years old, who, on July 9, 1862, was attacked, while on a journey, with colic. The attack was so severe that he had to be taken home in a wagon, arriving in a very weak condition. The patient, a very strong and robust man, stated that he had suffered for two months from indigestion, and that in this time he had lost a marked amount of flesh. Biliary colic was diagnosed. The attacks of colic recurred at intervals of several days with increasing severity. After one attack of remarkable severity, eighteen gall-stones, the largest the size of a pea, were found in the stools. Three days later so severe an attack with vomiting came on that a fatal issue was feared. But the attack passed off, and four days later still, *a discolored mass of tissue was passed from the bowels*. This was recognized by Rokitsansky as the *sloughed pancreas*. From this time on the patient improved, and in three weeks was completely well.

At the time of writing he was sixty-nine years old and in perfect health.

The second case was a man thirty-eight years old, who had previously, in the year 1878, suffered with the symptoms of the passage of gall-stones. He recovered and remained well till September of the same year, when he suffered from pain in the abdomen. The pain though continuous did not prevent him from continuing at his business. At the end of ten days (September 28th) it suddenly increased in severity, becoming intense and of a colicky character; obstinate vomiting supervened, and the symptoms resembled those of intestinal obstruction. The principal symptoms were pain in the region of the stomach, vomiting, constipation, increased respiration, feeble pulse, cold skin, profuse perspiration, anxious countenance, tenderness over stomach. These passed away, however, but only to return again at the end of two days (October 4th). Improvement again set in and continued until October 20th, when high fever came on, together with similar symptoms of obstruction, and continued for three days at 104.8° F. These symptoms again disappeared, and continued to thus intermit till November 7th, when *there was passed from the bowels a piece of tissue which proved to be the greater part of the pancreas in a state of extreme gangrene*.

From this time the patient made a good recovery.

One of the most interesting questions connected with this subject is the *cause of death* in those cases which have ended suddenly in an apoplectiform manner. The hæmorrhage of itself is not sufficient in quantity to be fatal, or to cause the alarming collapse observed in more protracted cases. Zenker, who noticed venous congestion of the semilunar ganglion without alteration of the ganglion cells or nerve fibres in two of his cases — the only ones in which these bodies have been examined — draws attention to the similarity between these cases of sudden death and those of shock following severe mechanical violence inflicted on the abdomen, and thinks both resembles Goltz experiment of tapping on the abdomen of the frog, and that death is due to reflex paralysis of the heart through the semilunar ganglion. Friedreich considers that there is a marked difference between these cases and that of Goltz' frog, in that there is complete absence of congestion of the abdominal viscera observed in the tapping experiment, and attributed the sudden death to reflex paralysis of the heart due to pressure upon the semilunar ganglion from the suddenly enlarged pancreas. Both, however, look to a reflex paralysis of the

heart through this body. To my mind a fatal objection to the pressure theory lies in the fact, that other and larger tumors, though to be sure of more gradual growth, but placed so as to exert a similar influence, are known to occur in the abdomen without any such ill consequence. Furthermore, the inadequacy of this explanation is shown by Draper's first case, where death suddenly occurred at the end of forty to forty-five minutes, where no enlargement of the pancreas was found, notwithstanding the hæmorrhage.

In regard to the congestion theory, it is necessary to examine the semilunar ganglia in a larger number of cases before accepting such an hypothesis.

I am inclined to the opinion that the best explanation is to be found in the condition known as *shock*, using this term to denote a sudden and profound depression or inhibition of the nervous centres, as a reflex result of so sudden and extensive injury of the pancreas itself, without requiring the mediation of the semilunar ganglion.

This view receives some support from the fact that we find cases of all grades: from those where death is nearly instantaneous, to others where it is delayed several days, and in which the condition of "shock" is established at equally varying periods. In the latter class of cases there may be a recovery from the shock, but final death from peritonitis. This state of collapse or shock, which sooner or later appears, is similar to that which is common to any of the more violent diseases of the abdominal organs (such as nephritic colic, strangulation of the intestine, wounds, etc.), and which is brought about through reflex depression of the nervous centres depending upon neural disturbances originating directly in the organs involved. When death is sudden the reflex disturbance is more acute and profound than when it is delayed.

Dr. W. F. Whitney, in a paper¹ read before this Section, rejects the theory that death is due to loss of blood, and suggests that "it is much easier to conceive of it [the hæmorrhage] as the accompaniment of some lesion, as yet overlooked, of the central nervous system, and standing in the same relation to this that the subserous ecchymoses and pulmonary extravasations do to injuries of the head; or else consider with Zenker that it is the cause of profound changes in the nervous centres through reflex action of the sympathetic. This explanation I can only regard in the same spirit in which I believe it was offered, namely, as one of the possibilities which it would be well to look into.

