A case of pneumothorax, with skiagraph / by William Pepper.

A CASE OF PNEUMOTHORAX, WITH SKIAGRAPH.

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T. F., aged 28 years, a laboring man, was admitted to the hospital on October 2, 1897, complaining of pain in the right side of the chest and dyspnea.

Family History.—The patient's father was killed in a coal-mine; the cause of his mother's death is unknown. There is no history of phthisis in the family.

The patient denies venereal disease and presents no evidence of syphilitic infection. He suffered the ordinary diseases of childhood, but had latterly been healthy, though he had a tendency to take cold during the last two or three years. During the last eleven months he has had a cough and muco-purulent expectoration. Occasionally the sputa were blood-tinged. He continued at work, exposing himself to cold, and frequently wetting his clothes to the skin. His cough grew worse, and he had night-sweats, but did not lose flesh. During the three weeks preceding his entrance to the hospital he was engaged at walling the banks of a creek, and was constantly wet.

On September 30 he came home from work feeling as well as usual, but early the next morning was attacked with pains in the right side, dyspnea, chills, and paroxysms of coughing. He was admitted to the hospital the next day.

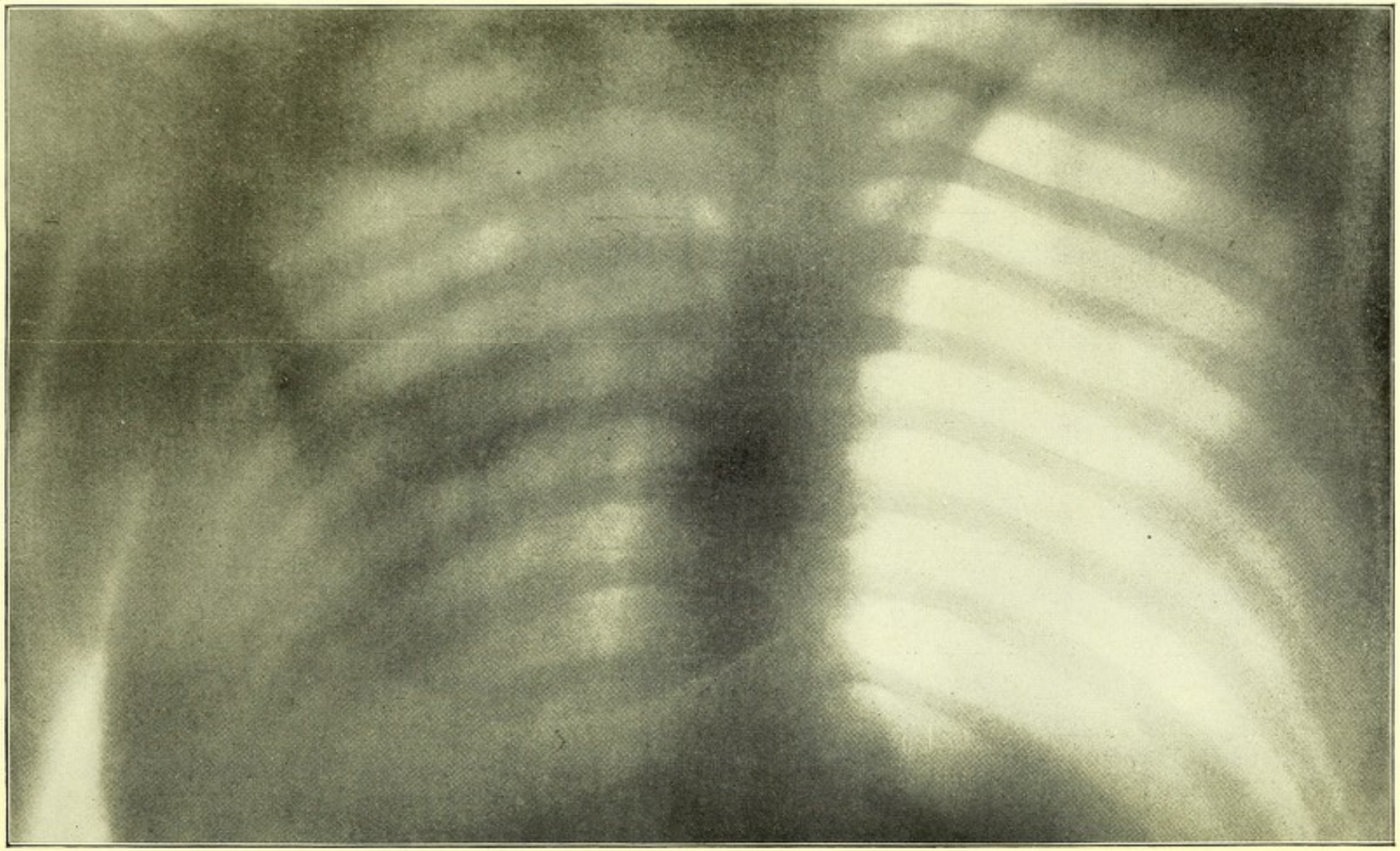
Physical Examination.—Large, florid man, face flushed, breathing difficult, alæ of nose active. Chest: Respirations principally superior

