.

HEAD AND NECK.

SECOND WEEK.—Anterior Surface.

FIRST DAY.

To continue the work on the neck divide the external jugular vein and sterno-mastoid muscle at their middle and reflect.

Be careful to leave the spinal accessory nerve intact.

Clean the parts of fascia and adipose tissue.

Draw the submaxillary gland upward and carefully incise any remaining fascia, holding the gland down, until the deeper structures are fully exposed.

Parts Exposed.

Lingual triangle.

Mylo-hyoid.

Posterior belly of digastric.

Hypoglossal, descendens hypoglossi (noni) and muscular branches of hypoglossal nerve.

Omo-hyoid.

Sterno-hyoid.

Sterno-thyroid.

Thyro-hyoid.

Communicans hypoglossi (noni).

Carotid artery.

Internal jugular vein.

Pneumogastric nerve.

32. Lingual triangle.—As you raise the submaxillary gland you will notice a triangular space that is bounded as

follows: In front by the posterior margin of the mylo-hyoid muscle (also sometimes given the anterior belly of digastric), behind by the posterior belly of the digastric (and stylo-hyoid muscle) and above by the hypoglossal nerve (which shows through the fascia). The floor of the space is formed by the hyoglossus muscle. By cutting through the last transversely to its fibres, the lingual artery will be found.

33. Mylo-hyoid.—Divide the tendon of the anterior belly of the digastric and clean the mylo-hyoid muscle. Notice how the submaxillary gland is extended under the muscle.

34. Hypoglossal, descendens hypoglossi, and thyro-hyoid branch.—Expose the hypoglossal nerve as far as possible. Notice how it curves around the occipital artery and where it gives off the descendens hypoglossi (noni), and trace this nerve down the sheath of the carotid to its muscular distribution. Note the point where the communicans hypoglossi joins the descendens.

Find the separate branch of the hypoglossal nerve to the thyro-hyoid muscle.

35. Digastric and stylo-hyoid.—Complete the dissection of the posterior belly of the digastric and the stylo-hyoid muscles and endeavor to find their nerve supply.

SECOND DAY.

36. Omo-hyoid, sterno-hyoid, sterno-thyroid and thyro-hyoid.—Completely clean the omo-hyoid, leaving a small loop of fascia to mark where it is bound down to the clavicle, the sterno-hyoid, sterno-thyroid and thyro-hyoid, and demonstrate their nerve supply.

34. Communicans hypoglossi (noni).—Go back to the loop between the descendens and communicans hypoglossi

(noni), and trace the latter to its origin by two branches, one from the second and the other from the third cervical nerves.

35. Common carotid triangles.—Study well the location of the common carotid artery and note where it bifurcates. Practise bounding the triangles of the neck, and examine their contents as far as dissected out and their relations.

36. Internal jugular vein.—Expose the internal jugular vein as high as possible and trace it downward until with the subclavian it forms the innominate.

37. Pneumogastric nerve.—Bring the pneumogastric nerve into view by separating the carotid and internal jugular, and clean it as far as convenient both ways.

THIRD DAY.

Divide the mylo-hyoid muscle along the median raphé, also cut through its attachments to the hyoid bone and reflect the muscle.

Parts Exposed.

Genio-hyoid.

Genio-hyoglossus.

Hyoglossus.

Wharton's duct.

Gustatory nerve.

Submaxillary ganglion.

Hypoglossal nerve.

38. Genio-hyoid, genio-hyoglossus, hyoglossus.—On either side of the median line you will find a genio-hyoid muscle. Underneath this (really above) the genio-hyoglossus. More externally the entire extent of the hyoglossus can be made out.

39. Wharton's duct.—Trace the duct—Wharton's—of the submaxillary gland forward to the floor of the mouth.

40. Gustatory nerve.—Along with the duct you will find the gustatory branch of the inferior maxillary nerve. By drawing the gland well down you can trace the nerve back under the lower jaw between it and the internal pterygoid muscle.

41. Submaxillary ganglion.—In the little space between the gland, duct and gustatory nerve is located the submaxillary ganglion; about as large as the head of a small pin.

42. Hypoglossal nerve.—Trace the final muscular distribution of the hypoglossal nerve.

Divide the posterior belly of the digastric and the stylohyoid muscles near the hyoid bone.

Parts Exposed.

Stylo-glossus.

Stylo-pharyngeus.

Superior constrictor.

Middle constrictor.

Glosso-pharyngeal nerve.

42. Stylo-glossus, -pharyngeus, and constrictor superior and middle.—The stylo-glossus muscle passes from the styloid process to the side of the tongue, decussating with the hyoglossus.

The stylo-pharyngeus descends to the pharynx and passes in between the borders of the superior constrictor above and the middle below. The constrictor muscles are only slightly exposed.

44. Glosso-pharyngeal nerve.—The glosso-pharyngeal nerve comes out between the internal jugular vein and in-

ternal carotid artery. It issues from under the styloid process and curves forward around the stylo-pharyngeus muscle. Trace it as far as possible.

FOURTH DAY.

Divide the omo-hyoid near its middle, the sterno-hyoid and sterno-thyroid near the sternum, and reflect them.

Divide the internal jugular near the subclavian vein (first having ligated it) and as high up near the head as possible, and remove it.

Parts Exposed.

External carotid and branches.

Internal carotid.

Pneumogastric nerve.

Recurrent laryngeal nerve.

Phrenic nerve.

Scalenus anticus.

Subclavian vein.

Subclavian artery.

Thyroid axis.

Transversalis colli artery.

Supra-scapular artery.

45. External carotid.—The external carotid and all its branches can now be finished. Most of the branches have been partially cleaned in the dissection of other structures, but are now to be taken up more particularly.

As usually found, the branches are given off in the following order:

a. Ascending pharyngeal in the fork between the external and internal—but often higher up from the external carotid.

b. Superior thyroid. In tracing this artery, especially notice the crico-thyroid branch.

c. Lingual. Follow its course and bound the lingual triangle.

d. Occipital. Remember its relation to the hypoglossal nerve and follow the artery back under the digastric.

e. Facial. Complete the dissection of this branch by finding the ascending palatine and tonsillar arteries.

f. Posterior auricular. Runs up behind the ear as its name indicates. It is crossed by the facial nerve.

g. h. Cut away all remains of the parotid gland and expose the bifurcation of the external carotid into the internal mammary and temporal arteries.

46. Internal Carotid.—The internal carotid ascends vertically to the base of the skull; at first the external carotid is in front, then superficial to the internal. There are no branches of the internal in the neck.

47. Pneumogastric, recurrent laryngeal, and cervical cardiac nerves.—Follow the pneumogastric down to the chest. On the right side its recurrent laryngeal branch curves around the subclavian artery and on the left side around the aorta, and then passes up (same now on both sides) between the trachea and œsophagus and disappears under the lower border of the inferior constrictor muscle.

With care the inferior cardiac branch may be found. It is given off near the clavicle, then passes into the chest.

48. Scalenus anticus.—This muscle is of great importance surgically as furnishing a sure guide to the subclavian artery, when the artery is normal. The muscle passes between the subclavian vein (in front) and artery (behind). It is inserted into the tubercle of the first rib, which should be felt by passing the finger down the front of the muscle.

49. Phrenic nerve.—The phrenic nerve—internal re-

spiratory nerve of Bell—crosses the scalenus obliquely from above downward and without inward, and passes into the chest between the subclavian vein and artery.

50. Subclavian vein.—After noting the relations of the subclavian vein ligature it at its beginning and ending, and remove it.

51. Subclavian artery.—Learn the artery and its relations. Notice how high it reaches into the neck and how intimately related to the brachial plexus.

52. Thyroid axis and external branches.—The thyroid axis comes off from the front of the subclavian artery just internal to the scalenus anticus. Trace the two external branches of the thyroid axis—the transversalis colli and supra-scapular—out across the scalenus anticus muscle and phrenic nerve. The former runs outward above and parallel with the clavicle, and the latter passes behind the clavicle to the upper border of the scapula.

FIFTH DAY.

Divide the common carotid near its bifurcation and draw it upward and forward.

Divide the scalenus anticus over the subclavian artery.

Parts Exposed.

Superior laryngeal nerve.

Sympathetic nerve and ganglia.

Rectus capitis anticus major.

Longus colli.

Internal mammary artery.

Vertebral artery.

Inferior thyroid artery.

Superior intercostal artery.

Inferior constrictor muscle.

Scalenus medius.
 Brachial plexus.
 Scalenus posticus.
 Levator anguli scapulæ.
 Splenius capitis.
 Internal pterygoid.

53. Superior laryngeal nerve.—This nerve will be found coming off from the pneumogastric high up and passing behind the internal carotid to the larynx—it has an upper, internal branch and a lower, external branch.

53. Sympathetic nerve and ganglia.—The sympathetic nerve will be found directly behind the carotid artery. It lies upon the rectus capitis anticus major and longus colli muscles. It presents a large superior and inferior and a small middle cervical ganglion.

54. Remaining branches of subclavian artery.—From the upper and back part of the subclavian you will find the vertebral which ascends vertically and enters the foramen in the transverse process of the sixth cervical vertebra.

Below and behind is given off the internal mammary which passes into the chest.

The inferior thyroid, the remaining branch of the thyroid axis, reaches the thyroid gland by a tortuous course behind the common carotid artery and sympathetic nerve.

The inferior thyroid gives off (usually) the ascending cervical artery, which passes upward between the vertebral origins of the scalenus anticus and rectus capitis anticus major.

Raise the subclavian artery and you will find its last branch, the superior intercostal, coming off from the posterior surface of the artery.

55. Inferior constrictor. Scalenus medius and posticus.

Levator anguli scapulæ. Splenius.—Clean the following muscles: Inferior constrictor; scalenus medius and posticus; levator anguli scapulæ; splenius capitis et colli.

56. Brachial plexus.—In connection with the one dissecting the upper extremity, study the formation of the brachial plexus (after disarticulating the clavicle from the sternum).

This completes the dissection for the second week, and is intended to take five days, allowing a day extra for unfinished work and reviews.

HEAD AND NECK.

THIRD WEEK.—Posterior Surface.

FIRST DAY.

Incisions.—1. Continue the median incision down the back of the neck to midway between the shoulders.

2. Carry a transverse incision out along the scapular spine to the point of the shoulder to meet the anterior incision (same as 2, p. 55).

Remove the integument entirely. It will be found bound by a dense fascia to the parts beneath.

Parts Exposed.

Occipital artery.
Great occipital nerve.
Third occipital nerve.
Trapezius.
Small occipital nerve.

57. Occipital artery.—The occipital artery will be found imbedded in the dense fascia of the back of the head. It pierces the trapezius close to the occipital bone and near its outer border and ascends over the back of the head.

58. Great occipital nerve.—Close to and internal to the artery will be found the great occipital nerve. The internal branch of the posterior division of the second cervical nerve. It takes a vertical course. Trace the nerve from its exit through the trapezius upward.

59. Third occipital nerve.—Internal to the great occipital nerve and close to the median line is a smaller—or third—occipital nerve. The internal cutaneous branch of the posterior division of the third cervical nerve.

60. Small occipital nerve.—Recognize the small occipital nerve and complete its dissection if not finished (see § 25, *d*, page 15).

61. Trapezius muscle.—Finish cleaning the trapezius. Notice where the spinal accessory and cervical branch enter the muscle. In connection with the one working on the upper extremity make out its lower portion—origin and insertion.

SECOND DAY.

Divide the trapezius one-half inch from its superior and close to its median origin and turn it downward.

Parts Exposed.

Splenius capitis et colli.

Levator anguli scapulæ.

Posterior scapular artery.

62. Splenius capitis et colli.—The splenius runs obliquely outward and upward to the occipital bone and mastoid

process, and also to the three or four upper cervical vertebræ. It is separated from the median line by a triangular space, in which is seen the complexus.

63. Levator anguli scapulæ.—The levator anguli scapulæ, as its name indicates, reaches from the upper angle of the scapula to the three or five upper cervical vertebræ.

64. Posterior scapular artery.—Underneath the above muscle and rhomboids, and showing between them, you will find the posterior scapular branch of the transversalis colli passing around the upper angle of the scapula.

Divide the splenius one inch from its cranial and vertebral (upper) attachments, and turn downward and inward.

Parts Exposed.

Occipital artery.

Trachelo-mastoid.

Complexus and biventer.

65. Occipital artery.—The entire course of the occipital artery is now exposed. It passes under the following muscle.

66. Trachelo-mastoid muscle.—The trachelo-mastoid runs vertically downward from the mastoid process to the cervical vertebræ, third to sixth.

67. Complexus and biventer.—The complexus is now fully exposed. Its inner portion called the biventer—two-bellied—cervicis can easily be distinguished. Note the points where the great and third occipital nerves leave the muscle.

THIRD DAY.

Divide the complexus, biventer and trachelo-mastoid muscles close to their cranial attachments. Cut the levator anguli scapulæ from its vertebral origin. (It is intended

that the dissector on the upper extremity will have removed the rhomboids and serratus posticus superior by this time.)

Parts Exposed.

Sub-occipital triangle.
Sub-occipital nerve.
Vertebral artery.
Rectus capitis posticus minor.
Root of great occipital nerve.
Root of third occipital nerve.
Princeps cervicis artery.
Profunda cervicis artery.
Scalenus posticus.
Cervicalis ascendens.
Transversalis colli.
Semispinalis colli.

68. Sub-occipital triangle, boundaries and contents.—The sub-occipital triangle can be nicely demonstrated, if the student is careful to dissect off the thick fascia which envelops the muscles forming the triangle and fills the space between them. Unless care is used in cleaning out the triangle, the sub-occipital nerve will be cut away.

The muscles forming the triangle are to the inside—the rectus capitis posticus major. Outside the obliquus superior, below the obliquus inferior.

When the triangle is cleaned, at its bottom will be seen the vertebral artery—learn its course. The sub-occipital nerve comes out alongside the vertebral artery between the occipital bone and posterior arch of the atlas.

69. Rectus capitis posticus minor.—Internal to and beneath the larger rectus is the rectus capitis posticus minor.

70. Great and third occipital nerves.—Trace the great and third occipital nerves to their roots.

71. Princeps and profunda cervicis arteries.—The long and important anastomosis between the princeps cervicis branch of the occipital and the profunda cervicis branch of the superior intercostal should be traced.

The former—princeps cervicis—crosses the superior and inferior oblique muscles, the latter ascends on the semispinalis colli.

72. Scalenus posticus, cervicalis ascendens, and transversalis and semispinalis colli.—Identify by the aid of the plates and descriptions in your standard text-books the following muscles. It is not necessary to learn them.

Scalenus posticus.

Cervicalis ascendens.

Transversalis colli.

Semispinalis colli.

UPPER EXTREMITY AND THORAX.

FIRST WEEK.—Anterior Surface.

FIRST DAY.

As a preliminary study it is well to map out on the chest with an aniline pencil the bony landmarks and relative positions of the thoracic viscera—lungs, heart and its valves and great vessels—as given by Holden in his “Landmarks” in Gray’s Anatomy.

Incisions.—1. In the median line from the top to the end of the sternum.

2. From the beginning of 1, out along the clavicle to the point of the shoulder (same incision as 2, Head and Neck, p. 13).

3. From the lower end of 1, transversely around the body, as far as the posterior axillary line. (No. 2, p. 75.)

4. From the centre of the clavicle down the front of the arm to the elbow.

Remove the integument from the chest and upper part of arm.

Parts Exposed.

Superficial fascia.

Origin of platysma.

Cervical cutaneous nerves.

Mammary gland (females).

1. Superficial fascia.—The superficial fascia covers the

entire area. It is continuous with that of the abdomen, neck, and arm.

2. Origin of platysma.—The origin of the platysma will be seen along the front of the clavicle.

3. Cervical cutaneous nerves.—Filaments of the sternal, clavicular and acromial cutaneous branches from cervical nerves may be found in the regions indicated by their names (See § 25, *e*, p. 15).

4. Mammary gland.—The mammary gland is contained between two layers of the superficial fascia. It is freely movable upon the deep fascia.

