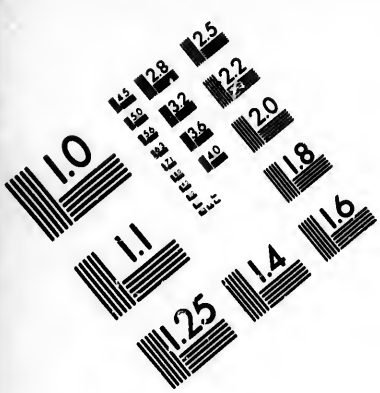

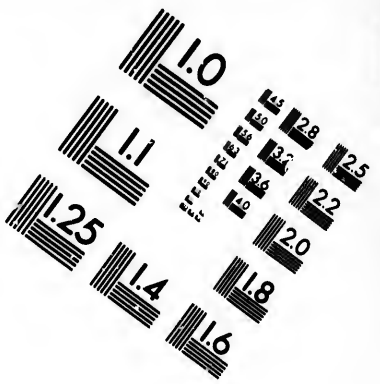

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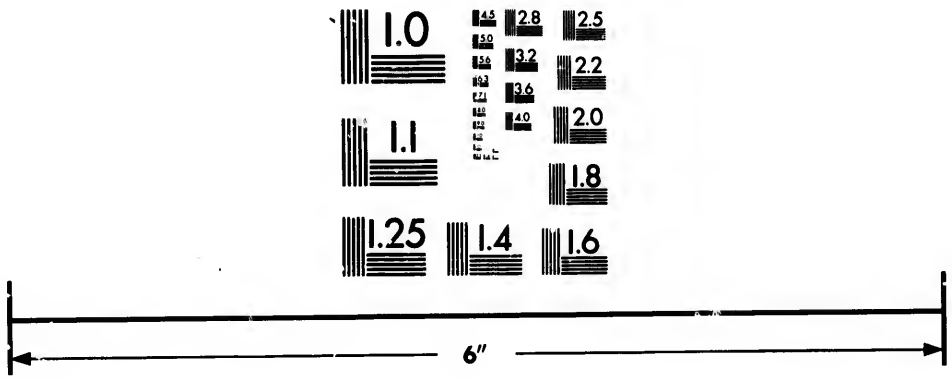

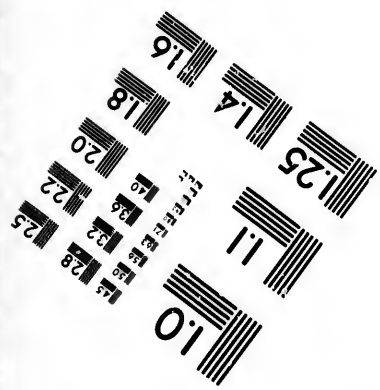

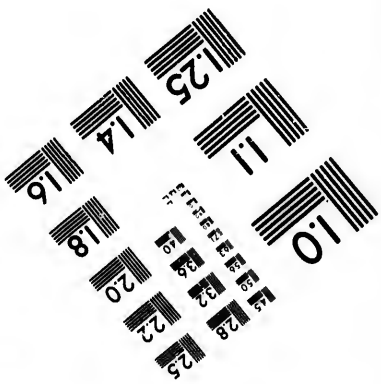

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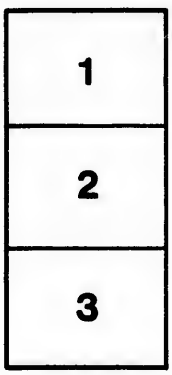
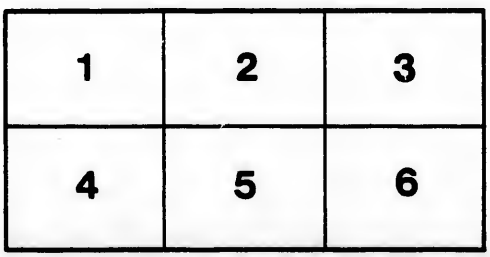




CERVICAL RIBS.

BY

FRANCIS J. SHEPHERD, M. D., M. R. C. S., Eng.,

DEMONSTRATOR OF ANATOMY IN M'GILL UNIVERSITY, MONTREAL; SURGEON TO THE OUT-PATIENT DEPARTMENT OF THE MONTREAL GENERAL HOSPITAL, ETC.

EXTRACTED FROM
THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES,
JANUARY, 1883.

