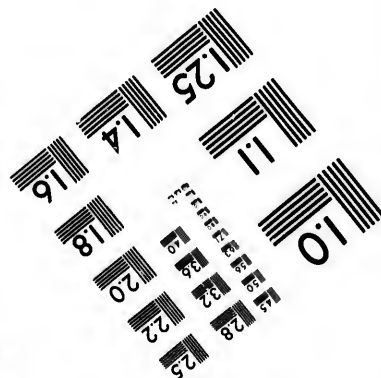
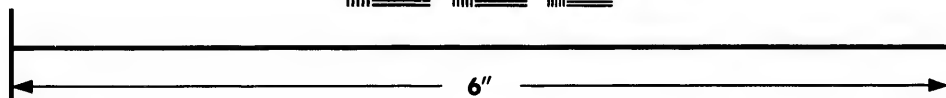


A resolution test chart featuring various patterns of horizontal and vertical lines of increasing frequency. Each pattern is accompanied by a numerical value indicating its resolution. The values include 1.0, 1.1, 1.25, 1.4, 1.6, 1.8, 2.0, 2.2, 2.5, 2.8, 3.2, 3.6, 4.0, 4.5, 5.0, 5.6, 6.3, 7.1, 8.0, 9.0, 10, 11.2, 12.5, 14, 16, 18, 20, 22.5, 25, 28, 32, 36, 40, 45, 50, 56, 63, 71, 80, 90, 100, 112, 125, 140, 160, 180, 200, 225, 250, 280, 320, 360, 400, 450, 500, 560, 630, 710, 800, 900, 1000, 1120, 1250, 1400, 1600, 1800, 2000, 2250, 2500, 2800, 3200, 3600, 4000, 4500, 5000, 5600, 6300, 7100, 8000, 9000, 10000, 11200, 12500, 14000, 16000, 18000, 20000, 22500, 25000, 28000, 32000, 36000, 40000, 45000, 50000, 56000, 63000, 71000, 80000, 90000, 100000, 112000, 125000, 140000, 160000, 180000, 200000, 225000, 250000, 280000, 320000, 360000, 400000, 450000, 500000, 560000, 630000, 710000, 800000, 900000, 1000000, 1120000, 1250000, 1400000, 1600000, 1800000, 2000000, 2250000, 2500000, 2800000, 3200000, 3600000, 4000000, 4500000, 5000000, 5600000, 6300000, 7100000, 8000000, 9000000, 10000000, 11200000, 12500000, 14000000, 16000000, 18000000, 20000000, 22500000, 25000000, 28000000, 32000000, 36000000, 40000000, 45000000, 50000000, 56000000, 63000000, 71000000, 80000000, 90000000, 100000000, 112000000, 125000000, 140000000, 160000000, 180000000, 200000000, 225000000, 250000000, 280000000, 320000000, 360000000, 400000000, 450000000, 500000000, 560000000, 630000000, 710000000, 800000000, 900000000, 1000000000, 1120000000, 1250000000, 1400000000, 1600000000, 1800000000, 2000000000, 2250000000, 2500000000, 2800000000, 3200000000, 3600000000, 4000000000, 4500000000, 5000000000, 5600000000, 6300000000, 7100000000, 8000000000, 9000000000, 10000000000, 11200000000, 12500000000, 14000000000, 16000000000, 18000000000, 20000000000, 22500000000, 25000000000, 28000000000, 32000000000, 36000000000, 40000000000, 45000000000, 50000000000, 56000000000, 63000000000, 71000000000, 80000000000, 90000000000, 100000000000, 112000000000, 125000000000, 140000000000, 160000000000, 180000000000, 200000000000, 225000000000, 250000000000, 280000000000, 320000000000, 360000000000, 400000000000, 450000000000, 500000000000, 560000000000, 630000000000, 710000000000, 800000000000, 900000000000, 1000000000000, 1120000000000, 1250000000000, 1400000000000, 1600000000000, 1800000000000, 2000000000000, 2250000000000, 2500000000000, 2800000000000, 3200000000000, 3600000000000, 4000000000000, 4500000000000, 5000000000000, 5600000000000, 6300000000000, 7100000000000, 8000000000000, 9000000000000, 10000000000000, 11200000000000, 12500000000000, 14000000000000, 16000000000000, 18000000000000, 20000000000000, 22500000000000, 25000000000000, 28000000000000, 32000000000000, 36000000000000, 40000000000000, 45000000000000, 50000000000000, 56000000000000, 63000000000000, 71000000000000, 80000000000000, 90000000000000, 100000000000000, 112000000000000, 125000000000000, 140000000000000, 160000000000000, 180000000000000, 200000000000000, 225000000000000, 250000000000000, 280000000000000, 320000000000000, 360000000000000, 400000000000000, 450000000000000, 500000000000000, 560000000000000, 630000000000000, 710000000000000, 800000000000000, 900000000000000, 1000000000000000, 1120000000000000, 1250000000000000, 1400000000000000, 1600000000000000, 1800000000000000, 2000000000000000, 2250000000000000, 2500000000000000, 2800000000000000, 3200000000000000, 3600000000000000, 4000000000000000, 4500000000000000, 5000000000000000, 5600000000000000, 6300000000000000, 7100000000000000, 8000000000000000, 9000000000000000, 10000000000000000, 11200000000000000, 12500000000000000, 14000000000000000, 16000000000000000, 18000000000000000, 20000000000000000, 22500000000000000, 25000000000000000, 28000000000000000, 32000000000000000, 36000000000000000, 40000000000000000, 45000000000000000, 50000000000000000, 56000000000000000, 63000000000000000, 71000000000000000, 80000000000000000, 90000000000000000, 100000000000000000, 112000000000000000, 125000000000000000, 140000000000000000, 160000000000000000, 180000000000000000, 200000000000000000, 225000000000000000, 250000000000000000, 280000000000000000, 320000000000000000, 360000000000000000, 400000000000000000,