Remove the superficial fascia from the same area as the skin. This exposes the deep fascia, which is a thin layer, and after being demonstrated, should also be removed from the parts it covers.

Parts Exposed.

Pectoralis major.

Deltoid.

Cephalic vein.

Acromio-thoracic artery and branches.

5. Pectoralis major and deltoid.—Clean the pectoralis major and anterior half of the deltoid. Note the space between the two muscles is very narrow in muscular subjects and contains a vein and artery.

6. Cephalic vein.—Separate the two muscles and trace the vein—cephalic—from the arm until it disappears by piercing the costo-coracoid membrane.

7. Acromio-thoracic artery and branches.—Coming out through the same membrane you will find the acromio-thoracic artery, which breaks up into three branches—acromial, descending, with the cephalic vein and thoracic.

SECOND DAY.

Section the pectoralis major at its middle and outer thirds. Carefully reflect the inner portion of the muscle and expose its nerve supply.

Parts Exposed.

External anterior thoracic nerve.

Internal anterior thoracic (sometimes).

Costo-coracoid membrane.

Pectoralis minor.

Subclavius.

8. Anterior thoracic nerves.—The external anterior thoracic (outer cord) will be found coming through the costo-coracoid membrane to end in the pectoralis major (outer muscle).

The internal anterior thoracic (inner cord), if found at this stage, will appear on the outer surface of the pectoralis minor (inner muscle), having traversed it to pass to the pectoralis major.

9. Costo-coracoid membrane—The membranous process of fascia reaching from the under margin of the clavicle to the upper border of the pectoralis minor and from the coracoid process of scapula to first rib, is called the costo-coracoid membrane. The structures which pass through it have been mentioned already.

10. Pectoralis minor.—Clean the pectoralis minor, noting how at its upper border the above membrane divides into two layers enclosing the muscle.

11. Subclavius.—Incise the costo-coracoid membrane, close to the clavicle, and expose the subclavius muscle.

Remove the costo-coracoid membrane and the connective tissue covering the vessels and nerves beneath.

Parts Exposed.

Axillary vein.
Axillary artery.
Superior thoracic artery.
Acromio-thoracic artery.
Anterior thoracic nerves.

12. Axillary vein.—The axillary vein, of large size, will first be encountered. It receives the cephalic vein and rests upon and to the inside of the artery.

13. Axillary artery. Superior thoracic and acromio-thoracic branches.—The first portion of the axillary artery is exposed. It gives off in this locality two branches, the superior thoracic, which runs upward to the chest, and the acromio-thoracic, the branches of which have already been found.

14. Anterior thoracic nerves.—Finish tracing the anterior thoracic nerves; the external to the outer cord across the axillary artery and vein, the internal to the inner cord between the artery and vein.

THIRD DAY.

Dissect out the floor of the axilla; that is, the portion of the axilla external to the pectoralis minor between the arm and chest.

Parts Exposed.

Long thoracic artery.
Serratus magnus.
Long thoracic nerve.
Intercosto-humeral nerve.
Axillary vein.
Axillary artery.

Subscapular artery.

Dorsalis scapulæ artery.

Anterior and posterior circumflex arteries.

Latissimus dorsi.

Teres major.

15. Long thoracic artery.—Immediately below and parallel with the lower border of the pectoralis minor, is the long thoracic artery. Follow it to its source and distribution.

16. Serratus magnus.—The muscle covering the side of the chest in this region is the serratus magnus, a part of which only is exposed.

17. Long thoracic nerve.—The long thoracic nerve is found descending upon the serratus magnus at about its middle. Only the lower portion of the nerve can be traced.

The nerve is also called the external thoracic or external respiratory nerve of Bell.

18. Intercosto-humeral.—The intercosto-humeral nerve will be found imbedded in the fascia of the floor of the axilla.

Its upper part will be dissected out later. At this stage trace its external distribution and find the small branch it receives from the lesser internal cutaneous nerve.

19. Axillary vein.—Examine the formation and relations of this portion of the axillary vein.

20. Axillary artery.—Clean the last or third portion of the axillary artery. Study its relations in this locality. Its branches in this part of its course are the subscapular, which gives off the dorsalis scapulæ, and the anterior and posterior circumflex. Trace all these branches as far as convenient to their distal supply.

21. Latissimus dorsi and teres major.—Clean the latis-

simus dorsi and teres major muscles, and in doing so preserve their arterial and nerve supply.

FOURTH DAY.

Divide the pectoralis minor at its outer and middle thirds, and reflect the parts, saving its nerve supply, which will be attached to the inner portion of the muscle.

You have now opened the axillary space throughout its entire extent. Learn its boundaries and contents before going farther.

Parts Exposed.

Axillary vein.
Axillary artery.
Alar-thoracic artery.
Brachial plexus.
Long thoracic nerve.
Intercosto-humeral nerve.
Serratus magnus.
Subscapularis.

22. Axillary vein.—The axillary vein is now to be finished. Then ligate it under the clavicle and near its beginning, and remove it together with its branches.

23. Axillary artery and alar-thoracic branch.—The axillary artery is also exposed in its entire course. Examine its relations as a whole. Its remaining branch, the alar thoracic—if present—will be found coming from the second portion of the artery to supply the glands and areolar tissue of the axillary space.

24. Brachial plexus and branches.—Take up the brachial plexus. Study its formation as given in Gray or Quain (the dissection of this part will be omitted now, but taken up later when the neck is dissected to the proper stage).

Begin where the plexus issues from under the clavicle and clean in turn:

a. Outer cord and its branches.

- (1) External anterior thoracic (already completed).
- (2) Musculo-cutaneous. Trace to where it enters the coraco-brachialis.
- (3) Inner head of median.

b. Inner cord and branches, viz.:

- (1) Internal anterior thoracic (already completed).
- (2) Lesser internal cutaneous.
- (3) Internal cutaneous and
- (4) Ulnar to the lower border of the latissimus dorsi. Find the small branch of the lesser internal cutaneous to the intercosto-humeral—already partially dissected—and finish it.
- (5) Dissect the inner head of the median.

c. Posterior cord and branches, viz.:

- (1) Upper, (2) Middle, (3) Lower subscapular nerve, and trace each to the muscle it supplies.
- (4) Circumflex. Follow it until it disappears in a quadrilateral space with the posterior circumflex artery. Learn the boundaries of the space.
- (5) Musculo-spiral. Trace it until it enters the musculo-spiral groove.

25. Long thoracic nerve.—Follow the long or posterior thoracic nerve as far upward as possible, and learn how it is formed.

26. Intercosto-humeral nerve.—Complete the dissection of the intercosto-humeral nerve by tracing it to where it comes out of the second intercostal space.

27. Subscapularis and serratus magnus.—Clean the subscapularis and remaining portion of the serratus magnus muscles.

FIFTH DAY.

Incision.—At the lower end of the arm incision, just below the elbow, make a transverse cut.

Reflect the skin from the front of the elbow and lower part of the arm and clean the superficial veins and nerves.

Parts Exposed.

Superficial veins.

Median, radial, ulnar (common); median cephalic, median basilic; cephalic, basilic.

Superficial nerves. Branches of

Internal cutaneous.

Lesser internal cutaneous.

Musculo-spiral.

28. Superficial veins.—Learn the usual arrangement of the superficial veins as given in your text-book, and notice whether they correspond in the subject with the description or not.

Especially notice the position and relation of the median basilic vein to the artery beneath.

29. Superficial nerves.—The superficial nerves found in this region are branches of the internal and lesser internal cutaneous nerves on the front and inner side of the elbow and the inferior cutaneous branch of the musculo-spiral on the outer side.

Remove the superficial veins and deep fascia, and clean the muscles, vessels and nerves.

Parts Exposed.

Biceps.

Coraco-brachialis.

Brachialis anticus.

Musculo-cutaneous nerve.
Median nerve.
Ulnar nerve.
Internal cutaneous nerve.
Brachial artery and branches.
Triceps.

30. Biceps.—In cleaning the biceps save the broad expansion from its tendon to the deep fascia of the forearm.

Trace up its two origins—the long head in the bicipital groove on its way to enter the capsule of the shoulder-joint, the short head to the coracoid process.

31. Coraco-brachialis.—The coraco-brachialis passes from the coracoid process to the humerus. It is pierced by the musculo-cutaneous nerve and is the guide to the upper portion of the brachial as the biceps is for its lower portion.

32. Brachialis anticus.—By raising the biceps the upper part of the brachialis anticus is exposed.

33. Nerves in arm.—Trace the following branches of the brachial plexus through the arm:

a. Musculo-cutaneous. From its exit through the coraco-brachialis muscle to where it becomes cutaneous, making out its muscular distribution.

b. Median. From its formation to the elbow, noting its relations to the brachial artery.

c. Ulnar. Follow it until it disappears behind the internal condyle.

d. Internal cutaneous. Find its posterior trunk and trace it (superficially) behind the internal condyle. (Anterior branch, § 39, p. 40).

34. Brachial and its branches.—The brachial artery and all its branches can now be cleaned and their relations studied.

a. Superior profunda. This is the first branch. It enters the musculo-spiral groove with the musculo-spiral nerve.

b. Inferior profunda. This branch joins the ulnar nerve, and with it passes behind the internal condyle.

c. Nutrient. Look for this artery in the middle of the arm. It enters the nutrient foramen just below the attachment of the coraco-brachialis to the humerus.

d. Anastomotica magna. Given off about two inches above the elbow and passes transversely around the arm to the inner side.

e. Muscular. Supply adjacent muscles.

35. Triceps.—The inner part of the triceps can be dissected. At its upper part save the muscular branches from the musculo-spiral nerve.

This completes the advance for the first week. More work of course can be done. This is only the minimum that should be finished in this time.

UPPER EXTREMITY AND THORAX.

SECOND WEEK.—Anterior Surface.

FIRST DAY.

Incisions.—**1.** Down the front of the forearm to the wrist.

2. A short transverse cut across the wrist.
Reflect the integument only.

Parts Exposed.

Superficial veins.

Superficial nerves.

36. Superficial veins.—No time need be spent in dissecting out the superficial veins of the forearm. Simply recognize the main ones as the radial, median and anterior ulnar.

37. Superficial nerves.—These are from the nerves already dissected out in the arm.

On the inside of the forearm is the anterior branch of the internal cutaneous.

On the outside of the forearm the external cutaneous branch of the musculo-cutaneous nerve.

Remove the veins and superficial fascia. This exposes the deep fascia, which after recognition can also be removed.

Parts Exposed.

Supinator longus.

Pronator radii teres.

Flexor carpi radialis.

Palmaris longus.

Flexor carpi ulnaris.

Radial artery and branches in forearm.

Radial nerve.

Posterior interosseus nerve.

Ulnar artery—beginning and ending.

38. Superficial muscles of forearm.—Clean the following muscles and in all cases save their nerve supply when found.

Supinator longus—outer boundary of elbow space.

Pronator radii teres—inner boundary of elbow space.

Note the median nerve passing between the two heads of the muscle.

Flexor carpi radialis.

Palmaris longus.

Flexor carpi ulnaris.

39. Radial artery and branches.—Draw the supinator longus outward and trace the radial artery to the wrist, noting its relations and branches, which are the recurrent, muscular, carpal and superficialis volæ (only the beginning).

Follow the recurrent radial up between the supinator longus and brachialis anticus, and find its anastomosis with the superior profunda.

40. Radial nerve.—In drawing outward the supinator longus you will find a nerve lying beneath it—the radial—which if traced upward will be seen to come off from the musculo-spiral just in front of the elbow. Trace the nerve as far as the wrist.

41. Posterior interosseus nerve.—The other terminal branch of the musculo-spiral nerve is the posterior interosseus which if traced downward will be found to disappear in the supinator brevis muscle.

42. Ulnar artery.—The ulnar artery (at this stage) can be traced only a short distance; at its beginning until it disappears beneath the two heads of the pronator radii teres muscle, and at the lower part where it becomes superficial. Note its relations above the wrist in the forearm.

Divide the supinator longus, flexor carpi radialis, palmaris longus and flexor carpi ulnaris muscles, where they are becoming tendinous, and the pronator radii teres at its outer and middle thirds.

Parts Exposed.

Flexor sublimis digitorum.

Supinator brevis.

Posterior belly of pronator radii teres.

Anterior and posterior ulnar recurrent arteries.

Common and (beginning of) anterior and posterior interosseus arteries.

Anterior interosseus nerve (beginning).

43. Flexor sublimis digitorum, supinator brevis, pronator radii teres.—Clean the entire surface of the flexor sublimis digitorum, paying attention to its origins. Make out the anterior attachment of the supinator brevis and the direction of its fibres.

In turning back the pronator radii teres note its small posterior belly, and the median nerve in front of it.

44. Ulnar artery and recurrent and interosseus branches.—The ulnar in the first part of its course gives off the following arteries:

a. Anterior recurrent—ascending to anastomose with the anastomotica magna and inferior profunda.

b. Posterior recurrent—passing inward and backward behind the internal condyle.

c. Common interosseus—which speedily divides into the anterior interosseus, running down the front of the forearm (covered by the flexor sublimis) and the posterior interosseus which goes to the back of the forearm between the two bones.

45. Anterior interosseus nerve.—In the space in front of the elbow the median nerve gives off many muscular branches; one of the largest is the anterior interosseus nerve, which disappears under the flexor sublimis muscle.

SECOND DAY.

Divide the flexor sublimis near the wrist, cut it away from its radial attachment, and reflect.

Parts Exposed.

Median nerve (and median artery).

Palmar cutaneous nerve.

Anterior interosseus nerve and artery.

Ulnar artery and muscular branches.

Ulnar nerve.

Dorsal cutaneous nerve.

Flexor profundus digitorum.

Flexor longus pollicis.

Pronator quadratus.

45. Median nerve. Median artery.—Clean the median nerve. Note the small (sometimes large) median branch of the anterior interosseus artery which accompanies the nerve.

46. Palmar cutaneous nerve.—Save the small palmar cutaneous branch of the median nerve.

47. Anterior interosseus nerve.—Trace the anterior interosseus nerve between the deep muscles of the forearm until it terminates in the pronator quadratus.

48. Anterior interosseus artery.—The anterior interosseus artery takes the same course until it reaches the pronator quadratus, where it passes back through the interosseus membrane.

49. Ulnar artery and muscular branches.—Clean the ulnar artery and its muscular branches. Rehearse the relations in its middle and lower thirds by replacing the superficial parts.

50. Ulnar nerve and dorsal cutaneous branch.—Trace the ulnar nerve from as high a point as possible. Note where it joins the artery and on which side of the artery it lies. Save its dorsal cutaneous branch.

51. Deep muscles of forearm.—Complete the forearm by cleaning the flexor profundus digitorum, flexor longus pollicis, and pronator quadratus. Recognize their nerve supply.

Incisions.—**1.** Continue the median incision down the palm and along the front of the middle finger.

2. Make a transverse cut across the palm near the web of the fingers.

3. Incise the skin down the front of the fingers.

4. Carry an incision from 1, at the wrist along the palmar surface of the thumb.

Reflect the integument from the palm, thumb and two or three fingers. Be very careful in doing so not to injure the palmar fascia and cutaneous nerves and vessels, which lie close under the integument.

Parts Exposed.

Palmaris brevis.

Palmar cutaneous nerves.

Palmar fascia and tendon of palmaris longus.

Digital arteries and nerves.

Collateral digital arteries and nerves.

52. Palmaris brevis.—The palmaris brevis muscle will be found immediately beneath the integument on the ulnar side of the palm.

53. Palmar cutaneous nerves.—Try to find the palmar cutaneous branch of the ulnar—inner side—median, middle, and musculo-cutaneous—outer side—of wrist. Probably they have been removed already.

54. Palmar fascia.—Study the arrangement of the palmar fascia as given in your text-book, and in the light of that description make out its three portions—two lateral very thin and middle very thick, the division of the central portion into fasciculi, and their digital attachment.

At the wrist you will find the tendon of the palmaris longus and see how it is continued into the median portion of the palmar fascia.

55. Digital and collateral digital vessels and nerves.—Between the prolongations of the fascia to the fingers you

will find the digital arteries and nerves imbedded in adipose tissue. Note that they lie between the metacarpal bones, so incisions over the bones will not injure the arteries and nerves.

