Anatomography, or, Graphic anatomy / by William Darling.

ANATOMOGRAPHY

DARLING

ANATOMOGRAPHY OR GRAPHIC ANATOMY.

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MOTOR NERVES OF THE INTRINSIC MUSCLES OF THE UPPER EXTREMITY.

MOTOR NERVES OF THE INTRINSIC MUSCLES OF THE LOWER EXTREMITY.

MUSCLES DIVIDED IN CASES OF AMPUTATION.

FORAMINA COMMUNICATING WITH THE INTERIOR OF THE CRANIUM.

SYNOPSIS OF THE STRUCTURE OF THE HEART AND THE CIRCULATION OF THE BLOOD.

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INTRODUCTORY NOTE.

These tables will be found serviceable as a means of enabling the student to remember the details of information gathered by study of the subject in books and by observation. They are valueless as an assistance in "cramming;" no aid will be derived from them *until* this detailed study has been accomplished.

The explanatory notes appended to each table will be found sufficient to indicate the right method of employing it; but—particularly with the table referring to amputations—these directions must be *carefully* read.

In the table of "Motor Nerves of Muscles of the Lower Extremity" "Curral," by a printer's error, has been substituted for "Crural." The external popliteal branch of the great sciatic nerve is in the same table termed "Peroneal," a name less familiar to English students than to their American brothers.

In using the tables of Motor Nerves it will be found convenient to read from right to left, proceeding from the column of "totals" to those of distribution.

The present series will be followed at intervals by other Anatomographical tables.

MOTOR NERVES OF THE INTRINSIC MUSCLES OF THE UPPER EXTREMITY.

