(1) TWO CASES OF CERVICAL RIBS. (2) AN ANOMALOUS ARRANGEMENT OF THE VAGI.

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Two Cases of Cervical Ribs.

In the study of these two cases of cervical ribs, particular attention has been paid to the other costal and vertebral elements, and also to the constitution of the cervical, brachial, and lumbo-sacral plexuses.

Subject 1, female, presented bilateral cervical ribs; the left was 6 cm. long, and did not quite articulate with the 1st thoracic rib, but was attached to its medial border by a short band of fibrous tissue. On its upper surface were two grooves, the anterior very well marked and evidently produced by the lowest trunk of the brachial plexus, the posterior more shallow, formed and occupied by the middle trunk.

External and internal intercostal muscles were present, and also a well-marked scalenus minimus, arising from the tip of the cervical rib, and spreading out over the upper surface of the 1st thoracic rib. The subclavian artery just crossed the origin of this muscle, and thus lay below the lowest trunk of the plexus and on a more anterior plane (fig. 1).

The brachial plexus on this side received some fibres from the 4th cervical root directly, and also indirectly from the fibres of C 4 to the phrenic nerve. The 1st thoracic nerve sent a small branch to the normal 1st intercostal space, and also to the space between the cervical and 1st thoracic rib, before joining the 8th cervical nerve (see fig. 2).

On the right side the cervical rib was less well developed, measuring only $2\frac{3}{4}$ cm. Its upper surface presented a groove for the middle trunk of the brachial plexus. The tip of the rib gave origin to a similar muscle to that described on the opposite side.

No communication was found between the 4th and 5th cervical nerve roots. The 1st thoracic nerve gave off branches to the normal 1st space and also to the highest, but the root of the 1st thoracic nerve joining C 8 was appreciably larger on this side than the other (see fig. 2).

The lumbar plexus was normal on both sides. The vertebral and other costal elements were also normal. The 12th thoracic ribs were fairly

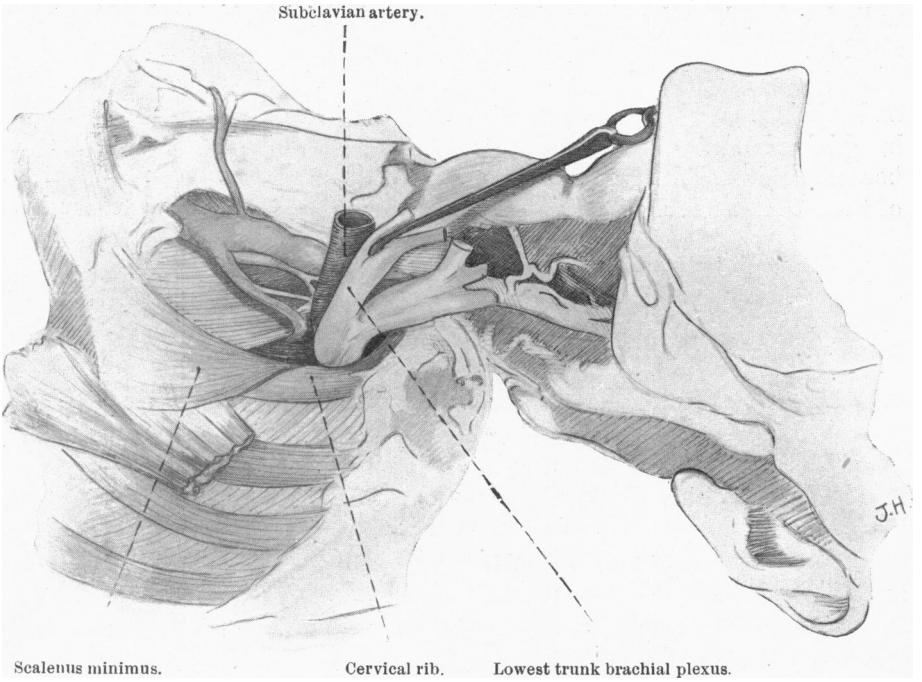


FIG. 1.—Dissection showing relations left cervical rib.

