

situated upon the epiglottis, arytenoids, vocal cords, or tracheal cartilages. The resulting scars assume a great variety of shapes (ledges, projections, diaphragm-like membranes).

As a rule, no difficulty will be encountered in determining the nature of the ulcerative process which underlies a threatened or already present stenosis. Typhoid ulcers develop in the course of typhoid fever, while tubercular ulcers are present in individuals already suffering with tuberculosis of the lung. Sometimes the differential diagnosis between syphilis and tuberculosis is hard to make, especially if no foci are found in the lung. In such cases the following points are of value:

*Syphilitic changes* are usually painless; pain is felt only in rapidly spreading ulcerations upon pressure exerted from without, or upon deglutition. The painful period is always preceded by a noticeable change of voice, though both cough and swallowing remain entirely painless. As a whole, syphilitic destruction is characterized by its rapidity.

In *tubercular ulcerations*, on the other hand, a burning pain is felt from the very beginning of ulceration. The pain is greatly increased by speech, swallowing, and expectoration. The excruciating pain on swallowing is especially significant, for the patients, during eating and drinking, suffer the tortures of the damned.

Serious difficulty in swallowing occurs in the course of laryngeal syphilis only when extensive erosions of the epiglottis have taken place. In tubercular ulceration this difficulty appears early, and very frequently is the prominent symptom, so that the unbearable pain on swallowing is the patient's constant complaint.

NEOPLASMS OF THE LARYNX bear the most diverse relations to stenosis. In the most serious variety of

new growth, *Carcinoma*, the symptom which usually precedes all others by a long period is hoarseness. If an individual past middle age suffers from an irregular and progressive hoarseness, which obstinately resists all treatment, the suspicion is immediately aroused that a slow change of texture is taking place in the vocal cords. Should tearing pains now occur spontaneously in the larynx, pharynx, and, what is well worth keeping in mind, *in the ear*, we are forcibly reminded of the lancinating pain of cancer. These pains are seen, for instance, in cancer of the thyroid gland, the patient suffering with radiating pain in the head and shoulder. The worst fears are justified if the symptoms of laryngeal stenosis gradually develop. At first, dyspnoea on severe exertion appears; later, slight efforts will bring on the shortness of breath which finally becomes constant. If a hard lymph gland can be felt in front of the sterno-mastoid, the diagnosis is almost assured, even without laryngoscopic examination. The decided emaciation of the patient, which is visible by this time, indicates also the malignant nature of the disease; and changes of contour in the laryngeal cartilages may be visible to inspection from without.

In dealing with a *Polyp* we reason differently. These tumours assume many and various shapes. They occur most often in very healthy subjects, but never in young people, always in adults. As the tumour is benign its growth is very slow. It is situated either on the upper or lower surface of the vocal cords, and acts as a continual irritant to the mucous membrane in the vicinity, so that this is in a continual state of chronic catarrh. Consequently a change of voice is invariably brought about, and the irritation is aggravated by exertion. At



this stage no distinctive symptoms can be observed, because in a middle-aged individual the same symptoms may be due to a chronic catarrh. If we assume that the polyp is pedunculated, there is always the possibility that the growth may change its position within the radius permitted by the pedicle. Finally, it may fall into the rima glottidis and become wedged fast. The symptomatology then becomes clear. If, after the gradual and progressive onset of the above symptoms, stenosis suddenly occurs, disappearing with equal rapidity only to recur at intervals, the sole logical explanation, after a foreign body has been excluded, can be furnished by a pedunculated growth. During one of these attacks the patient will frequently mention that he has the feeling that there is a foreign body in his throat.

One of Lieutaud's patients died unexpectedly from suffocation, brought about by leaning out of his bed to pick up an object from the floor. The first polyp, removed by the endolaryngeal route, by v. Bruns (1861) was found under the left vocal cord. It was pear-shaped and sessile.

*Papillomata* are the commonest new growths of the larynx. They are associated with certain individual traits to be noticed in the afflicted subject. In the first place, they occur in childhood or at puberty (in contradistinction to carcinomata); in the second, they usually are found in subjects of anæmic and lymphatic habitus (in contradistinction to polypi). The neoplasm may cover the whole inner surface of the larynx; the vocal cords are its usual starting-point. The chief symptoms of this trouble are, disturbance of the voice, the sensation of a foreign body, irritation causing cough, and a stenosis which is relatively rapid in its progress.

With the present facilities for making an examination, the diagnosis must be confirmed with the laryngoscopic mirror. But the practitioner will be able to make a provisional diagnosis, without further examination, by means of the symptoms outlined above.

*Paralyses* offer an interesting field, which is, however, open to the specialist alone. Especially important is *paralysis* of both *posterior crico-arytenoid muscles*, which prevent the glottis from opening during inspiration, thus producing danger of suffocation. The disease develops insidiously, usually unaccompanied by catarrh or alterations in the voice. Noticeable is the fact that expiration is not disturbed—therefore no mechanical obstacle is present.

In contrast to this, *bilateral paralysis* of the *recurrent laryngeal nerve* can be diagnosed almost positively without laryngoscopic examination. This disease is marked by complete aphonia, absence of dyspnoea during quiet respiration, inability to cough or expectorate vigorously, the patient, however, being able to expel a powerful blast of air from his mouth.

