In January, 1912, Dr. Ehrmann kindly informed me that this lady was still quite well and fully able to perform all her usual occupations.

Case 69.

A lady, aged 39, sent by Dr. Edwards of Fulham, May 31st, 1911. Cough in winter time for some years; very subject to "colds going on to bronchitis." For about three years has had asthmatic attacks, which recur about once a month. Since March, 1911, she has had continual cough, with shortness of breath and yellow phlegm, and has lost weight. Anorexia, dyspepsia, flatulence, and disturbed sleep.

Weight 6 st. 9½ lb. On examination of her chest the signs found were not those of a generalized bronchitis: they were limited to the regions affected in early pulmonary tuberculosis. There were rather large areas of dullness at the characteristic positions at the four apices and elsewhere; the air-entry at the apices was very defective, and prolonged expiration, bronchophony, and audible whisper were heard at both upper and lower apices on the right side posteriorly. She was kept in bed for two weeks, and practised continuous antiseptic inhalation, and a tonic was prescribed.

On June 28th she had gained a pound in weight, and her condition was slightly improved, but she still suffered from asthma, which disturbed her sleep. A nasal spray of cocaine, eucalyptus, and parolein was therefore prescribed, to be used three times a day, and the continuous antiseptic inhalation was continued. On July 25th she stated that she had been quite free from asthma since she had used the nasal spray; the physical signs in her lungs were decidedly improved. On September 23rd, 1911, she felt and looked better, in spite of the very trying summer; the dull areas were still smaller and the air entry much improved, but there was now distinct evidence of a small (dry) cavity at the right apex posteriorly. She was advised to persevere with the inhalations, and to practise breathing exercises.

On January 9th, 1912, she weighed 6 st. 13½ lb., a gain of four pounds. She was still quite free from asthma and had no cough, though on some mornings she brought up a small quantity of phlegm on waking. She was still using the inhaler at night and for four hours in the daytime. Her dull areas were now very much smaller, and the only morbid sound detected was a slightly prolonged expiration at the right apex posteriorly. She was dismissed as cured, but advised to use the inhaler two to three hours daily for the next six months.

Case 70.

The matron of a convalescent home (formerly a hospital sister) came to me on August 5th, 1911, on account of a general feeling of illness, and occasional night sweats, with loss of weight (5½ lb. during the last month). She had, however, no cough at all, and no pain in the chest. On examination the only sign of disease that could be discovered was the existence of small dull areas in both lungs, in the positions characteristic of an incipient pulmonary tuberculosis, and very slight catarrhal sound at both apices in front. The signs might easily have been overlooked altogether.

She was unable to begin a course of treatment until a week later, when arrangements had been made to release her from duty. During this week there was a further loss of weight to the amount of 2 lb. But during the first week of treatment (in bed) by continuous antiseptic inhalation she regained these 2 lb. and in the following week gained 2½ lb. more. On August 24th, 1911, she wrote: "Already life is so much more worth living, and that excessively tired feeling has almost vanished. I can hardly believe that it is only three weeks since I felt such an absolute wreck." On September 1st, 1911, she wrote: "I gained another 2½ lb. this week—that makes 4½ lb. My temperature is much more steady; at first it was generally 96.4° in the morning and 99° at night. Now it is 97.4°–98° in the morning and 98°–98.2° at night. Also I don't have the night sweats now."

On September 16th, 1911, all her dull areas were found to be smaller, and the catarrhal sounds at the apices had nearly disappeared. There were some digestive difficulties in October, but when these were overcome she again gained weight. Up to the end of this month she had been using the inhaler persistently, except during an hour's exercise each morning. She now reduced the time of inhalation to eight hours in the daytime, and at night; with a further reduction of one hour every fortnight. On December 9th she wrote: "I am still feeling quite well, my weight is quite steady, and I feel equal to anything. I can't understand anybody having a doubt as to the efficacy of the treatment. I wish I could satisfactorily explain how different in every way I feel, and have felt since shortly after taking up the treatment."

On December 29th, 1911, the dull areas were found to be still further lessened and the air entry was good. Only the faintest crepitant sound (probably pleural) was detected at one apex.

On February 1st, 1912, she was found to be quite well, and no morbid sounds could be detected. She has since resumed her duties.

THE fourth Congress of Physio-therapy of French-speaking doctors will be held in Paris at Easter, under the presidency of Dr. Georges Rosenthal. The Vice-Presidents are Drs. Hirschberg, Pierre Kouindjy, and Mesnard, of Paris; Dr. Edgar Cyriax, of London; and Dr. Profanter, of Franzenbad.