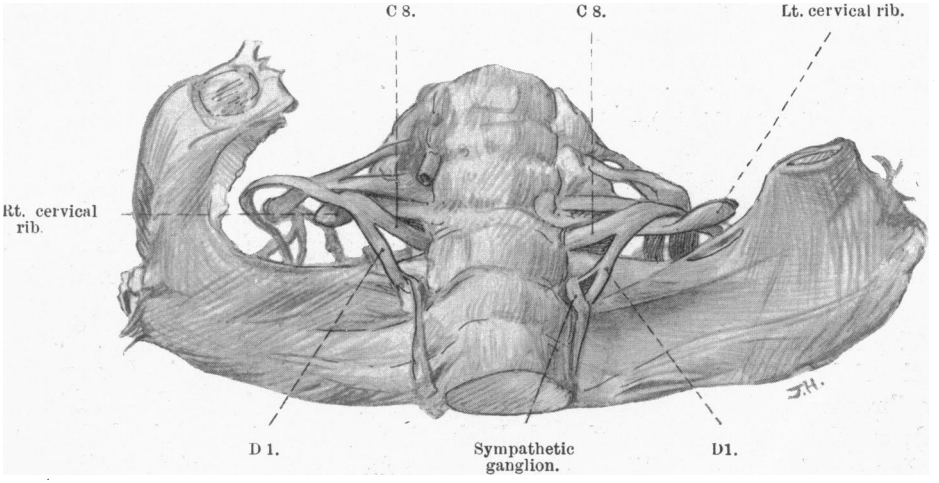


FIG. 2.—Course of 1st thoracic nerve.

well developed, and measured 10 cm. on the right side and 10½ cm. on the left.

Subject 2, male, also presented bilateral cervical ribs, each 4¼ cm. long, and their upper surfaces were grooved by the middle trunk of the brachial plexus. External intercostal muscles arose from their outer borders, and scalenus minimus from their tips. The antero-medial fibres of these muscles formed a free edge over which passed the lowest trunk of

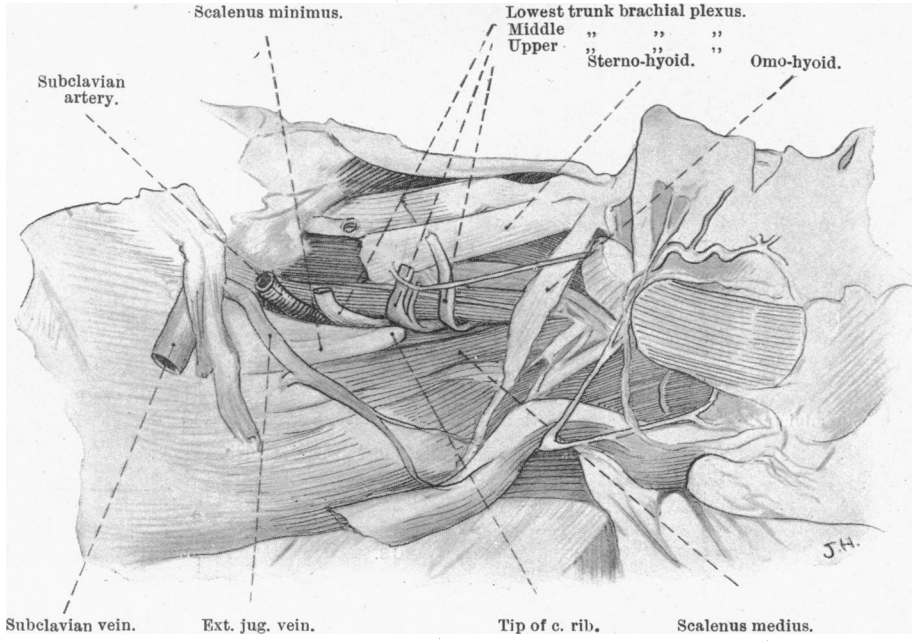


FIG. 3 (Subject 2).—Dissection showing relations left cervical rib.

the brachial plexus and the subclavian artery (see fig. 3). Internal intercostal muscles were also present. The brachial plexus was normal, and the 1st thoracic nerve of either side, after furnishing a small twig to the normal 1st space, joined C 8 below the tip of the cervical rib by a short wide trunk (see fig. 4).

