Henderson

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William Henderson

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The Lung in Health and Disease
The important functions of excretion and absorption, and the chemical vital changes which take place in the lungs, render the consideration of these organs as important as others in the animal economy, and not only with regard to their function, but also to the various abnormal changes which may take place in their structure, and constitute by far the most frequent signs of disease in this country. If we examine the lungs in early fetal life, we find them developed in the form of two sac-like protuberances from the upper part of the alimentary canal and lined by its mucous membrane. These in process of development are found attached to the upper part of the oesophagus by a pedicle, the rudiment of the trachea; and as the bronchial tubes become more and more developed, we have the air cells developed around them after the manner of the development of glands. At the full period of fetal development. Michel found the proportionate weight of the lungs to the body to be as 1 to 40. At this time they lie at the back of the thorax and do not yet entirely cover the sides of the pericardium; they have a compact, heavy gland-like appearance, are of a yellowish pink color, and sink in water. As soon as respiration had been established
Their margins expand in consequence of the inward rush of atmospheric air, and the consequent afflux of blood to the parenchyma of the organ; they increase in volume and now completely cover the pericardium and costal pleurae, and their proportionate weight to the body is as 1 to 40. They are now felt to be light, crepitant, and spongy, they even float in water though strongly compressed; for, it has been proved by experiment that a lung which has been inflated by the vital act of respiration cannot readily be emptied of air by compression, thus differing much from a lung artificially inflated with air, which would readily sink beneath in water after compression. Their color is now of a light rose pink, this change in color and texture commences at the anterior borders and proceeds backwards until the entire substance of the organs becomes uniformly crepitant. They now weigh about two and a half ounces whereas before respiration was established their weight was only an ounce and a half. In certain presentations, where air has found access to the mouth of the child previous to birth, the lungs may be imperfectly inflated; and should it happen that the child be still born under such
In pensive circumstances, we would find that though certain portions of the lung would float in water, three-fourths of the two lungs will sink in water. In this case the mother generally gets the benefit of the doubt. The change in the character of the lungs from respiration sometimes takes place in an imperfect manner from an arrest of development of the process of obliteration of the foetal vessels. When the foramen ovale in the septum auriculareum remains open, that portion of the blood coming from the inferior vena cava is diverted from the lungs; the blood therefore is not sufficiently oxygenated and the child has a cyanosed appearance. This however does not necessarily cause death in the child. I had under my care a child G. A. — aged 5 months, who had such a cyanosed appearance — the general surface of the skin and extremities always felt cold; there was evidently defective nutrition; but the child died notwithstanding every care on the part of the mother. On opening the body and carefully examining the heart and vessels in situ, I found the lungs were badly developed — especially the left lung which was collapsed, mostly non-crepitant and of a dusky and gland-like appearance. This
hepatoid appearance was also observed towards the posterior part of the right lung. The foramen ovale was open and a free communication existed between the pulmonary artery and the descending portion of the arch of the aorta by means of the ductus arteriosus which divided into two branches, one passing to the aorta and the other to the lungs. Without removing the parts I placed a blowlamp from the pulmonary artery into the aorta with the greatest care, and then opened up the vessel which contained recent blood. The blood consequently was diverted in a twofold manner from the lungs, only a small portion of the blood could be aerated and the vitality of the tissues became so much impaired as to interfere with the child's ventilation and death therefore took place partly from asthenia partly from asphyxia. In such a condition, a child is peculiarly liable to bronchitis. The lungs are composed (a) of the ramifications of the bronchial tubes, around the terminations of which, the bronchial sacs or dilatations are situated and formed into lobules (b) of the ramifications of the pulmonary artery and veins (c) Bronchial artery and veins (d) lymphatics and pleura of nerves; the whole being
Enclosed by the pleura pulmonalis, the visceral portion of the serous sac lining the thoracic cavity. The subserous tissue consisting of areolar and elastic fibrous tissue invests the entire organ and its lobules and surrounds the vessels and nerves as well as the lymphatics. Each lobule which may be considered a miniature lung has a distinct bronchial tube which divides and subdivides dichotomously and at last ends in small pouches, the pulmonary air cells. The larger bronchi consisting of an outer fibrous and an inner mucous coat lined with ciliated columnar epithelium and between these two of a muscular coat, the fibres principally arranged transversely and of longitudinal elastic fibres principally arranged posteriorly when the cartilaginous rings are deficient, undergo a change in character as they approach the visceral structure of the organ, the fibrous coat gets thinner and ultimately degenerates into areolar tissue. The mucous layer loses its ciliated columnar character and becomes more squamous but the muscular and longitudinal elastic layers may be traced even to the smallest bronchi. External to the muscular coat may be observed the irregular...