Dissect out one or two fingers to trace the collateral digital vessels and nerves.

THIRD DAY.

Remove the lateral portions of the palmar fascia—with the palmaris brevis muscle—and the central portion in the following manner:

Draw downward on the tendon of the palmaris longus muscle and cut it and the fascia carefully away from the annular ligament. When the lower border of the annular ligament is passed, raise all of the central portion of the palmar fascia and separate it from the vessels and nerves beneath. When the attachments of the fasciculi are reached, notice how they split for the transmission of the flexor tendons, while the lumbricales and digital vessels and nerves occupy the space between the fasciculi themselves. Then divide the fasciculi and remove the fascia entirely.

Clean the sheath of one or more of the long flexor tendons of the fingers. Notice how the sheath is reinforced by oblique and transverse cross-bands of fibres, then open the sheath.

Parts Exposed.

Superficial arch.

Superficialis volæ artery.

Radialis indicis artery.

Ulnar artery.

Deep palmar artery.

Ulnar nerve and branches.

Median nerve and branches.

Abductor pollicis.

Flexor brevis pollicis (outer head).

Abductor minimi digiti.

Flexor brevis minimi digiti.

Tendons of flexor sublimis and profundus digitorum.

Lumbricales.

56. Superficial arch.—Clean the superficial palmar arch. Note its formation and location with reference to the surface of the palm.

57. Superficialis volæ.—Trace the superficialis volæ, if present, from the radial artery until it is found (usually) to disappear at the base of the muscles of the thumb. Later on, after the thumb muscles are learned, they can be cut away and the artery followed for the rest of its course.

58. Radialis indicis.—In more cases the superficial palmar arch will be completed by union with the radialis indicis artery, which runs on the outer side of the index finger, than by union with the superficialis volæ. Often it is formed by anastomosing with both.

56. Ulnar artery and deep palmar branch.—Follow the course of the ulnar artery from the wrist, down over the annular ligament, and find its deep palmar branch.

60. Ulnar nerve and branches.—Also trace the ulnar nerve and find its deep palmar branch. This artery and nerve take the same course, passing in between the origins of the abductor and flexor brevis minimi digiti muscles.

Trace the ulnar digital nerves and a small branch of communication with the median.

61. Median nerve and branches.—In a similar manner clean the median nerve, saving all its muscular and digital branches.

62. Abductor, flexor brevis pollicis (outer head); abductor and flexor brevis minimi digiti.—Clean the following muscles, saving their nerve supply:

Abductor and outer head of flexor brevis pollicis.

Abductor and flexor brevis minimi digiti. Between their origins pass the deep palmar artery and nerve.

63. Tendons of flexor sublimis and profundus digitorum. Lumbricales.—Clean the tendons of the flexor sublimis and profundus digitorum. In the fingers note the splitting of the former for the passage of the latter. Also note the vincula accessoria tendinum.

In the palm of the hand find the four lumbricales muscles attached to the deep flexor tendons and follow them as far as the sides of the fingers.

FOURTH DAY.

Divide the abductor pollicis, annular ligament, second, third, and fourth median digital nerves close to origin, and the ulnar artery and nerve immediately below their deep palmar branches.

Parts Exposed.

Opponens pollicis.

Central compartment of the annular ligament.

Lumbricales.

Opponens minimi digiti.

64. Opponens pollicis.—Clean the opponens pollicis.

65. Central compartment of annular ligament.—In the central compartment of the annular ligament find the following structures:

Median nerve.

Tendons of flexor sublimis and profundus digitorum.

Tendon of flexor longus pollicis.

66. Lumbricales.—Draw the tendons of the superficial flexor toward the fingers, and complete the dissection of the lumbricales.

67. *Opponens minimi digiti*.—Recognize the *opponens minimi digiti*.

Divide the tendons of the flexor profundus above the wrist and draw them down toward the fingers. Divide the pronator quadratus at its middle transversely to the direction of its fibres.

Parts Exposed.

Flexor brevis pollicis (both heads).

Tendon of flexor longus pollicis.

Adductor pollicis.

Deep palmar arch and branches.

Deep palmar nerve.

Anterior carpal anastomosis.

68. Flexor brevis pollicis. Tendon of flexor longus pollicis. Adductor pollicis.—The attention of the student is again called to the flexor brevis pollicis and the relation its two heads bear to the tendon of the flexor longus pollicis and to the adductor pollicis on the inner and abductor pollicis on the outer side of the muscle.

69. Deep palmar arch.—Trace out the deep palmar arch, its formation, relations and branches, viz.: perforating, interossei and recurrent carpal.

70. Deep palmar nerve.—The deep palmar nerve follows the communicating branch of the ulnar artery into the palm.

71. Anterior carpal anastomosis.—In front of the carpus is the anterior carpal anastomosis. The following arteries send branches to enter into its formation: laterally, radial

and ulnar—medianly, above, anterior interosseus—below deep palmar arch.

Divide the adductor and inner head of flexor brevis pollicis and reflect them.

Parts Exposed.

Beginning of deep arch.

Princeps pollicis artery.

Radialis indicis artery.

Interossei muscles.

72. Deep palmar arch, princeps pollicis, radialis indicis.—The beginning of the deep palmar arch is now shown, and the princeps pollicis and radialis indicis branches of the radial artery can be traced.

73. Interossei muscles.—Clean the interossei muscles. The entire seven can be seen from this side of the hand. Study their arrangement, attachment, and action in the text-book and be ready at this stage to identify each muscle.

FIFTH DAY.

The foregoing completes the dissection of the anterior part of the upper extremity excepting the study of the formation of the brachial plexus, which was purposely omitted until the neck had been dissected. Now working with the one dissecting the neck disarticulate the clavicle at its sternal end (having previously studied the ligaments of this joint), divide the subclavius muscle near its costal attachment and carry the clavicle outward. This will give sufficient room without entirely removing the clavicle.

Parts Exposed.

Brachial plexus.

Subclavian nerve,

Suprascapular nerve.

Posterior thoracic nerve.

Third portions of subclavian artery and vein.

74. Brachial plexus and subclavian, suprascapular and posterior thoracic branches.—The usual formation of the brachial plexus must be thoroughly learned from the text-book. In dissecting it out in the subject, note whether it agrees with or differs from that description.

The subclavian nerve is a very small one that supplies the subclavius muscle. The suprascapular nerve is a large one and enters the suprascapular foramen (foramen in the fresh state).

The posterior thoracic should be traced to the nerves that form it.

75. Third portion of subclavian artery and vein.—The third portion of the subclavian artery and vein will also be seen and their relations examined.

Remove the sternum and costal cartilages by cutting through the latter as close to the ribs as possible, until the seventh rib is reached, cut the muscles between it and the sixth up to the sternum, and saw through the latter just above the point where the seventh costal cartilage articulates with it.

Beginning above raise the sternum, dividing the internal mammary arteries as close to it as possible, and remove the sternum and cartilages from the thoracic contents by careful dissection so as not to injure them.

Parts Exposed.

On sternum.

Triangularis sterni.

Internal mammary arteries.

Anterior intercostal arteries.

Within thorax.

Pleuræ and lungs.

Pericardium and heart.

Phrenic nerves.

Arteria comes nervi phrenici.

Remains of thymus gland.

Great veins.

76. Under surface sternum.—Recognize the *triangularis sterni* muscle. Trace out the internal mammary artery and one or two of its anterior intercostal branches.

77. Pleuræ and lungs.—If the sternum and costal cartilages have been carefully removed, the lungs enveloped in their costal pleura will be disclosed, but usually the pleura is so cut away that only portions of it are left and the lungs are found collapsed and retracted into the back part of the chest. The costal and visceral layers of the pleura can be demonstrated.

The description of the mediastinum as given in the text-book should be carefully studied before going on with the dissection.

78. Phrenics and accompanying artery.—Trace the phrenic nerves to the diaphragm, noting their course. Save the small artery which accompanies them—a branch of the internal mammary.

79. Pericardium and heart.—Remove the areolar tissue covering the pericardium and great veins. You will find the pericardium attached to the diaphragm below. Make two incisions into the pericardium, one vertical and the other transverse, and reflect the flaps. You can now see how far it reaches up on to the great vessels.

The heart is also exposed, and you should carefully study its position, what portions of the heart are most in view,

and the relations of the two great arteries to each other close to the heart.

80. Great veins and thymus.—Clean the great veins, noting the difference between the right and left innominate veins. In cleaning them you will find the remains of the thymus gland. Ligature the superior vena cava and remove all the great veins. Clean the arch of the aorta.

Parts Exposed.

Arch of aorta and branches.

Trachea.

Pneumogastric nerves.

Recurrent laryngeal nerve (left).

Cardiac nerves.

Pulmonary artery.

Coronary arteries.

81. Contents of mediastinum.—No detailed description of the above structures can be given here. Clean them and study their relations, comparing the text-book with the subject.

SIXTH DAY.

Divide the branches of the aorta, trachea, and phrenic nerves. Lift everything forward and cut the aorta across at the beginning of its downward curve. Cut away the attachment of the pericardium to the diaphragm and divide the inferior vena cava. Remove heart, lungs, and trachea. Study relations at root of lungs.

Parts Exposed.

Pneumogastric nerves.

Œsophagus.

82. Pneumogastric nerves.—Trace the pneumogastric nerves along the œsophagus to the diaphragm.

83. Oesophagus.—Define the relation of the oesophagus to the aorta and trachea (removed).

Divide the oesophagus above (high up), also the pneumogastric nerves where they join it. Pull the oesophagus forward and carefully separate it from the parts behind. When the diaphragm is reached, cut it and the nerves away.

Parts Exposed.

Thoracic aorta.

Intercostal arteries.

Intercostal nerves.

Intercostal muscles.

Azygos and intercostal veins.

Sympathetic ganglia.

Splanchnic nerves.

Thoracic duct.

84. Thoracic aorta, intercostal arteries.—Recognize the course of the thoracic aorta until it disappears through the aortic opening in the diaphragm.

Trace its intercostal branches, dissecting one or two fully.

The two upper arteries (intercostal) are derived from the superior intercostal branch of the subclavian. The other nine come from the thoracic aorta.

85. Intercostal nerves.—There are twelve intercostal nerves, which are the anterior divisions of the dorsal nerves. Each one receives a filament from the sympathetic and then passes out along under the lower border of a rib. Trace out one or two intercostal nerves in their course between the internal and external intercostal muscles.

86. Azygos and intercostal veins. **a.** Azygos major—enters chest through aortic opening, lies to right of aorta upon its intercostal arteries, empties into superior vena

cava (now cut away), receives nine or ten lower right intercostal veins, azygos minor and superior right intercostal vein (and others).

b. Azygos minor—enters chest through left crus of diaphragm, passes under aorta, empties into azygos major at sixth dorsal vertebra, receives the six left lower intercostal veins (and others).

c. Right superior intercostal—small size, receives one or two upper right intercostal veins (and some others), empties into azygos major.

d. Left superior azygos—takes up four or six upper left intercostal veins and empties into azygos minor (or major).

e. Left superior intercostal—formed by two or three upper intercostal veins, empties into left innominate.

87. Sympathetic ganglia and splanchnic nerves.—The sympathetic ganglia are twelve in number. Clean one or two and trace the branch to the intercostal nerve. The ganglia from the fifth or sixth to the tenth give off branches which unite to form the great splanchnic nerve. The lesser splanchnic nerve is formed by a branch from the tenth and eleventh ganglia.

88. Thoracic duct.—Draw the thoracic aorta forward and dissect it away from the vertebræ and veins. Divide the intercostal arteries about half an inch from the aorta. When the diaphragm is reached cut the artery off.

If this is done carefully the thoracic duct will be left behind. It is about one-sixth of an inch in diameter, enters the chest by the aortic opening and lies close behind and to the right of the aorta between it and the azygos major. Trace it as far as possible.

Completion of dissection of anterior part of upper extremity and thorax.

UPPER EXTREMITY AND THORAX.

THIRD WEEK.—Posterior Surface.

FIRST DAY.

Incisions.—1. Continue the median incision from the seventh cervical to the last dorsal spine.

2. Make a cut along the spine of the scapula to the point of the shoulder joining the anterior one (same as 2, p. 25).

3. From the lower end of 1, carry a transverse cut around the body to meet the similar one from the front (same as 2, p. 110).

Reflect the integument from the back of thorax, shoulder and upper part of arm.

To expose the last no farther incisions in the skin are necessary; simply reflect it, beginning at the point where its anterior dissection stopped, and working from the outer to the inner side of the limb.

This method will also hold for the removal of the integument from the back of the forearm, hand and fingers.

Parts Exposed.

Trapezius.

Latissimus dorsi.

Deltoid.

89. Trapezius, latissimus dorsi and deltoid.—These muscles are covered by a dense layer of fascia, often infiltrated with fluid, which must be removed before the boundaries of the muscles can be determined.

The nerve supply of the trapezius comes from the neck,

and the one dissecting that region will demonstrate it; that of the deltoid will be seen later, and of the latissimus dorsi has been already found, but should be again identified (§ 21, p. 35 and § 24, c. (2), p. 36).

SECOND DAY.

Cut the trapezius and deltoid close to their scapular and clavicular attachments, and roll the former up toward the median line and turn the latter downward.

Disarticulate the clavicle at the acromial articulation; divide the coraco-clavicular ligaments and draw the clavicle out of the way.

Remove the fascia covering the muscles.

Parts Exposed.

Levator anguli scapulæ.

Rhomboideus major and minor.

Supra and infra-spinatus.

Teres major and minor.

Triceps, upper part.

Posterior scapular artery.

Suprascapular artery and nerve.

Posterior circumflex artery.

Circumflex nerve.

Dorsalis scapulæ artery.

90. Levator anguli scapulæ, rhomboidei, supra- and infra-spinatus, teres major and minor, triceps.—Clean the muscles in the order given. Remember the relation of the rhomboideus and teres major and minor to each other, by noting that in each case the smaller muscle is above and the larger below.

The supra- and infra-spinatus are covered by a strong fascia, which must be removed to expose the muscles.

The two teres muscles, the long head of triceps, and the humerus enter into the formation of a triangular and quadrilateral space; learn the boundaries of each.

91. Posterior scapular artery.—The posterior scapular branch of the transversalis colli artery will be found under the levator anguli scapulæ and rhomboidei muscles as it passes in its course around the superior angle of the scapula.

92. Supra-scapular artery and nerve.—Note the relation of the supra-scapular artery and nerve to the transverse ligament of the scapula. Their course cannot at this stage be traced any farther.

93. Circumflex nerve and posterior circumflex artery.—In the quadrilateral space formed by the triceps, humerus, and two teres find the circumflex nerve and posterior circumflex artery; trace them both to their distribution to the deltoid. The artery anastomoses with the anterior circumflex, acromio-thoracic, and superior profunda arteries.

94. Dorsalis scapulæ.—The triangular space bounded by the triceps and two teres muscles is occupied by the dorsalis scapulæ artery, a branch (really the continuation) of the subscapular artery.

Divide the rhomboideus major and minor and latissimus dorsi (also cut the last away from its costal origin), and reflect them.

Parts Exposed.

Serratus posticus superior.

Serratus magnus.

Serratus posticus inferior.

95. Serrati.—The serratus posticus superior and inferior are located, as their names indicate, at the superior and inferior part of the chest posteriorly.

96. *Serratus magnus*.—By pulling the scapula outward and raising it from the chest, you will see the posterior surface of the *serratus magnus*.

THIRD DAY.

Remove the integument from the arm to below the elbow as directed on page 55 for the exposure of the upper part of the arm.

Parts Exposed.

Superficial nerves.

Triceps.

Musculo-spiral nerve.

Superior profunda artery.

97. Superficial nerves of back of arm.—The cutaneous nerves of the back of the arm are derived from the intercosto-humeral, musculo-spiral and lesser internal cutaneous on the inner side, and musculo-spiral on the outer side of the arm. Find these nerves when removing the skin.