ON PEREZ'S SIGN: AND AUDIBLE MOTOR CRACKLES.

WITH SPECIAL REFERENCE TO THE INTRATHORACIC TISSUE SOUNDS ELICITED BY ARTICULAR MOVEMENT IN THEIR RELATION TO THE DIAGNOSIS OF TUBERCULOSIS.

BY

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THE stethoscopic sounds classified by Laënnec are mostly due to the conflict or to the reciprocal movements of fluid and of air, ranging from the capillary "pneumonic crepitations" to the loud gurgling of "crying bowels," or to the "water wheel" churning of hydro-pneumopericardium. But they also include a long scale of "dry" sounds, either from solid vibrations such as the fine "grazing" or the coarse "new leather creaking" sounds of pericarditis, or the fine and the coarse sounds of pulmonary emphysema or fibrosis; or else from mainly aerial vibrations, like those elicited by pressure in subcutaneous emphysema. Fluid, when unmixed with air, as in the infiltrations of subcutaneous oedema or in the bulk of a serous effusion, has a silencing effect. It might almost be said that fluid, unmixed with air, is "parent of sweet sounds yet mute for ever" but for the loud report of joint dislocation sounds where there is no air conduction but slight moisture only within the joint, and which Dr. Garrod has ingeniously termed a *non lucendo* "articular vacuum sounds." These might perhaps be due to the solid vibrations of some forcible membranous flapping, like the analogous report of the sigmoid valve flap at the moment of its tension.

Perez's sign has done more than anything else for the study of the dry vibration sounds which make up the immense majority of the "tissue-movement sounds," by directing the stethoscope to their observation, although we were already familiar with the "muscular rumble." As it has only recently brought that study into more general use, we are saved the burden of a long bibliography; and any investigator would enjoy the rare opportunity of commanding a comprehensive view of the entire subject at the start. This communication is offered as a brief introduction to that survey.

PEREZ'S SIGN.

Perez's sign consists essentially in the production of sounds audible over the upper thoracic surface on actively or passively moving the arms at the shoulder-joint, and particularly on raising or lowering them. It was originally described by him, in a case of mediastino-pericarditis, as due to intrathoracic sounds elicited by these movements in the upper part of the chest; and it has been referred to in that connexion by Fowler and Godlee,¹ by Frederick Roberts,² and also in Gould's *Practitioners' Dictionary*, and in Lippincott's new *Medical Dictionary*. The following description is from Dr. Perez's own pen:

The original case in which this physical sign was discovered and subsequently described in the *BRITISH MEDICAL JOURNAL*³ was commented on very thoroughly by the late Dr. Thomas Harris, of Manchester, and was examined by Sir Richard Douglas Powell, Sir Kingston Fowler, Dr. Wm. Ewart, Dr. Herbert Spencer, and others. The maximum intensity of the loud friction sounds or crackles was over the mid-sternum, although the sounds could also be distinctly heard over both scapular regions. The patient having had for many years attacks of what was considered to be dry pericarditis attended with excruciating, in fact anginal, pain, no reasonable doubt could be entertained that inflammatory adhesions existed, at any rate, in the anterior mediastinum, and that they were probably of a chronic tubercular nature, the patient having had formerly an infiltration of one of the apices of the lungs, which was diagnosed by the late Sir Wm. Gull. The various cardiac murmurs which were heard by some eminent London physicians, but not confirmed by others, point in my mind to extra cardiac murmurs produced by adhesions.

Its Scope in Relation to Articulations.—As regards the interpretation of these stethoscopic sounds, a critical examination of the case led the writer to suggest as an alternative explanation their possibly extrathoracic articular origin—namely, in the joints which were subjected to movement; for I could hear the same sounds when the stethoscope was applied either to the shoulder-joint or to the sterno-clavicular articulation, and also along

the clavicle. As pleximetric conduction along bone and cartilage would operate in both directions from any given spot, this fairly raised a question as to the precise site of the crepitations in this case, and as to their mechanism and significance in possible relation to the joints. In this way it seemed as though the scope of the sign might be further extended to include a study of articular conditions, and a new field opened for auscultation—namely, the stethoscopic auscultation of joints for the investigation of articular movement sounds; my previous experience having been limited to their percussion for the purposes of pulmonary diagnosis. Since then Dr. Archibald Garrod has recently submitted that new subject to a systematic examination, the results of which are given in his important paper *On Auscultation of Joints*.⁴