Photographic Sciences Corporation

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

**CIHM/ICMH
Microfiche
Series.**

**CIHM/ICMH
Collection de
microfiches.**



Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques

© 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.

- ☒ 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:

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 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:

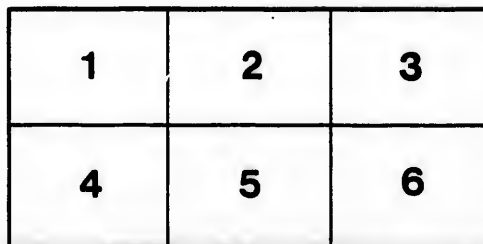
Medical Library
McGill University
Montreal

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 → (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:

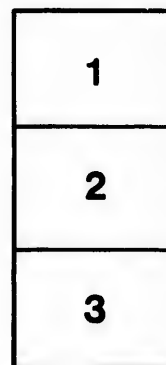
Medical Library
McGill University
Montreal

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 → 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.



Ross, G. T.
Author's Compliments

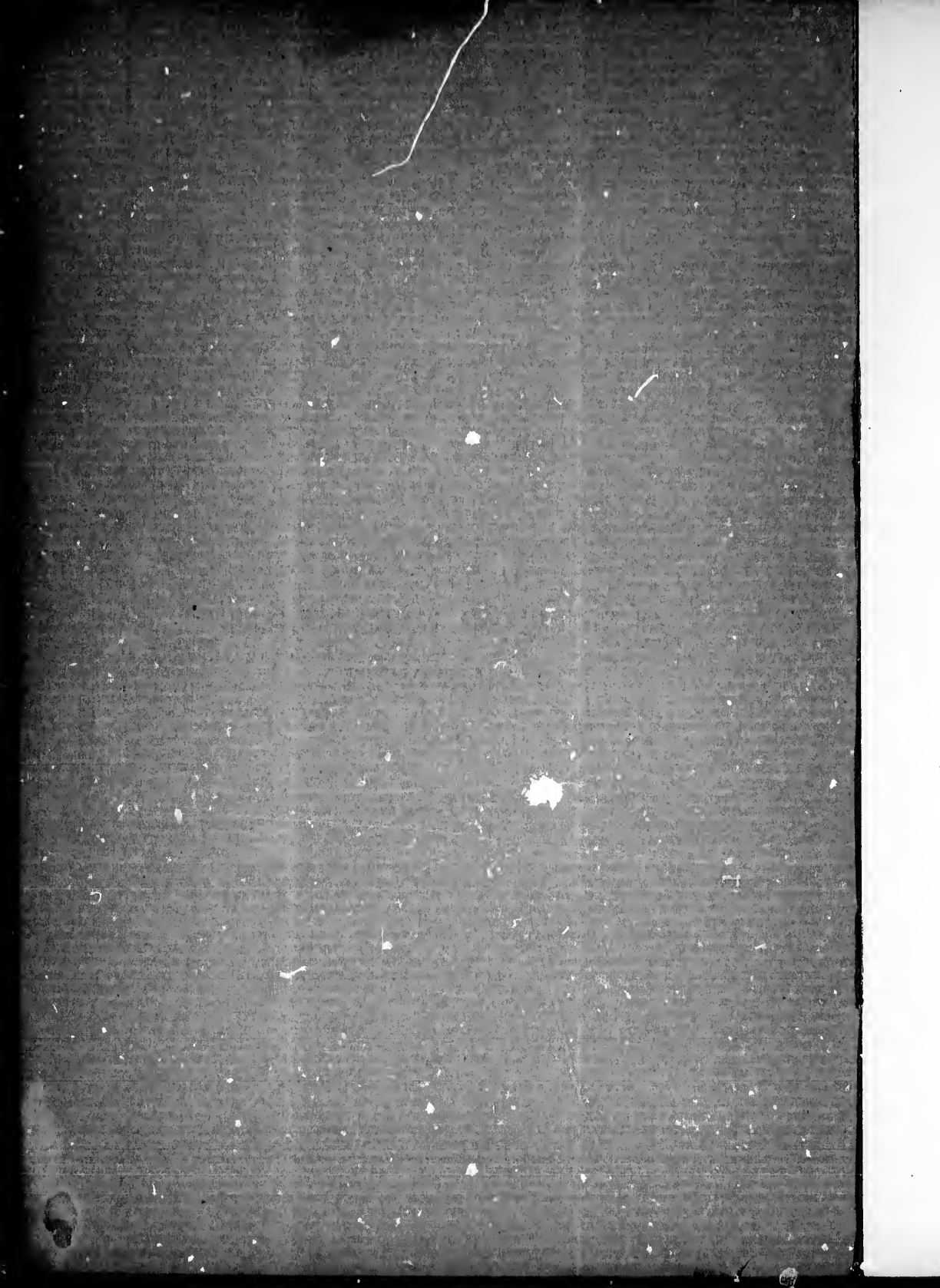
CLINICAL LECTURE

.....ON.....

BILATERAL
ABDUCTOR LARYNGEAL
PARALYSIS

.....BY.....

Geo. T. Ross, M.D.



CLINICAL LECTURE ON BILATERAL ABDUCTOR LARYNGEAL PARALYSIS.

Delivered to the students attending clinic at Throat and Nose Department, Western Hospital, Montreal

By GEO. T. ROSS, M D.

Fellow American Laryngological Association; Prof. Laryngology Bishop's College; Laryngologist Western Hospital, etc.

GENTLEMEN :—The nervous system is almost entirely inaccessible to direct observation, with trifling exceptions; the state of this system, therefore, can be ascertained only by the manner in which its work is done, and morbid states in the system reveal their presence by the derangement of function which they cause. The larynx is no exception to this fact, and disordered function here is our only guide to diagnosis. Remember in examining the larynx that only a few unimportant affections of this organ are independent of systemic disease or of disease in contiguous organs. Since then the interpretation of doubtful cases will always depend largely upon examination of neighboring parts of the air passages, especially the fauces, the alimentary canal, and even the entire body, it is wise in the absence of very large experience to make a careful general examination in order to check even such local findings as seem to be perfectly