

A wise physician, skilled our wounds to heal,
Is more than armies to the public weal.

The very name of medical science is suggestive of living thought, noble deeds, high morals, generous sacrifice and benevolent action; whose remaining charities, after feeding multitudes, fill to repletion the baskets of humanity and philanthropy; a profession possessing an incalculable force of restorative and recreative energy; whose *Materia Medica* comprehends earth, air, and sky; and whose *Therapeutics* levies contributions on the three kingdoms of physical science.

History announced an indubitable fact and Philosophy exclaimed: "The nation that shortens its sword enlarges its empire." Medical Science has reduced the sword to the dimensions of the scalpel, and moulded the bayonet into a tenaculum. Hence its empire comprehends the nations of the globe, and its soldiery rides the waves of every ocean, and walks the decks of the fleets of the world. This science has the earth for its theater and the people thereof are its *dramatic personæ* and the drama of its attendant revelations signalizes the splendor of its achievements.

Therefore, with a heart overflowing with fraternal felicitations, I congratulate you on being faithful, zealous members of this great and glorious profession, and joyously express at once the hope and belief that your presence and your deliberations, in this great city, will be productive of good to the cause in which we are so heartily enlisted.

Original Articles.

PRACTICAL USE OF RADIOGRAPH AND FLUOROSCOPE IN DISEASES OF THE LUNGS.

BY T. MELLOR TYSON, M.D.

Assistant Physician to the Hospital of the University of Pennsylvania, and Visiting Physician to the Rush Hospital for the Treatment of Consumption.

AND

WILLIAM S. NEWCOMET, M.D.

Junior Physician to the House of Good Shepherd; Registrar to St. Agnes Hospital; Dispensary Physician to Rush Hospital for the Treatment of Consumption.

PHILADELPHIA.

The subject on which I would like to say a few words has been quite thoroughly dealt with by Dr. F. H. Williams, of Boston, and my object is not to go into the methods as much as to report a number of cases which were admitted to the Rush Hospital for the Treatment of Consumption in Philadelphia, and of which radiographs of the thorax were taken before any physical examination was made. You will see that in every instance the shadow, which is the only thing at present demonstrable, and which in the early stage is not due to the transparency of the diseased lung, but to the greater or less amount of blood in the part affected in the period of expansion and contraction, was present in every instance, and on examination the physical signs were present to corroborate it. In looking through the fluoroscope, which is always desirable before a picture is taken, a marked diminution of the excursion of the affected side is also seen. The advocates of this method of examination for tubercular deposits in the lungs report cases in which the physical signs and symptoms of the disease were absent when the fluoroscope revealed disease at one or the other apex and after repeated examination the physical signs began to appear. It has been found by us that some cases will reveal disease when the fluoroscope is used, and when a radiograph is taken there will be no

marked difference on either side. It is therefore always better to use the fluoroscope and abide by its decision rather than to rely on the radiograph.

CASE 1.—M. K., aged 21; single; American.

Family History: Mother is living and well; father died five months ago, of phthisis; five brothers died in infancy; one sister living, 19 years of age, is suffering from phthisis; three brothers and twelve sisters are living and in good health.

Previous History: The patient had measles in infancy, la grippe ten months ago.

Present Illness: Has been ailing for the last 3½ years; takes cold very easily; pain over chest; hemorrhage a year ago, about f3ij; cough; expectoration profuse, greenish yellow in character; sweats; chills; stomach in fair condition; appetite good; bowels regular.

Radiograph 1 (shows only the left side; very little of the right; taken from the back) shows a large transparent area on the left side posteriorly at the level of the fifth rib, about 2½ inches long and 1½ inches wide.

