the post-mortem results exonerated the stethoscope, "or rather ourselves," from blame, they are enough to teach us that, to detect and treat disease correctly, we ought to make general symptoms and physical signs correct the chain of our reasoning on every individual case; and when they refuse to do so, he will act wisely who withholds a positive opinion.

SKETCH

OF THE

RELATIVE ANATOMY OF THE SPINAL COLUMN.

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The object of the following sketch of the relative anatomy of the spinal column is to make each vertebra an indicator of the parts in connection with, in juxtaposition to, or on a line with it; and thus to make each subservient to practical purposes in the diagnosis and treatment of disease.

The addition of the origins and insertions of muscles might not be of any material use; nevertheless they are included that the sketch may be more perfect. I have also thought fit to introduce a few remarks on subjects arising out of the parts in connection with the position of some of the vertebræ.

I do not pledge myself for the critical correctness of the relative positions; but I trust they will be found sufficiently correct for the purposes intended.

Atlas.

Foramen magnum occipitale, through which the medulla with its meninges, the arteriæ spinales, and the sinus venosi pass out; the arteriæ vertebrales, the arteriæ meningæ posteriores, and the nervi accessorii pass in.

Lingual nerve from the anterior condyloid hole of the occipital bone.

Suboccipital nerve between this bone and the cranium.

First cervical nerve below the atlas.

Spinal accessories from the root of the first cervical nerve.

Ganglionic enlargement of the vagi.

Last turn of the vertebral artery before entering the cranium.

Transverse ligament to confine the dentoid process of the second vertebra to the anterior arch of the atlas.

Perpendicular ligament to attach the above process to the anterior edge of the foramen magnum.

Roof of the pharynx.

Superior vertebral attachment of the ligamentum nuchæ

Sole origin of the rectus capitis anticus minor from its fore part.

Sole origin of the rectus capitis lateralis from its transverse process.

Sole origin of the rectus capitis posticus minor from its back part.

Sole origin of the obliquus capitis superior from its transverse process.

Sole insertion of the obliquus capitis inferior into its transverse process.

Superior insertion of the longus colli into its body.

Superior insertion of the scalenus medius into its transverse process.

Superior origin of the levator scapulæ from its transverse process.

Superior vertebral insertion of the splenius colli.

Superior insertion of the inter spinalis and intertransversalis colli.

Remarks.—In cases where the head is drawn towards one shoulder from paralysis of the sternocleido-mastoideus and trapezius muscle on the opposite side, the effect is probably produced by pressure upon the course or origin of the spinal accessory nerve, which is often given off as low as the seventh cervical nerve.

It is interesting to observe the tortuous course which the vertebral artery takes before it enters the cavity of the cranium. Such an arrangement is manifestly for the purpose of preventing a too direct injection of arterial blood into the posterior parts of the brain; but for this provision a variety of causes, both moral and physical, would be constantly producing cerebral inflammation or congestion and all their fatal consequences.

In cases of sudden death from falls upon the head, should no satisfactory cause be detected within the cranium, we ought never to omit to examine the state of the transverse ligament, the complete vertical rupture of which would instantly extinguish life by allowing a dislocation of the dentoid process upon the spinal cord.

Dentatas.

Second turn of the vertebral artery before it enters the cranium.

First cervical ganglion of the sympathetic nerve lies upon the body of this bone.

Superior branch of the origin of the phrenic nerve arises from the second cervical nerve.

Sole origin of the rectus capitis posticus major from its spinous process.

Sole origin of the obliquus capitis inferior from its process.

Part insertion of the splenius into its transverse process.

Part origin of the levator scapulæ from its transverse process.

Superior insertion of the multifidus spine into its spinous process.

Superior insertion of the semispinalis colli into its spinous process.

Superior insertion of the transversalis colli into its transverse process.

Part insertion of the longus colli into its body.

Part insertion of the scalenus medius into transverse process.

Interspinalis and intertransversalis colli.

Third Cervical Vertebra.

The vertebral artery makes its first turn upwards and forwards between this bone and the dentatas.

The principal origin of the phrenic nerve is given off from the third cervical.

The bifurcation of the common carotid artery takes place at about opposite this vertebra.

Superior origin of the rectus capitis anticus major from its transverse process.

Part insertion of the longus colli into its body.

Superior origin of the splenius from its spinous process, where the splenii capitis recede.

