in the past. The smallness of the percentage of cures, on the other hand, emphasizes forcibly the thought which I wish to impart, that is, that early diagnosis is of the first importance, because the vast majority of early cases respond happily and promptly to appropriate management.

THE LEG AND ARM PHENOMENA IN TETANY.

BY EUGENE H. POOL, M.D.,

ATTENDING SURGEON TO THE FRENCH HOSPITAL; ASSOCIATE ATTENDING SURGEON TO THE
NEW YORK HOSPITAL, NEW YORK.

IN recent years an increasing interest has been taken in tetany because of the attractive field for research which its etiology and treatment have offered. Although these considerations have overshadowed the study of the clinical features of the disease, that phase of the subject has not been entirely neglected, as is evidenced by the fact that new tests have been developed, notably the leg and arm phenomena. These have been of late the subjects of some discussion in German neurological circles, on account of the desirability of having for diagnostic purposes, in the quiescent or free periods of the disease, reliable and simple tests to supplement the tests of Erb and Trousseau and the less characteristic signs of Chvostek and Hoffmann.

In 1906 I had an opportunity to study a case of postoperative tetany for a long period at the French Hospital, New York. Of particular interest in the case was the constant response of the muscles of the extremities to the arm and leg tests. A complete report of the case was published,¹ yet a brief review of the features bearing on these new phenomena may prove of interest. The patient, a woman, aged thirty-three years, from whom the left lobe of the thyroid had been removed elsewhere several years before, developed the typical symptoms of tetany four days after I performed a partial thyroidectomy, the isthmus and adjoining part of the right lobe being removed, with ligation of the inferior thyroid vessels of the right side. Most of the right lobe was left. Among the significant features of the disease were frequent attacks of symmetrical and bilateral tonic contractions of the hands and feet and the presence of Chvostek's and Trousseau's signs, the latter characterized by slow contractions accompanied and preceded by cramp-like pains. "Contractures also resulted from making the sciatic nerve tense by holding the patient in a sitting position, so that the trunk and thighs were flexed beyond a right angle, with the legs extended; or by putting the nerves of the brachial plexus on the stretch by elevating the arm above the

¹ *Annals of Surgery*, October, 1907.

head with the forearm extended (extreme abduction). The contracted muscles were always board-like to the touch" (p. 510).²

The methods of evoking these contractures in the extremities were shown by illustrations, some of which are well reproduced in Osler's *Modern Medicine*.³ In the leg test the muscles of the calves became markedly contracted; the feet took a position of extreme plantar flexion, with the toes usually turned forcibly toward the sole. In the arm test the abduction must be as extreme as possible, the elbow being held in full extension; the brachial plexus is thus put upon the stretch. The hand took, as a rule, a position similar to that produced by stimulation of the ulnar nerve, with at times flexion of the wrist. The average time from the beginning of the tests to the onset of the contractures was about one and one-half minutes, though this was very inconstant, being sometimes more, sometimes less. It was noted that after about twelve months, while the patient was under treatment, these two tests, coincidentally with Chvostek's and Trousseau's, became less marked and finally elicited no response. In a general way, then, it is evident that susceptibility to all of these tests may be simultaneously present; no evidence, however, appears to have been brought out as to the relative reliability and sensitiveness of Trousseau's sign, the most reliable of the older methods, on the one hand, and the arm and leg tests on the other. It was pointed out in the report of the case that "the value of the two tests dependent upon stretching the nerves of the brachial plexus and the sciatic nerve, which were so striking in our case, cannot be estimated until repeated trials have been made in further cases" (p. 527). Consequently, it is gratifying to note that Schlesinger⁴ Alexander, and others have recently independently observed and confirmed the leg phenomenon, which apparently was demonstrated for the first time in my case, in numerous cases of tetany of various kinds. With the exception of Alexander, who has of late independently noted and reported the arm test as present in one case, there seems to have been no further effort to test the arm phenomenon.⁵

If these tests are sufficiently constant in the free interval to be reliable for diagnosis, the ease with which they can be made should

² The passages quoted refer to the original case report.

³ Osler's *Modern Medicine*, vol. vii, pp. 800 and 802, Plates xxxiv and xxxv.

⁴ Ueber ein bisher unbekanntes Symptom bei Tetanie (Beinphänomen), *Wiener klinische Woch.*, 1910, No. 9; Weitere Erfahrungen mit dem Beinphänomen bei Tetanie, *Neurologisches Centralblatt*, 1910, No. 12; Alexander, Ueber das Beinphänomen bei Tetanie, *Deutsch. med. Woch.*, 1910, No. 22; Pool, Tetany Parathyreopriva, *Annals of Surgery*, New York, October, 1907.