Physical Examination: Inspection showed marked depression under the right clavicle; poor expansion over the whole chest. Palpation gave fremitus, increased at the left apex. Percussion gave dullness over the left side down to the second interspace. Auscultation showed expiration prolonged at both apices; râles on the left side, about the level of the second rib. At the left, posteriorly, the signs of a large cavity from the mid-scapula to the seventh rib; hyperresonant note over this area. At the angle of the scapula could be heard pectoriloquy and bronchial breathing.

CASE 2.—B. F., aged 18; single; American.

Family History: Father and mother living and in good health; three brothers and two sisters living and well; one died in infancy; one sister, 14 years of age, died of phthisis.

Previous History: The patient had scarlet fever and measles, otherwise good health.

Present Illness: Seventeen months ago she had a fright which she thought caused a hemorrhage; since then has had a bad cough, worse in the morning, with expectoration, yellow green in character; appetite good; no digestive disturbance; menses regular; palpitation; lost weight.

Radiograph 2 (taken from the back) shows generally darker at the left apex in comparison with the right, although at the right apex there is a slight shadow. On the right side, at the fourth rib can be seen a round transparent spot surrounded by a dark ring, and another spot extending from the fourth to the sixth rib. Over this area signs of a cavity can be heard.

Physical Examination: Inspection showed winged scapulae and that the right shoulder drooped more than the left; chest well nourished; right side more retracted and less movement. Palpation gave increased fremitus at the right apex. Percussion revealed flatness at the right apex, and below this hyperresonance. Auscultation showed the breath sounds roughened and, at the level of the third rib, blowing breathing and gurgling râles; at the level of the fifth rib, amphoric breathing and pectoriloquy were heard. Posteriorly, at the right side, at the level of the upper part of the scapula and within was a patch of dullness. At the left apex there was impairment of resonance and harsh breathing, with a few râles.

CASE 3.—H. H., aged 25; single; American.

Family History: Father dead—accident; mother died of pneumonia; one brother died of pneumonia and another of some cardiac lesion; four brothers and one sister are living and well.

Previous History: The patient has had measles, diphtheria, and typhoid fever one year ago.

Present Illness: This began last January, when he caught a severe cold. He thinks he was rendered vulnerable by the attack of typhoid, during which he lost over thirty pounds, never regained; cough; expectoration, greenish yellow, occasionally blood tinged; pains over entire chest, more severe over right side near base of upper lobe; night sweats; at times he notices puffiness under the eyes; much dyspnea; usually has an attack of fever some time during the afternoon; has had one hemorrhage of consequence, which occurred last August and the amount of blood lost was about half a gill. There is palpita-

tion, vertigo, severe frontal headaches, no edema, nausea and vomiting quite frequent; appetite poor; bowels regular; flatulence; nocturnal urination (2).

Radiograph 3 (taken from the back) reveals a dark shadow over both apices, more so at the left. At this side, posteriorly, at the fourth rib there is a transparent spot, and also one on the right side between the third and fifth ribs.



Fig. 1.—M. K. Advanced case. 1, cavity; 2, area of intense light; 3, cavity; 4, heart shadow. Patient was unable to rest on her back, and only on the right side.

Physical Examination: Inspection showed the patient poorly nourished; marked retraction of whole chest, more marked at the right; winged scapulae and bowed spinal column. Palpation gave increased fremitus and less expansion at the left. Percussion gave dullness above and below the clavicle at the left apex, and impaired resonance at the right. Auscultation revealed prolonged expiration at both apices, with râles at the left. At the fourth rib, left, and from the third to fifth on the right posteriorly there could be hard pectoriloquy, bronchial breathing and gurgling.