— and cartilaginous plates which, however, do not appear in the smaller bronchi. The air cells, the terminal expansions of the ultimate ramification of the bronchial tubes vary in diameter from the 1/3 to 1/4 of an inch. Their size increases as they approach the surface, apices or borders of the lung. In the infant according to Osburn, their diameter is about 1/50 of an inch so that they increase in size with the age of the individual and are generally found larger in men than in women. Their walls are constituted by an interlacement of areolar and fibrous tissues and Gerlach and Hirschmann maintain that there are also muscular fibres entering into the structure of their walls. They are lined by a fine papamont epithelium, principally distinguished by the presence of nuclei of larger size than those that belong to the walls of the capillaries. Beneath the delicate lining membrane and surrounding the orifice of each cell is an arterial circle communicating with the adjoining ones and from the arches of capillaries arise which dip into the septa between the air cells and form a network around them. These, the terminal capillaries of the pulmonary arteries from which the pulmonary veins arise.
are so thin as to enable them to perform the function of exhalation and absorption with rapidity. While the pulmonary artery and its branches convey the dark and impure blood from the right side of the heart to the air cells, the pulmonary veins and their branches convey away from the air cells the pure blood which has theretofore been oxygenized to the left side of the heart. This is one of the most important functions the lungs have to perform viz. to present the blood in a sufficiently attenuated form to the influence of the atmosphere. For this purpose we find that the lungs present an extent of surface many times greater than that of the whole body to the influence of the atmosphere. The essential function of the lungs is to enable the blood to absorb oxygen on the one hand and to exhale carbonic acid gas on the other; this is common to all organized beings, both animals and plants, and the more highly organized and the greater the degree of functional activity, existing in the animal the more essential is this function to life, for it must be evident, that the more rapid the functional changes which take place in an animal, the more rapid will be the decay of those tissues which
take part in these changes, in the exercise of which this vital life consisted and as the tissues consist abundantly of Carbon, the decayed particles of Carbon must be eliminated from the blood. The best form being that of Carbonic acid gas. Nature economically combines this necessity for the elimination of Carbon from the tissues and the blood by making it subservient to another all important process viz. the maintenance of animal heat. For by the chemical union of Carbon with Oxygen, heat is developed. In Carnivorous animals whose musculature development is undergoing constant change, the combination of Oxygen with the tissues may be sufficient to maintain the heat of the body. In Herbivorous animals on the other hand, their well developed metabolism is not sufficient and we find their animal heat maintained in part by the union of Oxygen with the Carbonaceous portion of their food. In the human subject in proportion to the amount of Cold, exercise of muscular and nervous functions, will be the amount of Carbonaceous food acted on by the oxygen of the air to maintain the heat of the body. More of this kind of food being required at very low tempe
tures and when little exercise is taken than in the opposite condition. So far as the atmosphere is concerned, the conditions necessary for respiration are that the air be pure and that the proportion of carbonic acid contained in it does not exceed 2,000 parts. Oxygen is absorbed by the lungs in larger quantity than it is given out in the form of carbonic acid. Greater on an animal diet than on a farinaceous diet according to Regnault. There is an intimate relation between the amount of carbonic acid given off by the lungs and the menstrual function, for the menstrual secretion or rather excretion is rich in carbon and when suppression of that fluid takes place, there is an increased strain on the respiratory function. Dyspnoea and other symptoms of disease show themselves as the result. There is the same relation between the excreting function of the lungs and that of the skin and liver, and this is well shown in cases of the pulmonary organ by which the function of the lungs is impaired, and at the same time the excreting function of the skin is increased as well as the bile, with increased sweats, a fatty liver. The exhalation of carbonic acid increases up to twenty.
