account for the symptoms and the wound was closed. Later, it was discovered that the patient was a morphin habitué and that any combination of symptoms possible could be evoked by reducing the customary dose of the drug. Convalescence from the operation was satisfactory, but it was difficult to cure her of her habit.

CASE VII. Obesity.—A man, 46 years old, was brought to my office by Dr. J. W. Johnson. A month before I saw him he had lost about 30 pounds, his weight falling to 145 pounds, and being seen at this time, when examination was easy and satisfactory, by a very keen diagnostician, a tumor of the kidney, supposed to be sarcoma, was found. Since then he had rapidly gained weight to 186 pounds, and apparently an ascites was well under way, as the circumference of the abdomen was increasing at the rate of one inch a day. Examination at this time was unsatisfactory, the abdomen being tense and fluctuating. An indefinite tumor could be felt in the region of the left kidney and in the right lower quadrant. For a year he had had dull pain in the left loin, which at times was sharp and aggravated by motion or jarring, and frequently interfered with sleep. After consultation at my office he sought the advice of one of our most prominent surgeons, who was unable to make a definite diagnosis but advised exploration. A month later he entered the hospital for operation, the abdomen having meanwhile steadily increased in size all out of proportion to the increase of his body elsewhere. I started to aspirate, but could not convince myself that there was ascites, so I opened the abdomen under ether. There was no excess of fluid; the kidneys, after most careful palpation, showed nothing abnormal. Nothing was found elsewhere except an excessive quantity of fat in the omentum (which was undoubtedly the tumors felt from the outside) and in the mesentery.

That there may have been a small renal calculus, with temporary blocking of the ureter, is quite possible, especially as the patient had had a marked oxaluria, for which he had been successfully treated by Dr. Johnson. His family history should have given me a clue to the diagnosis, as his father and sister were abnormally fat. Whether the obesity accounted for all of his symptoms, it is impossible to say with the data at command; it certainly explained the rapid increase in his abdominal circumference.

The symptoms were relieved for a while by operation, but later I learned that they had recurred more or less and were probably due to his oxaluria.

CASE VIII. Supposed pancreatic cyst.—In June, 1899, a married woman of 48 was dragged over the dashboard of a wagon and kicked by a stumbling horse. Unconscious for a while she vomited several times, the vomitus showing streaks of blood. Twenty months later she was referred to me by Dr. Benner of South Framingham, with the story of daily vomiting since the injury, the vomitus always being a yellowish, bitter fluid,

never containing food and coming at any time of day, but perhaps more frequently in the afternoon. She never vomited during the night. She complained of no pain, but a feeling of fulness and a swelling in the epigastrium which were relieved by the vomiting. At no time had there been jaundice and she had lost about 30 lbs., although her appetite and digestion were good. The epigastrium was tender with spasm. An indistinct feeling of deep fulness merging off to the left could be felt on palpation. The aortic impulse felt superficial; the stomach was not dilated. Elsewhere the abdomen was negative. She had already sued the town where she was injured and had recovered damages. A diagnosis of pancreatic cyst, or partial obstruction of the duct, or a retroperitoneal growth, was made. As she was steadily growing worse an exploration was advised. A fortnight later, at the Framingham Hospital, the abdomen was opened. Under ether the epigastric spasm was slight only. The supposed tumor proved to be the pancreas spread out over a rheumatoid spine projecting forwards. Careful examination of all the adjacent organs showed them to be normal. The retroperitoneal space was opened and nothing found to explain her condition. The abdomen was closed, she recovered quickly from operation, and the fulness and vomiting disappeared never to return.

To discuss the possible diagnoses in each individual case would lengthen the paper indefinitely. In some, painstaking examinations were made, while in others only a routine examination could be carried out under the existing circumstances; but, for the most part, in each individual many possible conditions were debated and ruled out, although it has not seemed worth while in this report to elaborately discuss the various considerations.

THE VAGUS REFLEX.

BY THOMAS J. MAYS, A.M., M.D., PHILADELPHIA, PA.

IN a footnote appended to my first paper¹ on the vagus treatment of phthisis, the statement is made that on investigation it will be found that pressure over the course of one vagus in the region of the neck produces more pain on one than on the opposite side in most phthisical persons, and that this supersensitiveness usually corresponds with the side of the chest having the affected lung. During the two years that have elapsed since this was written I have investigated this subject further and believe that it is not only an almost constant concomitant of phthisis, but that it is a frequent premonitory symptom of this disease, and is often associated with other pulmonary and nervous disorders either as a forerunner or as an accompanying sign.