98. Triceps.—The three heads of the triceps may now be cleaned and the muscle studied.

99. Musculo-spiral nerve, superior profunda artery.—Follow the musculo-spiral nerve and the artery that accompanies it—the superior profunda—into the musculo-spiral groove. The groove divides the external and internal heads of the triceps. Cut away as much of the muscle as is necessary to expose the nerve and artery in their course.

FOURTH DAY.

Continue to remove the integument from the forearm, hand, and fingers as before directed, page 55. The superficial veins need not be preserved, as their arrangement

can be studied in your own arm, but the superficial nerves should be looked for and saved.

Parts Exposed.

Superficial nerves.

Deep fascia and posterior annular ligament of wrist.

100. Superficial nerves of back of forearm.—On the outer side of the forearm you will find the following cutaneous nerves. Above, the inferior cutaneous branch of musculo-spiral, and below, the radial nerve.

On the inner side of the forearm above, the posterior branch of internal cutaneous, and below, the dorsal cutaneous branch of ulnar nerves.

Trace carefully the distribution of the radial and dorsal cutaneous nerves.

101. Deep fascia and posterior annular ligament.—After the nerves are dissected out the deep fascia can be cleaned and its transversely reinforced portion at the wrist—called the posterior annular ligament—demonstrated.

Remove the deep fascia, leaving the posterior annular ligament in place.

Dissect the fingers and thumb so as to lay bare the tendons passing to them.

Parts Exposed.

Supinator longus.

Extensor carpi radialis longior and brevior.

Extensor communis digitorum.

Extensor minimi digiti.

Extensor carpi ulnaris.

102. Superficial muscles of back of forearm.—After dis-

secting out the above muscles divide the extensor communis digitorum and minimi digiti at their middle; remove the aponeurotic origin of the extensor carpi ulnaris from its attachment to the olecranon and upper part of posterior ridge of ulna, saving the muscle beneath (anconeus).

FIFTH DAY.

Parts Exposed.

Anconeus.

Extensor ossis metacarpi pollicis.

Extensor primi and secundi internodii pollicis.

Extensor indicis.

Supinator brevis.

Posterior interosseus nerve.

Posterior interosseus artery.

Recurrent interosseus artery.

Anterior interosseus artery.

Radial artery and branches.

Compartments in posterior annular ligament.

Interossei and lumbricales.

103. Deep muscles of back of forearm.—Complete the dissection of the muscles of the forearm as given above.

The origin of the thumb and index finger muscles can be remembered easily by the following scheme: The extensor ossis from both bones of forearm; the extensor primi, from the radius—the first bone of the forearm met with in going from the thumb to the forearm; the secundi, from the ulna, the second bone; and the indicis from the ulna also. Of course it is understood that the terms primi and secundi are intended to refer to the phalanges of the thumb, but for the sake of remembering the origins of the muscles they may be used as here stated,

104. Posterior interosseus nerve and artery, anterior interosseus and radial arteries.—The posterior interosseus nerve will be found coming through the supinator brevis muscle. Just below this muscle the posterior interosseus artery will be found. Trace them both down the back of the forearm. When near the wrist the anterior interosseus artery will be seen coming through the interosseus membrane. The posterior anastomoses with the anterior interosseus artery, and both with the posterior carpal branch of the radial.

Find the recurrent interosseus passing up under the anconeus muscle to enter into the elbow anastomosis.

The course of the radial artery around the base of the thumb beneath its extensor tendons must be carefully followed, and its small dorsal branches dissected out as far as possible.

105. The compartments of the posterior annular ligament.—Recognize the various compartments of the posterior annular ligament and the tendon or tendons that pass through each. Upon the dry radius and ulna identify each groove.

106. Dorsal and palmar interossei and lumbricales.—Clean the dorsal interossei and complete the dissection of the palmar interossei and lumbricales. Trace the insertion of these muscles, studying their action.

Finally remove all the soft parts, and study the ligaments of the shoulder, elbow, wrist, thumb, and index finger articulations. The student is referred to his standard textbook for the description of these various joints. In cleaning off the shoulder-joint, complete the dissection of the supra-scapular artery and nerve, and when at the elbow, trace out the anastomoses at that joint between the supe-

rior and inferior profunda and anastomotica magna above and the radial, ulnar, anterior and posterior and interosseus recurrent arteries from below.

Examine the relations of the fixed bony points: at the shoulder—acromion, greater and lesser tuberosities of humerus; at elbow—two condyles and olecranon; and at wrist—styloid process of radius and ulna, former one-fourth inch lower than latter.

At the metacarpo-phalangeal articulation, note the anterior ligament or fibro-cartilage which plays such an important part in dislocations at that joint.

PERINEUM, MALE.

FIRST WEEK.

FIRST DAY.

Fill the rectum with oakum and take two or three stitches in the anus.

Incisions.—1. In the median line from the perineo-scrotal junction to tip of coccyx (cutting close to anus on either side).

2. Two transverse incisions three or four inches long at each end of 1.

Reflect the integument, and in doing so be sure not to cut away the external sphincter of the anus.

Parts Exposed.

External sphincter of anus.

Superficial fascia.

a. Superficial layer.

b. Deep layer—perineal fascia.

Ischio-rectal fossa.

Inferior hemorrhoidal artery and nerve.

Obturator fascia.

Anal fascia.

Gluteus maximus.

Fourth sacral nerve.

Inferior pudendal nerve.

1. External sphincter.—The external sphincter lies immediately under the integument. It is a broad but very

thin muscle, and extends from the mid-point of the perineum to the tip of the coccyx.

2. Subcutaneous tissue, perineal fascia.—The subcutaneous tissue consists mostly of adipose tissue. This must be carefully scraped and picked away until you come to a firm fascia in the anterior half of the perineum. It is seldom, however, that the ordinary subject of the dissecting-room will show this fascia in a satisfactory manner. Nor is it so thick and easily recognized as the usual descriptions found in the text-books would lead a beginner to expect.

The best way to recognize the fascia is to scrape away the overlying adipose tissue until a smooth plane of fascia is found—usually so thin that the muscles (erector penis and accelerator urinæ) show through it. This is the deep layer of the superficial fascia, or perineal fascia, or fascia of Colles. It passes through the scrotum as the dartos and thence into the abdomen. (See § 22, p. 76.)

3. Ischio-rectal fossa.—In the posterior half of the perineum you will find that the fat fills a deep pouch on either side of the rectum, the ischio-rectal fossa. Clean the fat out carefully and study the boundaries of this fossa.

4. Inferior hemorrhoidal artery and nerve.—Crossing the fossa from the outer side to the rectum, you will find the inferior hemorrhoidal artery and nerve. They are branches of the internal pudic artery and nerve.

5. Obturator and anal fascia, pudic artery.—At the bottom of the ischio-rectal fossa you find the very thin anal fascia covering the levator ani muscle and on the outer side of the fossa the obturator fascia.

Through the obturator fascia feel the internal pudic artery (injected with plaster) about one inch from the margin of the ischium.

6. *Gluteus maximus*.—The superficial boundary of the ischio-rectal fossa behind is the *gluteus maximus* muscle; only a very small part of the muscle is exposed here.

7. Fourth sacral nerve.—Close to the coccyx look for a branch of the fourth sacral nerve curving over the *gluteus maximus*.

8. Inferior pudendal nerve.—Scratch through the superficial fascia about one inch external to the tuberosity of the ischium and you will find the inferior pudendal nerve from the small sciatic passing forward to the scrotum.

If the perineal fascia has been shown as a continuous layer incise it in the median line and along its posterior borders, and turn the flaps aside.

If, as is usually the case, it is partially cut away here and there, complete its removal and expose the parts beneath, carefully cleaning them.

Parts Exposed.

Erector penis and crus penis.

Accelerator urinæ.

Transversus perineæ.

Superficial perineal artery and nerve.

Transversalis perineal artery and nerve.

9. Perineal triangle.—The erector penis, transversus perineæ, and accelerator urinæ form the perineal triangle. The first forms the outer side, the second the lower (posterior), and the third the inner side.

10. Vessels and nerves in the perineal triangle.—The superficial perineal artery and nerve run together through the perineal triangle from behind forward. The transversalis perineal artery and nerve are very small and pass along the base of the triangle into the transversus perineæ muscle.

Cut away entirely the erector penis, accelerator urinæ, and transversus perineæ muscles.

Clean the parts presenting.

Parts Exposed.

Corpus spongiosum.

Bulb.

Crura of penis.

Triangular ligament (anterior layer).

11. Corpus spongiosum, bulb, crura of penis.—By removing the accelerator urinæ the corpus spongiosum and its posterior portion called the bulb is exposed.

A crus penis is seen when an erector penis muscle is cut away. Notice the attachment of the crus to the ramus of the ischium, and then cut it away close to the bone and pull the crus outward.

12. Triangular ligament, anterior layer.—Draw the bulb first to one side and then to the other, so as to expose in turn the deeper fascia, viz.: the anterior layer of the triangular ligament. It is also called the superficial layer of the triangular ligament or the deep perineal fascia.

From the names and descriptions given of this plane of fascia, the student expects to find a dense membrane closing the anterior part of the pelvic outlet. He will be disappointed. If the perineal fascia (§ 2, p. 64) was recognized with difficulty, this layer will be found much more difficult to demonstrate, and in the usual dissecting-room subject will be missed altogether.

If the subject is a poor one, the tissues dark and infiltrated with fluid, it may be impossible for the student to demonstrate the following parts: Compressor urethræ, Cowper's glands, posterior layer of triangular ligament, anal fascia; however, he should do his best to find them.

SECOND DAY.

If the anterior layer of the triangular ligament has been found, incise it along its margins and remove it.

Parts Exposed.

Compressor urethræ muscle.

Membranous urethra and Cowper's glands.

Internal pudic artery and nerve and their branches.

13. Compressor urethræ.—This muscle reaches from side to side, filling the space between the two layers of the triangular ligament.

14. Membranous urethra and Cowper's glands.—The membranous portion of the urethra will be exposed by drawing the bulb upward (really forward); at the same time two little bodies on the posterior upper portion of the bulb will be found; these are Cowper's glands.

15. Internal pudic artery and nerve and their branches.—The internal pudic artery and nerve come through the posterior layer of the triangular ligament and pass forward. The artery gives off the branch to the bulb, and then divides into the branch to the corpus spongiosum and the dorsal artery of the penis. The nerve follows the same distribution. In a good subject trace all these branches.

Carefully remove the compressor urethræ muscle and the nerve and artery and their branches.

Remove the hemorrhoidal vessels and nerves.

Section a portion of the gluteus maximus.

Parts Exposed.

Posterior layer triangular ligament.

The mid-transverse line of fascial junction.

Anal fascia.

16. Posterior layer of triangular fascia, anal fascia, mid-transverse fascial junction.—Though the stretch of fascia covering the levator ani muscle is divided in the descriptions into two portions—the anterior or posterior layer of the triangular ligament, the posterior or anal fascia—it is really the same fascia under two names. And united to it in the mid-transverse line you find the (anterior layer of the) triangular ligament and the perineal fascia.

Remove the posterior layer of the triangular ligament and the anal fascia.

Parts Exposed.

Levator ani.

Coccygeus.

17. Levator ani and coccygeus.—These two muscles taken together are termed the diaphragm of the pelvis. The levator ani not only slings the anus (and rectum), but its anterior portion supports the prostate and bladder.

Remove the levator ani by cutting it away from its marginal and anal attachments.

18. Recto-vesical fascia.—This exposes the recto-vesical fascia, which supports the rectum, prostate, and bladder, and passing in between them forms their true ligaments.

The various fasciæ to which reference is here made by name alone must be carefully studied up in the text-books.

Draw the rectum backward, and keeping close to it cut the fascia between it and the prostate and bladder until the recto-vesical fold of peritoneum is reached. Clean the prostate and base of bladder.

Parts Exposed.

Prostate.

Vesiculæ seminales.

Vasa deferentia.

External trigone.

19. Prostate.—The tissue removed from the prostate is part of the recto-vesical fascia and forms the prostatic capsule.

20. Vesiculæ seminales, vasa deferentia.—Reaching upward and backward, diverging from each other, you find the vesiculæ seminales, and internal to them the vasa deferentia.

21. External trigone.—The external trigone is bounded above by the line of attachment between bladder and rectum; laterally by the vesiculæ seminales and vasa deferentia, and its apex is at the prostate. This area represents the extent of attachment between the bladder and rectum.

ARRANGEMENT OF STRUCTURES FILLING PELVIC
OUTLET (DIAGRAMMATIC).

MALE.

FROM WITHIN OUTWARD.

<i>Posterior.</i>	<i>Mid-Point.</i>	<i>Anterior.</i>
1. Rectum	Ureters 1.	Vasa deferentia 2.
	Vesiculæ seminales 3.	Bladder 4.
		Prostate 5.
		Urethra 6.
2. Recto-	Vesical	fascia 7.
3. Levator ani		(et prostatae) 8.
4. Anal fascia	Post. layer triang.	ligament 9.
		Urethra 10.
		Compressor urethrae 11.
5. Adipose tissue	Ant. layer triang.	ligament 12.
		Perineal triangle 13.
		Bulb—corpus spongiosum 14.
6. Anus		Crura penis 15.
7. Sphincter ani		Perineal fascia 16.
8.		Subcutaneous tissue 17.
	Integument	18.

PERINEUM, FEMALE.

FIRST WEEK.

FIRST DAY.

With a few changes the directions just given for dissecting a male perineum can be applied to the female.

Identify the following external genital organs:

- a. Mons veneris.
- b. Labia majora and minora.
- c. Clitoris.
- d. Vestibule—the gutter which leads down from the clitoris to the meatus urinarius.
- e. Posterior commissure of labia majora.
- f. Fossa navicularis—depression between e and g.
- g. Fourchette—transverse fold of mucous membrane just inside posterior commissure.
- h. Orifice of vagina.
- i. Hymen or carunculæ myrtiformes.

Take a few stitches in the labia majora and anus, previously filling them with oakum.

Incisions.—1. Similar to incisions in male perineum, excepting the anterior part of the median incision divides to pass along the margins of the labia majora.

2. Transverse incisions at the upper and lower part of 1.

§§ 1 to 8 (see male perineum, pp. 63-65).—Remove the integument and follow the directions given on pages 63-65, and find the structures §§ 1 to 8 inclusive. Note the remarks made on page 64. Note that the perineal fascia

gives passage to the vagina as well as urethra. This will be found to be the case with the remaining fasciæ and median muscles anterior to the centre of the perineum.

9. Superficial perineal artery and nerve.—In addition to the structures above (1 to 8) you will find the superficial perineal artery and nerve outside of the perineal fascia instead of beneath it as in the male.

Incise the perineal fascia along its margins and remove it. (See remarks, page 64.)

Parts Exposed.

Erector clitoridis (penis, male).

Transversus perineæ.

Sphincter vaginæ (same as accelerator urinæ in male).

10. Perineal triangle.—These muscles together form the perineal triangle as in the male.

Divide the transversus perineæ and sphincter vaginæ and reflect them. Cut away the erector clitoris.

Draw the clitoris forward, and remove the mucous membrane between it and the urethral orifice.

Parts Exposed.

Orifice of urethra.

Bulb of vaginæ.

Crus of clitoris.

Artery and nerve to bulb.

Artery and nerve to corpus cavernosum and dorsal artery and nerve of clitoris.

Anterior layer of triangular ligament.

11. Bulb of vagina.—The bulb of the vagina consists of a venous plexus embracing the upper portion and sides of

the vaginal orifice; it is analogous to the corpus spongiosum.

12. Crura of clitoris.—The crura of the clitoris are very small. They occupy similar positions to the crura of the penis.

13. Branches of internal and pudic artery and nerve.—By drawing the bulb one side and dissecting away the crura of the clitoris, the small branches of the internal pudic artery will be found, viz.: artery to the bulb, to corpus cavernosum, and the dorsal artery of clitoris.

The internal pudic nerve gives off similar branches.

14. Anterior layer of triangular ligament.—Remove the bulb and superficial vessels and nerves and make out the attachments of the anterior layer of the triangular ligament. (See remarks, page 66.)

SECOND DAY.

Remove the anterior layer of the triangular ligament in the same way the perineal fascia was removed. (See remarks, page 66.)