When it remains stationary as long as menstruation continues regular, amounting then to about 100 grains per hour. After cessation of the catamen it increases, the average quantity between 40 and 50 years of age being 130 grains per hour. In males the quantity of carbonic acid exhaled increases gradually up to 30 years of age, it then remains stationary up to 40 being then about 189 grains per hour; between 40 and 50 the average is 156 grains per hour, and so it diminishes with age; between 60 and 80, it was 147 grains per hour. Its quantity increases with muscular development. Along with water nitrogen gas is absorbed and exhaled from the pulmonary surface. The quantity of water exhaled and absorbed will depend on the condition of the atmosphere both with regard to moisture, less being given off and more absorbed in a moist and heavy atmosphere than in a dry state of the atmosphere. The pulmonary circulation is maintained according to Bunsen by the force generated by the contraction of the right ventricle of the heart and pulmonary artery and its branches as well as by a fæzée generated by the attraction which the venous in the pulmonary
capillaries, thus for oxygen and which ceases to manifest itself, at any rate in that particular form, when it has obtained what oxygen and put it with carbonic acid gas. Thus the blood in the capillaries of the pulmonary artery arrives before it the blood in the capillaries of the pulmonary veins, the lungs covered by their pleurae. Completely fill up the sides of the cavity of the chest being in contact externally with the pleura costalis, internally with the mediastinal and pericardial pleurae. Below with the diaphragmatic pleura which in a measure explains the mechanism of the respiratory acts. An ordinary expiration when the capacity of the chest is diminished by the contraction of the abdominal muscles forcing up the diaphragm which is in a passive state, a certain portion of air is expelled from the lungs viz., about 20 cubic inches, leaving still in the lungs about 100 cubic inches of air. During ordinary inspiration which is accomplished by the contraction of the diaphragm and the relaxation of the abdominal muscles, the ribs being drawn up slightly by the scaleni and intercostal muscles (these with the serrate and the muscles that fix the capsule contributing more especially to full inspiration).
The capacity of the chest is increased and the
elasticity of the air in the lungs causes them to
expand to prevent a vacuum being formed in
the cavities of the pleurae. Air at the same time is
drawn in through the bronchial tubes into the air
cells to establish an equilibrium of density
between the rarified air in the air cells and the external
atmosphere. Thus the lungs are passively submitted
to the function of respiration. In health the respira-
tion is conducted quietly, every breath being
prolonged, the number of respirations being about
16 per minute. If we auscultate the chest in
health any where over the parenchyma of the lung
we hear a rhythmical vesicular murmur of a
fine Breezy character with both respirations and
the expiratory murmur preceding the inspiratory
with out any interval, and being about one third
shorter in duration and fainter in character than
the inspiratory murmur. On listening over the
Bronchi at the root of the lung, the respiration
is tachycardia and of a blowing character, there is
a short interval between the respiratory inspira-
tion being heard longer than expiration. On
listening over the trachea there is heard a loud
Loud blowing sound with inspiration is the same with expiration with an interval between the acts. The vocal sound is heard as resonation, whereas over the bronchi we hear it as bronchophony, but in health we do not hear the vocal resonance over the proper lung tissue. In children inspiration is heard louder and more intense (pronile) owing to the great elasticity of the walls of the chest. In old age the lungs lose their elasticity and the expiratory murmur therefore is prolonged. The nutrition of the lungs is maintained by the bronchial arteries and probably also by the pulmonary arteries, for when the circulation through any of the branches of the pulmonary artery is obstructed by an embolic clot, gangrene of that part of the lung ensues. The sympathetic vessels coming from the lungs are superficial and continue the forms lying beneath the pleura, while the latter accompany the pulmonary vessels and terminate in the bronchial glands, from which vessels proceed and empty themselves into the thoracic duct and ductus lymphaticus. The lungs derive their nervant influence from their connection with the pneumogastric and sympathetic nerves. These form the anterior and posterior pulmonary pleurae, and