[Extracted from the American Journal of the Medical Sciences for Jan. 1883.]

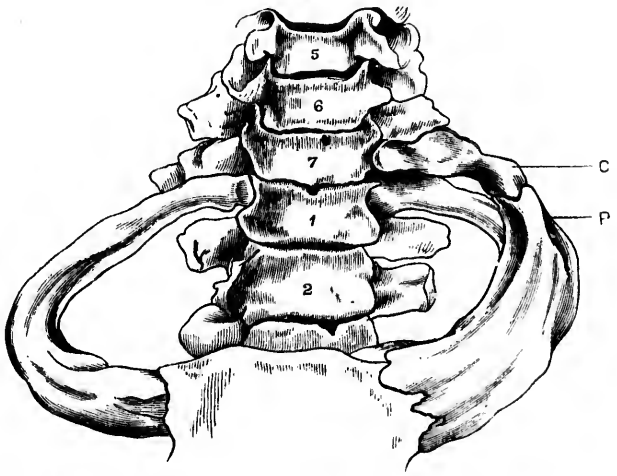
CERVICAL RIBS.[1]

By FRANCIS J. SHEPHERD, M.D., M.R.C.S. Eng.,
DEMONSTRATOR OF ANATOMY IN M'GILL UNIVERSITY, MONTREAL; SURGEON TO THE OUT-PATIENT DEPARTMENT OF THE MONTREAL GENERAL HOSPITAL, ETC.

From the circumstance that supernumerary cervical ribs are rarely met with in man, I have thought that a short account of some examples which have recently come under my observation might prove of interest.

Case I.—This occurred in the dissecting room of McGill University during last winter's session, and was fortunately noticed before the soft parts were destroyed and the dissection carefully recorded by myself at

Fig. 1.



C, Cervical rib articulating with process, P, on the upper surface of first thoracic rib.

the time. The subject was a female between fifty and sixty years of age. Vertebral formula, C 7, D 12, L 5, S 5, C 4. The supernumerary cervical rib occurred on one side only, the left, and had a distinct head,

[1] Read before the Canada Medical Association, Sept. 1882.

neck, tubercle, and body. Anteriorly it ended by articulating with a bony elevation 1 centimetre high, and 2 centimetres broad, on the upper surface of the first thoracic rib 1.5 centimetre in front of its tubercle. Both the extremity of this process and the anterior end of the cervical rib were encrusted with cartilage, and the two were united by a capsular ligament which formed a freely movable joint. The head of the cervical rib articulated with what Mr. Turner describes as a "tubercle like elevation" on the side of the body of the seventh cervical vertebra, and was held in position by a strong ligament. Its tubercle had a broad movable articulation with the transverse process of the same vertebra. On the upper surface of the neck of the rib were two distinct grooves separated by a prominent ridge; the innermost groove was small and lodged the vertebral artery, which passed up and entered the transverse process of the sixth cervical; the outer groove was of large size and had placed in it the seventh cervical nerve, the eighth nerve passed out between the supernumerary rib and the first thoracic and united with the seventh at the anterior border of the cervical rib. The united nerve was joined by the first dorsal to form the lower cord of the brachial plexus, which when formed passed down grooving the under surface of the bony prominence on the upper surface of the first thoracic rib. Immediately anterior to this cord was the subclavian artery. A few muscular fibres were seen passing between the anterior transverse process of the sixth cervical and the ridge on the upper surface of the neck of the supernumerary rib. This probably was an intertransverse muscle. The scalenus anticus muscle was normal; the scalenus medius was inserted into the cervical rib, the process on the upper surface of the first thoracic rib, and also into the whole of its border between the process and the tubercle, thus filling up the interspace between the supernumerary and first rib. The head of the first rib articulated as is usual in these cases, not only with the first dorsal but also with the seventh cervical. The seventh cervical vertebra presented the appearance of a dorsal, the transverse process on both sides being quite like. The anterior transverse process on the right side was rudimentary, presenting the appearance of a short spine $\frac{1}{3}$ centimetre long and not arching over to meet the posterior transverse process. The sixth cervical was the same on the left side, the anterior transverse process standing out as a spine 1 centimetre long and not reaching outwards and backwards far enough to unite with the posterior process. The first rib on the right side was distinctly longer and narrower than that on the left side.[1] The anterior and middle scalene muscles had a continuous insertion along the upper border of the first rib from the scalene tubercle to the tubercle of the rib, and in front of the conjoined muscle was the subclavian vein; the subclavian artery with the brachial plexus passed through a slit in the fused muscle one inch above its attachment to the rib.