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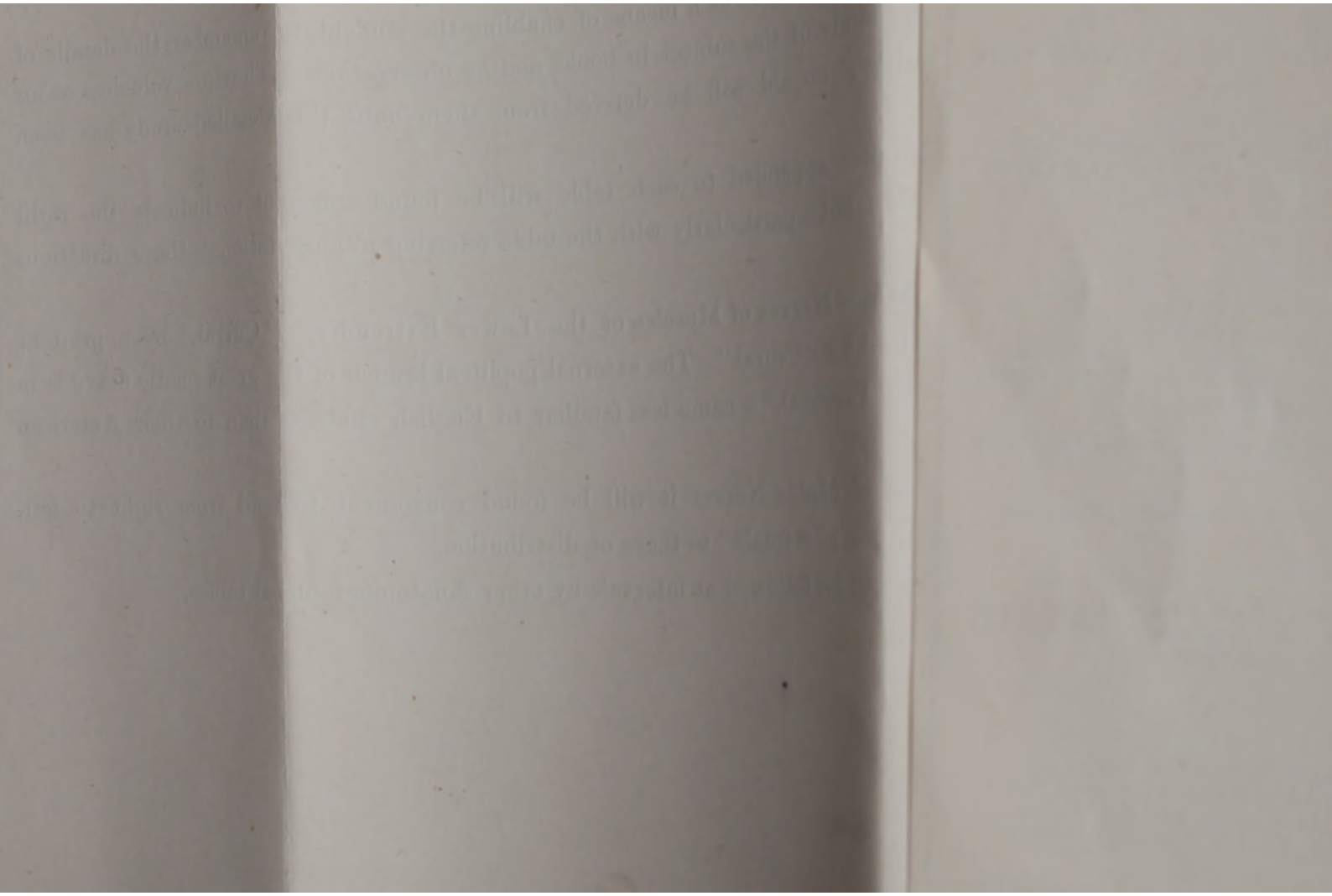
Nerves.	Muscles of the Scapulo-Humeral Reg., or Muscles connecting the Arm with Shoulder.	Humeral Reg., or Muscles situated on the Arm.	Muscles of the Forearm.	Muscles of the Hand.	Total.		Muscles.
SUPRA-SCAPULAR (5th and 6th Cervical Nerve.)	2	...	...	...	2	2	Supra-spinatus, and Infra-spinatus.
SUBSCAPULAR ... (From Posterior Cord of the Brachial Plexus.)	2	...	...	...	2	2	Subscapularis, and Teres Major.
CIRCUMFLEX ... (From Posterior Cord of the Brachial Plexus.)	2	...	...	...	2	2	Deltoid, and Teres Minor.
MUSCULO-SPIRAL (From Posterior Cord of the Brachial Plexus.)	...	2	3	...	5	14	Triceps, Anconeus, Subanconeus, Supinator Longus, Extensor Carpi and Radialis Longior.
Posterior Interosseous ...	...	...	9	...	9		Extensor Carpi Radialis Brevior. | Supinator Brevis. Do. Communis Digitorum. | Extensor Ossis Metacarpi Pollicis. Do. Minimi Digiti. | Do. Primi Internodii Pollicis. Do. Carpi Ulnaris. | Do. Secundi do. do. and Extensor Indicis.
MUSCULO-CUTANEOUS, Ex. Cord	1	2	...	...	3	3	Coraco-Brachialis, Biceps, and Brachialis Anticus.
MEDIAN, Ex. and In. Cord ...	...	...	4	4½	8½	11	Pronator Teres. | Abductor Pollicis. Flexor Carpi Radialis. | Opponens Pollicis. Palmaris Longus. | First and Second Lumbricales. Flexor Sublimis Digitorum. | ½ of the Flexor Brevis Pollicis (outer head).
Anterior Interosseous ...	...	...	2½	...	2½		Pronator Quadratus, Flexor Longus Pollicis and outer half of the Flexor Profundus Digitorum.
ULNAR, Inner Cord	...	...	1½	...	1½	16	Flexor Carpi Ulnaris, and inner half of the Flexor Profundus Digitorum.
Superficial Palmar ...	...	...	...	1	1		Palmaris Brevis.
Deep Palmar	...	...	...	13½	13½		Abductor Pollicis, Abductor Minimi Digiti, Flexor Brevis Minimi Digiti, Opponens Minimi Digiti, 3rd and 4th Lumbricales, 7 Interossei, and inner half of the Flexor Brevis Pollicis (inner head).
	7	4	20	19	50	50	