Nor did I know when the above was penned that the physiological and the clinical aspect of vagus compression had been described very ably

¹ The hypodermic injection of silver nitrate over the course of the vagi in the treatment of pulmonary consumption, *Philadelphia Medical Journal*, Feb. 11, 1899.

by Dr. Augustus Waller, as early as 1870.² This learned authority says, in the paper referred to, "that pressure on the vagus occasions a deep-seated sensation of a peculiar benumbing character in the head, which scarcely amounts to pain. The sense of languor and of fainting, as if 'going off,' is so manifest, that if the head and body be not supported, and if pressure on the nerve is continued, complete syncope ensues." He also gives the history of some cases of vomiting, of pain in the head and neck, of hysteria, and of hemiplegia, which were materially benefited by means of vagus compression.

My own study of this phenomenon, which I venture to name *the vagus reflex*, dates back some years, and to me at least it has opened an interesting field of research, which is comparatively new, and which I believe is of considerable importance, both clinically and therapeutically. So far as my notes show, the following case was the first one that drew my attention prominently to this subject:

CASE I. In 1891, Mrs. S. was suffering from pulmonary phthisis in the third stage, and from which she died in the course of the same year. During one of my visits she complained of marked soreness along the course of the right vagus in the neck. Pressure in the same region caused her to gag and vomit, which was not the case if a similar degree of pressure was applied on the left side. These pressure phenomena I could reproduce at my own pleasure. A narrow and short strip of fly plaster over the painful nerve relieved the cough to a marked degree, and abated the nausea and vomiting which had previously been called forth when pressure was applied over the affected nerve.

CASE II. The following case, which is the very converse in many respects of the one just related, came under my observation more recently: C., aged 54, a sufferer from asthma for some years, was treated with the silver nitrate injections for this disease for a year and a half, and always with relief to the dyspnea, cough and general distress. In January, 1901, he returned with a fresh attack of asthma, which he attributed to influenza. At this time he received 10 minims of a 2 1-2% solution of silver and cocaine nitrate each, in the right side of his neck. In the course of 48 hours there was considerable swelling at the seat of injection, and he found that buttoning the neckband of his shirt produced distress in the epigastrium, nausea and cough, and that pressure applied with the fingers on the tumefaction called forth retching, vomiting and cough. These effects could be repeated at the pleasure of anyone, for a period of about a week or 10 days, the time during which the lump lasted, but could only be produced when pressure was made directly over the latter. Pressure over the region of the vagus, either above or below the swelling, or over that of its mate on the opposite side, caused no disturbance whatever. There has been no recurrence of the asthma since that injection was given.

I had no experience of this kind before nor since, and it must be acknowledged that it is difficult to account for the peculiar effects of the injection in this case. Why should the cough, expectoration and physical signs belonging to asthma disappear after the injection, and why should the stomach, which performed its function normally before, become irritable on pressing the swelling? Is it possible that the degree of stimulation which ele-

vated the tone of the depressed pulmonary fibres of the vagus could become a source of irritation to the more normal and more impressive fibres of the gastric branches of the pneumogastric?

The following is a typical example of a group of cases which are frequently met by the practitioner, and in which the morbid manifestations of the vagi are more apparent in the laryngeal than in any of the other branches.

CASE III. W., female, aged 36, was first seen June 10, 1900, when she gave this history: Father died of phthisis, aged 40; mother well, and aged 60. Patient is third oldest of a family of seven. Two sisters, aged 18 and 22 respectively, and one brother, aged 23, died of phthisis; one maternal aunt, aged 60, died of apoplexy, which was immediately preceded by acute pneumonia, and one maternal uncle died of grip-pneumonia. Patient resembles her mother.

Present symptoms.—She complained of being chilly for the last 3 weeks, with pain in the middle of the chest. Has been having rheumatic pain in her joints, but is free from this affection at present. Has constant distress and fulness in the occipital region. Is nervous and constantly tired and awakes unrefreshed in the morning. Her appetite is good, bowels and menses regular; has lost some in flesh; no night sweats, and had malaria. Coughs a great deal, which is followed by vomiting, but expectorates little. Her cough is paroxysmal, appears usually in the morning, and seems to be accompanied by spasm of the laryngeal muscles, for occasionally she loses breath and falls down unconsciously. These attacks are very exhaustive, and afflicted her for 3 years. Noon respiration 28, pulse 70, temperature 98 2-5°, weight 104 3-4 lbs.

Physical signs.—No dulness, but a roughened respiratory murmur over the whole area of the left lung, and an occasional dry râle in the mammary region of same lung. Both vagi are sensitive to pressure, which is very acute in the nerve on the left side of the neck.