clear and easy to explain, for not infrequently a preconceived opinion concerning the primary cause of the disease is in this way shown to be erroneous. Your examination cannot be too thorough; in no other organ of the body is disease so dependent on the general condition as in the larynx, and conversely, the finding of certain conditions in the larynx often throws light on latent or obscure processes in the entire organism. The importance of these remarks is well illustrated by the case we have before us for study to-day. This patient, a married man, aged 50, gives the following history :— he complained of hoarseness about beginning of the year 1897, and says it has con-

tinued more or less since that time. His attention was specially directed to the state of his throat in March last year, when on taking a drink of cold water he experienced a choking spasm which he says almost suffocated him, and this spasm has always been repeated whenever he attempted since that time to swallow cold fluids. At times he complains of distress from gas in stomach and bowels, and that "rumbling and roaring" in these organs makes him miserable occasionally. He continued his work of cab-driving until beginning of Feb'y. last, when the difficulty of breathing was such as to compel him to quit. At night his noisy inspirations were such that his wife feared he would suffocate. Every morning a fit of coughing would dislodge a quantity of thick mucus, after which he had some relief. He had been under the care of several physicians, but the throat trouble becoming so pronounced he was referred to this clinic. Eight years ago he had gonorrhœa for three months, but never was confined to the house sick until three years ago when he had an attack of what was called rheumatism. His left leg became weak and painful, causing lameness for over 8 months. The pain was not spasmodic or of the character of "lightning pains," but simply caused by the effort of walking, and getting on and off his cab was difficult. Says his right leg was always quite strong and is unaffected to-day. The left leg improved and he returned to work, but it continued perceptibly weaker than the right. For the past 23 years he took liquor freely. Thinks he averaged 3 or 4 quart bottles of beer daily.