N.B.—The above table, constructed for the purpose of showing the Motor Nerves of the Intrinsic Muscles of the Upper Extremity, indicates at the same time the name and number of the muscles situated on the different segments of the limb. It should be borne in mind that the Flexors and Pronators of the forearm and hand are situated on the anterior, while the Extensor and Supinator Muscles are on the posterior surface of the limb. By reference to the table it will also be found that of the former (27 in number) 11 are supplied by the Median, 16 by the Ulnar Nerve and its branches, and of the latter (11 in number) 2 are supplied by the Muscule-Spiral, and the remaining 9 by the Posterior Interosseous. The Brachialis Anticus usually receives a filament from the Musculo-Spiral, as well as from the Musculo-Cutaneous Nerve.

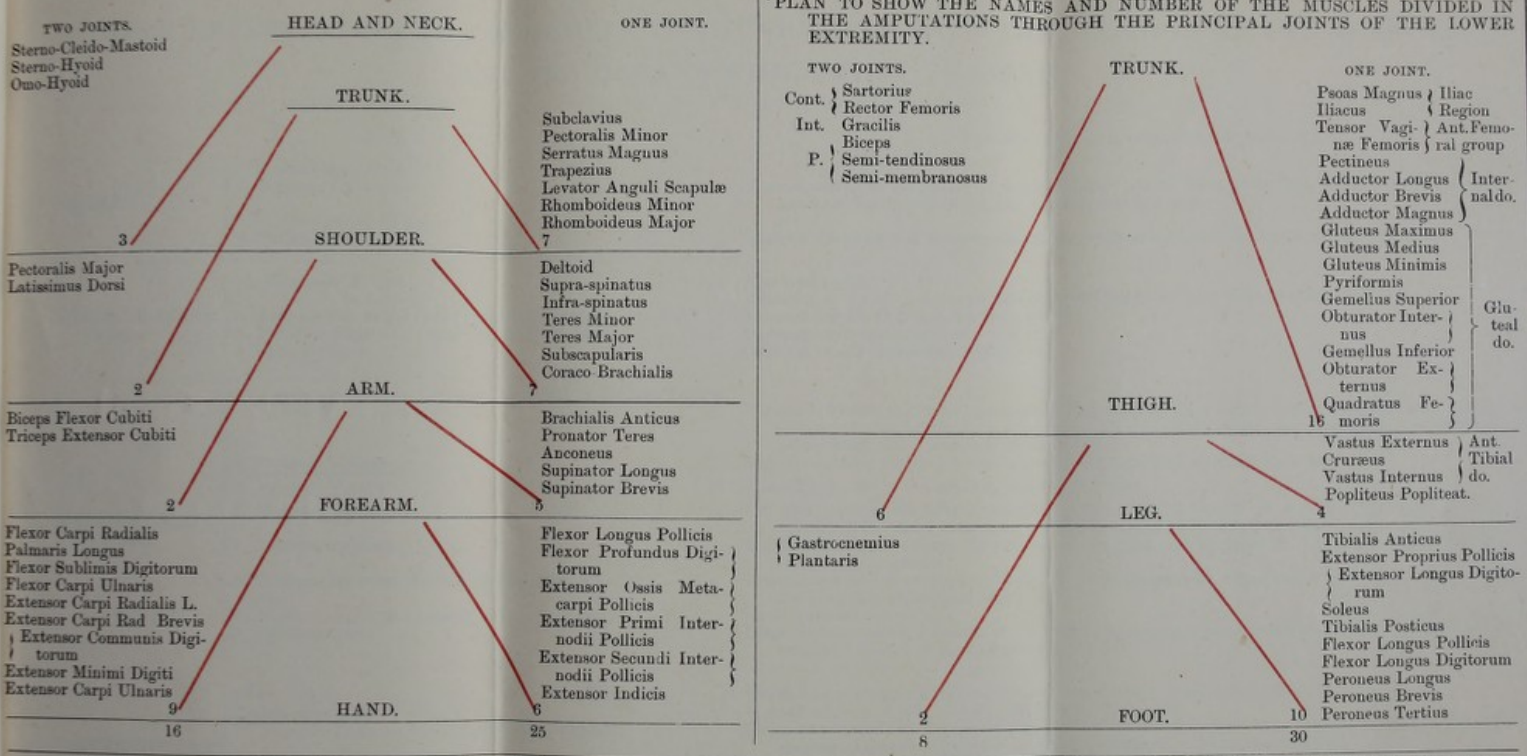


MOTOR NERVES OF THE MUSCLES OF THE LOWER EXTREMITY.

Nerves.	Iliac Region.	Femoral Region.				Poplit. Region.	Crural Region.				Pedal Region.		Total.			Names of the Muscles.
		Anter.	Int.	Glut.	Poster.		Ant.	Exter.	Post. Sup.	Post. Deep.	Dors.	Plant.				
LUMBAR PLEXUS	2	...	...	...	...	...	...	...	...	...	...	...	2	...	...	Psoas Magnus, and Psoas Parvus.
1. Ant. Crural	1	6	...	...	...	...	...	...	...	...	...	...	7	...	...	Iliacus, Sartorius, Rectus Femoris, Vastus Externus, Vastus Internus, Crureus, and Subcrureus.
2. Obturator	...	...	5	1	...	...	...	...	...	...	...	...	6	15	15	Gracilis, 3 Adductors, Pectineus, and Obturator Externus.
SACRAL PLEXUS	...	...	...	5	...	...	...	...	..	...	...	...	5	5	...	Pyriformis, Gemellus Superior, Obturator Internus, Gemellus Inferior, and Quadratus Femoris.