"PHONIC PARALYSIS," WITH RAPID RESPIRATION.

BY ROBERT M. LAWRENCE, M. D.

THE following paper was suggested by a case of which I have prepared a brief account, to which has been added a synopsis of an analogous case. I have endeavored to make partial amends for my own limited observation by a somewhat extended study of the literature of the subject. The term "Phonic Paralysis" or "Palsy" is used by Tobold, and has at least the merit of being comprehensive. It is applicable to all cases where there is loss of voice due to paralysis, however caused, of the adductor muscles of the larynx, as in functional, nervous, intermittent, and hysterical aphonia, and also paralytic dysphonia. It is that va-

riety of glottic palsy where the movements of the glottis are not wholly suppressed, but in which there is observed an incomplete or only a momentary closure, and where, in consequence of faulty innervation of the laryngeal muscles, the vibration of the vocal cords either entirely fails or is insufficient to produce a voice sound in spite of the efforts of the patient. The affection presents different forms.

CASE I. Sarah McC., aged twenty-three years, of American birth, tall and of spare figure, had had a fair degree of health until the spring of 1878, when she became much debilitated owing to overwork. As the oldest of several children, a large share of household work devolved upon her, whereby her strength was unduly taxed. There was no previous history of syphilis or rheumatism. At the time above mentioned her menses, previously regular, ceased, and have not since reappeared. Three months later her voice suddenly failed. She could no longer speak aloud, but only in a husky whisper. She was seen by me in April, 1880. At this time, besides the aphonia, there was dyspnoea of a peculiar type. The respiratory rhythm was very much accelerated, and so continued; the number of respirations being from 60 to 70 in a minute and somewhat jerking, noisy, and irregular. Pulse 80, regular and alike at each wrist. Countenance anxious. Appetite poor. Bowels regular. No pain or soreness in the chest. This was the condition of things up to the spring of 1881, when I lost sight of the case. I shall ask your attention later to the character of the respiration.

There was a slight cough and expectoration. No pain in the region of the larynx. For two years previous, rest in the recumbent position had been impossible on account of the dyspnoea. Two or three hours' sleep were obtained at night in an arm-chair. Sometimes, and especially in summer, it has been necessary to carry her out into the open air, on account of threatening asphyxia. Repeated examinations of the chest have failed to reveal any signs of pulmonary or cardiac lesions, nothing indeed except varying bronchitic râles.

Laryngoscopic examination demonstrated that there was no induration or inflammation of the vocal cords or adjacent parts, nor any signs of chronic laryngitis.

On the patient's attempting phonation the cords approximate but slightly, the left cord being stationary, the right one moving sluggishly, thus indicating paralysis of the lateral crico-arytenoid and arytenoid muscles. . . . The above is a brief sketch of the history and average condition of the patient during the past three years.

In this period she has on several occasions suddenly regained her voice and as abruptly lost it after intervals of from two to six days. The treatment of this case consisted chiefly in the administration of tonics and emmenagogues.

Faradization was applied to the vocal cords and externally to the thyroid cartilage, on several occasions, but without marked benefit.

CASE II. Naveatil¹ relates the case of a middle-aged man who complained of dyspnoea upon the least exertion. At night also his breathing was often embarrassed, and he was forced to sit up in bed on this account. Inspection of the mouth and pharynx revealed nothing abnormal, but laryngoscopic examination,

showed the right vocal cord to be stationary in the middle line of the glottis, immovable during respiration, and also during attempts at phonation and laughter. The left cord moved sluggishly, and marked hoarseness, amounting almost to aphonia, was the result. The laryngeal mucous membrane was everywhere reddened and thickened. Auscultation and percussion of the chest gave absolutely normal results, evidences of trivial catarrh excepted. There was a slight cough. How could the existing phonic palsy in this case be accounted for? It might be a local rheumatic affection, for there were no signs indicating pressure on the vagus or recurrent nerves. A coincident laryngeal catarrh seemed to confirm this theory. In spite of treatment the patient grew worse, began to expectorate pus and blood, and was seized with a fatal attack of asphyxia. The autopsy showed that the air-passages had been perforated by a large posterior mediastinal abscess; thus explaining the perplexing incongruity between the subjective symptoms, namely, the feeling of oppression on the chest, with dyspnoea, and the absence, during life, of explanatory physical signs.