and on left side. Apex-beat below nipple; slight fulness of right side; ample fremitus. On right, dulness below angle of scapula and impairment almost to apex posteriorly; anteriorly impaired; left side normal or hyperresonant. Cardiac area slightly enlarged; left border extending to nipple; right border to right side of sternum. Auscultation: Bronchial breathing with occasional crackling râles on right posteriorly; at extreme base sounds very weak; anteriorly, on right broncho-vesicular to bronchial breathing, and on left side exaggerated respiration with many liquid râles. Heart-sounds heavy and indistinct, second pulmonary much accented; no murmurs. Pulse fair in volume. Abdominal organs seemingly normal. Liver dulness encroached upon below by intestinal tympany.

October 3. Breathing very labored. Face much flushed. Pain less but continues. Expansion on right good, but right chest is enlarged; right (nipple level) nineteen and three-quarters inches; left, eighteen and one-half inches. Note over whole right chest is slightly dulled tympany. Fremitus is difficult to elicit on the right above, and is absent below. Breath-sounds on right are broncho-vesicular over the upper lobe. Below this there is distant, high-pitched, metallic blowing breathing, which is almost amphoric or cavernous in quality, accompanied by an occasional metallic râle. On tapping coins on chest distinct bell-tympany is heard through the chest. On the left the breath-sounds are exaggerated, the percussion note hyperresonant, the breath-sounds exaggerated and accompanied by many crackling râles. The first heart-sound is of fairly good quality, the second pulmonary much accentuated. Cardiac apex-beat is about three-quarters inch outside nipple line.

October 4. His signs are unchanged to-day. His dyspnea has increased and requires the sitting posture. Blood: Red blood-corpuscles, 3,720,000; white blood-corpuscles, 12,500; hemoglobin = 70 per cent. Urine normal.

October 5. His pain is now gone. The dyspnea persists, but is now less and not distressing when he is sitting up. The cough is still bad and only produces a thick muco-purulent expectoration with much difficulty. The right chest is everywhere tympanitic. There is some fremitus on the right, though less than on the left. The breath-sounds are even more cavernous and metallic than yesterday. The bell-tympany is marked. Liver dulness begins only at the edge of the ribs and reaches downward into the abdomen one and one-half inches. Cardiac apex-beat one inch outside nipple line. The heart-sounds are unchanged. The signs over the left lung remain unchanged, except for some increase of râles in the left axillary region. There is a good deal of recession of the supraclavicular spaces on res-



Skiagraph showing the collapsed lung projecting slightly beyond the middle line from the dark shadow of the spinal column.

piration, and the lower intercostal spaces on the left recede pronouncedly with respiration, while there is little movement on the right, and the intercostal spaces scarcely change with respiratory effort. Right chest to-day measures at nipple level nineteen and one-half inches; left chest, eighteen and three-quarters inches.

Skiagraph was taken. With the fluoroscope it was plainly demonstrated that the ribs on the affected side did not move, and the right chest was much more translucent than the left.

October 6. Had a severe attack of dyspnea last evening and another this morning. Now breathing quietly but rapidly. Cough is less and he has no pain. There is no change in the signs over the lung.

Examination of sputum showed diplococci and tubercle bacilli.

October 7. He appears distinctly emaciated since admission and has constantly an anxious facial expression. The dyspnea is always severe, and occasionally becomes actively distressing. The right hand and forearm appear distinctly swollen to-day, but do not pit on pressure. Right arm rather more cyanotic than the left, but both are quite blue. The apex-beat is in same position. The chest measurements the same. The râles are distinctly less on the left side, and the resonance is everywhere good and even rather hyperresonant over the left lung. The signs on the right have not changed since noted.