Probably the nerves terminate in minute ganglionic corpuscles similar to those discovered in the frog by Arnold. The respiratory movements are involuntary reflex in character. That portion of the nerve centre which is essential to its performance is that portion of the medulla oblongata and spinal cord which is connected with the 5th, 7th, and 8th pairs of cephalic nerves and also with the phrenic nerves. This has been proved by the fact that the other portions of the central spinal axis maybe destroyed and yet we have respiration, and also by the fatal nature of injuries to the cord above the origin of the phrenic nerve. The ordinary stimulus of the respiratory movements is the presence of venous blood in the pulmonary capillaries and carbolic acid in the air cells, acting by way of the terminal expansions of the pneumogastric nerves. This irritation being conducted to the medulla oblongata and a reflected motor impulse being conveyed to the muscles of respiration by the phrenic and intercostal nerves. This action taking place in a rhythmical manner as long as the conducting apparatus and the respiratory tract are maintained in their normal condition. Impulses on the sensory portions of the 5th nerve & intercostals and other impulses on
The general surface of the body or irritations of particular tissues may engage the sympathetic communicating nerves. Cause respiration by reflex action through the pneumogastric nerve, as for instance increased decomposition of blood and tissue in certain diseased states of the system causing irritation and an increased effort to eliminate the poison by the pulmonary surface. In this way can we account for the increased strain upon the lungs in amenorrhoea, the skin also participating in the work of elimination and often being overcome by excess of function or taken over in work while in an unhealthy or inefficient condition and acne menstruatus being the result. But though the respiratory movements are independent of the influence of the Will, still the Will has a certain amount of controlling power over the respiratory actions as is well illustrated by the Diver who can hold his breath for two or three minutes at pleasure also the passions and the emotions are expressed by various actions of the respiratory muscles as in laughing and crying. These express the feelings of the mind involuntarily showing an emotional tendency in many. Moreover the respiratory muscles are under the control of the
will in the act of speaking and singing. The Cerebellum being intimately connected with the Respiration and is supposed to regulate and control the various muscular movements of the body. Any cause which interferes with the nutrition or induces torpidity of the medulla oblongata interferes with the function of Respiration as in cases of narcotic poisoning, the state of the blood in Typhoid fever &c. The more freely an organ vibrates on percussion, the less is the sense of resistance communicated to the finger. On percussion of a healthy chest, it ought to be resonant and equally resistant on opposite points. In pneumothorax, fully developed, we have a full tympanitic sound on percussion; in limited pneumothorax, a shallow tympanitic sound and in case of Empyema &c. There there is a large cavity found in the lung or bronchus we have increased Elem on percussion and less sense of resistance. If on the other hand from congestion of the Capillaries or from some other cause fluid be effused we would expect to find dulness on percussion & more resistance on percussion over a cavity in the lung we may have an amphoric or shallow tympanitic sound if the air be expelled forcibly by percussion force.
A cavity communicating with the external atmosphere by a fractured joint is produced. On applying the stethoscope to the thorax of an adult, if exaggerated or precordial breathing be heard, it shows that this action is complementary to diminished action in some other part of the lungs. If the intensity of the respiratory movements be diminished, it may be caused by deficient expansion of the pulmonary tissue arising from pain or inflammation in surrounding organs. Or it may be caused by debility or by an obstacle to the entrance of air from tubercular deposit either in and around the bronchi causing presence on them a in the pulmonary tissue diminishing the elasticity of the organ. Should these conditions be intensified or if a definite effusion be forced out in quantity compressing the lung tissue, the sounds may be entirely suppressed. As the effusion is being suction out, the vesicular murmur would first cease then as the fluid increased in quantity with greater compression of the organ, tubular breathing would also cease to be heard & the respiration of the opposite lung would be quickened. The vesicular murmur may be of a jerking or wavy character from nervous emotion, excessive action of the heart & from pain also from deposit.