Niemeyer, in commenting on the fact that mental emotions are proverbially influential in the causation and cure of hysterical aphonia, is of the opinion that the origin of the affection is to be attributed to that part of the brain where the more complex mental operations are performed; on the contrary, it is quite improbable that it is ever due to a derangement of nutrition in the motor centres. He prefers the title "Psychical Palsy," in contradistinction to the centric or peripheral varieties. Occasionally, however, the affection may arise from disease of the cerebral substance or from a lesion of the cervical portion of the spinal cord. Exactly what part of the brain must be affected by pathological processes in order to give rise to a disturbance of the vocal function, has not yet been determined with precision. It is probably the region of the fourth ventricle.

Persistent laryngeal catarrh is not unfrequently a cause of phonic palsy, as is also the inspiration of intensely cold air, and likewise excessive straining of the voice in singing. Hence auctioneers and hawkers are subject to it. The affection may arise in consequence of pressure either of morbid growths in the neck and mediastinum, or of enlarged lymphatic glands, especially those which lie along the course of the recurrent nerve. It may also be due to inflammatory processes in the neck or to traumatic influences. Other causes are poisoning by lead, arsenic, atropia, hyoscyamus, stramonium, or ergot. It may be a reflex manifestation due to irritation of the intestine by worms, and last, but not least, to disorders of the uterine system. Irregularity in the menstrual function, delicacy of constitution, excitability of temperament; these are conditions which predispose to the affection. To quote from Ziemssen²: "Menstrual disturbances occur in many hysterical women, without its being always possible to state in how far they precede or cause the disease, as an independent functional disturbance, or whether they are merely to be regarded as a symptom and consequence of it. Increased vascular fullness, and irregularities of the circulation caused by a suppression of the menses, can influence the nervous system in a similar manner."

Aphonia may also occur as a sequela of typhus, diphtheria, or croup. Often the notable pallor of the larynx

¹ Berliner klin. Wochenschrift, 1869.

² Encyclop., vol. iv., page 484.

geal mucous membrane sufficiently indicates the diminished irritation of the nervous filaments and the inadequate motor innervation caused thereby. Malarious agencies may be an important factor in some cases. Flint asserts that loss of voice may be caused by paralysis of the spinal accessory nerve, which is the nerve of phonation. Gerhardt,¹ in speaking of vocal palsy, caused by tuberculosis invading the apices of the lungs, says, that of fifty-two patients with tuberculosis, where the *right* pulmonary apex was affected, fifty were hoarse. And of thirty-two in whom the *left* apex was affected only *one* was hoarse. He describes three forms of the affection, of rheumatic origin, namely: First. Meta-rheumatic vocal paralysis, following acute articular rheumatism. Second. A catarrhal rheumatic variety, which may occur in connection with laryngeal catarrh, and may persist after the latter has subsided. Third, direct rheumatic vocal paralysis, which is comparatively rare. Friedrich² relates a case where bilateral vocal palsy was due to the appearance of trichinæ in the laryngeal muscles. Lastly, Naveatil mentions syphilitic periostoses, circumscribed indurations or softening of the cerebral substance, as causes of the affection.

With the aid of the laryngoscope, the *diagnosis* of the ordinary forms of phonic palsy is usually easy. Some writers distinguish between a *true* paralysis of the cords, giving rise to a so-called functional aphonia, and a *false* paralysis, meaning thereby hysterical aphonia. In order to ascertain which of these conditions is present, the following method has been suggested. Having placed the small mirror in position, the patient is told to cough. Should the case be one of true paralysis, the cords will remain immovable. If false paralysis, they will approach the median line.

On the other hand, Bosworth³ says: "Hysterical aphonia is a *true* paralysis for which the sufferer is not directly responsible, and although it has much resemblance to a counterfeit affection, it cannot be controlled by the patient. It is always bilateral and assumes the form of incomplete closure of the glottis." Flint⁴ remarks that in aphonia from paralysis, which is functional, there is simply a weak, but not a husky, voice; or a soft, easily produced whisper. If the trouble be due to laryngitis, on the other hand, or to morbid growths, there is either a harsh whisper produced with considerable effort or there is huskiness.