Parts Exposed.

Compressor urethræ (constrictor vaginæ).

Glands of Bartholin (Cowper's, male).

Internal pudic artery and nerve.

Posterior layer triangular ligament.

15. Compressor urethræ (constrictor vaginæ).—The compressor urethræ muscle occupies the same position in the female as in the male. Besides its urethral function it also constricts the vagina. Various small muscles are described in this plane by various dissectors, but it is sufficient if the student now recognizes the above muscle.

16. Bartholin's glands.—Opposite the middle of the vaginal orifice and imbedded in or behind the above muscle you will find a small gland—Bartholin's—similar to Cowper's in the male.

The internal pudic artery and nerve will be exposed by removing the muscle. They lie upon the posterior layer of the triangular ligament.

17. Posterior layer, triangular ligament.—This layer—the posterior—of the triangular ligament is similar to that in the male, and should be carefully exposed by removing the above structures.

You will notice that it is continuous with the anal fascia. (Same remarks apply here as to fascia in male, page 68.)

Remove the fasciæ above and the hemorrhoidal vessels and nerves.

Section the gluteus maximus near the coccyx.

Parts Exposed.

Levator ani.

Coccygeus.

18. Muscles.—See under male perineum, § 17, p. 68.

19. Recto-vesical fascia.—Remove the levator ani from its marginal, anal, and vaginal attachments, and expose the recto-vesical fascia.

20. Recto-vaginal fossa.—Draw the rectum backward and separate it from the vagina until the fold of peritoneum passing between them is reached.

21. Base of bladder. Ureters.—Similarly separate the vagina from the urethra and bladder until the ureters are exposed. Note their position.

ARRANGEMENT OF STRUCTURES FILLING THE PELVIC
OUTLET (DIAGRAMMATIC).

FEMALE.

FROM WITHIN OUTWARD.

Posterior.	<i>Mid-Point.</i>	Anterior.
1. Rectum		Uterus 1. Bladder 2.
2. Recto-		Vagina 3. Urethra 4.
3. Levator ani	Vesical	fascia 5.
4. Anal fascia		(et vaginæ) 6.
5. Adipose tissue	Compressor urethræ (Constrictor vaginæ) 8.	Post. layer triangular lig. 7.
6. Anus		Ant. layer triangular lig. 9.
7. Sphincter ani		Perineal triangle 10.
8.	Integument	Bulb vagina 11.
		Perineal fascia 12.
		Subcutaneous tissue 13.
		14.

LOWER EXTREMITY AND ABDOMEN.

FIRST WEEK.—Abdomen.

THIRD DAY.

Before any dissecting is begun on the abdomen, the student is again referred to Holden's "Landmarks" in Gray's Anatomy, and, following the directions there given, to locate the bony landmarks and superficial relations of the principal abdominal viscera.

Incisions.—1. In the median line from the lower end of the sternum to the pubes.

2. Transversely around the body from the upper end of 1 (same as 2 for thorax, page 30).

3. From the lower end of 1, along Poupart's ligament and over the crest of the ilium.

Remove the integument alone over the whole area as far around the side as possible.

Parts Exposed.

Subcutaneous tissue.

Superficial epigastric artery.

Superficial external pudic artery.

Inguinal lymphatics.

Cutaneous branch of ilio-hypogastric nerve.

22. Subcutaneous tissue.—The subcutaneous tissue or

superficial fascia will be found of variable thickness due to the amount of adipose tissue it contains. It is backed by a denser plane of fascia called the deep layer of the superficial fascia. This deeper layer is attached to the linea alba, front of pubes, and Poupart's ligament. It loosely covers the cord and passes into the scrotum as the dartos to end in the perineum as the perineal fascia. (See § 2, p. 64.)

23. Subcutaneous arteries.—Imbedded in the subcutaneous tissue you will find the superficial epigastric artery passing upward over the middle of Poupart's ligament toward the umbilicus, and the superficial external pudic arching over the pubes to anastomose with the corresponding artery of the other side. The latter gives off at the side of the penis the superficial dorsal artery of that organ.

24. Subcutaneous nerves.—The subcutaneous nerves are very small and will hardly repay the time necessary for their dissection. One nerve, the cutaneous branch of the anterior division of the ilio-hypogastric, will be found after coming through the aponeurosis of the external oblique, about two inches above the spine of the pubes.

25. Inguinal lymphatics.—Small lymphatic glands in the inguinal region take the name of this locality. Unless enlarged, they may escape observation. They lie over and above the middle of Poupart's ligament.

Remove the superficial fascia beginning on a transverse line at the umbilicus. Turn it down over the thigh (having cut through it in the median line from umbilicus to pubes), and in doing so note its attachment to the linea alba. Leave it attached by its lower portion to the front of the pubes and Poupart's ligament. Mark that it is not firmly attached to the spermatic cord. It is through this gap that sometimes extravasated urine finds its way from

the perineum through the scrotum into the front of the abdomen.

Clean away the upper portion of the superficial fascia.

Parts Exposed.

External oblique muscle.

Linea alba.

Linea semilunaris.

Lineæ transversæ.

Poupart's ligament.

External abdominal ring.

Spermatic cord (or round ligament).

Intercolumnar fascia.

External spermatic fascia.

Suspensory ligament of the penis.

Cutaneous branches of the deep and superior epigastric arteries.

Ilio-hypogastric nerve.

26. External oblique.—Note the direction of the fibres of the external oblique muscle and aponeurosis.

Learn this as well as all the other abdominal muscles thoroughly.

27. Linear markings of the abdomen.—The union of the aponeuroses of the lateral abdominal muscles in the median line in front is called, from its light color, the linea alba.

Similarly the line of union of the internal oblique and transversalis at the outer border of the rectus is called from its curved direction the linea semilunaris.

The transverse tendinous markings of the rectus show through its sheath as the lineæ transversæ and are three in number.

28. Poupart's ligament.—The fibres of the aponeurosis of the external oblique, which pass from the anterior superior iliac spine to the spine of the pubes, form what is called Poupart's ligament, one of the most important landmarks in the body.

29. External abdominal ring, spermatic cord (round ligament).—Just above and outside the spine of the pubes is an opening in the fibres of the external oblique aponeurosis for the exit of the spermatic cord (or round ligament).

This is the external abdominal ring. The edges of the aponeurosis bounding the ring are termed the pillars or columns of the ring.

30. Intercolumnar fascia.—You will notice between the anterior superior iliac spine and the external abdominal ring there are scattered fibres which are superficial and nearly at right angles to the fibres of the external oblique aponeurosis. These fibres become more numerous in the region of the ring and stretch across from one column to the other, reinforcing the ring at what would otherwise be a weak point.

This layer of fibres has on this account been called the intercolumnar fascia.

31. External spermatic fascia.—From the lower margin of the intercolumnar fascia and from the edges of the ring a very thin membrane is reflected on to the spermatic cord (or round ligament). This is the external spermatic fascia (and will be easily demonstrated later, though it is mentioned now to show its connection with the fascia above).

32. Suspensory ligament of the penis.—In reflecting the superficial fascia a portion of it will be found attached to the front of the pubes and passing down to the penis. This forms the suspensory ligament of the penis.

33. Cutaneous arterial branches.—The deep and supe-

rior epigastric arteries give off cutaneous branches which perforate the upper two-thirds of the sheath of the rectus muscle.

34. Ilio-hypogastric nerve.—The ilio-hypogastric nerve will be found issuing from an opening in the aponeurosis of the external oblique as before mentioned. (§ 24, p. 76.)

Just above the level of the anterior superior iliac spine make a small transverse cut through the aponeurosis of the external oblique, until the internal oblique is seen. Insert a knife-handle in this opening, and, raising the external oblique, divide it transversely toward the median line, until its aponeurotic junction with the internal oblique is reached. This will be about one-half inch to the inside of the linea semilunaris.

Reflect the upper part of the muscle, first raising it carefully from the one beneath, and dividing its aponeurosis just over the linea semilunaris, cut away the two or three upper costal attachments of the muscle and turn it backward as far as it will go.

The lower triangular piece is to be removed in a similar manner, cutting it away near its median fascial junction, but leaving it attached by its base, *i.e.*, Poupart's ligament.

Parts Exposed.

Internal oblique.

Linea semilunaris.

Conjoined tendon.

Triangular ligament.

External ring and its columns.

Intercolumnar and external spermatic fasciæ.

Cremaster muscle and fascia.

Spermatic cord (or round ligament).

Inguinal canal.

Ilio-inguinal nerve.

Ilio-hypogastric nerve.

35. Internal oblique, *linea semilunaris*, conjoined tendon.—Mark the direction the fibres of the internal oblique take, that its aponeurotic junction with the transversalis at the outer border of the rectus is called the *linea semilunaris*, and that the common tendon of the internal oblique (and transversalis) behind the external abdominal ring and its inner pillar forms the conjoined tendon and strengthens an otherwise weak spot in the abdominal wall.

36. Triangular ligament.—You will find the conjoined tendon crossed by a narrow band of fibres from the pectineal line to the *linea alba*. These fibres constitute the triangular ligament and are between the conjoined tendon and internal pillar of the ring. They serve chiefly as a source of bother and confusion to students.

37. External ring, external spermatic fascia.—Now again examine the external abdominal ring; by following down the cord with the finger the external spermatic fascia will be found, and its reflection on to the cord appreciated.

38. Cremaster muscle and cremasteric fascia.—In examining the cord you will see that it is inclosed within loosely arranged muscular loops. The muscle is the cremaster, and it, with the connective tissue uniting its loops, is called the cremasteric fascia (neither exists in the female).

39. Inguinal canal.—Trace the spermatic cord (or round ligament) internal to the external ring until it disappears by passing under the arch of the internal oblique and transversalis. This part in the course of the cord is called the inguinal canal. Learn all its boundaries.

40. Ilio-inguinal nerve.—Parallel with and just above Poupart's ligament is the ilio-inguinal nerve, which joins

the cord on its outer surface and with it passes out through the external ring to the scrotum.

41. Ilio-hypogastric nerve.—This nerve will have been found in reflecting the lower portion of the external oblique.

It comes through the internal oblique about on a level with, and one inch internal to, the anterior superior iliac spine, and takes a course downward and forward to pass through the external oblique as stated in § 34, p. 79.

FOURTH DAY.

Beginning at the point where the ilio-hypogastric nerve pierces the internal oblique (see above), carefully divide the fibres of the muscle in a vertical direction to the ribs and along their free border to the outer margin of the rectus.

You can tell when you have divided all the fibres of the internal oblique through to the transversalis, by finding the shiny intermuscular septum or muscular arterial branches and intercostal nerves which lie between the muscles.

Leave the vessels and nerves lying upon the transversalis and reflect the internal oblique inward until its aponeurotic junction with the transversalis is reached.

The lower portion of the muscle should be left in position.

Parts Exposed.

Transversalis muscle.

Muscular branches of the deep circumflex iliac artery.

Intercostal arteries (two or three lower ones).

Lower intercostal nerves.

Ilio-hypogastric nerve.

Ilio-inguinal nerve.

42. *Transversalis* vessels and nerves.—All the above structures can be easily found.

The intercostal nerves run forward to the rectus, as will be seen later (§ 44), and the intercostal arteries (ninth to twelfth) take the same course.

The deep circumflex iliac artery gives off two or more good-sized branches, which pass upward between the two muscles.

The ilio-hypogastric and ilio-inguinal nerves can be easily traced to where they disappear through the *transversalis*.

Turn the internal oblique back into place.

Incise the sheath of the rectus from top to bottom about three-fourths of an inch from the *linea alba* and reflect the two parts. In doing this be very careful not to cut into the rectus at the places where the sheath is attached to the *lineæ transversæ*.

Parts Exposed.

Rectus and sheath.

Pyramidalis.

Superior and deep epigastric arteries.

Lower intercostal nerves.

43. *Rectus pyramidalis*.—These two muscles are to be learned. Note the transverse tendinous markings in the rectus, and that phantom tumors are sometimes caused by the contraction of a segment of the muscle.

Consult the text-book for the formation of the sheath of the rectus.

44. Epigastric arteries and intercostal nerves.—By raising the muscle, beginning at its inner edge you can demonstrate the two epigastric arteries and on the outer

border of the muscle how the intercostal nerves enter it. (See § 42.)

Divide the rectus at its middle and reflect the two portions, cutting the intercostal nerves and deep epigastric artery close to the muscle, leaving the latter in position.

Parts Exposed.

Deep epigastric artery.

Superior epigastric artery.

Posterior part of sheath of rectus.

Semilunar fold of Douglas.

45. Deep epigastric artery.—The deep epigastric artery can be traced downward until it passes behind the internal oblique and transversalis; do not follow it any farther at present.

46. Superior epigastric artery.—The superior epigastric enters the upper part of the rectus and descends to anastomose with the deep epigastric in the substance of the muscle.

47. Posterior part of sheath of rectus, semilunar fold of Douglas.—The posterior layer of the sheath of the rectus is now exposed. The lower free edge of the posterior part of the sheath is called the semilunar fold of Douglas. Cut through the transversalis (and anterior part of sheath of rectus) from just below the semilunar fold of Douglas to the anterior superior spine of the ilium. Do not divide the ilio-hypogastric and ilio-inguinal nerves, but draw them outward.

Take the lower portion of the internal oblique and transversalis, which have been left united, and turn them outward, trying to leave behind the aponeurosis of the transversalis, which is very thin above but becomes thicker as you near the internal abdominal ring.

Cut through the linea alba from the inner part of Douglas' fold to the ensiform appendix, and cut the transversalis away from its costal attachment, and turn it (and the internal oblique) as far backward as possible.

In raising the upper portion of the transversalis, great care will have to be used to escape perforating the peritoneum, and in the lower part to leave behind the transversalis fascia.

Parts Exposed.

Transversalis fascia.

Internal abdominal ring.

Infundibularform fascia.

48. Transversalis fascia.—As stated above, this fascia is very thin except close to the internal ring, where it becomes reinforced.

49. Internal abdominal ring.—The cord (or round ligament) passing through it forms the internal abdominal ring.

50. Infundibularform fascia.—The fascia which is (really a part of the transversalis fascia) reflected on to the cord is called the infundibularform fascia.

Raise the transversalis fascia and demonstrate the internal ring and infundibularform fascia by passing the finger into the ring.

If the transversalis fascia should have been raised in removing the muscle, make out the above points and proceed to clean the lower surface of the peritoneum of its sub-peritoneal fat.

Parts Exposed.

Peritoneum.

Urachus.

Obliterated hypogastric arteries.

Deep epigastric artery, its relations and branches.

51. Peritoneum.—Carefully study the text-book descriptions of the peritoneum, and at this stage examine as far as possible its parietal attachments, and later on as the dissection progresses make out its various visceral reflections.

52. Urachus. Obliterated hypogastric arteries.—From the umbilicus you will find three thin fibrous cords leading down to the bladder.

The outside ones are the obliterated hypogastric arteries. The middle one, the urachus, once an open canal between the bladder and allantois.

53. Relations of deep epigastric artery to internal ring.—Raise the peritoneum (and its contents) from the iliac fossa, clean the cord for a short distance, trace the epigastric artery to the external iliac, and then carefully note the relations between the cord and internal ring and the deep epigastric artery.

54. Cremasteric and pubic arteries.—In this locality you will find that the deep epigastric gives off a branch to the cord, the cremasteric, and one to the inner surface of the pubes, the pubic.

FIFTH DAY.

By stripping up the peritoneum (without opening it) from the iliac fossa you can demonstrate how ligation of the iliac arteries can be accomplished without cutting into the peritoneum.

Incise the peritoneum from the ensiform appendix to the pubes and transversely just below the umbilicus.

Turn back the four segments. Attached to the right upper one are two ligaments of the liver—preserve these.

Parts Exposed.

Cavity of greater peritoneum.

Liver and gall bladder.

Ligaments of liver.

Stomach, spleen.

Gastro-colic (great) omentum.

Gastro-hepatic (lesser) omentum.

Gastro-splenic (third) omentum.

Foramen of Winslow.

Small intestine.

Large intestine.