Part insertion of the splenius colli into its transverse process.
 Superior origin of the trachelo-mastoideus from its transverse process.
 Part origin of the levator scapulæ from its transverse process.
 Part origin of the multifidus from its transverse and spinous process.
 Part insertion of the same into its spinous process.
 Part insertion of the semispinalis colli into its spinous process.
 Part insertion of the transversalis colli into its transverse process.
 Part insertion of the scalenus medius into its transverse process.
 Interspinalis and intertransversalis colli.

Fourth Cervical Vertebra.

The fourth cervical nerve gives the inferior root to form the phrenic nerve.
 The superior root to form the axillary plexus.
 Prolongation of the first cervical ganglion reaches as low as this vertebra.
 Superior origin of the longus colli from its transverse process.
 Part insertion of the same into its body.
 Part origin of the rectus capitis anticus major from its transverse process.
 Part origin of the splenius from its spinous process.
 Part insertion of the same into its transverse process.
 Superior insertion of the cervicalis descendens into its transverse process.
 Superior origin of the complexus from its transverse process.
 Part origin of the trachelo-mastoideus from its transverse process.
 Part origin of the levator scapulæ from its transverse process.
 Part origin of the multifidus spinæ from its transverse process.
 Part insertion of the same into its spinous process.
 Part insertion of the semispinalis colli into its spinous process.
 Part insertion of the transversalis colli into its transverse process.
 Superior insertion of the scalenus anticus into its transverse process.
 Part insertion of the scalenus medius into its transverse process.
 Interspinalis and intertransversalis.

Remarks.—The phrenic nerve is completed by roots from the second, third, and fourth cervicals. Compression of either of these roots by dislocation, fracture, or any other cause, would endanger life, by impeding the respiratory function.

Severe neuralgic pain high up in the back of the neck sometimes (as I have known), disorders the functions of this nerve, and occasions a grasping sensation at the region of the heart. This feeling may be explained by the course of the nerve over the pericardium.

It is through the medium of the right phrenic nerve, and its connection with the third cervical, from which it takes its principal origin, that pain at the point of the shoulder is felt in disorders of the hepatic function.

Fifth Cervical Vertebra.

The pharynx terminates in the œsophagus at this vertebra.
 The fifth cervical nerve contributes a root to form the brachial plexus.
 Part origin of longus colli from its transverse process.
 Part insertion of the same into its body.
 Part origin of the rectus capitis anticus major from its transverse process.
 Superior origin of the rhomboideus from its spinous process.
 Part insertion of the cervicalis descendens into its transverse process.
 Part origin of the splenius from its spinous process.
 Inferior insertion of the same into its transverse process.
 Part origin of the complexus from its transverse process.
 Part origin of the trachelo-mastoideus from its transverse process.
 Inferior origin of the levator scapulæ from its transverse process.
 Part origin of the multifidus spinæ from its transverse process.
 Part insertion of the same into its spinous process.
 Part insertion of the semispinalis colli into its spinous process.
 Part insertion of the transversalis colli into its transverse process.
 Part insertion of the scalenus anticus into its transverse process.
 Part insertion of the scalenus medius into the same process.
 Superior insertion of the scalenus posticus into the same process.
 Intertransversalis and interspinalis colli.

Sixth Cervical Vertebra.

The vertebral arteries first enter the perforations of the transverse processes at this vertebra.
 The sixth cervical nerve gives a root to the formation of the brachial plexus.
 The second cervical ganglion lies on the inferior part of this bone.
 The thoracic duct ascends as high as this vertebra.
 Part origin of longus colli from its transverse process.
 Part insertion of the same into its body.
 Inferior origin of the rectus capitis anticus major from its transverse process.
 Superior *vertebral* origin of the trapezius from its spinous process.
 Part origin of the rhomboideus from its spinous process.
 Part origin of the splenius from same process.
 Part origin of the complexus from its transverse process.
 Part origin of the trachelo-mastoideus from its transverse process.
 Inferior insertion of the cervicalis descendens into the same process.
 Superior insertion of the semispinalis dorsi into its spinous process.
 Part origin of the multifidus spinæ from its transverse process.
 Part insertion of the same into its spinous process.
 Inferior insertion of the semispinalis colli into its spinous process.

Inferior insertion of the transversalis colli into its transverse process.
 Inferior insertion of the scalenus anticus into its transverse process.
 Part insertion of the scalenus medius into the same process.
 Inferior insertion of the scalenus posticus into the same process.
 Interspinalis and intertransversalis colli.