This is not all, however. The sign possesses a yet wider range. Shoulder girdle conduction is also capable of picking up audible vibrations of extra-articular origin in the vicinity of, or at a distance from the joints, from muscles or membranes in contact with any of the links in that pleximetric chain. This is of practical importance, particularly as any incomplete examination might be misleading as to the localization of the cause either within the chest or at any part of its upper circumference. Additional interest has recently been given to this point by the almost simultaneous publication of papers by Ralph Stockman⁵ on *The Clinical Symptoms and Treatment of Chronic Subcutaneous Fibrosis*, and by W. H. Maxwell Telling⁶ on *Nodular Fibromyositis*—conditions likely to give rise to the sign, although both authors refer to the employment in their investigations of the method of palpation only.

In this special group the most familiar instances are the more or less obvious vibrations commonly to be felt as well as heard in the scapular regions. They are not unlikely to be due to rubbing and rucking of thickened aponeuroses, or of stiffened or nodulated muscles, although they have not yet been conclusively traced to their precise causation. When of the coarser kind, they are often palpable and unmistakably extrathoracic; but the finer varieties are less easily placed, and are apt to complicate questions of pulmonary diagnosis. Some of them, too, may be of articular origin, as admitted by the latest authority, Miramond de Laroquette, and conducted by the shoulder girdle; but he does not favour another alternative view, which has been prominently advocated in France—that of their connexion with a "subscapular bursa."

The motor crackles which may be elicited by Perez's method, present therefore, as may be gathered from this brief enumeration, considerable variety in kind, in degree, and in possible derivation; they clearly require to be carefully scrutinized as to their genuineness before we proceed to isolate them into groups. On the other hand, it is high time that, with due regard to that clause, the analytical method should be applied to them for the elucidation of the most difficult group in the entire series—the study and identification of those intrathoracic motor crackles which were first introduced to our notice by Perez, and which bear upon the most important of our problems in diagnosis.

The Articular Motor Sounds.

In the study of these sounds Garrod has now led the way to greater thoroughness by supplying the basis for their classification into (a) intra-articular sounds proper, (b) peri-articular, and (c) tendons sounds; and by recording his special observations in the first of these groups, which is the most important for differential diagnosis. The most striking intra-articular varieties which he describes are: The familiar "vacuum sounds," produced apart from any disease by sudden forcible movement of the joints, and sometimes at will, and often audible at a distance as loud explosive reports; the synovial "cracklings" of varying size and intensity somewhat analogous to fluid crackles in the lungs; the "attrition" sounds of roughened surface presenting every degree of roughness from the osteo-arthritis "scrunch" downwards; the "fibrous" sounds of tension or friction; and other less determinate or mixed types, among which may be mentioned the sounds audible in old or disused joints when worked beyond the range of their habitual movement. Any considerable effusion supersedes sound production and conduction. Tubercular joints are usually silent; and likewise the rheumatoid, in their more acute stage, when the trouble is still chiefly

periarticular, although later on synovial crackles may be elicited.

The Subscapular Motor Sounds.

In the direction of the extrathoracic motor crackles a long lead had already been taken by the French school, but in a limited and exclusive field, that of the subscapular sounds. The "craquements et frottements sous-scapulaires" first attracted the attention of surgeons; and one of the latest articles, also of a surgical complexion, is an editorial review of the subject, and in particular of a recent thesis by Marcel Laisney,⁷ and of the exhaustive articles by Surgeon-Major Miramond de Laroquette,⁸ in Lucas-Championnière's *Journal de Médecine et de Chirurgie Pratiques*.⁹ Chauvel's nomenclature describes three varieties: (1) *Froissements*, which are practically physiological; (2) *Frottements*, which are rather louder, but likewise unassociated with pain; and (3) *Craquements*, which are usually more or less painful, and have been compared by Zaphariades to the noise that a horse makes in chewing its oats. We need not dwell upon the surgical and operative aspects, which are limited to the removal of any scapular or costal exostosis, or of the crepitating bursa if present, or perhaps to a plastic muscular insertion between the thoracic and scapular surfaces. These are unusual and almost exceptional indications. The clinical interest attaching to the subject is now almost exclusively of a medical order, in connexion with the diagnosis of tuberculosis, and it is chiefly to that aspect that the question owes its actuality and its claim to special consideration.

The Question of Tuberculosis.