of tuberculous accumulation of mucus. In Emphysema we have an interval between the respiratoriy act, and as there is an obstacle to the egres of air, expiration is prolonged. The same happens in Chronic Bronchitis, and in Cases when there is tubercular deposit. The respiratoriy murmurs may be heard from alteration in the Calibre of the air passages or from the men of the passage increasing the amount of Jiction or from tubercular deposit. If a blowing or hollow sound be heard over the pulmonary tissue, it either indicates a cavity or consolidation of lung tissue allowing bronchial breathing to be heard over the lung tissue which is redundant thereby a less conductor of sound. The friction of the column of air passing through narrow tubes, when dry produces a shrill dissilent sound, when fluid is present, a fine mucous rattle or crepitation; aphonious or harsh sonorous sound, when pass through the larger Bronchi when dry, but when fluid is present a coarse mucous rattle is produced. A rend bath with inspiration and expiration. If air be passing through a viscous fluid, the bubbling sounds an coarse than when the fluid is watary. In pneumonia if we make the patient
Take a long inspiration we hear fine crepitation at the end of the inspiratory act and on the patient coughing. This condition remains, as the exudation is in the air cells. In case of bronchitis, the crepitation is coarser and it may disappear after a cough. When consolidation takes place in a case of pneumonia from exudation into the air cells, the respirating sounds cease and tubular breathing alone is heard. When resolution takes place in pneumonia, in capillary bronchitis, and also in oedema of the lung, we hear moist crepitation with both respiratory acts. Benzol may aid them, by coughing. The mucous rattles are heard, and in cases where there is a cavity formed in a bronchus enlarged. If in inspiration, one or two clicks of a dry character be heard, passing into the moist form and then heard with both respiratory acts, it is supposed to be an indication of phthisis. A friction found over the substance of the lung of superficial in character indicates pleurisy. This at first is of a fine grazing character, the surfaces of the pleurae being dry and heard best at the close of a full inspiration. As fluid is formed, this sound becomes more rough and
superficial we distinguish from a dorsal
role in not being altered by coughing. Frication
sounds may also be heard when the surface of the
lung is roughened by deposits of tubercle or cancer
or it may be by bullae & then if the patient take
a full breath we hear the grating. By comparing
the vocal resonance heard over different points of
the chest in health with the different degrees of con
sidered over the same situations in disease, we are
at a tolerably good conclusion as to the state
of the parts. Thus whatever interposes with the
vibration of air as a layer of fluid in the pleural
cavity or condensation in the bronchi, causes a dimin
ution in the amount of vocal resonance. If the re
sonance be increased, we expect to find the lung
in a state of comparative consolidation, rendering
the lung tissue a better conductor of sound. Though
tubercular cavities exist in the bronchi being
with thickening of surrounding tissue, the vocal
sound would be concentrated reflected and in-
tensified. That the lung however may be a
better conductor of sound, then must be a c
amount of elasticity combined with consolidation
or the formation of small tubercular cavities.
Should a large cavity exist in the lung, communicating with a bronchus and the walls of the cavity have acquired a considerable degree of tension, we would on listening over it with the stethoscope and causing the patient to Spera, hear sputtering. Again when pneumothorax takes place by the rupture of a tubercular cavity and should at the same time there be a certain amount of effusion of fluid so as to cause the bursting of air bubbles in a confined space with tense walls, we would hear a metallic tinkling. But if the air is effusion along with the air, we would hear anaphonic resonance owing to the vibrations of air in a hollow and confined space.

