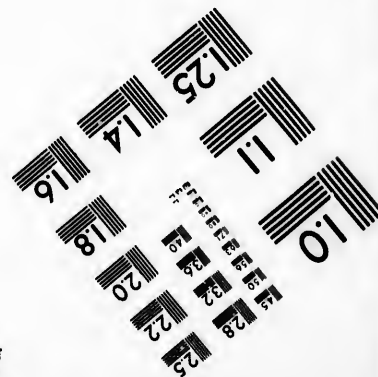
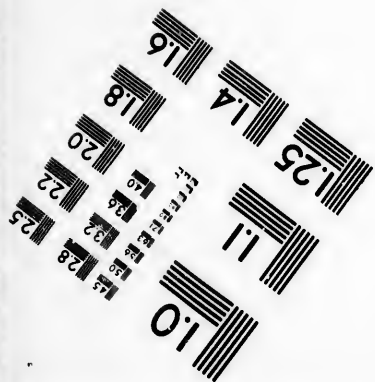
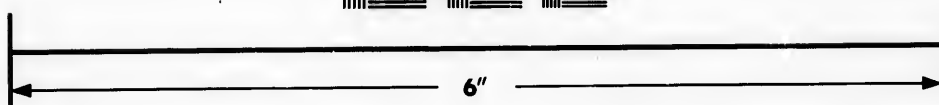
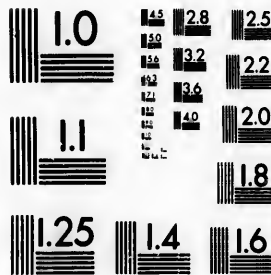


**IMAGE EVALUATION
TEST TARGET (MT-3)**



**Photographic
Sciences
Corporation**

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

15 128
16 32
17 25
18 22
19 20

**CIHM/ICMH
Microfiche
Series.**

**CIHM/ICMH
Collection de
microfiches.**



Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques

11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

© 1985

Technical and Bibliographic Notes/Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- Coloured covers/
Couverture de couleur
- Covers damaged/
Couverture endommagée
- Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée
- Cover title missing/
Le titre de couverture manque
- Coloured maps/
Cartes géographiques en couleur
- Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)
- Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur
- Bound with other material/
Relié avec d'autres documents
- Tight binding may cause shadows or distortion along interior margin/
La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/
Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- Additional comments:/
Commentaires supplémentaires:

- Coloured pages/
Pages de couleur
- Pages damaged/
Pages endommagées
- Pages restored and/or laminated/
Pages restaurées et/ou pelliculées
- Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées
- Pages detached/
Pages détachées
- Showthrough/
Transparence
- Quality of print varies/
Qualité inégale de l'impression
- Includes supplementary material/
Comprend du matériel supplémentaire
- Only edition available/
Seule édition disponible
- Pages wholly or partially obscured by errata slips, tissues, etc., have been refilmed to ensure the best possible image/
Les pages totalement ou partiellement obscurcies par un feuillet d'errata, une pelure, etc., ont été filmées à nouveau de façon à obtenir la meilleure image possible.

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	14X	18X	22X	26X	30X
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12X	16X	20X	24X	28X	32X

The copy filmed here has been reproduced thanks to the generosity of:

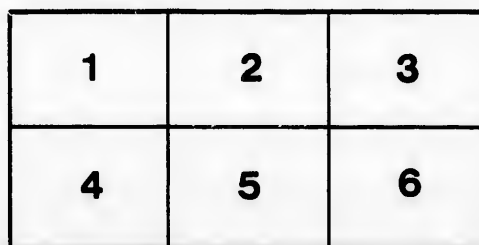
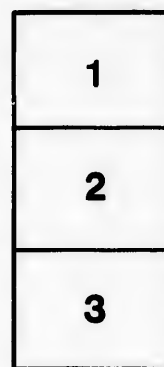
Medical Library
McGill University
Montreal

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol \rightarrow (meaning "CONTINUED"), or the symbol ∇ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:



L'exemplaire filmé fut reproduit grâce à la générosité de:

Medical Library
McGill University
Montreal

Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole \rightarrow signifie "A SUIVRE", le symbole ∇ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.

arrata
to

pelure,
n à

32X

UPON BIFURCATION OF THE RIBS AND COSTAL
CARTILAGES.

By J. G. ADAMI, M.A., M.D.

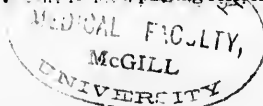
Professor of Pathology, McGill University, Montreal.