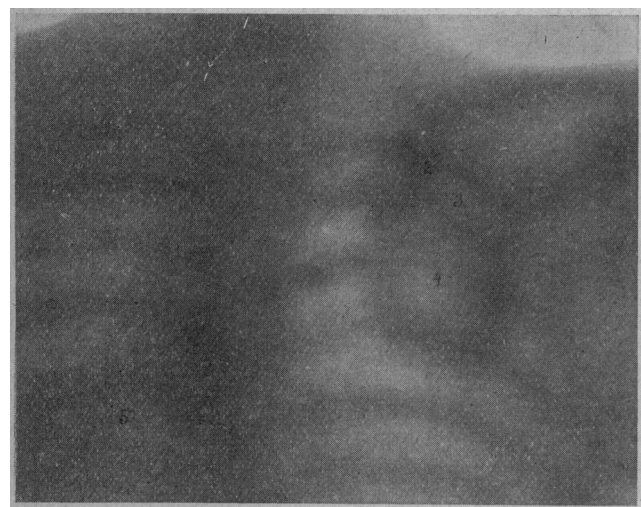


Fig. 2.—B. F. Physical signs: Right side is flatter than left, with somewhat more restriction of motion; apex is higher pitched than left, but anteriorly generally the chest is hyperresonant; at 5th rib right side tympanic; at level 3d rib right side blowing breathing, gurgling râles; at the level of 5th rib amphoric breathing, pectoriloquy. Posterior on the right side at level of upper level of scapula is a patch of dullness, and left side breathing is harsh, few râles. Fluoroscope: Chest transmits light easily, especially the right side. 1, clavicle; 2, scapula; 3, 4, cavity; 5, heart.

CASE 4.—Mrs. N., aged 25; married; American.

Family History: Father living; mother died of pneumonia; no phthisis in family.

Previous History: Negative.

Present Illness: She was confined eight months ago, and has since had cough and lost weight; cough is worse in the

morning; pain in the chest and back; dyspnea; palpitation; spat some blood.

Radiograph 4 (taken from the back) shows the left generally darker than the right. On the right there is a spot of transparency extending from the first rib to the third.



Fig. 3.—R. H. 1,1,1, shadow of spine and sternum; 2,3, dark at apex; 4, clavicle; 5, cavity; 8, cavity; 9, heart shadow.

Physical Examination: This showed dullness at the right apex and from the level of the fifth rib posteriorly to the mid-scapula; left side hyperresonant to the third interspace; cracked-pot sound at the second and third interspaces, nipple line to right side; crepitation; prolonged expiration; bronchial breathing over hyperresonant area on left side.

CASE 5.—A. H., aged 35; married; American.

Family History: Father and mother dead; cause unknown; one sister died of phthisis.

Previous History: Negative.

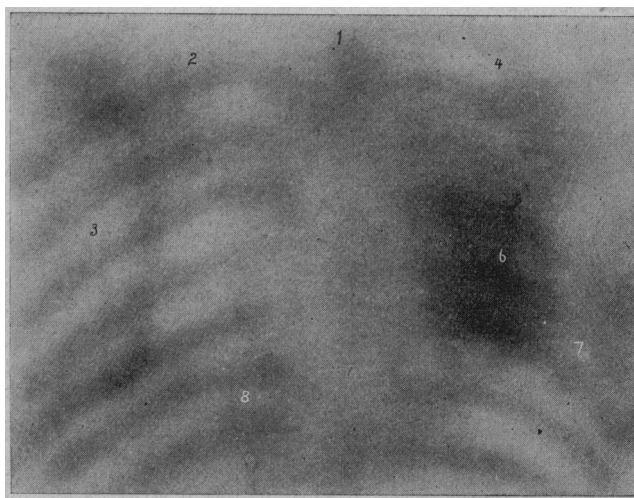


Fig. 4.—Mrs. N. Physical examination: Dullness at right apex, and level of 5th rib posteriorly at mid scapula; left side hyperresonant to 3d interspace; later normal cracked-pot sound at 2d or 3d interspaces, nipple line, right side; crepitation, prolonged expiration, bronchial breathing over hyperresonant area on left side. Does not show apices. 1, spine and sternal shadow; 2, patch of dullness; 3, scapula; 4 and 5, normal lung between consolidated apex and cavity; 6, spot of dullness; 7, scapula; 8, heart.