Treatment.—Injected 5 minims of a 2 1-2% solution of silver nitrate, preceded by the same dose of a 2 1-2% solution of cocaine hydrochlorate over the left vagus in the region of the neck, and gave internally the following:

R
Strych. Sulph.
Quin. sulph., sod. salicyl., and lith. cit each gr. i
Make xxxii capsules.
Sig.—One capsule four times a day.

June 16. No spasm of the throat since last visit. No cough at night, but some during the day. Fulness and pain in occiput and vomiting very much improved, sleeps better, and the soreness in the middle of her chest has disappeared. States that her whole condition began to improve immediately after the injection was given. Injected same dose on right side of neck; other treatment same.

July 1. No spasm since she came under treatment. Cough very much better, no more vomiting, soreness gone out of chest, and occipital fulness has disappeared entirely. Injected the same dose on the left side of the neck.

It is a year now since she came under treatment, and altogether received three injections. Her cough has practically left, she has had no spasm of the glottis, no vomiting, no occipital distress, and no pain or soreness in the chest. Her temperature remains normal, her pulse 72, her respiration 20, and she weighs 107 lbs.

CASE IV. This is a case in which the morbid symptoms of vagus disorder manifested themselves chiefly in constant cough, copious yellow expectoration, general loss of strength, and a painfully tired feeling in the lower legs.

H., male, aged 28, married, whose father and mother are well, and who is the third oldest of a family of five, one of which died in early infancy, and the rest are well. No lung disease or asthma in the family. He was seen for the first time May 12, 1901, when he gave

² On the effects of compression of the vagus nerve in the cure or relief of various nervous affections, *The Practitioner*, April, 1870, p. 193.

the following account of his affection: With the exception of typhoid fever, which he had in 1889, he was practically well all his life until February, 1901, when he began to have a cold feeling along his spine, and in the following month he had what was supposed to be a catarrhal affection of the right lung. From this time on he had a spasmodic cough, and expectorated copiously, and these symptoms have increased up to the present time. Appetite medium, tongue coated, vomiting in the morning, bowels inclined to be constive, and lost from 6 to 8 pounds in flesh since he is sick. He feels tired—the legs from the knees down painfully so. He never had malaria or rheumatism, but is suffering from profuse night sweats; and his right arm feels lame and heavy. At 11 A.M. temperature was 98 2-5° F., pulse 78, respiration 18; weight 130 3-4 lbs., stature 5 ft., 7 1-4 inches.

Physical signs.—Slight impaired percussion resonance in right suprascapular region, a few crepitant râles over anterior base of same lung, and a few sibilant and mucous râles in lower half of left lung, anteriorly and posteriorly. Vagus reflex most evident on left side of neck. Pressure on left vagus produces pain and discomfort in the left side of the chest and tingling, sweating and coldness in whole of left arm down to tips of the fingers.

Treatment.—Injection of 5 minims of the silver, preceded by the cocain solution in each side of the neck, and internally the following:

R
 Strych. sulph. gr. 1
 Quin. sulph. dr. iss
 Sod. salicyl. dr. 1
 Pil. Hydrag. gr. iv
 Make xxxii capsules.
 Sig.—One capsule four times a day.

May 21. Feels better, cough no longer spasmodic and very much less, expectoration less copious, no more vomiting, appetite very good, tongue cleaner, tiredness much improved, and no longer a painful feeling in the legs below the knees, and night sweats are much improved. Temperature (6 P.M.) 98 2-5°, pulse 72, respiration 18, weight 138 1-2 lbs.

June 9. Feels well, coughs only slightly in the morning, his appetite is good, and he has neither tired feeling nor night sweats, although he has been working for a week. His temperature (6 P.M.) is 98 2-5°, pulse 72, and respiration 16, and he weighs 140 lbs. Numbness and tingling in right arm on making pressure over the right vagus is very much less than it was at first visit. Same treatment internally and an injection of 8 minims of silver and cocain solution on right side of neck.

June 22. Coughs and expectorates very little. Feels strong. Is working right along; no tiredness; a lameness in right arm when pressure is made over right vagus. Night sweats have disappeared and his appetite is splendid. Temperature normal and he weighs 141 lbs.

Feels well at present and is working steadily.

