

larger bronchial tubes but merely an exchange of gases. In whatever way produced, these changes in the respiratory sounds do occur very early, and, as the disease progresses, pass insensibly into the broncho-vesicular and, finally, more or less distinctly bronchial breathing. In other instances, enfeeblement of the inspiratory sound, especially the inspiratory sound at the apices, is the earliest change observed. This may be due to tuberculous infiltration of the lobules, to adjacent local emphysema, to pleurisy localised at the apex, or, more rarely, to compression of the bronchus by enlarged glands. Hence it is not so reliable a sound as the roughening of inspiration. Jerky, or cog-wheel, respiration is of value only in connection with other signs, for it is found in other conditions such as hysteria, non-tuberculous affections of the lung, and in nervous persons. It must be noted that normally, especially in women, a slight difference in the auscultatory phenomena may be found between the right and left apices. The breath-sounds at the right apex may be more intense, even a little harsh, expiration a little prolonged and the voice-sounds more distinct than at the left apex. Hence it is chiefly when there is alteration of the respiratory murmur at the left apex that the above noted signs have a real diagnostic value.

The presence of adventitious sounds is the surest indication by physical examination of incipient pulmonary tuberculosis, the crackling *râle* heard over a limited area of the lung being almost pathognomonic of tuberculous infiltration of that region. There may be only a few clicks heard at the end of inspiration, or a shower of crackling sounds may occur with each inspiration, more rarely with expiration. These *râles* have been compared, not inaptly, to the sounds produced by insufflating a dry bladder. They vary much in intensity, volume, tone, and pitch, but their chief characteristic is their persistence in the area over which they have been found. It is important to remember that these sounds may be completely absent during quiet breathing. To produce them a deep inspiration is often necessary. A still better method is to make the patient cough once and then inspire quickly and deeply. They may then be heard either at the end of the cough or during the succeeding inspiratory effort. Too much stress cannot be laid upon this method, which often gives positive evidence of adventitious sounds when other methods have failed.

While the diagnostic value of the crackling *râle* is undoubted, the explanation of its occurrence and the mechanism of its production are still matters of controversy. By some it has been thought to have its origin in the pleural covering of the lungs, by others to be a variety of the crepitant *râle*, due to distension of alveoli adjoining the small areas of tuberculous infiltration,—by still others to be due to the localised bronchial catarrh which accompanies the growth of tubercles in the lung structure.