Remarks.—The fifth and sixth cervical vertebræ have the greatest number of muscular attachments of all the bones of the spine, each having forty.

Seventh Cervical Vertebra.

This bone is usually more prominent than the rest at this point of the column, and, therefore, called the *vertebra prominens*.
 The arteria cervicalis profunda passes towards the back part of the neck, between the transverse process of the last vertebra of the neck and first of the back.
 Third cervical ganglion lies on the body of this bone.
 The seventh cervical gives a root to the formation of the brachial plexus.
 The thoracic duct enters the angle formed by the left internal jugular and subclavian veins.
 By a deep inspiration, the apices of the superior lobes of the lungs rise as high as this vertebra.
 Inferior insertion of the longus colli into its body.
 Part origin of the same from its transverse process.
 Part origin of the trapezius from its spinous process.
 Part origin of the rhomboideus from its spinous process.
 Part origin of the splenius from its spinous process.
 Part origin of the complexus from its transverse process.
 Part origin of the trachelo-mastoideus from its transverse process.
 Part insertion of the semispinalis dorsi into the spinous process.
 Part origin of the multifidus spinæ from its transverse process.
 Part insertion of the same into its spinous process.
 Inferior insertion of the scalenus medius into its transverse process.
 Interspinalis and intertransversalis colli.

Remarks.—Owing, in great measure, to the above-named distribution of the cervicalis profunda, this part of the neck is very vascular, and explains the fact why cupping-glasses are so successfully applied over it.

The state of the upper and back part of the superior lobes of the lungs may be auscultated as high as the seventh cervical vertebra.

First Dorsal Vertebra.

The first dorsal nerve gives the inferior root to form the brachial plexus.
 First dorsal ganglion lies on this bone.
 The right recurrent branch is given off from the vagus opposite this bone; it passes posteriorly around the subclavian artery in its way to the larynx.
 The subclavian arteries lie nearly on a level with this vertebra.
 Vena cava superior begins to form here.
 First rib is articulated to this vertebra, marking the superior boundary of the thorax.

Superior and posterior angle of the scapula points to this bone.

Part origin of the longus colli from its body.
 Part origin of the trapezius from its spinous process.
 Part origin of the rhomboideus from the same process.
 Part origin of the splenius from the same process.
 Part origin of the complexus from its transverse process.
 And sole origin of a slip of the same from its spinous process.
 Part origin of the trachelo-mastoideus from its transverse process.
 Superior insertion of the longissimus dorsi into the same process.
 Part insertion of the semispinalis dorsi into its spinous process.
 Part origin of the multifidus spinæ from its transverse process.
 Part insertion of the same into its spinous process.
 Superior origin of the semispinalis colli from its transverse process.
 Superior origin of the transversalis colli from the same process.

Interspinalis and intertransversalis.

Remarks.—The axillary plexus, being usually formed by roots from the fourth, fifth, sixth, seventh cervical, and first dorsal, nerves, we should apply our local remedies for morbid affections of the brachial nerves over the corresponding vertebræ.

Second Dorsal Vertebra.

The arch of the aorta reaches as high as this vertebra.
 Left recurrent branch passes posteriorly around the arch.
 This vertebra points to the superior humero-intercostal nerve, given off from the second dorsal.
 Termination of the vena azygos in the cava.
 Part origin of the longus colli from its body.
 Part origin of the trapezius from its spinous process.
 Part origin of the rhomboideus from the same process.
 Part origin of the splenius from the same process.
 Part insertion of the longissimus dorsi into its transverse process.
 Superior insertion of the spinalis dorsi into its spinous process.
 Part origin of the complexus from its transverse process.
 Part origin of the trachelo-mastoideus from its transverse process.
 Part insertion of the semispinalis dorsi into its spinous process.
 Part origin of the multifidus spinæ from its transverse process.
 Part insertion of the same into its spinous process.
 Part origin of the semispinalis colli from its transverse process.
 Part origin of the transversalis colli from the same process.
 Interspinalis and intertransversalis.

Remarks.—Dilatations of the arch of the aorta may be auscultated at this point, as well as at the upper part of the sternum.

It is probably through the medium of the recurrent nerves that disordered actions are transmitted from the laryngeal to the gastric function, and *vice versa*. Thus, in whooping-cough the convulsive actions of the laryngeal muscles are frequently associated with, or

followed by, vehement contractions of the stomach, as evinced by forcible expulsion of flatulence, or vomiting. On the other hand, gastric irritation, from crude ingesta or any other cause, frequently occasion paroxysms of apyrexial asthma, laryngismus stridulus, &c. Apyrexial aphonia may be the result of an atonic state of the vagus and its recurrences.