CASE V. J. H. was seen for the first time on June 4, 1901, when he gave the following history: He is married, and 43 years old. His father died aged 67, of heart disease, and his mother, who is rheumatic, is alive at the age of about 70. Patient is the sixth oldest of a family of nine. One brother had inflammatory rheumatism when young, then a chronic cough, and finally contracted whooping cough, from which he died at the age of 32. One brother died in infancy. A sister has a chronic cough, but does not suffer from headache. Patient resembles his father. Had typhoid fever in 1876, and has been suffering from severe headache for many years. The latter is of a paroxysmal character, occurs every week and becomes so violent that he is compelled to go to bed. The pain is not unilateral, but as a rule begins in the temples, moves to the occiput, and then down the spine. In former years the paroxysms were accompanied by vomiting. Has some pain in right shoulder and arm, in fact, the whole right side of his body is more tender to pressure than the left. Is very tired in the lower legs, a feeling

which he had since boyhood. Sleeps poorly, and has a ringing noise in his head. He coughs some, and expectorates blood-streaked sputum occasionally. His appetite is good, bowels constive, and has no night sweats. Eyeglasses gave no relief to his headache.

Physical signs.—Heart and lungs normal. Pressure over both vagi produces a fullness in the head with a tendency to unconsciousness, and he would have fallen into a swoon if pressure had been persisted in at this examination. After several trials it was found that these phenomena were more readily induced by pressing on the left than on the right vagus.

R

Strych. sulph. gr. i
 Quin. sulph. dr. iss
 Pil. Hydrag. gr. vi
 Pulv. capsici and extr. Colocynth . . . each gr. iv
 Pulv. aloes gr. ii
 Make xxxii capsules.
 Sig.—One capsule four times a day.

June 11. Not well. Headache very severe since last visit, and continues up to the present time. The other symptoms were practically the same. Pressure over the vagi produced the same reflex disturbances in the head. Continued the same capsules and gave him an injection of 5 minims of silver nitrate solution over the left vagus in the neck.

June 14. Better. Free from pain in occiput and had no headache, sleeps poorly, and the ringing in the ears continues. Injected 5 minims of same solution over right vagus.

June 26. Had an attack of headache on the 16th, but altogether feels much better. Pressure over vagi produces neither fullness in the head nor dizziness, as before, but pressure over left vagus provokes a short cough which is not the case when pressure is made on the right vagus. Same internal treatment.

July 4. Says there is a marked improvement in the headache, and feels generally better.

July 18. Felt well until the 14th and 15th, when he had severe headache not so much in occiput as in left temple, which was accompanied by difficulty of breathing when headache was most severe, a symptom which he had experienced before. Dizziness is produced by pressure on right but not on left vagus.

Aug. 5. Headache less intense than before. Bowels are regular and stools are more satisfactory than they were. Appetite good, sleeps well, cough and expectoration gone. No dizziness nor pain on pressing both vagi. Injection 2 minims right side of neck.

Oct. 1. Had two attacks of headache, which were of shorter duration, since last visit. Cough, expectoration and blood-spitting have entirely disappeared. Bowels regular and appetite is very good. The legs feel strong and have lost their tired feeling. The occipital fullness has gone. Pressure on either vagus produces neither cough nor dizziness.

CASE VI. N., male, aged 31, came under my care in September, 1892, with chronic consolidation of the left apex, with the family history and all the symptoms of pulmonary consumption. In the course of a year and a half the symptoms and physical signs subsided, and, barring an attack of appendicitis for which he was operated on three years ago, he has since been practically well and able to pursue his occupation actively. On Feb. 28 last, he came to me with the history of a cold accompanied by severe paroxysmal coughing and vomiting. There was no loss of flesh or any relighting of the old phthisical condition. I prescribed morphin, cocain, codein, benzoïn, nux vomica, quinin, strychnin, muriate of ammonia, etc., without any perceptible influence on the cough or vomiting. On April 4, injected 8 minims of a 2 1-2% solution of silver nitrate over the left vagus, which I found more sensitive than the right. His cough became easier at once and the vomiting ceased, and in 10 days he was entirely free from both symptoms.

CASE VII. W., female, aged 42, exhausted from nursing her husband through a protracted illness, suffered from general tiredness and a constant pain and fullness in the occiput for three months before she came under my observation on Oct. 4, 1901. Her heart and lungs

were normal, and there is an absence of lung disease in the family history. Pressure over the right vagus is very painful, aggravates the occipital fulness, induces a feeling of faintness and a weakness in the lower limbs. Injected 5 minims of the silver nitrate solution in the right side of the neck over the vagus, and gave her internally:

R
 Strych. sulph. gr. i
 Quin. sulph. dr. iss
 Cinch. salicyl. dr. ss
 Pil. hydrarg. gr. iv
 Make xxxii capsules.
 Sig.— One capsule every four hours.