Professor Poncet, of Lyons,¹⁰ who entertains well-known views as to the frequency of a chronic tubercular inflammation, or *tuberculose inflammatoire*, as the real cause of many cases of arthritis commonly regarded as rheumatic, has advanced the opinion that the main pathological cause of the "subscapular crepitus" is inflammatory tuberculosis of the subscapular cellular tissue, or of a subscapular bursa. Other writers have taken up the idea, and among them Rénon and Moncany have placed on record that these crackles are met with special frequency, nay almost exclusively, among the tuberculous. If we adopt the standpoint that freedom from tuberculosis is rather the exception than the rule among those who are reputed healthy, no strangeness would attach to that statement. Clinicians may, however, feel some hesitation in subscribing to it in a broad practical sense. Happily, they will find ample relief from the anxiety which has been raised on that score in a perusal of Miramond de Laroquette's masterly and exhaustive review of the whole subject, including observations on 824 cases in health and in disease, and 25 *post-mortem* examinations. His trustworthy conclusions are that sufferers from tuberculosis are not more liable than others to this peculiarity, that in a vast majority of instances it is of a purely physiological nature, and that in pathological as well as in normal subjects its mechanism is mainly due to a relative over-action of certain muscular fibres, chiefly those of the upper dentations of the serratus magnus. It is, he states, comparatively rare in children, but occurs in both sexes, at all ages and in all professions. Its pathological incidence is about equal in rheumatism, in tuberculosis, and in the remaining category of all diseases. It cannot, therefore, be regarded as special to any diathesis.

Miramond's views are practically endorsed by E. Pallasse,¹¹ whose paper contains the latest review of the question as to the tubercular origin of the subscapular sounds, although, as in the other French papers, no reference is made to the more critical anterior auscultation for similar sounds elicited by moving the arms. He cannot admit that the subscapular sounds are ever truly physiological; but he adduces good evidence that their pathology is not always tubercular in the remarkable history of a robust youth of 19, free from all hereditary taint or symptoms of tuberculosis and refractory to its tests, but in whom, for a period of two years, painless subscapular creaking has been so loud as to be audible at a distance of one metre from the chest.

To return to the general question, similar conclusions may be provisionally extended to the wider field covered by the application of Perez's method for the anterior examination and for the general examination of the

thoracic surface, as well as for the study of the intra-thoracic conditions—the latter, however, owing to the possible bony conduction of sounds originating within the chest, present a complicating element of difficulty and of doubt. It is noteworthy that the sign was first described in a case of tuberculosis. Although no general significance attaches to that circumstance, the sphere of its clinical utility seems likely to remain largely identified with a more thorough physical examination of the chest for the diagnosis of tubercular affections of the pulmonary apices and of the mediastinum, in addition to its everyday employment in the diagnosis of rheumatic affections of the scapular and sterno-clavicular articulations and of their ligaments and muscles.

The Practical Value of the Method.

The chief recommendations of the method are its simplicity when conducted with the binaural stethoscope and the amount of information which it is capable of furnishing. By opening up a new field of observation its systematic employment might lead to clinical results the importance of which we cannot foretell. I venture to suggest to clinical inquirers that they make a rule of combining the articular with the upper thoracic examination in all cases yielding any stethoscopic sounds, and of noting the result. The most convenient technique is to firmly steady with one hand the cup of the stethoscope over the front of the head of the humerus, which it fits well, or in dorsal examinations over its side or over the flat acromial surface of the spine of the scapula, whilst the other hand grasps the elbow and imparts to the humerus a full range of strictly passive movements. The sterno-clavicular examination presents no difficulty.

1. *For articular conditions*, as this is by far the finest test that can be applied, the examination should be *de rigueur*. A negative result from auscultation and from manipulations would be the quickest as well as the only conclusive evidence of absolute soundness. Should, however, any articular sounds be heard, let us continue the movement, and simply shift the chestpiece to the supra-clavicular and infraclavicular regions—a matter of a few seconds, and well worth our while if any unexpected sounds should happen to be heard.

2. *For pulmonary and pleural conditions* the indication is obvious. The earliest detection of apical tuberculosis is the question of the day. Our time and trouble must not count; the shadowy indications of radiology draw largely upon both, but they are worthless in the absence of the best technical and instrumental advantages, and this is also true of the stethoscope. Meanwhile, should we continue to neglect a whole line of evidence which lies close at hand and needs no technical refinements? In all doubtful cases we should proceed to submit our apical results, whether positive or negative, to the articular test. Perez has taught us that there are lesions (in my experience chiefly pleural, but sometimes pulmonary) which may give sound under the mechanical traction of movement, and not always under that of deep breathing only; and the no less important fact that some of the sounds audible over the apices may be merely conducted from the sterno-clavicular or shoulder joints. There is no choice for us but to take the trouble to apply the necessary differential tests. Without them there can be no strictly conclusive overhauling of the chest.