The lumbar plexus showed a certain amount of prefixation (see fig. 5). On the right side, the obturator and anterior crural nerves received very few fibres from L 4, the bulk of the fibres going to form the lumbo-sacral cord; on the left side, more than half the fibres of the root joined the 5th L nerve, but the condition was not so marked as on the right. The ilio-hypogastric came from the last dorsal nerve, and the external cutaneous

came from L 1 and 2 on the left and L 2 only on the right. This prefixation of the lumbar plexus was associated with absence of the 12th thoracic ribs. The right and left transverse processes of the 12th thoracic vertebra measured 2·5 and 3 cm. respectively, and presented the appearance of normal 1st lumbar transverse processes. The 11th thoracic ribs were each 16 cm. long. Five lumbar vertebræ were present. The sacrum consisted of six pieces, having apparently assimilated a caudal element.

The 1st thoracic ribs of this subject presented no subclavian groove. The nerves of the brachial plexus and the subclavian arteries were kept

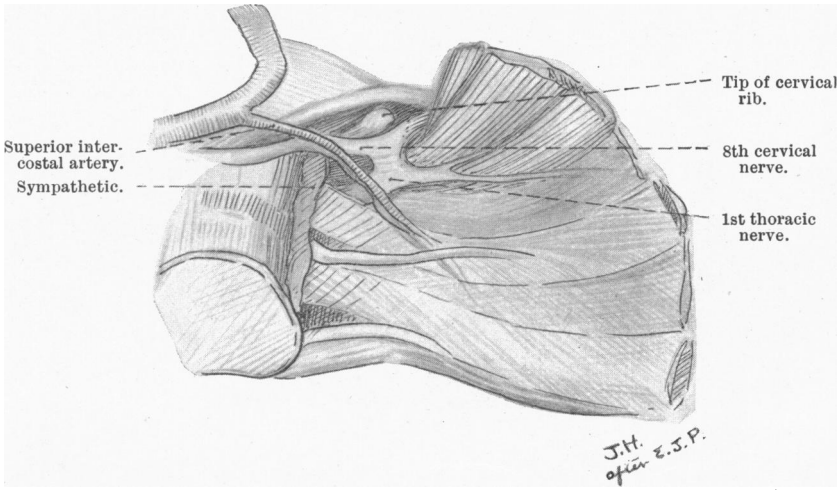


FIG. 4 (Subject 2).—Left side from below.

off from the rib by scalenus minimus muscles (see fig. 3). These latter muscles and the external intercostals produced a well-marked groove on the superior surfaces of these ribs; the groove running parallel with the inner borders of the rib, and extending as far forward as the attachment of scalenus anticus.

The points of interest in these dissections are the following:—

(1) In subject 1 the larger cervical rib is associated with a prefixed brachial plexus, the latter not only receiving fibres from C 4 root, but also receiving fewer fibres from T 1 than the plexus does on the opposite side, where the rib is less well developed

(2) In subject 2, absence of the 12th thoracic ribs is associated with a cephalic movement of the lumbo-sacral plexuses.

These facts are in favour of there being a causal association between

the formation of limb plexuses and the development of costal elements. Further, from the study of these and other cases it seems probable that, as has already been suggested, (1) prefixation of the brachial plexus leads to the production of cervical ribs, and post-fixation to a deformed or abortive 1st rib; and also that prefixation of the lumbo-sacral plexus causes small or absent 12th thoracic ribs, and post-fixation in varying degrees leads to production of 1st lumbar ribs with corresponding degrees of development.