Third Dorsal Vertebra.

Posterior mediastinum commences at about this point.

The second humero-intercostal is given off from the third dorsal.

Bifurcation of the trachea.

The arch of the aorta begins to descend, and is completed at the lower border of this vertebra.

First aortic intercostal artery ramifies along the inferior margin of the third rib.

Primary branches of the pulmonary artery enter the lungs about on a line with the vertebra.

The spine of the scapula points to the third dorsal spine.

Inferior origin of the longus colli from its body.

Part origin of the trapezius from its spinous process.

Part origin of the rhomboideus from the same.

Part origin of the splenius from the same.

Part insertion of the longissimus dorsi into its transverse process.

Part insertion of the spinalis dorsi into its spinous process.

Part origin of the complexus from its transverse process.

Inferior origin of the trachelo-mastoideus from the same.

Part insertion of the semispinalis dorsi into its spinous process.

Part origin of the multifidus spinæ from its transverse ; and

Part insertion of the same into its spinous process.

Part origin of the semispinalis colli from its transverse process.

Part origin of the transversalis colli from the same.

Interspinalis and intertransversalis.

Remarks.—The pain felt down the arms, in some diseases of the heart, is referable to the humero-intercostal nerves, in their connection with the ganglionic and small internal cutaneous nerves. Auscultation at this point will ascertain the state of the mucous membrane of the trachea at its bifurcation.

Fourth Dorsal Vertebra.

Extreme rise of the diaphragm on the right side.

The right bronchus enters the lung on a level with this vertebra.

Spring of the aorta on a level with the upper part of this bone.

First intercostal artery from the aorta on the right side runs across the body of this bone.

Part origin of the trapezius from its spinous process.

Part origin of the rhomboideus from the same.

Inferior origin of the splenius from the same.

Part insertion of the longissimus dorsi into its transverse process.

Part insertion of the spinalis dorsi into its spinous process.

Part origin of the complexus from its transverse process.

Part insertion of the semispinalis dorsi into its spinous process.

Part origin of the multifidus spinæ from its transverse, and

Part insertion of the same into its spinous process.

Part origin of the semispinalis colli from its transverse process.

Part origin of the transversalis colli from the same.

Interspinalis and intertransversalis.

Remarks.—To auscultate the state of the commencement of the right bronchus, the stethoscope must be planted to the right of this vertebra, or a little below a line continued from the spine of the right scapula.

Fifth Dorsal Vertebra.

The inferior margin of the superior lobe of the right lung reaches as low as the level of this vertebra, or of the fifth rib, which also points to about the centre of the third lobe.

Maximum height of the superior convex surface of the liver.

The fifth thoracic ganglia give the superior branches to the great splanchnic nerve at the lower border of this vertebra.

Part origin of the trapezius from its spinous process.

Inferior origin of the rhomboideus from the same process.

Part insertion of the longissimus dorsi into its transverse process.

Part insertion of the spinalis dorsi into its spinous process.

Part origin of the complexus from its transverse process.

Part insertion of the semispinalis dorsi into its spinous process.

Part origin of the multifidus spinæ from its transverse, and

Part insertion of the same into its spinous process.

Part origin of the semispinalis colli from its transverse process.

Inferior origin of the transversalis colli from its transverse process.

Interspinalis and intertransversalis.

Remarks.—It may be sometimes difficult to form a correct diagnosis between the incipient symptoms of costal pleuritis and hepatic peritonitis, when the pain is felt below the fifth rib on the right side of the thorax. In both cases the invasion, the dyspnœa, the character of the pain, are similar ; but the following observations might tend to help the diagnosis :—

In the former, thoracic symptoms will predominate ; in the latter, abdominal. If there be early cough, if a moderate inspiration be suddenly checked by an exquisite lancing stitch, causing an absolute dread of coughing, and if there be cegophony, the case is, probably, inflammation of the pleura costalis.

But if a cautious inspiration do not occasion severe lancing pain—if the act of coughing moderately do not cause acute suffering—if there be pain shooting upwards in the course of the right phrenic nerve and its connections—if there be frequent vomiting of acid or bilious secretions, and, above all, if pain be increased by pressing up the large lobe of the liver from beneath the margin of the rib—the case is inflammation of the peritoneal covering of the large lobe of the liver.

[To be continued.]