REFERENCES.

¹ *Diseases of the Lungs*, 1898, p. 625. ² *Diseases of the Mediastinum and Thymus*, Allbutt and Rolleston's *System of Medicine*, vol. v, 1909, p. 617. ³ *Mediastinal Friction*, BRITISH MEDICAL JOURNAL, vol. i, p. 82, 1896. ⁴ *Lancet*, 1911, vol. i, p. 213. ⁵ BRITISH MEDICAL JOURNAL, vol. i, 1911, p. 352; also *The Causes, Pathology, and Treatment of Chronic Rheumatism* (with bibliography), *Edin. Med. Journ.*, 1904. ⁶ "Nodular" Fibromyositis an Every-day Affection and its Identity with so-called Chronic Muscular Rheumatism, *Lancet*, vol. i, 1911, p. 154; cf. N. S. Jawger, Chronic "Rheumatic" Myositis (*Muskel schmerzen*), *Lancet*, July 31st, 1909; and J. Odery Symes, *The Rheumatic Diseases*. ⁷ *Thèse de Paris*, chez Steinhell. ⁸ Les Frottements sous-scapulaires (with bibliography), *Arch. gén. de méd.*, Décembre, 1910, p. 705; also *Etude anatomique et mécanique de la ceinture scapulaire*, *Revue d'orthopédie*, July, September, November, 1909. ⁹ *Les craquements sous-scapulaires*, *Art.* 23291, June 25th, 1911. ¹⁰ Poncet et Dueroix, *Journ. de méd. et de chir. pratiques*, Art. 21,004, 1906. ¹¹ Les frottements sous-scapulaires, *La prov. méd.*, No. 33, August 19th, 1911.

A LABORATORY for the investigation of pellagra has been established by the Public Health and Marine Hospital Service in Savannah, Georgia. Dr. C. H. Lavinder is in charge of the work.

THE INFLUENCE OF STRONG, PREVALENT, RAIN-BEARING WINDS ON THE COURSE OF PHTHISIS.

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[Second Paper.]

In a first paper on this subject, recently published,¹ I have shown that strong, prevalent, rain-bearing winds probably exercised a considerable influence on the course of phthisis in the Exmoor portion of Barnstaple Rural District during the forty-five years 1860 to 1904.

I now propose to show, in two other areas in quite different parts of Devonshire, a similar influence of these winds—namely, in the rural district of Okehampton, in Mid-Devon, during the fifty years 1860 to 1909, and in the parishes round Budleigh Salterton, in St. Thomas district of South-East Devon, during the forty-five years 1866 to 1910. Following the plan of my former paper, I have only considered cases under 50, as I find here, just as I did there, that from 50 onwards cases tend to be more chronic. As cases under 10 in these two areas evidently tend to be disproportionately acute, I have also omitted them. So that the cases given died over 10 and under 50.

As I have carefully described elsewhere the rural district of Okehampton,² where a most marked contrast was shown to exist in phthisis prevalence between the parishes fully exposed both to west and south-west winds and the parishes sheltered from them both, it is only necessary to recall the facts that most of the parishes are on impervious soils with a very considerable rainfall, and that many of the sheltered, as well as most of the exposed parishes, are more or less open to north-west wind.

Taking the same two groups of parishes that afforded the striking contrast in regard to phthisis prevalence, we obtain the following table:

Name of Parish.	Recorded Duration of Illness.			
	Under 1 Year.	1 to 1½ Years.	2 to 3½ Years.	4 Years and over.
<i>Exposed to both W. and S.W. Winds.</i>				
Highampton	3	1	1	
Beaworthy... ..	5			
Bratton Clovelly... ..	2		1	1
Sourton	2			
Totals	12	1	2	1
Percentages	73 %		18 %	
<i>Sheltered from W. and S.W. Winds.</i>				
Inwardleigh				
Monkehampton				
Chagford	9	7	5	1
Gidleigh	1			
Throwleigh	5	3	1	
Drewsteignton	7	4	6	
Ashbury				
Totals	22	14	11	1
Percentages	45 %		25 %	

Thus the exposed parishes have a higher proportion of comparatively short cases than the sheltered parishes and a lower proportion of comparatively long cases.

Turning next to the parishes about Budleigh Salterton. These are nowhere so severely wind-swept as the preceding, nor is their rainfall so great; the soils of all are comparatively pervious, and the average inhabitant is