In certain rare cases, we may have derangements of the respiratory function as a complication, of which neither the rational nor the physical signs afford a satisfactory explanation. In Case I. there was at first slight much resemblance to asthma. But this theory was excluded on further examination, for the dyspnoea was constant, not paroxysmal, and, moreover, both inspiration and expiration were abnormally shortened, whereas the reverse is ordinarily true in asthma. Again, aortic aneurism was thought of, or the possible presence of an intra-thoracic tumor pressing on the recurrent laryngeal nerve or on the air-passages, but neither of these theories was supported by any confirmatory physical signs on examination of the chest, and, moreover, the paralysis was bilateral. That the dyspnoea was not of cardiac origin is obvious from the fact that exercise did not especially aggravate it; and auscultation confirmed this view. Failing to obtain

in the thorax any sign which could aid in accounting for the dyspnoea, the cervical region was carefully examined. Could the presence of a tumor or enlarged gland in *that* region affect in any way the respiratory rhythm? But this too yielded negative results.

We have then here a case of functional aphonia, due either to hysteria, debility, anæmia, or to menstrual suppression, and indicated by a paralysis of the adductor muscles of the vocal cords. Such cases are frequently met with. But how is it possible to account for the permanent rapidity of the breathing in our case? On this point I have not been able to find a ready and perfectly satisfactory explanation. A *temporary* acceleration of the respiratory rhythm is sometimes observed in hysteria. With a pulse at or about the normal figure, the respirations may reach 70 or 80 in a minute, and may thus continue for a short time. Dr. S. Weir Mitchell⁵ says: "In other forms of disease, when the breathing becomes rapid, the pulse rate is proportionately increased, but hysteria breaks all laws except its own rules of eccentricity. Where the respiratory rhythm is very rapid, and the pulse about normal, we have a 'clinical curiosity' except it be owing to hysteria. In hysterical subjects, however, rapid breathing may accompany cardiac derangements, which is uncommon, or may exist alone, the pulse being unaffected."

It seems to me that the most plausible theory of this unusual case (for I have in vain sought for the record of a parallel one) is that a localized hysteria was the cause of the two prominent symptoms, namely, the aphonia, which is not uncommon, and the permanently rapid breathing, which is exceedingly rare. Leaving now this latter feature, I will speak briefly of the prognosis, and lastly of the treatment of phonic palsy.

In cases where the loss of voice has been occasioned by exposure to cold, and which are usually of a catarrhal nature, the outlook is favorable. The same is true of cases of aphonia occurring in hysterical subjects, of those which are a reflex manifestation of uterine disorder, and of the sequelæ of diphtheria and croup. Somewhat less favorable is the prognosis in that form of the affection due to habitual over-straining of the voice. According to Naveatil local rheumatic palsies of the vocal cords often disappear spontaneously. If persistent, however, the muscles lose their contractility and become atonic. They may even undergo fatty degeneration. Least amenable to treatment is that form associated with cerebral or spinal lesions.

In many cases of nervous aphonia the simple introduction of a sound, with which the cords are incidentally touched; has sufficed to restore the voice, temporarily at least, and it is a peculiarity of that form of the affection due to hysteria, that while certain cases seem to resist obstinately the most energetic treatment, others yield to the simple contact of the laryngeal mirror. A spontaneous cure is not rare, and of especial efficacy are those influences which act on the mind of the patient.

It is related that at the time when homœopathy was most flourishing in France, Trousseau and Tourand cured several cases by means of marshmallow pills, the patients supposing that they were being treated after the most approved homœopathic style.

Dr. H. K. Oliver⁶ has proposed a method of treat-

¹ Virchow's Archiv, vol. xxvii., 1863.

² Berliner klin. Wochenschrift, 1869, page 407.

³ Diseases of the Throat, page 344.

⁴ Clinical Medicine, page 162.

⁵ Nervous Diseases, page 188.

⁶ American Journal of Medical Sciences, 1870.

ment by external manipulation of the larynx, which is now mentioned by most writers on the subject. Briefly, this consists in the compression of the alæ of the thyroid cartilage in their posterior and upper part by the thumb and forefinger. The patient is told to attempt to produce a vocal sound while the larynx is being compressed. It was found that usually, after a little perseverance, a feeble sound was produced, and this was followed by a normal voice sound. The chief thing is to make the cords vibrate properly once or oftener. The mechanism, once set in motion, seemed to continue of its own accord. According to his theory the manual external compression produces a degree of approximation of the cords sufficient for a decided resistance to the inspired current of air, while a further approximation, sufficient to cause a vibration of the cords, is effected by forcible inspiratory efforts on the part of the patient. Of course the treatment by manipulation is contraindicated in cases of unilateral paralysis due to pressure. In five out of six cases reported by Dr. Oliver restoration of the voice followed this treatment.