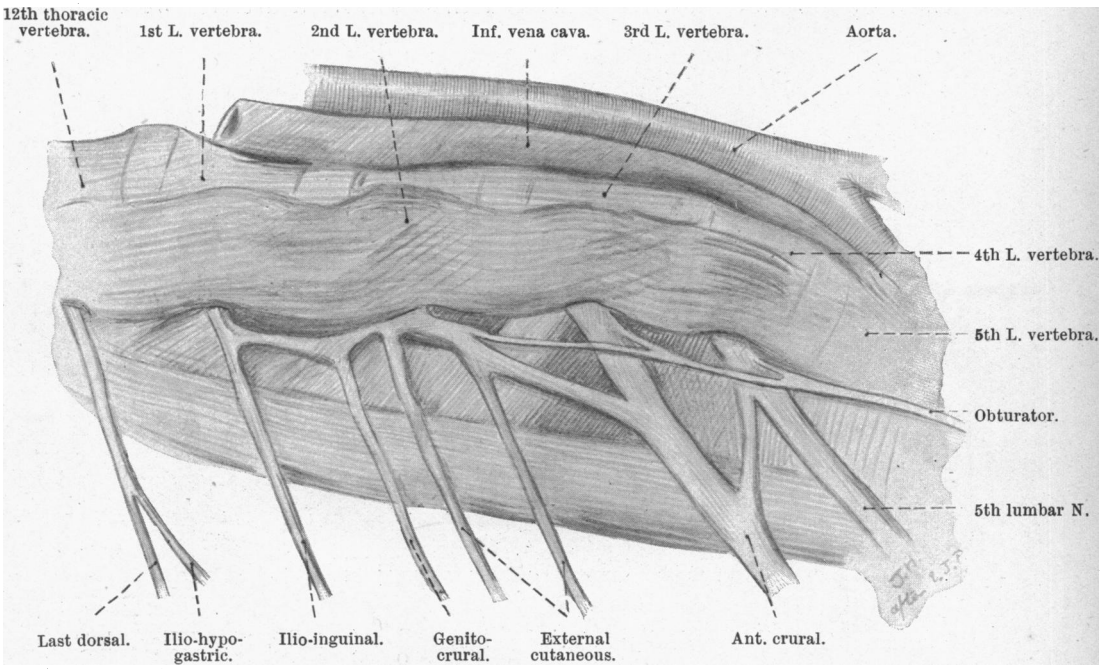


FIG. 5 (Subject 2).—Lumbar plexus.

The fact that the sacrum has assimilated a caudal element is anomalous, for the movement of the sacral elements is not usually opposed to the movement of the lumbo-sacral plexus.

With regard to the clinical aspect, it is conceivable that the conditions present in the first subject may have caused some symptoms, but in subject 2 the lowest trunk of the brachial plexus did not pass over the cervical rib on either side. No evidence of physical signs, referable to the rib condition, was found in either case, and no information as to symptoms could be obtained from notes on the cases, as both were mental.