 Cæcum and vermiform appendix.

 Ascending colon.

 Transverse colon.

 Descending colon.

 Sigmoid flexure.

 Rectum.

Mesentery.

Bladder and ligaments (false).

Uterus and ligaments.

Ovaries and tubes.

Only brief summaries can be given here to fix the more important relations of the viscera in the mind of the student.

For detailed descriptions of the various relations of the viscera to each other and to the surface landmarks, the text-books must be consulted.

55. Liver, its ligaments. The gall bladder.—The liver occupies a position immediately beneath the diaphragm (to which it is attached) on the right side and reaches to the left a hand's breadth beyond the median line.

Make out its four peritoneal ligaments and one—the remains of the umbilical vein—in the free border of the suspensory ligament.

The gall bladder lies under the middle of the liver and reaches to—and if distended beyond—its anterior border.

56. The stomach.—The stomach (with the spleen) fills a place beneath the diaphragm on the left side corresponding to that of the liver on the right side, excepting that toward the middle it lies under the left lobe of the liver and only reaches about two inches to the right of the median line.

57. Gastro-hepatic (lesser) omentum.—Between the liver and stomach you will find a process of peritoneum folded around the hepatic artery and duct and portal vein. This is the lesser or gastro-hepatic omentum.

58. Spleen, gastro-splenic (third) omentum.—Feel in behind the stomach and find the spleen, which caps its left end posteriorly and will be found to be joined to it by the gastro-splenic or third omentum.

59. Gastro-colic (great) omentum.—From the greater curvature of the stomach a broad apron of peritoneum reaches down to cover the intestines. This is the great or gastro-colic omentum.

By raising it upward over the chest you will expose the colon, to which it is attached in its transverse portion.

60. Small intestine, large intestine, and its divisions.—Examine the loops of small intestine which fill the central portion of the abdomen. Trace them to the right iliac fossa and there find the cæcum and, extending off from the cæcum, the vermiform appendix. It usually passes upward and inward behind the cæcum, but is often found at its lower end or lying by its inner side.

From the cæcum you can trace the ascending colon up

under the liver where it bends (hepatic flexure) to the left, forming the transverse colon, which crosses to the left side of the body until under the spleen it turns (splenic flexure) downward, forming the descending colon. Coming into the left iliac fossa the descending colon changes its name to the sigmoid flexure, and this in time becomes the rectum as the gut changes its course to enter the pelvic cavity.

61. Mesentery.—The intestine, large and small, is fastened to the posterior abdominal wall by a process of peritoneum called the mesentery.

62. Bladder, uterus, ovaries, tubes. Their ligaments.—In the pelvic cavity you will also find the bladder and in a female subject the uterus, ovaries, and tubes. Make out the folds of peritoneum forming the various false ligaments of these organs.

63. The foramen of Winslow.—Turn down the great omentum, pass your hand up under the liver behind the lesser omentum from right to left, and insert your finger in an opening you will find there, viz.: the foramen of Winslow.

64. Cavity of lesser peritoneum.—Make a transverse cut in the great omentum between the stomach and colon. This will open the cavity of the lesser peritoneum, and in it you can feel the posterior surface of the stomach, under surface of the liver, anterior opening of the foramen of Winslow, the spleen to the left, and the pancreas and kidneys behind.

Turn the great omentum (and transverse colon) upward over the chest and fasten it there.

Dissect off the anterior layer of mesentery from the arteries.

Parts Exposed.

Superior mesenteric artery.

Vasa intestini tenuis.

Ileo-colic.

Colica dextra.

Colica media.

Inferior mesenteric artery.

Colica sinistra.

Sigmoid artery.

Superior hemorrhoidal.

65. Superior mesenteric and branches.—It will not be necessary to completely dissect out the above arteries. Strip off enough of the mesentery to expose the superior mesenteric as high up as possible. Find the beginning of the twelve or more branches to the small intestine and carefully dissect out about six inches of their intestinal anastomosis.

Then follow the main branch, ileo-colic, to the cæcum and end of ileum. On the ileum side note its anastomosis with the vasa intestini tenuis and on the cæcum side the union with the colica dextra branch of the mesentery, and this in turn with the colica media supplying the transverse colon.

66. Inferior mesenteric artery and branches.—The last anastomoses with the colica sinistra—the first branch of the inferior mesenteric.

Trace the sigmoid and superior hemorrhoidal, the two remaining branches of the inferior mesenteric artery.

This completes the intestinal anastomoses excepting the duodenum and middle portion of the rectum, which you will examine later.

SIXTH DAY.

Ligate the rectum and small intestine near the duodenum in two places, and divide the gut between the ligatures.

Begin at the rectal end and remove the large and small intestine, dividing the mesentery close to them.

Raise the liver and ribs as far upward as possible, draw the stomach downward and trace the arteries seen above its lesser curvature.

Parts Exposed.

Cœliac axis.

Gastric.

Hepatic, pyloric, gastro-duodenalis, cystic.

Splenic.

67. Cœliac axis.—Clean the cœliac axis, demonstrating its three branches.

68. Gastric artery.—First trace the gastric artery, noting its direction and three distinct anastomoses it enters into, viz.: with the aortic œsophageal and splenic branches and the pyloric branch of the hepatic.

69. Hepatic and branches.—Then follow the hepatic artery to the under surface of the liver, where it divides into its two terminal branches (from the right one comes the cystic artery).

In its course the hepatic gives off the pyloric branch to inosculate with the gastric and the gastro-duodenalis, which disappears behind the duodenum close to the pylorus.

Turn the stomach upward and fasten it to the ribs, getting all the room possible.

70. Gastro-duodenalis.—Complete the dissection of the gastro-duodenalis and its two branches, the gastro-epiploica dextra and superior pancreatico-duodenalis.

71. Splenic and branches.—Trace the splenic artery to

the spleen and identify the following branches derived from it: pancreatic (*parvæ* and *magna*), gastric (*vasa brevîa*), and *gastro-epiploica sinistra*. Note the latter's anastomosis with the *dextra*.

72. *Inferior pancreatico-duodenalis*.—With the recognition of the *inferior pancreatico-duodenalis* (a branch of the *superior mesentery*) and its anastomosis with the *superior pancreatico-duodenalis* you have completed the examination of the arterial supply for the entire alimentary canal below the diaphragm (*rectum* excepted).

73. *Pancreas duodenum*.—Clean the anterior surface of the pancreas and duodenum, and see how the former is embraced by the latter.

Notice the *superior mesenteric artery* and vein lying upon the duodenum, but passing behind the pancreas.

74. *Portal vein*.—Coming out from behind the pancreas, you will find the portal vein; raise the pancreas and find how the portal vein is formed by the junction of the *splenic* and *superior mesenteric veins*. Then trace the portal vein—already partially dissected—to the under surface of the liver.

75. *Common bile duct*.—Accompanying the vein you have already found the *hepatic artery*. Now draw out the gall bladder and you will be able to find the *common bile duct* and follow it back to the space between the duodenum and pancreas.

76. *Pancreatic duct*.—Try to find the *pancreatic duct* as it joins the bile duct and where the latter empties into the duodenum.

Proceed as follows to remove the liver, stomach, duodenum, spleen, and pancreas:

Tie a ligature around the portal vein and cut the vein between the ligature and liver.

To the left of the aorta find the inferior vena cava; ligate it and divide it also on the hepatic side of the ligature.

Pull down the stomach; ligature the œsophagus as close to the stomach as possible and cut above the ligature. Cut the suspensory ligament of the spleen.

Draw down the liver; divide all its peritoneal ligaments, proceeding carefully; recognize the upper part of the vena cava inferior as it goes through the diaphragm above the liver; ligate it as close to the former as possible and cut through it on the lower side.

Remove the entire mass, dividing the cœliac axis and superior mesenteric artery as they come into view.

Clean the under surface of the diaphragm and the remaining contents of the abdomen, beginning above and working downward.

Parts Exposed.

Abdominal aorta.

Phrenics.

Cœliac axis.

Superior mesenteric.

Suprarenals—suprarenal capsules.

Renals—kidneys.

Spermatic (or ovarian).

Inferior mesenteric.

Lumbar.

Vena cava inferior.

Diaphragm.

Semilunar ganglia.

Greater splanchnic nerves.

Sympathetic ganglia.

77. Abdominal aorta: phrenics, suprarenals.—Clean

the abdominal aorta and trace its remaining branches: the phrenics to the diaphragm, the suprarenals to the suprarenal capsules. These arteries are very slender and will have to be carefully dissected or they will be torn away from the aorta.

78. Suprarenal capsules.—The capsules cap the upper and inner part of the kidneys. Unless care is used in cutting away the adipose and areolar tissue which envelops them, they will be removed before they are recognized. (Consult § 82, below.)

79. Renals, kidney, ureter.—Follow the renal arteries to the kidney.

Strip off the fatty tissue it lies imbedded in after examining its position with reference to the posterior abdominal wall. Trace the ureter to the cavity of the pelvis.

80. Spermatics.—Save the long slender spermatic (ovarian in female) arteries, and see how after joining with the vas deferens it leaves the abdomen by the internal abdominal ring (in female passes to ovary).

81. Vena cava inferior; lumbar arteries.—Before you can dissect the lumbar arteries you will need to remove the remains of the inferior vena cava. Strip it downward, ligate it at its lower end and remove the upper part. Then make out the four lumbar arteries.

82. Diaphragm.—Go back to the diaphragm, trace its crura downward, noting the difference between the right and left one. Recognize the three large openings—caval, aortic, and œsophageal.

83. Semilunar ganglion.—Now at the side of the aorta at the coeliac axis find the large sympathetic semilunar ganglion. It lies upon the crus of the diaphragm near the suprarenal bodies.

84. Greater splanchnic nerve.—It receives the splanchnic

nic nerves, the greater one of which you can find if not the smaller.

85. Lumbar ganglia.—Find the four lumbar sympathetic ganglia and trace their connecting cords. They lie upon the front of the lumbar vertebræ to the outer side of the aorta.

SECOND WEEK.

FIRST DAY.

Carefully remove any remaining peritoneum and all areolar tissue from the lumbar and iliac regions.

Parts Exposed.

Twelfth intercostal nerve.

Lumbar plexus.

Ilio-hypogastric.

Ilio-inguinal.

External cutaneous.

Genito-crural.

Anterior crural.

Obturator.

Quadratus lumborum.

Psoas magnus and parvus.

Iliacus.

Common iliac artery and vein.

External iliac artery and vein.

Femoral opening.

Gimbernat's ligament.

Relations beneath Poupart's ligament.

86. Last intercostal nerve.—Just below the last rib you will find the twelfth intercostal nerve.

87. Lumbar plexus.—Learn the formation of the lum-

bar plexus and trace its ilio-hypogastric and ilio-inguinal nerves through the transversalis.

Then cut away the internal oblique and transversalis close to the crest of the ilium and Poupart's ligament.

Below the above nerves find the external cutaneous traversing the iliac fossa upon the iliacus muscle and disappearing beneath Poupart's ligament immediately in front of the anterior superior iliac spine.

You will see the genito-crural lying upon the psoas magnus muscle. It divides into two branches. One branch joins the cord and the other passes under Poupart's ligament with the psoas magnus muscle.

In the groove between the psoas magnus and iliacus lies the anterior crural nerve. It passes also under Poupart's ligament.

The obturator nerve will be found passing forward below the pelvic brim to leave the pelvis by the obturator foramen.

It will be more fully exposed later in the dissection.

88. Quadratus lumborum.—Turn the kidney toward the other side and make out the quadratus lumborum muscle.

89. Psoæ. Iliacus.—Also clean the surface of the psoas magnus and parvus and iliacus muscles. Do not cut away the nerves and arteries which lie in or upon them.

90. Common and external iliac vessels.—Now carefully compare the relations of the common and external iliac arteries and veins on the two sides. Trace the deep circumflex iliac branch of the external iliac artery.

91. Femoral opening, Gimbernat's ligament; relations under Poupart's ligament.—To the inner side of the external iliac (femoral) vein you will see a dimple—or a depression—beneath Poupart's ligament. This depression is the

femoral opening. It is now closed by the septum crurale, and in the depression you will find a small lymphatic gland inclosed in areolar tissue.

To the inner side of the (closed) opening you have Gimbernat's ligament; above Poupart's ligament, and to the outer side, the femoral vein; then the artery, and last the anterior crural nerve.

Divide the psoas magnus and parvus. Clean the lower part of the lumbar plexus and the internal iliac artery and branches as far as convenient.

Parts Exposed.

Obturator nerve.

Lumbo-sacral cord.

Internal iliac artery and branches.

Ureter. Bladder.

Vas deferens.

92. Obturator nerve, lumbo-sacral cord.—Finish the dissection of the obturator nerve. Also find the lumbo-sacral cord which connects the lumbar with the sacral plexus. It passes over the base of the sacrum close to the body of the last vertebra.

93. Internal iliac and branches, ureter, vas deferens.—Take up the internal iliac artery, and make out its bifurcation. Trace its obturator branch, which accompanies the nerve of the same name; the ilio-lumbar, to its iliac (deep circumflex iliac) and lumbar (last lumbar) anastomoses and the vesical arteries. To follow the last it will be necessary to inflate the bladder with air, using for this purpose an ordinary syringe; tie a string around the penis and draw the bladder well out of the pelvis.

Note that the superior vesical gives off a fibrous cord,

which is the obliterated hypogastric artery (§ 52, p. 85), and a small branch to the vas deferens. Follow the ureter and vas deferens around the back of the bladder.

Divide the ureters, the vasa deferentia, and arteries passing to the bladder. Cut away any remaining peritoneal folds or recto-vesical fascia holding the bladder (uterus, vaginal in female) and rectum and remove them through the pelvic outlet.

Parts Exposed.

Remaining branches of internal iliac artery.

Sacral plexus.

Obturator internus.

Pyriformis.

Coccygeus.

94. Internal iliac finished.—Identify the remaining branches of the internal iliac artery. From the anterior trunk the middle hemorrhoidal (should be noticed when the rectum is removed) and the pudic and sciatic (terminal branches). From the posterior trunk the lateral sacral (two) and gluteal (continuation of trunk).

95. Sacral plexus.—In this locality determine the broad cord of the sacral plexus and the roots of origin from the lumbo-sacral cord and first three sacral nerves.

Recognize the obturator internus, pyriformis, and coccygeus muscles.

This completes the dissection of the abdomen.

LOWER EXTREMITY.

SECOND DAY.

Incision.—1. From the middle of Poupart's ligament down the front of the thigh to below the patella.

2. Two short transverse cuts at the lower end of 1.

Remove the skin only, turning it off laterally as far as possible.

Parts Exposed.

Superficial fascia.

Superficial arteries.

Superficial veins.

Superficial nerves.

Femoral lymphatics.

Prepatellar bursa.

96. Superficial fascia.—The superficial fascia is of varying thickness. It consists of two layers between which the superficial vessels and nerves will be found.

97. Superficial arteries.—The superficial arteries are (*a*) the superficial epigastric, (*b*) the superficial external pudic, which have already been dissected distally (§ 23, p. 76), and now only need to be traced until they disappear by passing deeply through the fascia lata, (*c*) the superficial circumflex iliac, which runs outward below Poupart's ligament and the crest of the ilium, (*d*) down the front of the thigh some superficial branches of muscular arteries which perforate the fascia lata, and (*e*) on the inner side of the knee the anastomotica magna becoming superficial.

98. Superficial veins.—The superficial veins are those

which accompany the above arteries, and are of no special importance excepting one, the internal or long saphenous, which follows no artery. Trace this vein from below where it appears along the inner side of the knee until it disappears through an (artificial) opening in the fascia lata (to be dissected later).

99. Superficial nerves.—The superficial nerves will be demonstrated as the fascia lata is cleaned, but filaments of the main branches may be found at this stage, though it is not advisable to delay the dissection to look especially for them.

The subcutaneous nerves are branches of the external cutaneous, the middle and internal cutaneous branches of the anterior crural, the crural branch of the genito-crural nerve, and the internal saphenous branch of the anterior crural.