Present Illness: For the last year has had cough; dyspnea; expectoration, greenish yellow; night sweats; loss of weight; digestive symptoms; palpitation; bowels regular; appetite poor.

Radiograph 5 (taken from the back) shows the entire left side darker than the right, with two lighter areas. The upper right apex is also shadowed. On the right side posteriorly is

seen a transparent area extending from the fourth to the sixth rib.

Physical Examination: Inspection showed a poorly nourished patient; poor expansion over the whole chest. Palpation gave fremitus, increased over both apices. Percussion showed the right apex as dull to the second rib, and below this hyperresonant; the left apex, flat; posteriorly, the left base flat and the right base dull. Auscultation revealed prolonged expiration at both apices; over the whole of the left lung râles could be heard, and anteriorly, at the right side at the mid-scapula, blowing breathing and bronchophony.

CASE 6.—E. McK., aged 13; single; American.

Family History: Father and mother living and in good health; sister died of phthisis.

Previous History: He has been in good health up to the present time.

Present Illness: About two weeks before admission, he spat up something that looked like blood, which scared the family on account of his sister's "dying of consumption." On admission to the hospital, the boy had none of the symptoms of tuberculosis, except a slight rise of temperature in the evening. His appetite was good, and he looked like a boy in good health. He was examined by one of the physicians there and I was told that there were no physical signs of tuberculosis.

Radiograph 6 (taken from the front) reveals a darker shadow at the right apex.



Fig. 5.—Advanced case of phthisis. A. H., female. Right apex was dull to second rib; hyperresonant below; left apex was flat; posterior left base flat and side generally; right base was dull. Left side, râles generally. Right side, mid scapula region, was blowing, breathing, bronchophony. 1, spine; 2, clavicle; 3, scapula; 4, cavity.

Physical Examination: Inspection was entirely negative. Palpation revealed slight increase in fremitus at the right apex. Percussion gave an impairment in resonance at the same side. Auscultation showed the breath sound could hardly be said to be altered.

The case was a suspicious one, but we could hardly make a positive diagnosis. On examining the radiograph it was found to correspond with the physical signs and explained why the boy had a rise of temperature, justifying the suspicion that there was a tubercular process going on that could not be positively diagnosed by the ordinary physical signs. This case, I think, shows the advantage to be derived from such an examination.

CASE 7.—R. S., aged 35; single; American.

Family History: Negative.

Previous History: Has had diphtheria; scarlet fever; was run over when a child and ribs hurt; rheumatism; last year, had an attack of typhoid fever and later an attack of pleurisy.

Present Illness: Since the attack of pleurisy, the patient has had a more or less constant cough, with pain in the chest, and now and then in the right shoulder-blade. Cough is worse in the morning; dyspnea; spits a yellow phlegm with some tinging of blood; no sweats; no fever; chilly at times;

appetite fair; no digestive disturbance; bowels regular; nocturnal urination; menses regular; has some loss of weight and complains of weakness.

Fluoroscopic Examination: Left apex somewhat darker than the right, and extended a little below the first rib; another shadow about the level of the second rib; another dark spot an inch below the scapula to the left of the heart shadow; anteriorly this last shadow can be seen about the nipple.

Physical Examination: Inspection showed the chest to be decidedly flatter on the left side and the left clavicle more prominent; some lagging in breathing was evident, but expansion seemed about the same; the left scapula was more winged than the right. Palpation gave increased fremitus greater at the left apex than the right; back and front. Percussion showed the left side dull anteriorly, while posteriorly, at the left base, resonance was impaired; the right apex was dull above and below the clavicle. Auscultation gave harsh breathing at the right; bronchial breathing at the left, with an occasional râle; harsh breathing at the left base.

CASE 8.—J. G., aged 45; married; American.

Family History: Father and mother living and well; two brothers and one sister living and in good health; one child living and well; one child died of pneumonia; wife in poor health.