In five days she wrote me from her home, which was about 50 miles distant, that she feels much better and stronger, and that the occipital pain and fulness had entirely disappeared 24 hours after the injection was given, and there is no return of same up to present date.

The following case, VIII, is of more physiologic than therapeutic interest, inasmuch as it has been seen very recently for the first time and has not yet undergone any treatment.

M., aged 50, with some cough, expectoration and loss of flesh, feels weak and is very easily exhausted. For 2 months before I saw him he complained of fulness and throbbing in the base of the brain on the left side. There are no abnormal physical signs in the chest except an occasional short sibilant râle in the right lung. Very slight pressure with my thumb on his left vagus produced marked faintness, dyspnea, and a feeling of helplessness of the whole body. These effects were so pronounced that he would have fallen on the floor if I had not caught him and placed him in a chair.

In briefly reviewing the histories of these interesting cases it will be seen that the vagus reflex seems to figure as a central, or at least as one of the most obvious lesions which lie at the bottom of their varied manifestations. How to account for all the symptoms which followed vagus compressions on the score of the latter operation is not an easy matter in some of these instances. It is obvious, perhaps, why vagus pressure should produce fulness and pain in the occiput, or a feeling of loss of consciousness, because the vagus is in direct physiological union with the lower and higher nerve centres. But how to connect the cold sweating and tingling in the arms on the same side as that on which the pressure was made, or the sudden helplessness which comes over the lower extremities, as was experienced in three of the above related cases, with vagus compression, is a subject for further study and elucidation. That the vagus lesion is the leading factor in the pathology of the cases is confirmed or at least indicated by the counterirritant influence of the silver injections, which relieved and abated the whole abnormal condition. It is true that most of the patients also received other treatment, but it is hardly probable that this had any marked control on the disease. This is well demonstrated in the history of Case VI, which had received morphin, codein, cocain, strychnin, quinin, etc., for some days without the slightest relief to the paroxysmal cough, but as soon as the silver was administered subcutaneously over the vagus which was most sensitive, the abatement was quick and permanent.

Another feature worthy of consideration in these vagus-reflex cases is, that in not one of

them, except in the first and second, was there any marked lesions of the pulmonary organs, although to anyone who has paid attention to the relations which exist between vagus pain and pulmonary disease, it is quite clear that the former is very frequently a premonitory symptom of the latter, and may therefore be regarded as an important diagnostic sign and a therapeutic indication in disease of the respiratory organs.

AUSCULTATION OF THE KNEE JOINT.¹

BY WILLIAM ERNEST BLODGETT, M.D., NEWTON, MASS.

THE following observations are recognized to be insufficient. They are therefore hesitatingly offered. It is hoped, however, that this preliminary report may stimulate independent investigation which shall supplement the continued work of the present observers, and thus combine to produce a result more extensive and more reliable than any possible by even the elaborate work of an isolated group of investigators. The idea of joint auscultation was suggested to me by Dr. Bradford, and it was by his encouragement that I started last midsummer to assist, as well as I could, in a subject on which Dr. Bradford was then already at work.

Auscultation can be applied to any of the large joints, but thus far I have listened almost only to the knee, as it is most accessible and most liable to disease and difficulty of diagnosis. As an instance of auscultation of joints other than the knee is cited a case of supposed complete ankylosis of the hip, in which detection of the joint sounds, transmitted by the trochanter, ruled out firm bony union and suggested extra-articular causes for the ankylosis.

The instrument used is the full-sized Bowles stethoscope, with a soft rubber cap sprung over the diaphragm. This cap tends to prevent slipping and skin friction sounds. With the patient lying, or sitting on the edge of a chair, the examiner stands or kneels on the side to be examined, grasps the lower leg with the hand that is nearer the foot, and with the other hand grasps the thigh just above the knee, while the index finger holds the receiver of the stethoscope resting on the bare skin over the patella. In children, the limb is small and light enough readily to be controlled in this way; but with adults, I have it convenient to have the patient clasp his hands under the thigh and assist in raising it as the knee is flexed, so that the heel clears the bed or chair. As the knee is extended, the thigh is allowed to sink again. All active motion of the limb I try to exclude, as muscular contraction produces a distant humming sound, which can be reproduced by gently placing the thumb in the ear, and then clinching the fingers into the palm; the joint sounds themselves, moreover, are liable to be altered — increased and multiplied — by muscular contraction, perhaps due to increased intra-

¹ Read before the Boston Society for Medical Improvement Nov. 18, 1901.