100. Femoral lymphatics.—The femoral lymphatics will be found below the middle of Poupart's ligament and clustered about the veins and arteries coming out of the saphenous opening.

101. Prepatellar bursa.—Cut through the superficial fascia over the patella; separate the sides of the cut and you will find the prepatellar bursa.

Now remove all of the superficial fascia, leaving the vessels and nerves lying upon the fascia lata. At the saphenous opening care will have to be used or all form of this opening will be lost.

The only directions that can be given are to work from all points toward the opening, isolate the vessels and nerves which pass through it, then cut the intervening tissue carefully away.

If done properly you will see defined the denser outer border of the opening and a looser layer of tissue (cribri-

form fascia) passing inward to the inner border of the opening.

In the lower third of the thigh the superficial fascia can be removed in a layer after making similar incisions in it to those in the skin. Here care must also be used to leave the fascia lata *behind*, for it is thin, especially over the front and inner surfaces of the thigh.

Parts Exposed.

Fascia lata.

Saphenous opening.

Cribriform fascia.

Deep external pudic artery.

102. Fascia lata.—The fascia lata—or deep fascia of the limb—incloses the thigh like a tight sheath.

At this time learn all its anterior attachments above and below. Notice how it thins out over the inner part of the thigh, but how dense it is between the ilium and tibia on the outer side of the thigh where it forms the ilio-tibial band.

103. Saphenous opening.—Study carefully the description of the saphenous opening in your text-book.

Do not confuse your mind with the many names applied to the borders of the opening. On the outer side recognize the curved band of fibres reaching from the spine of the pubes and inner part of Poupart's ligament downward and then inward under the saphenous vein to join the inner portion of the fascia.

This curved band forming the outer border of the opening is the falciform process of the fascia lata.

104. Cribriform fascia.—As before stated, the opening does not exist as such until the connective tissue filling it

and stretching from one border to the other and pierced by the internal saphenous vein, lymphatics, and nerves is removed. This is the cribriform fascia, and is really the deeper part of the superficial fascia which is attached around the margins of the opening.

105. Structures passing through the opening.—Remove the cribriform fascia; make out now clearly the borders (outer very distinct, inner not well defined) of the opening and the structures passing through it. They are the internal saphenous vein, superficial external pudic and superficial epigastric arteries, and the genito-crural nerve.

You will also see the femoral vein and artery covered by their sheath.

106. Deep external pudic artery.—The deep external pudic artery will be found coming through the fascia lata on a level with and about one inch to the inner side of the saphenous opening.

THIRD DAY.

Divide the saphenous vein and its tributaries near the saphenous opening.

Incise the fascia lata in the middle line from Poupart's ligament to the patella. Cut the fascia away from Poupart's ligament, working outward until the tensor vaginae muscle is reached. Follow the muscle and the ilio-tibial band downward, dividing the fascia at their anterior border, and remove this portion entirely.

Leave the stub of the external cutaneous nerve upon the sartorius.

Raise the inner portion of the fascia. Cut it away from Poupart's ligament and front of the pubes. Dissect it off from the deeper structures—carefully avoiding cutting into them—until the gracilis muscle is reached and passed.

Then divide the fascia along the inner border of the muscle and remove it.

In removing the fascia note its intermuscular septa and where it is pierced by the cutaneous nerves and vessels. Carefully dissect the connective and adipose tissue from the structures presenting.

Parts Exposed.

Tensor vaginae femoris.

Ilio-tibial band.

Sartorius.

External cutaneous nerve.

Internal saphenous nerve.

Anastomotica magna artery.

Rectus.

Femoral artery and vein.

Anterior crural nerve.

Iliacus.

Tendon of psoas magnus.

Pectineus.

Adductor longus.

Scarpas triangle.

Gracilis.

Clean the parts above in the order in which they are given. The muscles are to be exposed from origin to insertion and their arterial and nerve supply saved.

107. Tensor vaginae femoris, ilio-tibial band.—Recognize how the tensor vaginae femoris is inserted into the fascia lata, and by the so-called ilio-tibial band is continued into the tibia.

108. Sartorius, external cutaneous nerve.—In cleaning the origin of the sartorius, note the external cutaneous

nerve which comes out from under Poupart's ligament close to the anterior superior iliac spine.

109. *Anastomotica magna*, internal saphenous nerve.—As you follow the muscle around the internal condyle of the femur you will discover the internal saphenous nerve and superficial branch of the *anastomotica magna* artery.

Make out the inverted **J**-shaped insertion of the muscle, also the bursa common to its tendon and the tendons of the *gracilis* and *semitendinosus*.

110. *Rectus*.—Find the two tendons of origin of the *rectus*. Remove the fat between it and the *tensor vaginæ femoris*.

Notice the dense band from the *fascia lata* at the termination of the latter, which reaches upward to be attached just above the posterior tendon of the former muscle.

111. *Femoral artery* (and vein), *anterior crural nerve*.—Clean the *femoral artery* and its branches (as far as convenient) to the upper border of the *adductor longus*.

Trace downward the various branches of the *anterior crural nerve*.

112. *Iliacus*, tendon of *psoas magnus*, *pectineus*, *adductor longus*.—The *iliacus*, *pectineus* and *adductor longus* are now to be freed from areolar tissue. Leave the fibrous aponeurosis passing from the last muscle to the *vastus internus*.

In cleaning the *iliacus* you will find the tendon of the *psoas magnus* at its inner side.

113. *Scarpa's triangle*.—You are now to study carefully the triangular space bounded by the *sartorius*, *Poupart's ligament*, and the *adductor longus*—*Scarpa's triangle*—the floor of which is made by the *iliacus*, tendon of *psoas*, *pectineus* and *adductor longus* muscles. Its contents are the *femoral vessels*, the *anterior crural nerve* and their branches.

In this connection refer again to the femoral opening and run over its boundaries (§ 90, p. 95).

114. Gracilis.—Clean the gracilis muscle from end to end; above, its wide but very thin origin, and below, its narrow but thick insertion. At the knee you will see the internal saphenous nerve and anastomotica magna artery in front of the tendons of the muscle.

FOURTH DAY.

Divide the ilio-tibial band just below the tensor muscle and turn the latter upward; at the same time look for its nerve supply.

Divide the sartorius and rectus at their middle and reflect their ends, saving their nerves.

Parts Exposed.

Vastus externus.

Gluteus minimus.

Gluteus medius.

Vastus internus and crureus.

Hunter's canal.

Femoral artery and vein.

Internal saphenous nerve.

Anastomotica magna artery.

Profunda femoris.

Internal and external circumflex arteries.

Nearly all the structures mentioned above will have been more or less exposed by this time; complete the dissection of what remains unfinished.

115. Vastus externus, gluteus minimus and medius.—Demonstrate the extensive origin of the vastus externus, and when working above recognize also the gluteus minimus and medius; the former internal to the latter.

116. *Vastus internus* and *crureus*.—The *vastus internus* and *crureus* are really one muscle covering the front and lateral surfaces of the femur, and reaching around on the inner side to the *linea aspera*. Do not try to separate them.

117. Hunter's canal and contents.—Study the formation of Hunter's canal, then incise the fascia stretching across the front of the canal and expose the femoral artery vein and internal saphenous nerve. What are their relations to each other here?

118. *Anastomotica magna*.—While in this region complete the dissection of the *anastomotica magna* artery by tracing it to where it comes off from the femoral, and follow down its deep branch between the *vastus internus* and tendons of *adductor magnus*.

119. *Profunda* and *circumflex* arteries.—You should now dissect the *profunda* artery (upper portions) and its two branches, the internal and external *circumflex*.

Divide the *adductor longus* at its middle and lower thirds (below where the nerve enters it). Draw the *pectineus* upward, dividing it through the middle if necessary. Cut through the *iliacus* under *Poupart's* ligament and turn the lower part downward. Divide the femoral artery below the origin of the *profunda*.

Parts Exposed.

Adductor brevis.

Adductor magnus.

Obturator externus muscle.

Obturator nerve and artery.

Capsular origin of *iliacus* muscle.

Profunda and its perforating branches.

120. *Adductor brevis*.—When dissecting the *adductor*

brevis, you will find the anterior branch of the obturator nerve lying upon and the posterior branch behind the muscle. Divide the muscle and reflect its ends.

121. Adductor magnus.—The adductor magnus has already been partially cleaned; complete the unfinished parts. Notice its broad insertion, where its tendon ends in the adductor tubercle, and that it is pierced by the femoral artery.

122. Obturator externus.—Only the anterior portion of the obturator externus can be seen. It is pierced by the posterior branch of the obturator nerve.

123. Obturator nerve and artery.—With the obturator nerve you will find the internal branch of the obturator artery. Both can be traced to their exit from the obturator foramen.

124. Capsular origin of iliacus.—It is important to notice the fibres of the iliacus which arise from the capsule of the hip-joint. They are more numerous than usually stated. Between the tendon of the ilio-psoas and capsule of the joint is a bursa that often communicates with the joint.

125. Profunda and branches.—Finish the anterior portion of the thigh by completing the dissection of the profunda artery and its perforating branches.

FIFTH DAY.

Incisions.—**1.** Continue the incision down the front of the leg and foot to toes.

2. Make liberating transverse cuts at the ankle and one across the base of the toes.

3. Carry incisions along the top of the toes.

Remove the integument from the leg, foot, and toes.

Leave the superficial veins and nerves lying upon the

deep fascia. In removing the skin from the toes look out for and save the digital nerves.

Parts Exposed.

Internal saphenous vein.

Internal saphenous nerve.

Musculo-cutaneous nerve.

External saphenous vein.

External saphenous nerve.

Anterior tibial nerve (digital branch).

Deep fascia.

Annular ligament.

126. Internal saphenous vein and nerve.—The internal saphenous vein and nerve will be found running together down the inner side of the leg and ankle. The vein continues forward to form with the external saphenous a venous arch on the dorsum of the foot.

127. Musculo-cutaneous nerve.—At the lower third of the leg on the outer side you will see the musculo-cutaneous nerve piercing the deep fascia.

Carefully trace the branches of this nerve to their digital distribution, also the branch of communication it gives to the anterior tibial nerve.

128. External saphenous vein and nerve.—You will find the external saphenous vein and nerve below the external malleolus and passing forward on the outer side of the foot. The vein takes part in the formation of the venous arch (see § 126); the nerve sends a branch of communication to the musculo-cutaneous and supplies the outer side of the foot and small toe.

129. Deep fascia; annular ligament.—Read the descriptions of the deep fascia of the leg. Just above the ankle notice that the fascia is reinforced by transverse fibres

passing between the tibia and fibula. This band constitutes the upper portion of the annular ligament.

There is a second band lower down reaching from below the external malleolus across the front of the ankle. It is well marked on the outer side and front of the ankle, but becomes more indistinct over the inner side; however, its fibres can be seen to run to the internal malleolus (upper leg of ) and to the inner side of the sole of the foot (lower leg of ) .

Divide the musculo-cutaneous nerve in front of the ankle. Remove all the deep fascia from the leg and foot except those portions constituting the two annular ligaments.

Separate and clean the muscles, vessels, and nerves.

Parts Exposed.

Tibialis anticus.

Extensor proprius pollicis.

Extensor longus digitorum.

Peroneus tertius, brevis and longus.

Anterior tibial artery and branches.

Anterior peroneal artery.

Anterior tibial nerve.

Musculo-cutaneous nerve.

Extensor brevis digitorum.

Dorsalis pedis artery and branches.

Digital branch of anterior tibial nerve.

Dorsal interossei muscles.

130. Anterior and lateral muscles of leg.—These muscles are easily separated and cleaned. From within outward they are the tibialis anticus, extensor proprius pollicis, extensor longus digitorum, peroneus tertius, brevis and longus. Their tendons should be followed to their

insertion and the relations of the anterior tendons under the annular ligament and the external tendons behind the outer malleolus carefully noted.

131. Anterior tibial artery and branches.—The anterior tibial artery will be found lying deep on the interosseus membrane to the outer side of the tibialis anticus muscle. Examine its relations throughout its course. Trace its recurrent, various muscular and malleolar branches.

132. Anterior peroneal artery.—Find the anterior peroneal artery as it comes through the interosseus membrane about two inches above the outer malleolus, and follow it down the outer side of the ankle to its anastomosis with the external malleolar artery.

133. Anterior tibial and musculo-cutaneous nerves.—Examine the relations of the anterior tibial nerve to the artery. Then trace it and also the musculo-cutaneous to their source—the external popliteal nerve.

134. Extensor brevis digitorum.—The extensor brevis digitorum lies upon the front and outer side of the foot beneath the long extensor tendons. Notice the number and method of insertion of its tendons.

135. Dorsalis pedis artery and branches.—Clean the dorsalis pedis artery and its tarsal, metatarsal, dorsalis hallucis and communicating branches as far as convenient without cutting away the overlying muscles and tendons. Draw them to one side or the other.

136. Anterior tibial digital nerve.—Trace the digital branch of the anterior tibial nerve to the first and second toes.

137. Dorsal interossei.—Dissect out the four interossei muscles on the dorsum of the foot, following their tendons to their insertion.

This finishes the dissection of the anterior part of the lower extremity.

LOWER EXTREMITY.

THIRD WEEK.—Posterior Surface.

FIRST DAY.

Incisions.—1. Continue the median incision of the trunk to the tip of the coccyx.

2. Make a transverse cut from the last dorsal vertebra outward (same as 3, page 55).

3. From the middle of the sacrum carry a curved incision outward over the crest of the ilium to join the similar anterior one.

Remove the integument from the lumbar, gluteal and posterior crural regions.

To expose the back of the thigh (and for that matter the leg) it will not be necessary to make median and transverse incisions. But reflect the integument from the outer to the inner side of the limb and from above downward as far as necessary, here to below the knee. Do not cut this large flap of skin away.

Parts Exposed.

Superficial fascia.

Superficial nerves.

Fascia lata.

138. Superficial fascia and nerves.—The student need not delay to dissect out the superficial nerves, as they are not of enough consequence to repay the time and labor spent upon them.

He may proceed at once to remove the superficial fascia,

which will be found distended and soaked with gravitated injection fluid.

The same incisions used in removing the skin may be followed and the fascia removed in layers, or it may be scraped and cut away piecemeal, care being taken not to cut into the deep fascia beneath.

139. Fascia lata.—By the removal of the superficial fascia you expose the posterior portion of the fascia lata.

Learn its attachments above and below, and examine its reinforcement in the popliteal space by transverse fibres.

Remove the fascia lata from the gluteus maximus muscle, cutting in the direction of the fibres of the muscle. Expose the muscle entirely.

Incise the fascia in the middle line from the gluteus maximus to below the knee and remove it from the deeper parts, noting the compartments for the muscles. Save the small sciatic nerve.

Parts Exposed.

Gluteus maximus.

Small sciatic nerve.

140. Gluteus maximus.—This large coarse muscle will be seen to have been inclosed between two layers of the fascia lata, one layer having been removed, the other lies between it and the gluteus medius muscle.

141. Small sciatic nerve.—From under the lower edge of the gluteus maximus you will find the small sciatic nerve appearing to pass down the back of the thigh.

Divide the gluteus maximus at its outer and middle thirds and reflect the two portions.

The outer portion is to be carefully dissected to demonstrate the double insertion of the muscle and the bursa between it and the great trochanter, and the inner portion

to be lifted up and turned back on to the sacrum to show its extensive origin and the bursa which intervenes between the muscle and the tuberosity of the ischium.

Note the nerve and arterial supply, then divide them close to the muscle.

Now remove entirely the inner portion of the muscle by cutting it away from its origins.

Parts Exposed.

Great sacro-sciatic ligament.

Gluteus medius.

Pyriformis.

Gluteal artery, superficial branch.

Great sciatic nerve.

Small sciatic nerve.

Sciatic artery.

Great sacro-sciatic foramen.

Gemellus superior.

Obturator internus.

Gemellus inferior.

Small sacro-sciatic foramen.

Pudic nerve.

Pudic artery.

Nerve to obturator internus.

Quadratus femoris.

Obturator externus.

142. Great sacro-sciatic ligament.—The outer surface of this strong ligament is exposed by the removal of the gluteus maximus. It is usually found pierced by the coccygeal branch of the sciatic artery.