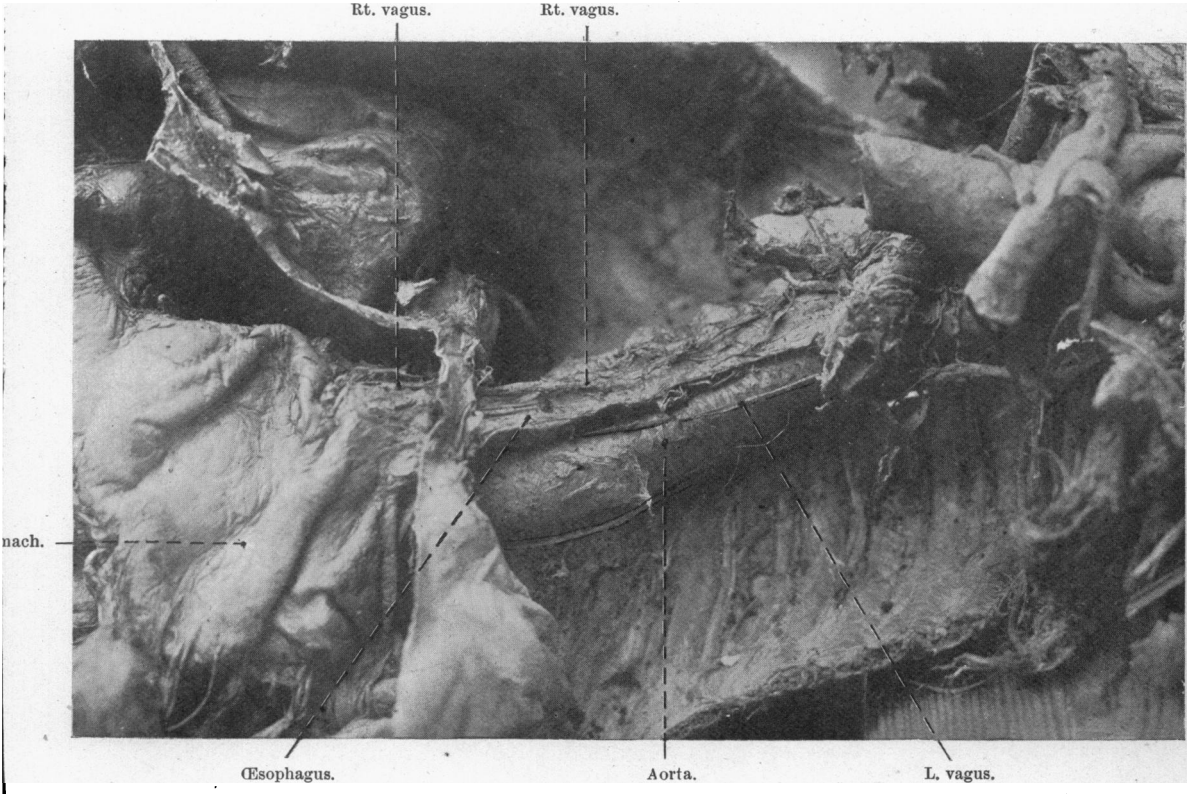
I am greatly indebted to Miss Hardy and Miss Partridge for their drawings of the dissections.

REFERENCE.

(1) Wood Jones, F., *Jour. Anat. and Phys.*, vol. xliv., "On the Relation of the Limb Plexuses to the Ribs and Vertebral Column."

An Anomalous Arrangement of the Vagi.

The photograph illustrates a very unusual arrangement of the vagi. The left nerve enters the abdomen behind the œsophagus, and the right anterior to the gut. The œsophageal plexus was formed by branches given off from both nerves.



Anomalous vagi.

Normally, the vagi dispose themselves in one of two ways when they emerge from the posterior pulmonary plexus:—

(1) Two large branches issue from the pulmonary plexus on either side, apply themselves to the sides of the œsophagus, and break up at once into an inextricable network of fibres which surrounds the gut. From this plexus two nerve trunks emerge, and the left passes anteriorly and the right posteriorly into the abdomen. This is the appearance usually described, but the following arrangement is equally common:—

(2) One trunk (or two which speedily unite) emerges from the pulmonary plexus on either side: the left takes up an anterior and the right a posterior position in reference to the gut. The plexus gulæ is then formed by numerous branches uniting the main trunks.

Wertheimer (1) found that these anastomoses presented a relatively constant arrangement. A large branch from the left nerve passed behind the œsophagus and joined the right nerve just above the diaphragm, and also less constantly a smaller branch passed from the right vagus to join the left vagus in front of the gut. It is generally accepted that the normal position of the vagi at the lower end of the œsophagus is due to the rotation of the stomach. The anomalous arrangement of the vagi in this specimen appears, at first glance, to be at variance with this theory; but the explanation suggested is, that the greater part of the fibres of the right and left vagi respectively run in these cross branches described by Wertheimer, so that after rotation of the stomach the main part of the fibres of the right nerve lie anterior and the main part of the left vagal fibres lie posterior to the gut.

It is therefore submitted that this arrangement of the vagi is only the result of a gross exaggeration of a fairly common condition, and is not incompatible with the theory of rotation of the stomach.

REFERENCE.

(1) *Compt. rend. Soc. Biol.*, 1901, p. 832.