On examination the calf of left leg measures 5-8 inch smaller than right, and at middle of thigh the left is 1 1-2 inches smaller than the right. Left patellar reflex is exaggerated. Right patellar reflex is normal. The cremaster and abdominal reflexes are normal. No local or general areas of disturbed sensation except in the left leg and foot, which patient says is always cold. Eyes act normally to light, but pupil of left eye is smaller than right eye. No Argyll-Robertson pupil. On speaking there is at times a decided stammer and effort to proceed; the voice will break occasionally and take a high falsetto note. On walking there is a slight want of co-ordination in left leg. His arms in respect to co-ordination are

normal. On the patient closing his eyes he can't maintain his equilibrium or walk without staggering. Examination of the other organs and systems of his body, excepting the larynx, gives negative results. The laryngeal examination shows a catarrhal laryngitis. Epiglottis normal in color and size. Ventricular bands are hyperæmic overlapping the vocal cords partially. The breadth of vocal cords in sight is not more than 2 m. m., and their margins are thickened and reddish. Glairy mucus covers the aryepiglottic folds and fills the pyriform sinuses. The true cords are permanently adducted so that only a very narrow chink allows entrance of air. The inspiratory effort instead of causing abduction forces the cords closer together by the resulting suction, and in consequence much noisy stridor is produced, while the expiratory effort mechanically forces the cords apart. This noise is much increased on patient falling asleep, so that the necessity for intubation or tracheotomy has been threatening for a time. This tonic spasm of the cords is permanent, although less severe in waking hours. The head is occasionally tossed back to assist inspiration, but the patient seemed to get enough oxygen because cyanosis has not appeared. Temperature and pulse are normal.

In all cases of disease in which there is an organic lesion of the nervous system, the object of the physician is not merely to give a name to the disease, but to make an exact anatomical and pathological diagnosis. Both the anatomical and pathological diagnoses are of importance, not merely from a scientific point of view, but for the practical purposes of prognosis and treatment. The object of the anatomical diagnosis is to determine the exact part of the nervous apparatus which is directly implicated by the lesion. In spite of the attention which has been paid to the functions of the larynx by means of physiological experiments, and clinical and pathological observations, knowledge of the innervation of this apparatus is still imperfect. To help understand the curious and fascinating phenomenon with which we have to deal, I first would remind you that the motor nerve *par excellence* of the larynx is the recurrent laryngeal nerve. With the only exception of the tensor of the vocal cords, the crico-thyroid muscle (this

being supplied by the external branch of the superior laryngeal), the recurrent laryngeal innervates all the laryngeal muscles proper, that is the antagonistic groups of the abductor and adductor muscles of the vocal cords. The former (*abductors*) are represented by the *posterior crico-arytenoid muscles* only, the latter (*adductors*) by the *lateral crico-arytenoid*, the *external and internal thyro-arytenoid* and the *inter-arytenoid muscles*. The statement of several German authorities that the superior laryngeal nerve takes part in motor innervation of all the laryngeal muscles proper has been strongly opposed by late observers. The ultimate derivation of the recurrent laryngeal nerve is, however, warmly contested. Many anatomists and physiologists considered the spinal accessory nerve the source of laryngeal innervation, but recently, Grossman, Spencer and others, by experiments, held that the true source of this impulse was the lower bundle of vagus roots. The question is not definitely settled. Dr. R. Russell has split up the recurrent laryngeal nerve throughout its peripheral length into three different bundles of fibres, one of which supplies the abductors and another the adductors, whilst from the third, no motor effect can be produced in the larynx. We, therefore, know now definitely that the fibres going to the antagonistic groups of laryngeal muscles are differentiated throughout their peripheral course. These fibres, ultimately supplying the abductor of the cords are situated on the inner side of the recurrent laryngeal nerve. I now show you a plate illustrating, first, what is beyond question the ordinary respiratory position of the vocal cords, and 2nd, what is the cadaveric position of them. The question arises, what is the greater width of the glottis in life due to? The reply is, the abductor muscles of the cords are endowed with a special reflex tonus, by means of which the glottis during life is kept open during both phases of respiration to such a degree that that type of respiration which we call "ordinary" is rendered possible. In this degree of respiration we breathe by the aid of diaphragm and intercostal muscles only. As soon as during life the glottis is narrowed to the same degree as we see it after death, we find that with every unusual muscular exertion dyspnoea begins, shown by very quick and shallow or by very deep and labored inspiration,