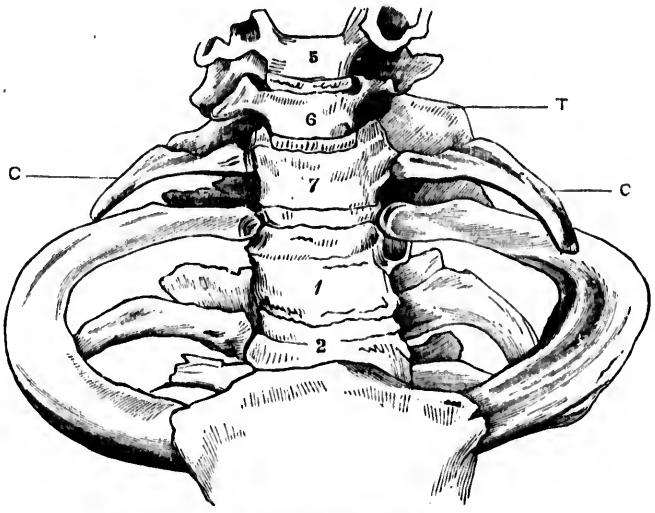
In the same subject there was anchylosis of the spines, transverse processes, and bodies of the fifth, sixth, and seventh dorsal vertebræ. The intervertebral substance had disappeared from between the bodies of the vertebræ. The left transverse processes of the third, fourth, and fifth lumbar vertebræ were also united together by bone.

Case II.—This is a beautiful example of cervical ribs occurring in a skeleton which Dr. T. Roddick of this city purchased in Paris some years

[1] The right rib measured 15 centimetres long by 2 centimetres broad. The left rib measured 12 centimetres long by 3 centimetres broad.

ngo for anatomical purposes, and which he afterwards kindly placed in the Museum of the Medical Faculty of McGill University. The skeleton is that of a well-developed adult male, and has on each side a supernume-

Fig. 2.



C C. Cervical ribs. T. Transverse process of seventh cervical vertebra.

rary cervical rib. Both ribs are provided with a head, neck, tubercle, and body. The left measures seven cent. in length, and ends anteriorly in a blunt point, which is grooved as if for the subclavian artery; on the upper surface of the neck are two grooves, as in the case above described, though not so well marked, which probably lodged the vertebral artery and seventh cervical nerve. The right cervical rib measures only five cent. in length, and is much slighter than the left, gradually tapering down to a fine point. It also presents two grooves on the upper surface of its neck, similar to those on the right, but not so strongly marked. Both ribs in the fresh state probably floated free anteriorly, the ends show no sign of being tipped with cartilage, nor is there any trace of a bony process on the upper surface of either of the first thoracic ribs. The left cervical rib articulates by its head with a prominent tubercle on the side of the body of the seventh cervical, on the right side this tubercle is hardly to be seen.

Both first thoracic ribs articulate with the sides of the bodies of the seventh cervical and first dorsal. In this skeleton the twelfth dorsal vertebra resembles not an ordinary twelfth dorsal, but possesses a transverse process like the tenth and eleventh dorsals, and on the anterior surface of each transverse process, near where it joins the body of the vertebra, is a raised tubercle, which has articulating with it a rudimentary twelfth rib. The twelfth ribs are merely flat pieces of bone, with a head which articulates only with the base of the transverse process. The right measures 4.5 cent. in length, and the left 4 cent.

The first lumbar vertebra is like an ordinary twelfth dorsal; has no transverse process proper, but in its place on each side is a tubercle-like process tipped with an articular facet, which evidently carried a short lumbar rib. Vertebral formula, C 7, D 12, L 5, S 5, C 4.

Case III.—This was seen in the right side of a male patient who died in the Montreal General Hospital during the last summer. It was noticed before death, but not recognized as a case of cervical rib. Owing to objections made by the friends, it was only hurriedly examined at the post-mortem examination, which was sufficient to make out that the rib had a head, neck, tubercle, and body, that it floated free anteriorly, and that the subclavian artery did not pass over it.