When, as is frequent, the affection is due to catarrh, topical stimulating applications are serviceable, such as tinct. iodine or solution argenti nitrat. (one drachm to one ounce) or tinct. ferri perchloridi (two drachms to one ounce) applied with a brush or sponge probang or in the form of spray. These remedies stimulate the laryngeal mucous membrane, and thus provoke a reflex glottic spasm. Inhalation of the vapor of a mixture containing aqua ammonia and water, equal parts, or chlorine, is also recommended. Skoda was an advocate of turpentine vapor. The inhalation of sulphuric ether is sometimes effective, particularly where there is reason to doubt the genuineness of the affection. Cohen says, with reference to his experience of such cases while an army surgeon during the war, "It was curious to notice, after the patients had learned the object of placing them under anæsthetic influence, how well they could control themselves under the influence of the ether, not a sound escaping them until the moment of unconsciousness, but oblivion having once ensued the effect in coming to was not anticipated, or at least was forgotten under the anæsthetic condition, and the intoxication would be evinced by the usual clamors, when a sudden restoration of consciousness would announce to them with a moral shock the cure of their aphonia."

Insufflations of powdered alum, tannin, or other astringents are sometimes promptly curative in catarrhal cases. Probably not a few of those present have practically tested the value of this method in the clinics of Schrötter, Störk, or Schnitzler in Vienna.

Faradization is mentioned by all writers as the most important therapeutic measure in phonic palsy. Its results are proverbially variable, and while often successful it fails in some instances. Ordinarily one pole of the instrument is applied directly to the vocal cords, the other to the thyroid cartilage externally. Before applying electricity it is considered advisable to wait until any local inflammation has subsided. It should not be forgotten that "in hysterical aphonia¹ any form of irritation, electrical or otherwise, may cause instantaneous cure, and that some of the most brilliant achievements of mesmerizers and of those who practice laying on of hands and other flummeries have been made in this affection." Tobold, while admitting

the good results of the application of the induced (faradic) current in many cases of paralysis, considers it inferior to the constant (galvanic) current. He testifies that the effect of the latter, especially in phonic palsy, is often prompt, and that it produces comparatively speedy results when the induced current is unsatisfactory or negative. Dr. F. I. Knight says that in cases of functional aphonia arising from bilateral paralysis of the glottis closers, the application of the electric current almost always effects a cure, sooner or later, through reflex action. Dr. Tanner,² after commenting on the fact that the treatment of phonic palsy is often unsatisfactory, dwells upon the good results obtained by the application of electro-magnetism to the tongue only, employed in connection with other remedies. Having proved by laryngoscopic examination that the aphonia is not caused by polypi, diseased arytenoid cartilages, or any morbid growth in the region of the larynx, and that there is no inflammation, ulceration, or serous infiltration of the mucous membrane, these organic conditions being often associated with hysteria, and any uterine functional disorders having been, so far as practicable, corrected, his method of procedure is as follows: The patient is placed in an arm-chair, the head being steadied by an assistant. One handle of the instrument (moistened) is then placed in her hand, while the other one is pressed upon the tongue. Usually a loud scream is sufficient evidence to herself and others that the voice has actually returned.

Dr. Seaverns³ has reported a case in which, after various gargles and inhalations had been tried, and after repeated faradization of the laryngeal muscles had failed, the voice was eventually restored by means of blisters, one of which was placed along the spine, and another over the upper part of the sternum. They were applied at bed-time, and on the following morning the patient, although suffering greatly from the local effect of the blisters, was able to speak. It was a doubtful matter whether the happy result was due to the pain caused by the heroic treatment or to the counter-irritant effect upon the spinal nerves.

Dr. Thاون⁴ advocates the actual cautery applied upon different points along the spine, and remarks that this measure is often successful. In attempting to explain its mode of action he asserts that it "probably acts by modifying the cerebral zone which holds the laryngeal trouble under its sway!" He also recommends metallo-therapy. The application of a necklace of gold pieces worn over night was sufficient in one case to banish the aphonia. Whether this result was due to the actual contact of the precious metal or to the moral influence of this attractive therapeutic measure upon the patient's mind is, perhaps, an open question.

After the restoration of the voice pathological conditions⁵ which have existed in connection with the aphonia may serve as a guide to the subsequent treatment. Reading aloud for a while every day is valuable as a means of furthering the nutrition of the laryngeal muscles. Absolute rest of the vocal organs is not advisable, but rather their systematic exercise, and this is true even of those comparatively infrequent cases where the aphonia was caused by over-straining the voice.

² Lancet, vol. ii., 1869.

³ Boston Medical and Surgical Journal, August 15, 1878.

⁴ Edinburgh Medical Journal, October, 1881.

⁵ Flint.

¹ Beard and Rockwell, Medical and Surgical Electricity, page 529.