1. Super. Gluteal ...	...	1	...	2	...	...	...	...	...	...	...	...	3	3	...	Tensor Vaginæ Femoris, Gluteus Medius and Minimus.
2. Small Sciatic ...	...	...	...	1	...	...	...	...	...	...	...	...	1	1	...	Gluteus Maximus.
3. Great Sciatic ...	...	...	...	...	3	...	...	...	...	..	...	...	3	...	...	Biceps, Semitendinosus, Semimembranosus.
A. Popliteal	...	...	...	...	...	1	...	...	3	...	...	...	4	...	...	Popliteus, Gastrocnemius, Plantaris and Soleus.
Poster Tibial ...	...	...	...	...	...	...	...	...	...	3	...	...	3	...	...	Flexor Longus Pollicis, Flexor Longus Digitorum, and Tibialis Posticus.
α. Int. Plantar ...	...	...	...	...	...	...	...	...	...	...	...	5	5	...	...	Abductor Pollicis, Flexor Brevis Digitorum, Flexor Brevis Pollicis, 1st and 2nd Lumbricales.
β. Extern. Plantar	...	...	...	...	...	...	...	...	...	...	...	14	14	29	...	Abductor Minimi Digiti, Flexor Accessorius, Adductor Pollicis, 3rd and 4th Lumbricales, Flexor Brevis Minimi Digiti. Transversus Pedis and the 7 Interossei.
B. Peroneal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
α. Anter. Tibial ...	...	...	...	...	...	...	3	1	...	..	1	...	5	...	...	Tibialis Anticus, Extensor Proprius Pollicis, Extensor Longus Digitorum, Peroneus Tertius, and Extensor Brevis Digitorum.
β. Musculo-Cutaneous	...	...	...	...	...	...	...	2	...	...	...	...	2	7	45	Peroneus Longus, and Peroneus Brevis.
	3	7	5	9	3	1	3	3	3	3	1	19	60	60	60	
	3	24				1	12				20					

N.B.—The *Pectineus* receives additional filaments from the Anterior Curral and Accessory Obturator N.; the *Adductor Magnus* one from the Sciatic, and the *Gluteus Maximus* one from the Sacral Plexus. It thus appears, that of the sixty muscles of the Lower Extremity, fifteen are supplied by the Lumbar, and the remaining forty-five by the Sacral Plexus.