accompanied by audible inspiratory stridor. At the same time, whilst the action of the diaphragm and intercostals becomes intensified, the accessory muscles of respiration come into play. The reason is simple. The laryngeal tube is the narrowest part of the whole respiratory apparatus, and this tube is still further narrowed by the insertion of the vocal cords into its calibre. Semon has shown that this arrangement has narrowed the space for entry of air to less than 1-3 its natural area. The result of this narrowing would be that if it were not counterbalanced by some compensation of nature, no sufficient space would exist for the entrance of air when any extra demand was made upon the breathing powers. To obviate this, nature has endowed the abductor muscles with the tonus referred to, by means of which the glottis is kept sufficiently open for ordinary breathing. This tonus is produced by certain centripetal fibres, contained mainly, but not exclusively, in the pneumogastric nerve, which are stimulated by the interchange of gases in the lungs during respiration and act rhythmically upon certain centres in the medulla oblongata, where they are changed into tonic impulses, which again descend along the fibres which ultimately form the recurrent laryngeal nerve and keep the glottis open to a degree sufficient for ordinary respiration. A knowledge of these facts is essential to understanding the pathological phenomenon of the case we are studying. If you cut any motor nerve which supplies various muscles horizontally across, all these muscles become completely paralyzed, unless innervated at the same time by other nerves. But should the lesion be slow instead of sudden, one of two things may occur, viz: either all the nerve fibres contained in that nerve may suffer together and in equal degree, and a stage of paresis instead of complete paralysis be first seen, or the cause may act in an unequal degree upon the nerve fibres contained in the nerve trunk, when the paralytic changes may be more pronounced in one set of muscles supplied by that nerve than in another. Authorities have shown that whilst the abductors were the first to succumb to disease, the adductors were the first to recover, and in fact the abductors may remain permanently damaged after complete recovery of the adductors. The ultimate cause of this greater

liability to attack of the abductors is still unknown. The following facts are clinically important: First, the motor nerves of the larynx have so long and tortuous a course, that from their medullary origin to their endings in the laryngeal muscles they are exposed to an enormous number of various pathological influences. Second, the laryngeal abductor paralysis caused by any of these influences may and in a good many cases does remain for a long time the only positive sign of these various pathological processes. Third, this paralysis, if unilateral, may in no way proclaim its existence but must be sought for, if one does not wish to miss the opportunity of making an early diagnosis in many of these cases.

Undoubtedly a number of cases of abductor paralysis occur in which it is a silent storm signal of impending grave trouble, while it may again be present for many years without other symptoms developing. In the latter cases some trivial local lesion, such as an enlarged gland compressing the motor laryngeal nerves at any point in their long course, may induce persistent abductor paralysis owing to the greater vulnerability of the abductor fibres. Thus it would be unwise to frighten a patient by suggesting possibilities of serious trouble; at the same time it is necessary to watch the course of such trouble and carefully follow it, for the reasons stated. In the case we have before us, symptoms of tabes dorsalis are by no means typical, the patellar reflexes being unimpaired and no history of lightning or girdle pains, but the other signs are such as to leave the diagnosis sufficiently positive at this stage of the disease. If the gastric and laryngeal crises had not asserted themselves so positively as well as the laryngeal inco-ordination, and had the paralysis alone existed, then the question of alcoholism might have reasonably been considered, but with the foregoing history we may look for developments of a more pronounced tabetic nature later on. The patient remained two weeks in the Hospital on full diet, sedatives, tonics and complete rest with electricity to larynx, when he gained in every way. The glottic chink widened sufficiently to afford fairly comfortable breathing, and this is now only slightly stridulous. His sleep is not much disturbed, and he has been

allowed to go home where he can continue treatment. The differential diagnosis between alcoholic neuritis with paralysis and tabes dorsalis I will leave to the professor of neurology, in whose domain this work lies. We will keep up Galvanism and Faradism and such constitutional restoratives and symptomatic treatment as the case indicates from time to time and report upon it later.