M. Hainauld[1] 140 years ago described nearly all the forms of cervical ribs, and Dr. Knox[2] figures several of his cases, among others, that rare form where the supernumerary rib is attached to the sternum by a special cartilage of its own. Dr. Knox,[3] of Edinburgh, has also described some cases of his own, and was the first to draw attention to the fact that the "laws of transcendental anatomy" (evolution?) explain their occurrence.

The seventh cervical vertebra presents an intermediate condition between the cervical and dorsal vertebræ, inasmuch as the anterior transverse process is developed, as was first pointed out by Beclard, from a separate nucleus which corresponds with the head and neck of a rib.[4] It appears about the third month, and unites with the body of the vertebra and posterior transverse process about the fifth year. Sometimes it never unites with the rest of the vertebra, but remains as a separate bone, often growing beyond the posterior transverse process, and developing into a supernumerary or cervical rib. Sometimes in these cases a true anterior transverse process is developed behind the rib, corresponding to the anterior transverse processes of the cervical vertebræ.

Cervical ribs usually occur on both sides of the seventh cervical vertebra, but often on only one side, as in two of my cases. More than one pair has never been met with in the same subject. They may consist merely of a head, neck, and tubercle, or may have a body as well, which floats free, or is attached to the first rib by bone or ligament. They may also, as in my first case, articulate anteriorly with a process growing from the upper border of the first rib. Again, they may be tipped with cartilage anteriorly, and this cartilage in rare cases may unite with the sternum or first costal cartilage, or they may be attached to the sternum by fibrous tissue or ligament. Sometimes, especially when small, they may be ankylosed to the body and transverse process of the seventh cervical, or to the transverse process only. According to Prof. Turner:[5]—

[1] Mém. de l'Acad. Roy. des Sciences, 1740, Paris, 1742.
[2] London Medical Gazette, vol. xxxiii. 1843–4.
[3] Loc. cit.
[4] Humphrey on the Human Skeleton, p. 126.
[5] Journal of Anat. and Phys., vol. iv. 1870.

"Cervical ribs may be either the unusually developed rudiments of the anterior transverse process or rib of the seventh vertebra, or merely unusually developed epiphyses, articulating only with the transverse process of the seventh vertebra. In the former case, which is the more frequent, they are more homologous with the inferior roots of the transverse processes in birds and the cervical ribs in crocodiles; in the latter with the rudimentary ribs connected with the eighth and ninth cervical vertebræ of the *Bradypus tridactylus*" (three-toed sloth).

If the cervical rib reaches anteriorly past the tubercle for the scalenus anticus, then this muscle is attached to it, and the subclavian artery passes over it. This abnormal position of the subclavian artery has been mistaken for aneurism. The existence of the cervical ribs has often been discovered during life, and has sometimes, as in my third case, been taken for an exostosis. Prof. W. Gruber has published, in the *Memoirs of the Imperial Academy of St. Petersburgh*,[1] a valuable paper on cervical ribs, in which he reviews the whole of the literature of the subject. He describes five cases which he has himself seen, and mentions seventy-six other cases in man, which have been recorded, occurring in forty-five individuals.

Prof. Turner[2] gives a description of seven cases, many of them museum specimens. In only one was he fortunate enough to obtain a knowledge of the arrangement of the soft parts, and in one they were recognized in a living person.

Prof. Struthers[3] describes ten cases, many of them very rudimentary. Two much resemble my first case. He also relates two cases occurring in living individuals, in one of which the subclavian artery passed over the cervical rib, and was raised quite two inches above the clavicle. Sir James Paget has diagnosed several cases in the living subject, and says:[4] "In each case the imitation of aneurism was close enough to deceive an unwary surgeon; but to one who examines closely, and has in his mind what the case may be, the mistake seems scarcely possible so long as the artery is healthy. I can well believe, however, that great difficulty of diagnosis would exist in any case in which the unusual arrangement of the parts is combined with a morbid state of the artery, especially with that state in which the arteries, not evidently diseased in texture, have more than natural pulsation. This state is common in the abdominal aorta, and I have seen it in the subclavian and carotid arteries." Prof. Struthers mentions a case which was brought to him for operation as a case of malignant growth, but which he easily recognized as a case of cervical rib. In this, as in my third case, the artery did not go over the supernumerary rib.

[1] Vol. xiii. No. 2, 1869.
[2] Loc. cit.
[3] Jour. Anat. and Phys., vol. ix. 1875.
[4] Jour. Anat. and Phys., vol. iv. p. 136.