PLAN TO SHOW THE NAMES AND NUMBER OF THE MUSCLES DIVIDED IN THE AMPUTATIONS THROUGH THE PRINCIPAL JOINTS OF THE LOWER EXTREMITY.



These tables are constructed for the purpose of enabling the learner to ascertain the names and numbers of the muscles divided in cases of amputation through the principal joints of the upper and lower extremities. The horizontal lines represent the segments of the limb respectively. The intermediate spaces will of course correspond to the joints. The red lines represent the group of muscles passing from one segment to another, and opposite which are their names. In order to ascertain the number of muscles divided in amputation through any joint, conceive a horizontal line, representing the knife of the surgeon to be drawn between any two segments, and it will necessarily intersect two or more oblique lines; then add up the respective numbers at the lower end of these lines, and the sum will indicate the number of muscles divided. Thus, in order to ascertain the number divided in an amputation at the shoulder joint, draw a horizontal line between shoulder and arm, and it will intersect three red lines, and on referring to the number placed at the lower end of the same lines, will be found the numbers, 7, 2, 2, which, being added together, make 11, the number of muscles divided. By proceeding in the same manner with the other joints, it will be found that in amputating at the elbow 16 are divided, at the wrist 15, at the hip 22, at the knee 12, and at the ankle 12. For instance, in the case of Matthew Wood, alluded to by Cheselden in his Anatomy, whose entire upper extremity was torn off by a windmill, there were 12 muscles torn across. This is proved by the horizontal line drawn between the Trunk and Shoulder. Crossing three red lines, and opposite the lower end of these lines, are the numbers, 7, 3, and 2, the sum of which is 12. The table also shows the name and number of the muscles which connect the segments between which they extend.