Examination of blood: Red blood-corpuscles, 4,120,000; white blood-corpuscles, 18,750; hemoglobin = 70 per cent.

October 8. The tympany is less over the back, at the lower part of the lung; behind the note is distinctly duller, and the breathing, while still cavernous, is more distant. The breathing in front is still loud and cavernous, and there is tympany down to the edge of the ribs. The signs over the left lung are about the same. There are still numerous crackling râles and harsh, labored breathing. The apex-beat is in the same position.

Examination of blood: Hemoglobin, 80 per cent.; red cells, 3,665,000; white cells, 36,500; polymorphous cells, 88 per cent.; mononuclear and transitional cells, 6.8 per cent.; eosinophiles, 0.6 per cent.; lymphocytes, 4.8 per cent. Not a pure septic leucocytosis. Urine contains no abnormal constituents.

October 9. The tympany at the right base and the hollow breathing are less marked, and the latter sounds more distant, but is still readily heard. The fremitus on the right is weaker and expansion is less, but the side still expands. The apex-beat is in the same position, and the chest measurements remain the same. There are still numerous râles in the left chest, in the axillary and scapular regions.

Dyspnea is still pronounced but has lessened somewhat, and the cough is not so troublesome.

October 11. The chest signs remain about the same, except that measurement shows an increase of one-half inch in circumference of the right side. He has more dyspnea to-day.

October 12. The signs of liquid effusion are rather more distinct to-day. Tympany is now distinctly decreased below the mid-scapula, and the note is dull, with some tympanitic quality still remaining. The breathing is more distant. There is still a little expansion. The râles on the left are profuse. The bell-tympany on the right is much less marked.

October 13. His condition is as noted yesterday, and there has been no change in the signs. His dyspnea is rather less.

October 14. At 9 A.M. was somewhat cyanotic but not unusually dyspneic. Complained of being nauseated. Pulse became rapidly extremely weak, and he died a few moments after the first indication of any change in his condition, from circulatory failure. (See skiagraph.[1])

The physical examination of the case plainly indicated, after the first day or two, that the patient was suffering with pneumothorax, though there were difficulties in the way of estimating the amount of collapse of the affected lung. The right chest at no time was greatly increased in circumference, and the heart was only moderately displaced during several days. In addition, there was some expansion of the affected side and slight fremitus until a comparatively late period in the case. These facts, together with the history which pointed to long-standing pulmonary disease and pleurisy, and with the indistinct tympany obtained on percussion, allowed the suspicion that the pneumothorax might be partial or circumscribed by pleural adhesions. The further progress of the case did, it is true, make it clear that the lung was almost wholly collapsed and the entire pleural sac distended with air; but earlier in the case a reasonable doubt existed, and at that stage the skiagraph was extremely useful. The illustration shows how satisfactorily this demonstrated the intrathoracic condition. The collapsed lung is plainly visible, projecting slightly beyond the middle line from the dark shadow of the spinal column; on the opposite side the shadow of the heart is faintly marked, the contrast between the cardiac shadow and that of the left lung being rather less decided than in health, and indicating a state of engorgement of the pulmonary circulation of this side. Below, the upper limits of the diaphragm and liver are discernible, but less clearly than might have been the case if the focus had been directed at this part.

[1] The skiagraph was made by Charles Lester Leonard, M.D.

The *autopsy* showed the following conditions in the thorax: The right pleural cavity was distended with gas. The lung was collapsed against the posterior wall of the chest. The mediastinum was dislocated. One-third of the chest cavity was filled with greenish-yellow, frothy, turbid liquid of not unpleasant odor. Diaphragmatic pleura was covered with a layer of lymph, rather thick in places. The costal pleura was similar. Right lung: Thick bands of lymph fastened the apex to the costal pleura. The lung was completely covered with a sheet of exudate. The apex contained a cavity about the size of a mandarin and lined with fibrous tissue. The cavity was empty. A small excavation was found in the base of the upper lobe and several others in the lower lobe, all of these containing thick yellowish pus. The walls of these were irregular and showed a few tubercles. The lung was carnified at apex and pleura greatly thickened. A fistulous communication was discussed between one of the smaller cavities and the pleural sac.

The left lung contained a number of tubercles and was deeply congested. The tubercles were most abundant just beneath the pleura, and the latter was bound down by thick adhesions posteriorly.