*Hysteria* is a true disease, yet hysterical women, "perfectly well" in the afternoon, may in the evening be attacked by dyspnoea, which simulates stenosis of the air-passages. These attacks are rarely serious; as a rule, the true state of affairs is readily unmasked. The hysterical facies, the rolling of the eyes, the simultaneous appearance of dysphagia (this is the rule in hysterical subjects), the rumbling of the intestines, the occasional distortion of the face, the cramps, etc., all give the picture of an hysterical attack. If we succeed in eliciting some answer from the patient—often a task demanding experience and *savoir-faire*—the voice at once shows the absence of laryngeal trouble. At times the patient, craving sympathy, voluntarily asks, in a low voice, whether she will die of suffocation. Although not dyspnoeic at this moment, a fresh attack may suddenly make its appearance without warning.

I often cure such an attack (after having taken the relatives into my confidence) by prominently displaying a few instruments upon the table, and declaring that an operation will be necessary if the disease grows worse. The attacks then fail to recur.

A stenotic attack can occur in an apparently healthy individual,



independent of any mechanical obstruction of the air-passages. I was forced, on one occasion, to perform a tracheotomy on a young girl who was in great danger of death from suffocation, although I was unable to find any œdema of the glottis. She was relieved, but pneumonia developed on the following day, and the patient died. Larynx and trachea were found free, and no trace of œdema could be discovered, but there was *marked hydrocephalus*. Such cases are at present obscure. I saw an analogous case in an insane female at Innsbruck.

The diagnosis of *tracheal stenosis* due to pressure exerted by tumours, especially by goitre, is more difficult. One class of cases is represented by women afflicted with goitre, who suffer from dyspnoea during the menstrual period, although they are troubled with only the slightest discomfort at other times. Such cases are unassociated with any danger; cold compresses about the neck reduce the hyperæmia of the gland and palliate the discomfort. In another class of cases a very slight degree of stenosis of the trachea may cause asphyxia, but the explanation must be sought elsewhere than in the trachea itself. The younger Demme has made valuable observations and studies which demonstrate the fact that neuroses of the larynx may occur in goitre through the agency of the recurrent laryngeal nerve, simultaneously with tracheal compression. This was known to be the case in carcinoma, as can be seen by consulting Lebert's references on this subject. Very lately, Professor Rose has emphasized the danger which may result from the pressure exerted by goitre upon the trachea, so that we may correctly speak of death from goitre (*Kropftod*). The cartilages of the trachea suffer a change of texture (a softening) which causes the windpipe to lose its circular shape and become a mere slit, usually likened to the scabbard of a sword. The ordinary move-

ments of the neck suffice to distort the softened trachea so as to reduce its lumen to a minimum.

We must remember that the picture can be complicated by various other factors. In addition to the compression of the trachea, an agglomeration of lymph glands may press upon one of the bronchi, or respiratory disturbances may be secondary to disease of the lung. The symptoms can be differentiated only by a careful physical examination of the thorax. If stenosis occurs in a goitrous subject, our first care must be to ascertain whether the condition is due to compression. The following factors should be borne in mind: 1. Careful examination of the mouth and pharynx excludes any disease which might produce stenosis of the larynx. Testing the voice excludes laryngeal affections. In pure stenosis aphonia is wanting, and the changes in the voice which are present differ from the changes seen in primary laryngeal affections. If a laryngoscopic examination is feasible, it will at once decide whether or not the larynx is narrowed; in favourable cases a skilled laryngologist may actually *see* the stenosis of the trachea. 2. The position of the larynx and trachea should be examined. If great displacement or distortion is found, auscultation at this site should be practised. The whistling sounds heard during respiration are characteristic. 3. One must not forget that the tumour, although of small size in the neck, may extend over a large area behind the sternum. This must be established by percussion over the sternum. 4. The history will show whether *dysphagia* existed for any length of time, in which case a retrotracheal extension of the tumour may be taken for granted. More rarely, passing of the esophageal bougie confirms the



diagnosis. 5. Catheterization of the trachea will clear any remaining doubts if the laryngoscopic examination is negative.

Auscultation requires special emphasis. The whistling sound is loudest during inspiration, differing somewhat in this respect from the sounds heard in catarrh, asthma, and emphysema, which are most marked during expiration. The quality of the sounds are very similar. In addition, the whistling inspiration is heard most distinctly in the median line anteriorly, and between the scapulæ posteriorly.

The presence or absence of complications must next be determined. This question is of paramount importance in high degrees of stenosis, in which the advisability of performing tracheotomy is under discussion, for if the lumen beyond the trachea is narrowed, a tracheotomy would be of no avail. Such a condition may be assumed to exist if one lung does not breathe, because the bronchus is occluded or compressed. The same holds true if, in addition to substernal dulness, there is diminished breathing and a lessened circumference of the thorax on one side, accompanied by whistling sounds at the site of the supposed stricture.

All in all, it is well to remember that two points alone are of real importance. In the first place, it is necessary to recognise that a stenosis is present. The loud stenotic sound occurs in this condition alone, and thus characterizes the breathing of stenosis. In all other respiratory disturbances, whether due to reduction of the lung surface (œdema, pneumonia, pneumothorax), or to lessened respiratory movement (emphysema, spasm, or paralysis of the diaphragm, widespread paralysis of the muscles of respiration), or to circula-

tory disturbance, the stenotic sounds are absent, although orthopnoea is not wanting. The stenotic attack is marked by *stridor*, the asthmatic by *stertor*. In the next place, the diagnosis of the underlying disease, as a rule, is the deciding factor. It determines whether or not surgical interference is to be of use; if the stenosis is not within the scope of the knife, it becomes a medical case.