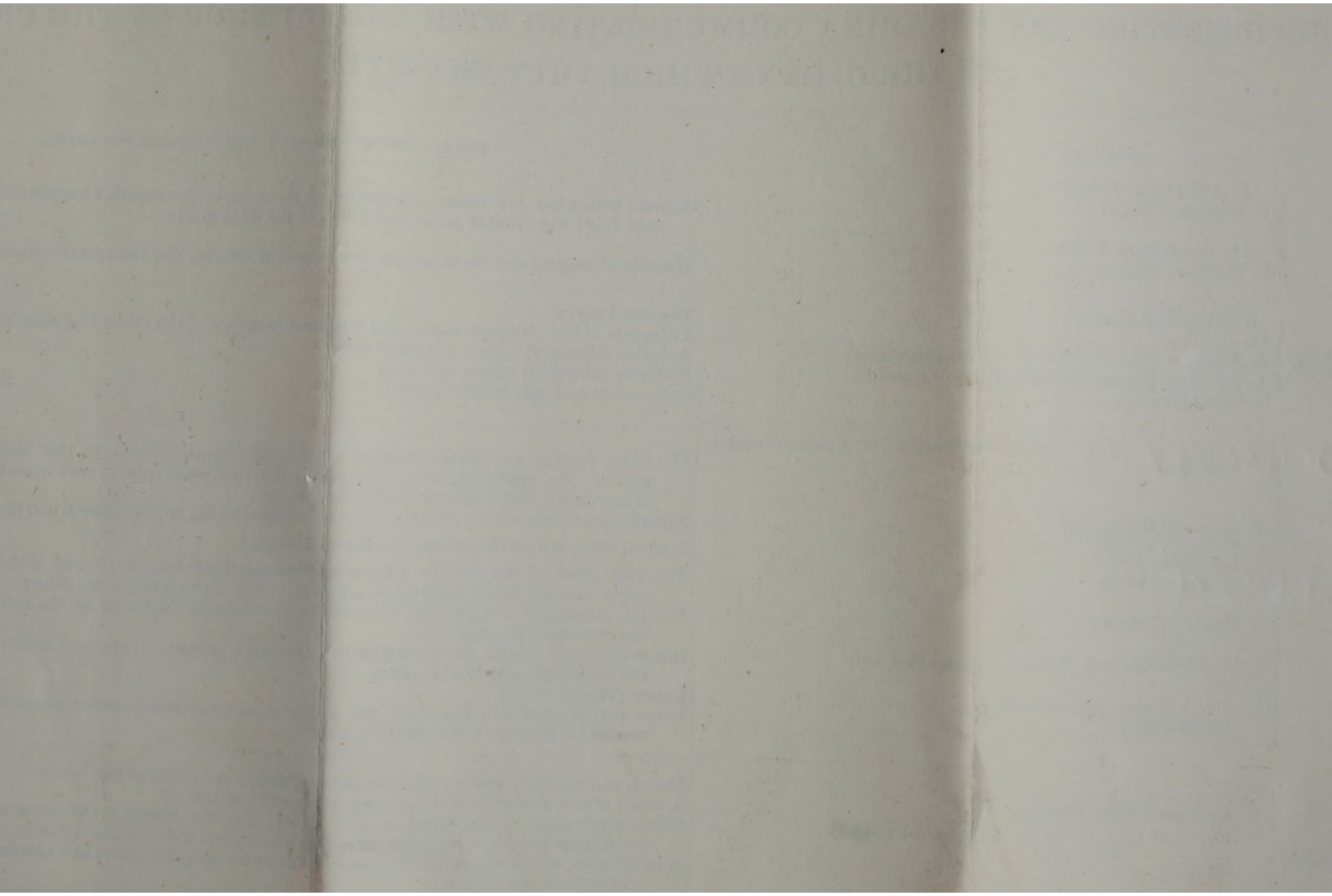
A TABLE REPRESENTING THE FORAMINA COMMUNICATING WITH THE INTERIOR OF THE CRANIUM, AND THE ORGANS WHICH THEY TRANSMIT.

	FORAMINA.	PARTS PASSING THROUGH THE VARIOUS FORAMINA.
SINGLE.	I. ANTERIOR FOSSA.	
	1. Foramen Cæcum	A small vein from the lining membrane of the nose to the superior longitudinal sinus, sometimes one from the frontal sinus, and a fold of the dura mater.
	II. POSTERIOR FOSSA.	
	2. Foramen Magnum	Medulla oblongata and its envelopes, the vertebral arteries, and the spinal accessory nerves.
ANTERIOR FOSSA. 5 pairs.	I. Ethmoidal Fissure	The nasal nerve.
	II. Olfactory Foramina	Filaments of the olfactory nerve, and the nasal branches of the ethmoidal arteries.
	3. Anterior Ethmoidal Canal (Fronto-Ethmoidal)	Anterior ethmoidal artery and nasal nerve.
	4. Posterior Ethmoidal Canal (Fronto-Ethmoidal)	Posterior ethmoidal artery and vein.
	5. Optic Foramen	Optic nerve and ophthalmic artery.
MIDDLE FOSSA. 8 pairs.	1. Foramen Lacerum Orbitale (Sphenoidal or Spheno-Frontal Fissure)	The third, fourth, and three branches of the ophthalmic division of the fifth, and sixth cranial nerves ; the opthalmic vein, a branch of the lachrymal artery, and sometimes the lachrymal artery itself, and a process of the dura mater.
	2. Foramen Rotundum	Superior maxillary nerve, or second branch of the trifacial or fifth cranial nerve.
	3. Foramen Vesalii	A small vein, one of the emissary veins of Santorini.
	4. *Foramen Ovale	The two roots of the inferior maxillary nerve or third branch of the fifth, the lesser petrosal nerve, and the small meningeal artery a branch of the internal maxillary.
	5. Foramen Spinosum	Middle meningeal artery, the two meningeal veins, and filaments of the sympathetic nerve from the cavernous plexus.
	6. Foramen Lacerum Medium (Spheno-Petrosal)	Internal carotid artery, the carotid plexus, the large petrosal nerve, and a meningeal branch from the ascending pharyngeal artery.
	7. Small Foramen (not named)	Lesser petrosal nerve.
	8. Hiatus Fallopii	Large petrosal nerve, a branch of the middle meningeal artery, which anastomoses with the stylo-mastoid a branch of the posterior auricular.
POSTERIOR FOSSA. 6 pairs.	1. Meatus Auditorius Internus	Facial, and auditory nerves, and the auditory artery, a branch of the basilar.
	2. Aqueduct of the Vestibule	A small artery and vein, and a process of the dura mater.
	3. Foramen Lacerum Posterius (Occipito-Petrosal)	Glosso-pharyngeal, pneumogastric, and spinal accessory nerves ; the internal jugular vein, and meningeal branches from the ascending pharyngeal and occipital arteries.
	4. *Mastoid	A small vein, which opens into the lateral sinus and occipital veins, and occasionally a small artery a branch of the occipital.
	5. Anterior Condyloid	The hypoglossal nerve and a meningeal branch from the ascending pharyngeal artery.
	6. *Posterior Condyloid	Posterior condyloid vein, establishing a communication between the vertebral vein and lateral sinus.