Previous History: He has had influenza and rheumatism, and is also subject to severe headache.

Present Illness: This began eight years ago, when he



Fig. 6.—Incipient case of phthisis. E. E. Chest is generally clear but considerably darker at right apex. Right side darker at the apex. Left side light at apex. 1, spine and sternum; 2, heart.

strained himself lifting. There is pain over the epigastrium, which gets worse when he takes cold; pain is sharp in character, but not as severe as it was; cough; expectoration; no sweats at present, but has been troubled with dyspnea; palpitation; sleeps poorly; no digestive symptoms; appetite fair; bowels regular.

Fluoroscopic Examination: The left side is generally darker than the right. On the right side, at the level of the second rib, is a darker shadow about 1½ inches in diameter.

Physical Examination: Inspection showed less expansion at the left apex and retraction of the same side, and the chest poorly nourished. Palpation gave increased fremitus at the left apex. Percussion revealed that the right apex was dull to the second rib, while the left apex was flat to the second rib. Auscultation showed over the left apex, sibilant and sonorous râles; posteriorly the same were discovered.

CASE 9.—C. McN., aged 45; married; American.

Family History: Negative.

Present Illness: This began six years ago, with an attack of pneumonia from which he suffered a relapse; since then has had dyspnea and much cough; the expectoration was mucoid and lumpy; no year has passed in which he has not had an acute exacerbation of the above symptoms, which confined him to bed for the time; during the intermission he has had a cough, but was able to work a little. He has had three typical hemorrhages, usually after severe attacks of coughing and during

which he spat up varying amounts of bright red blood; the first occurred three years ago—f3iv; the second about one year ago—f3iv, and he has had one since entering the hospital, not severe—f3ij. At other times the expectoration is free from blood. He has lost fifteen pounds; appetite good; bowels regular; palpitation of heart with dyspnea, which is independent of exertion, but usually follows a severe attack of coughing; occasional night sweats last summer, none at the present time.

Fluoroscopic Examination: The left apex is darker than the right, though the right is dark. This darkness on the right side is due to the liver, which extends from the mid-sternal line to the seventh or eighth rib. The crease in the pectoral muscles showed very distinctly.

Physical Examination: Inspection showed a long, narrow chest, fairly well nourished; flat at the right; expansion fair. Palpation gave increased vocal fremitus at the left. Percussion was dull above and below the clavicle at the left apex, and at the right, to the second rib. Auscultation showed prolonged expiration at both apices; about the mid-scapula posteriorly a hyperresonant note could be heard on both sides.

CASE 10.—F. W., aged 26; married; Hungarian.

Family History: Negative.

Previous History: He had smallpox at 11 years of age; pleurisy.

Present Illness: This started three years ago, on exposure to cold, followed by pain in his side; he was blistered and relieved. Three months ago he began taking cold shower-baths and the old pain returned; this was severe, lasted three months, and was diagnosed as old pleurisy with emphysema; he now complains of a hard and dry cough, and spits a mucus of a blue color, sometimes yellow; appetite is good; bowels regular; no loss of weight.

Fluoroscopic Examination: Negative.

Physical Examination: There were no physical signs except an old pleuritic friction on the right side.

CASE 11.—L. P., aged 61; a sailor; six children; native of France.

Family History: Negative.

Previous History: Negative.

Present Illness: This started two years ago, with a cold, and since then has had a cough and expectoration—white yellow; spat some blood; dyspnea; no sweats; no fever; appetite good; digestion fair; bowels constipated; palpitation.

Fluoroscopic Examination: The chest is generally very dark. There is an exceedingly dark patch to the left of the vertebra at the level of the mid-scapula. Both apices are dark, while the right side is darker at the top; the shadow extends lower down on the left by one rib.