Dr. J. G. ADAMI stated that while bifurcation of the ribs was an abnormality apparently of no very great rarity, and while most museums contain one or more examples of the condition, it was remarkable that most of the larger English text-books of anatomy, which devote attention to the abnormalities of various organs, pass over the subject in complete silence.¹ He exhibited three specimens illustrative of the condition. The first of these was a preparation presented to the museum by Dr. Shepherd, consisting of the 2nd to the 6th ribs of the right side, with their cartilages and part of the sternum. The specimen showed that the outer end of the 4th rib was much wider than any of the others, the breadth of the 3rd being 12 mm. at its articulation, of the 5th 11 mm., while that of the 4th was 18 mm. The cartilage of the rib consisted of two processes starting from the widened end of the rib and fusing into one before joining the sternum, thus leaving an oval space 10 mm. long by 6 mm. in a vertical direction.

The next two specimens had been obtained in the post-mortem room at the Royal Victoria Hospital during the last twelve months. Of these, one was from the body of an aged *habitant*, who had died of phlegmonous erysipelas. The specimen consisted of the end of the 3rd and 4th ribs of the left side, with their cartilages and a portion of the sternum. In this specimen the condition was a little more pronounced, the anterior end of the rib was relatively enormously broadened, being 29 mm. across, as compared with 11 mm., the breadth of the articular end of the 3rd rib. The rib presented a short upper process 8 mm broad at its articulation and scarcely projecting from the main mass of bone, and a lower process 9 mm. broad and 10 mm. long. From each of these processes there passed a separate cartilage, and these, as in the last case, fused together before the attachment to the sternum, leaving a space 17 mm. in depth by 20 mm. in a horizontal direction.

The third specimen showed still further exaggeration of the condition. This was taken from the body of an Irishman 78 years of age,

¹ Of the German text-books both Henle and the earlier Meckel devote a few lines to the condition. Of the English, Morris alone has a passing reference to it.



who had died of cardiac disease. The specimen consisted also of the 4th and 5th ribs, but in this case of the right side.

In this patient there had been a particularly wide space noted between the 5th and 6th ribs on the left side, and on the right side the bifurcation of the rib was very noticeable upon removing the pectoral muscles. Here the upper process was 20 mm. long and continued roughly the general course of the rib, while the lower process, 25 mm. long, was given off from the main body at an angle of about 30°. Careful counting of the ribs in this case showed that only eleven pairs were present, the last of the series having all the characters of the ordinary floating twelfth rib. Unfortunately the exigencies of time prevented in this case the removal of more than the outer portion of the ribs, and the vertebræ were not carefully examined. The post-mortem notes contained an entry to the effect that eleven pairs of ribs were present in the second case also. With regard to this he could not speak so positively, but he believed the statement to be correct. If so, these cases presented examples of a condition not hitherto recorded. Additions to the series of ribs both above in the cervical region and below in the lumbar region were not infrequent. There was one case at least on record of almost complete absence of the 1st rib and several instances of complete absence of the 12th; but diminution in number by fusion of mid-dorsal segments and their ribs was a condition of which he could find no mention. At the same time, when the variation in the number of lumbar, sacral and even cervical vertebræ was taken into account, there was undoubtedly an inherent probability that such fusion or dropping out of a somite of the body could occur in the mid-dorsal region. The fullest description that he had come across of cases of bifurcation of the ribs and their cartilages was given by Professor Struthers in the 9th volume of the *Journal of Anatomy and Physiology*. This observer, in describing a collection of specimens exhibiting variations of the vertebræ and ribs in man which he had accumulated during many years, gives notes upon five cases, two of bifurcation, two resembling the first case mentioned of ribs broad at the sternal end with bifurcated cartilage, and one in which the cartilage alone was bifurcated. It was interesting to notice that in three of these cases the variety was ascertained to be of the 4th rib—in one it was probably of the 4th, in the other two probable of the 4th or 5th. Evidently, therefore, taking the cases here described also into consideration, there was a special tendency for this variation to affect either the 4th or the 5th dorsal segment. In one of his cases Struthers stated, and in a second implied, that the number of ribs was normal.

That the ribs should divide at their outer extremity was but in keeping with the general law of variation that re-duplication of parts shows itself most often in the distal portion of an organ, and agreeable to this same law it might be stated that bifurcation of the costal cartilages is more frequent than the well marked bifurcation of the ribs themselves. As Professor Struthers pointed out, the condition has a clinical interest, as it might well give rise to a mistake in indicating the position of a chest symptom or of a fracture.