The number of foramina communicating with the interior of the cranium are from 36 to 42 : 2 at vertex, rest at base. Of the former one on each side of the sagittal suture transmits a small vein, and sometimes a small artery. Of the remaining 40, 2 are in the mesial plane : viz., the foramen cæcum and the foramen magnum. Of the remaining 38, 5 pairs are found in the anterior fossa, 8 in the middle fossa, and 6 in the posterior fossa. The foramina are arranged in regular order from before backwards.

* Frequently absent.

The names printed in red indicate the Foramina through which one or more of the Cranial nerves pass ; those underlined in red indicate the Foramina of exit of branches.



SYNOPSIS OF THE STRUCTURE OF THE HEART, AND THE CIRCULATION OF THE BLOOD.

The Organs of Circulation.—1*st. The Heart.* 2*nd. Arteries.* 3*rd. Capillaries.* 4*th. Veins.*

1.—The Heart is a conical shaped organ situated in the thorax in such a manner that its base looks upwards, backwards, and to the right, while its apex looks downwards, forwards, and to the left.

2.—It is a hollow organ: In its interior are four cavities, viz.: two Auricles and two Ventricles. The Auricles are situated at the base, and the Ventricles especially the left, towards the apex of the cone. These cavities are designated respectively the Right and Left Auricle, and the Right and Left Ventricle.

3.—The cavities on the right side have no direct communication with those on the left, being separated by a vertical partition called a "Septum;" that portion which separates the Auricles being termed "Septum Auricularum," while that which separates the Ventricles is called "Septum Ventriculorum." When the term "Septum" Cordis is employed in an absolute manner, the Septum of the Ventricles is invariably meant.

4.—Between the cavities of the same side there is a free communication by an opening called the Auriculo-Ventricular, through which the blood passes.

5.—The cavities on the right side of the Septum, consisting of the Right Auricle and Right Ventricle, frequently known by the name of the "Pulmonic" Heart, contain venous blood, while that portion on the left, containing the Left Auricle and Left Ventricle, is styled the "Systemic" Heart, and contains arterial blood.

6.—Into each Auricle there are five openings; by four of these, the mouths of veins, blood enters, and by one, the Auriculo-Ventricular, blood passes out into a Ventricle.

7.—Into each Ventricle there are two openings, viz: the Auriculo-Ventricular and the Arterial. By the former the blood enters, by the latter it leaves the Ventricle.