Physical Examination: Inspection showed the patient well nourished; the apex of the heart in normal position, the whole chest flat, a little more so to the left; slightly winged scapulae; spinal column curved a little to the right. Palpation revealed increased fremitus at the right apex, with less expansion. Percussion gave marked dullness above the clavicle; impaired resonance below the clavicle on the right. Auscultation revealed prolonged expiration at the right; no râles.

CASE 12.—C. C., aged 21; single; American; gave negative family and previous history; with no symptoms except cough from nasal catarrh, also complaint of dyspnea. The fluoroscopic examination was negative, as was the physical.

Judging from the cases reported, I am forced to conclude that this method would greatly help in the early recognition of tubercular disease of the lungs, and that a fluoroscopic examination should be made of any patient where there is the least doubt of the diagnosis. For example, in the case reported here, in which the physical signs were not marked enough to make the diagnosis positive, with the help of the X-ray the question was settled. Thus is recognized a stage in which proper treatment might be expected to produce a cure. In regard to the diagnosis of cavities, with this method an idea of the size of the cavity can be obtained, information which all other methods fail to positively give. Again, it is possible for physical signs of a cavity to be wanting, in which event the fluoroscope might reveal it.

CHALICOSIS PULMONUM OR CHRONIC INTERSTITIAL PNEUMONIA INDUCED BY STONE DUST.

BY WM. WINTHROP BETTS, M.D.

SALT LAKE CITY, UTAH.

The advent of the cyanid process of milling makes it possible to treat large bodies of low grade ore that previously could not be handled at a profit. This involved new methods of milling and taxed the ingenuity and inventive genius of the promoters. The transition has forced the expenditure of large sums of money and involved certain loss of human life by exaggerating old causes of danger. Many of these milling plants are springing up in the mining districts of the west, all involving more or less the same difficulties, but in order to make my investigations of a scientific value I must necessarily study the history of a single plant. I, therefore, desire to report the observations and experience of myself and friends among the workers of such a plant, also to call your attention to the greatly increased rate of mortality among the employees, induced by the constant inhalation of the fine dust produced by the crushing of these ores.

Whether we call the cases fibroid phthisis, chronic interstitial pneumonia, stone-cutters' phthisis, miners' consumption, or chalicosis, depends on the character and amount of foreign matter, or classify them under the generic name of pneumonokoniosis, makes but little difference. All convey to our minds a pathologic process with a clinical history the exact nature of which depends largely on the stage in which the case is found by the pathologist. Authors agree, however, in the dust causation, and in the cases under consideration the foreign matter is excessive. At the Delamar mill the ores, which are a gold-bearing quartzite, are crushed, dried and ground into a fine powder in what is known as the Griffin mill, conveyed to bins, and thence through chutes to cars which are wheeled to the tanks. In and about the mill the air is filled with an impalpable dust and in portions of the mill it is so dense that one can not be recognized a few feet away, and an electric light is in evidence by a spark.

The mill has been in operation since September, 1894, employing about 40 men, the capacity being increased from time to time until about 60 men are now being employed. It is stated that most of the men who worked in the mill from seven to nine months previous to January, 1898, are dead, and the others are sick. A review of the cases as compared by the employees to March 1, 1899, gives 166 deaths. Since then, to my personal knowledge, 3 have died in St. George. A later statement by a gentleman who has the disease himself, and is the editor of a Nevada paper, puts it at 200. Dr. Mayo, who was the company's physician from January, 1895, till a few months ago, and to whom I am indebted for much valuable information, states that only 38 have come to his knowledge. This I am sure is too low, and while 200 is an exaggeration, I believe an average of these figures nearer correct, as almost every town in Nevada and southern Utah has had its victim, for it is a fact that neither the company nor the men realized their danger until the deaths began to occur. My attention was directed to these facts while at St. George, as quite a number of the young men were employed in the Delamar mill, 11 of whom have died within the past year. A number of others are suffering from the disease. After interviewing the attending physicians and the unfortun-