⁵ Ferenczi's experience and conclusions should be mentioned in this connection. As reported in the *Neurologisches Centralblatt*, 1904, vol. xxiii, p. 924, he presented at the Section for Psychiatry and Neurology of the Budapest Medical Society, February 29, 1904, a boy, aged fourteen years, suffering from typical tetany. He noted that contractures occurred on lifting the arm, and interpreted it as Trousseau's sign. He concluded that Trousseau's phenomenon was of vasomotor origin, because in the elevated arm he found the radial pulse only slightly or not at all palpable.

render them of value as an "additional demonstration of the mechanical excitability of the motor nerves by the stretching of the sciatic and the nerves of the brachial plexus" (p. 535). It is in the hope that this communication may cause sufficient interest in the matter to stimulate investigation as to the relative constancy and sensitiveness of these two tests in various forms of tetany that I submit this report.

THE SIGNIFICANCE OF CARDIORESPIRATORY AND SUBCLAVIAN ARTERY MURMURS.

By H. R. M. LANDIS, M.D.,

DIRECTOR OF THE CLINICAL DEPARTMENT OF THE HIPPS INSTITUTE OF THE UNIVERSITY OF PENNSYLVANIA,

AND

S. A. MUNFORD, M.D.,

INSTRUCTOR IN PHYSICAL DIAGNOSIS IN THE CORNELL UNIVERSITY MEDICAL SCHOOL, ITHACA, NEW YORK.

MURMURS variously designated as cardiorespiratory, cardiopulmonary, cardiopneumatic, or systolic vesicular have been long recognized. Their causation is obscure and their significance is not fully established. Many of the older clinicians believed them to be commonly associated with pulmonary tuberculosis, but in recent years they have come to be regarded as accidental and as of no particular significance. A review of the standard text-books shows that in some instances there is no mention made of them whatsoever, while in others there is a difference of opinion as to what interpretation should be put on their presence. While some view these murmurs as accidental and of no particular moment, there is considerable support given to the theory that they are most commonly associated with disease of the pleura or lung, especially tuberculosis of the lung.

The commonly accepted theory as to their causation is that during the inspiratory phase the lung is brought into closer relationship with the heart, and as the latter contracts the air in the adjoining pulmonary vesicles is forced out into the bronchi or into an adjacent cavity. While they may be heard with the heart beating but eighty or ninety times to the minute, they are, as a rule, associated with a rapid cardiac action. Sahli states that they depend on variations of the intrathoracic pressure connected with systolic diminution in the size of the heart, which is, we believe, the true explanation, although the exact mechanism is not clear. We incline to this view because transient murmurs having all the characteristics of a cardiorespiratory murmur may be heard in individuals laboring under nervous excitement, with a rapidly acting heart, and

in many healthy young adults after violent exercise. In these individuals the murmur disappears as the heart regains its normal rate.

The cardiorespiratory murmur belongs to that variety of breath-sounds known as "cog-wheel." The murmur is dependent on the movement of the heart, and is heard principally in its neighborhood. It is a short, whiffing, interrupted breath sound, the interruptions being regular and having a rhythm of obvious cardiac origin. Furthermore, it is invariably associated with the systolic phase of the cardiac cycle. It varies in intensity and also in the number of times it is repeated during a particular respiratory act, depending on the rate of the heart and upon the length of the respiratory phase.

The distribution of these murmurs is fairly definite, being, as a rule, in the immediate neighborhood of the heart. They are best heard along the left border of the heart, especially in the second and third interspaces, and in the fifth and sixth interspaces, near the apex, and at the angle of the left scapula. They are less frequently heard along the right border of the heart. They are almost invariably heard during inspiration, but may be heard during expiration or during inspiration and expiration. They may be heard when the individual is breathing quietly, or only on deep inspiration. Posture also seems to influence them, as they may disappear in the recumbent posture, or may be heard only in that position. Furthermore, they do not always remain constant, but may disappear and reappear from time to time at subsequent examinations. They are to be distinguished from endocardial murmurs from the fact that they disappear when the breath is held.

As has been already stated, cardiorespiratory murmurs have been noted as being frequently associated with pulmonary tuberculosis. Lewis¹ has recently recorded 48 cases in which he encountered this murmur. He divided these cases into three groups. In group one, there were 24 cases of undoubted tuberculosis, with strong evidence in favor of pleural involvement. In group two there were 12 cases, in which there was strong evidence of a tuberculous lesion, but in which there were no signs of pleural involvement. In group three, there were 11 cases, with doubtful signs at one or both apices, but in which the history was strongly suggestive of a tuberculous lesion. The only case in which there was no reason to suspect a tuberculous lesion was in a case of double aortic disease.

Lewis also quotes Henssen as having encountered a cardiorespiratory murmur in 39 out of 268 cases; 27 of the 39 had tubercle bacilli in the sputum. In 88 youths in a military school he found the murmur in 4; 2 were suspected of having tuberculosis, while the others gave a history of having had a left-sided pneumonia some years before.

Our results were as follows (Landis): In 228 apparently normal

¹ Quarterly Journal of Medicine, January, 1910.