8.—At each opening of a Ventricle is placed a valve, one of which, called the Auriculo Ventricular, allows the blood to enter the cavity from the Auricle, but prevents it from passing back; the other, named Arterial, allows the blood to leave the Ventricle, but prevents it from returning.

9.—It thus appears that there are four valves employed in the transmission of the blood through the Heart, viz.: one between the Right Auricle and Right Ventricle, called "Tricuspid," another between the Left Auricle and Left Ventricle, named "Mitral," and sometimes "Bicuspid." The two other valves are situated in the Pulmonary Artery, and Aorta, and are known respectively as the "Pulmonic" and "Aortic" valves.

10.—The contraction of the walls of a cavity is called its "Systole," and the relaxation its "Diastole." When we speak of the "Systole" and "Diastole" of the Heart, we invariably refer to the condition of the Ventricles.

11.—The contraction and dilatation of cavities of the same generic name are synchronous and isochronous, while those of different generic names are alternate. Thus, the two Auricles are in a state of contraction and dilatation at the same time, as is also the case with the Ventricles, but when the Auricles are contracting the Ventricles are dilating, and *vice-versâ*.

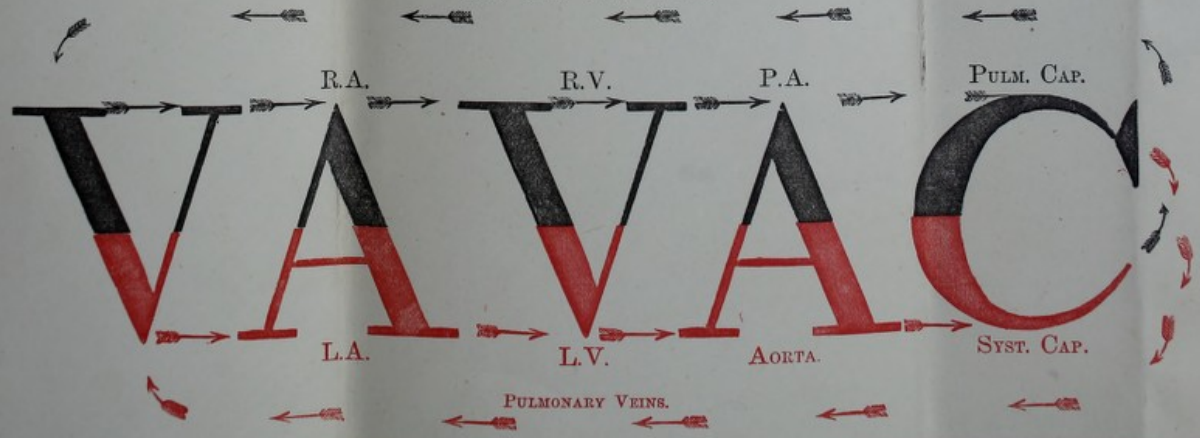
12.—On listening over the region of the Heart, two sounds are heard, known as the "First" and "Second" sounds. When the first sound is heard the Ventricles are contracting and the Auricles are dilating, while during the second sound the Auricles are contracting and the Ventricles are dilating.

13.—During the first sound of the Heart the Auriculo-Ventricular valves are shut and the Arterial valves are open; while during the second, the Auriculo Ventricular valves are open, and the Arterial valves are closed.

14.—When an abnormal sound proceeds from a valve that should be shut, it shows that the blood is taking a retrograde direction, and is called Regurgitation; when proceeding from a valve that should be open, it then is said to be "Obstruction."

15.—With regard to the course of the blood through the Heart, it may be stated in general terms that when the blood leaves an organ whose name begins with V, it enters one whose name begins with A, and *vice-versâ*; while in the tissues, when it leaves an organ beginning with A, it enters one beginning with C, and passes into one beginning with V, as shown by the following diagram.

C.D., C.A., C.V., & F.T.



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