143. Gluteus medius and pyriformis.—Remove the remains of the fascia lata covering the upper part of this

muscle, then clean the pyriformis and make out the latter muscle's attachment to the margin of the great sacro-sciatic foramen.

144. Gluteal artery.—Between the gluteus medius and pyriformis you will find the superficial branch of the gluteal artery.

145. Great and small sacro-sciatic foramina and what they transmit.—Below the pyriformis you will see the great sciatic nerve, small sciatic nerve and sciatic artery issuing from the great sacro-sciatic foramen. Carefully clean out the foramen and close to the spine of the ischium you will discover the pudic nerve, pudic artery and the nerve to the obturator internus, which also leave the pelvis by the great sacro-sciatic foramen, curve around the spine of the ischium, and re-enter the pelvis through the small sacro-sciatic foramen.

Trace the sciatic nerves and artery downward to the thigh and find the branch the artery sends off to the great sciatic nerve.

146. Obturator internus, gemelli.—Return now to the small sacro-sciatic foramen, where you will find the tendon of the obturator internus coming out. Above it is joined by the gemellus superior and below by the gemellus inferior.

The method of insertion of the pyriformis and the above muscles will be understood by cutting their tendons apart up to the great trochanter, when it will be seen that the posterior muscles have the anterior insertion.

147. Quadratus femoris, obturator externus —Clean the quadratus femoris. Draw it downward and the muscles above it upward, and in the interval look for the tendon of the obturator externus passing to its insertion into the digital fossa of the femur.

Cut through the gluteus medius at its outer and middle

thirds. Reflect the two parts and make out the extent of origin and manner of insertion of the muscle.

SECOND DAY.

Parts Exposed.

Gluteus minimus.
Superior gluteal nerve.
Gluteal artery, deep branch.

148. Gluteus minimus.—The gluteus minimus lies the deepest of the gluteal muscles. Its tendon passes in front of that of the medius to the front of the great trochanter.

The gluteal muscles are inserted into the great trochanter from before backward in order of size, beginning with the smallest, as minimus, medius and maximus. This may help the student to remember the order of their insertions.

149. Superior gluteal nerve, gluteal artery.—The superior gluteal nerve and deep branch of the gluteal artery will be found between the gluteus medius and minimus muscles. Trace them from their exit at the great sacro-sciatic foramen to their distribution.

Clean the muscles of the thigh and the upper part of the popliteal space.

Save the nerves and arteries.

Parts Exposed.

Biceps.
Semitendinosus.
Semimembranosus.
Adductor magnus.
Great sciatic nerve.
Branches of internal circumflex and profunda arteries.

150. Biceps, semitendinosus, semimembranosus, adductor magnus.—These muscles are to be dissected out from origin to insertion and the following points about them noted.

The two heads of the biceps and its fibular and tibial attachments. The common origin of the semitendinosus with the biceps and its insertion with the inner hamstring muscles (see § 108, p. 102, and § 114, p. 104). The origin of the semimembranosus above and to the outside of the above muscles—demonstrated by cutting their united tendons apart—its passage under the above muscles, insertion into the tibia and reflected tendon across the knee-joint (seen better when the popliteal space is finished).

Save the nerve and vascular supply to these muscles and also to the adductor magnus, which is to be carefully cleaned.

151. Great sciatic nerve.—Save all the muscular branches of the great sciatic nerve and clean its two popliteal branches.

152. Branches of internal circumflex and profunda arteries.—From above downward find the following arterial branches: Between the quadratus femoris and adductor magnus, the terminal branches of the internal circumflex (see “crucial anastomosis” in Gray); coming through the adductor magnus close to its femoral attachment, the three perforating branches of the profunda and the termination of the profunda itself piercing the muscle just above its femoral opening.

THIRD DAY.

Remove the integument from the back of the leg, following the general directions on page 110 for exposing the thigh.

When the heel is reached, cut the skin flap away entirely.

Parts Exposed.

External saphenous vein.

External saphenous nerve.

Posterior branches of internal saphenous nerve.

Deep fascia.

153. External saphenous vein and nerve.—The external saphenous vein and nerve accompany each other from the middle of the leg around below the external malleolus. Forward of this point they have been already dissected (see § 128, p. 107). At the middle of the leg the nerve leaves the vein, going beneath (in reality coming out through) the deep fascia, while the vein passes up to the lower part of the popliteal space before it disappears.

154. Deep fascia.—Examine the deep fascia of the leg. Notice the additions it receives from the tendons of the hamstring muscles and how it is reinforced in the popliteal space by transverse fibres (see § 139, p. 111).

After cutting through the fascia in the middle line remove it together with the external saphenous vein, but leave the nerve behind.

Clean out the popliteal space.

Parts Exposed.

External popliteal nerve.

Internal popliteal nerve.

External saphenous nerve.

Popliteal vein.

Popliteal artery and upper branches.

Gastrocnemius.

Plantaris.

Popliteal space, boundaries.

155. Popliteal and external saphenous nerves.—Trace the external popliteal nerve, which lies just below the tendon of the biceps, to the outside of the leg where it divides into its two terminal branches.

Save the branch which goes to help form the external saphenous nerve. Follow the internal popliteal nerve through the centre of the popliteal space and trace its muscular branches and the external saphenous nerve.

156. Popliteal vein and artery.—Beneath the internal popliteal nerve you encounter the popliteal vein a little to the inside of the former, and a little deeper and to the inner side of the vein you find the artery. Clean carefully the vein and artery and save the branches of the latter.

157. Gastrocnemius and plantaris.—The gastrocnemius and plantaris should be thoroughly cleaned at their origin and their nerve supply saved, and the former muscle examined to see what part it takes in the formation of the tendo Achillis.

158. Popliteal space.—Now study the popliteal space; learn its boundaries and examine the relation its contents (nerve, vein and artery) bear to each other. Clean the floor of the space and from above downward see that it is formed by the lower end of femur, posterior ligament of knee-joint, upper end of tibia and popliteus muscle. These can be more clearly demonstrated after the superficial muscles are removed.

Divide the two branches that go to form the external saphenous nerve, and the inner and outer head of the gastrocnemius just above their junction.

Turn the lower part of the muscle downward and separate the upper heads, saving their nerve supply. Remove the connective tissue from the muscles presenting.

Parts Exposed.

Plantaris.
Popliteus.
Soleus.

159. Plantaris, popliteus, soleus.—Demonstrate these muscles and their nerve supply.

The nerve to the popliteus curves around its lower border and is distributed to its anterior surface.

The long tendon of the plantaris muscle is distinct from the tendo Achillis, though it follows it closely along its inner side.

Divide the tendon of the plantaris and tendo Achillis near their insertion and cut the soleus away from its tibial origin.

Turn the muscles outward. Clean the deep layer of muscles, and the vessels and nerves.

Parts Exposed.

Posterior tibial nerve.
Popliteal artery and lower branches.
Anterior tibial artery.
Posterior tibial artery.
Peroneal artery.
Flexor longus digitorum.
Flexor longus pollicis.
Tibialis posticus.
Relations at the ankle.

160. Posterior tibial nerve.—The floor of the lower part of the popliteal space can now be plainly seen. Note the arbitrary point selected for changing the name of internal popliteal to posterior tibial nerve.

161. Popliteal artery and branches.—Complete the dis-

section of the lower part of the popliteal artery, its lower articular branches and bifurcation.

162. Anterior, posterior tibial and peroneal arteries.—See how the anterior tibial artery passes forward over the interosseus membrane. Follow the posterior tibial artery (and nerve, noting their relations) to the inner side of the ankle. Trace the peroneal artery along the outer side of the leg and heel. Find its anterior peroneal branch.

163. Deep posterior muscles of leg.—Complete the dissection of the flexor longus digitorum, tibialis posticus and flexor longus pollicis muscles. Between the first and second lie the posterior tibial artery and nerve, and between the second and third the peroneal artery.

164. Relations at the ankle.—Study the relations at the inner side of the ankle behind the internal malleolus. Take the posterior tibial artery as the central structure and you find two others in front of it, the tendons of the flexor longus digitorum and tibialis posticus; and two behind it, the posterior tibial nerve and tendon of the flexor longus pollicis.

FOURTH DAY.

No incision through or around the sole is necessary.

Working from the heel forward, dissect the skin off in one piece to the sides of the sole and toes (where its removal was stopped when on the dorsum of the foot).

Out away the entire flap.

The superficial fascia will be found as a thick pad of fatty and connective tissue covering the sole.

It is to be entirely removed so as to thoroughly expose the deep fascia. For this purpose the curved scissors will be found the most useful.

Be careful not to cut away the digital nerves which lie imbedded in the fat between the processes of the plantar fascia.

Parts Exposed.

Plantar fascia.

Digital nerves.

165. Plantar fascia.—Learn this fascia as given in the text-book. It is a most important structure surgically considered. Examine its outer and inner portions and especially the thick central one and its digitations.

166. Digital nerves.—Between the fasciculi of the central portion of the plantar fascia you will find the digital branches of the plantar nerves, and their branches to the toes.

Remove the plantar fascia by cutting away altogether the thin outer and inner portions. Incise the central part transversely across about three inches from the heel, raise the anterior portion from the muscle beneath and carefully dissect it forward, dividing the strong intermuscular septum on each side of the muscle, until the insertions of the fasciculi are reached. Stop here to examine how the flexor tendons pass through the divided fasciculi while the digital nerves, vessels, and lumbrical muscles lie between the fasciculi themselves, then remove the fascia entirely. Leave the posterior portion attached to the muscle.

Parts Exposed.

Flexor brevis digitorum.

Abductor pollicis.

Abductor minimi digiti.

Internal plantar nerve.

Internal plantar artery.

167. First layer of plantar muscles.—The flexor brevis digitorum, abductor pollicis and abductor minimi digiti constitute the first layer of the plantar muscles. They should be cleaned and carefully separated and their origin and insertion examined.

168. Internal plantar nerve and artery.—The internal plantar nerve appears from between the abductor pollicis and flexor brevis digitorum muscles and passes forward to supply the three and one-half inner toes.

The artery of the same name, usually very small, appears at the same point in the sole with the nerve, but passes forward along the inner side of the foot.

If the artery is not found at this stage, it can be after the abductor pollicis is divided.

FIFTH DAY.

Section the internal plantar nerve where it appears in the sole. Divide the abductor muscles about one inch in front of their origin, and the flexor brevis digitorum transversely across at its middle.

Reflect the parts.

Parts Exposed.

Internal plantar nerve and artery.

External plantar nerve and artery.

Posterior tibial nerve and artery.

Flexor longus pollicis tendon.

Flexor longus digitorum tendons.

Flexor accessorius.

Lumbricales.

169. Plantar nerves and arteries.—Follow the internal plantar nerve and artery to their origin from the posterior

tibial nerve and artery respectively. From this point of bifurcation trace forward the external plantar nerve (and its digital branches to the one and one-half outer toes) and artery until they pass under the lumbricales and tendons of the long flexor muscle.

170. Second layer of plantar muscles.—The tendons of the flexor longus pollicis and digitorum are to be cleaned. Notice the slip connecting the two tendons. Also clean the accessorius and lumbricales, examining their origin and insertion.

Divide the tendon of the flexor longus digitorum just in front of the accessorius and reflect it with the lumbricales forward.

Clean all the remaining muscles and tendons.

Parts Exposed.

Flexor brevis pollicis.

Adductor pollicis.

Flexor brevis minimi digiti.

Transversus pedis.

Interossei.

Tendons of tibialis posticus, tibialis anticus and peroneus longus.

Plantar arch.

171. Completion of foot.—The above parts are to be exposed one after the other. The first four muscles constitute the third layer of plantar muscles, while the interossei alone form the fourth.

The last muscles are to be studied with reference to their action.

The tendons of the three leg muscles should be traced to

their insertion and their action demonstrated by drawing upon the tendons separately.

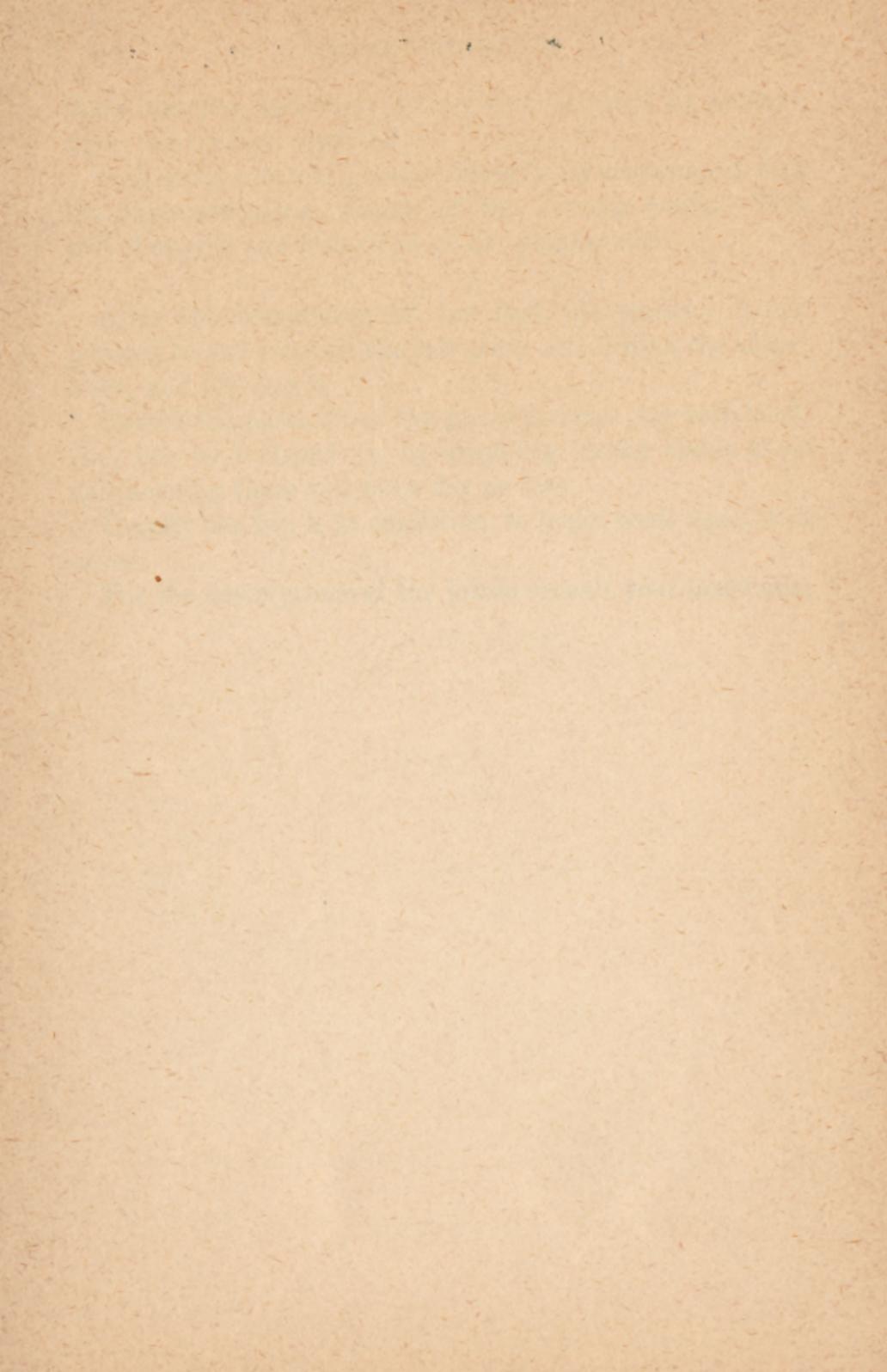
Follow the external plantar artery to its anastomosis with the communicating branch of the dorsalis pedis. This will show you the formation of the plantar arch.

After the completion of the foot the student should proceed to cut away all the soft parts and dissect the ankle, knee, and hip joints.

Should the parts about the joints become dry and hard, they can be softened up by wrapping cloths about them and keeping them wet for a day or two.

Usually the hip is in condition to begin work upon it at once.

For the descriptions of the joints consult your text-book.



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