This condition is made evident by the tympanitic sound on percussion and the urgent dyspnea for it is evident that if adhesions have not formed between the pleura pulmonalis and costata, the air coming down the trachea will find a ready channel into the cavity of the pleura to fill up the vacuum which otherwise would be caused by the expansion of the chest than it would by expanding the air cells. Thus the blood is not properly aerated. But without any communication with the external atmosphere, the
Plural Cavity may become the seat of effusion of serum blood or virus and if the effusion is great, the lung becomes compressed backwards against the spinal column, see then would have dulness on percussion, absence of vesicular respiration according to the amount of compression and bronchial breathing only heard, and even this may be wanting if the compression be great. Consequently, we would have pure aspiration heard over the opposite lung. We have a condition of collapse of the lung frequently occurring in infants in connection with bronchitis—a plug of mucus becomes lodged at the point of division of alveoli and should the inspiratory effort not be sufficient to expel it, air will escape by the side of the plug, but does not enter in the same proportionate quantity, for the plug obstructs the surface, and thus by repeated efforts, the air remaining in the lung becomes more and more ascidified and consequently the lung becomes more and more compressed by the pressure of the atmosphere on the thorax externally. This is a tendency to this in old age and in fever patients when the thorax is diminished. Physically the collapsed portion
Of lung is solid and dark colored; it is depressed below the general surface of the organ; but we might restore it to its natural condition by inflation. When, however, by peristaltic action of the bronchi, the plug is removed, the lung recovers its normal condition. A hypoplastic condition of the muscles of the bronchi caused by supersaturation of the medulla oblongata, gives rise to asthma. A sudden and violent hypoplastic contraction of the respiratory muscles acting when the air cells are fully distended, is liable to cause dilatation, puncture, and degeneration of some of the air cells, giving rise to the emphysematous appearance commonly seen on the surface of the organ. In this manner also we may have collections of air between the lobules expanding the interlobular tissue and causing congestion of the air cells. In this condition, the elasticity of the lung is diminished. More force is required to inject the organ when it is tender. While less blood is exposed to the influence of the atmosphere & hypoxia is produced. The vocal frequency is diminished, percussion is tympanic, inspiration is shrt, expiration prolonged, inspiration slow, laboured & chin of a husky.
fine and diminished in temperature. When the chest is distended with air or fluid, dyspnoea may ensue from the presence of the distended diaphragm interfering with the descent of the diaphragm as well as disturbing the balance of nerve forces conveyed through the pneumogastric. In chronic cases of bronchitis of long standing, the bronchus becomes dilated from weakness and degeneration of the muscles. Destruction similar to what takes place in aneurism, copious mucopulent secretion may at the same time take place from the lining membrane, a sympathetic sound may sometimes be heard or dulness on percussion from consolidation of surrounding tissues and auscultation either amphoric breathing or gurgling according to the amount and kind of secretion. This condition is usually met with at the junction of the upper and middle third or middle and lower third of the lung and is thus distinguished as well as by the patient from pleuritis, the symptoms of which would be found at the upper third of the lung. The proper substance of the lung is composed of an internal epithelial or mucous layer and externally of a neurovascular and fibrinous layer.
The entire lung being invested by a second layer, according to the predisposition to disease of either of these tissues, will be the liability to one or other form of disease of the lungs. We may have simple congestion of the active form from cold or irritation of tubercle leading to circumscripted abscess which may be discharged by the bronchi or be absorbed in a fluid form & contract and heal or we may have passive congestion from any cause which obstructs the return of venous blood or diminishes the servile power of the organ, leading to edema of the lungs. When active congestion occurs in a more general form the lungs still expirate & render a reddish serum when squeezed and float in water. If this progresses we have an exudation of leger & granules poured out into the air cells forming the stage of red hepatisation of pneumonia, the lung tissue being dark, hepatised brownish red and granular on section, softened and non expirant & sinking in water. This stage may pass into grey hepatisation, the lung tissue on section being paler than normal, granular cohesion impaired, readily breaking down & sinking into prulent suppuration. If this is not
absorbed in a fluid form or exsudated, this condition may be recovered from. The probability is in favour of the theory that the pus compounds are an independent development of the exudate thrown out and not the proliferation of epithelial cells and nuclei through its diffusion. The exudation received an impulse in development arising from its contact with a surfacing and organized porous membrane. When an exudation of plasma is found out in the pleural sac covering the lung, it has a greater tendency to become organized in the form of a pleural membrane because excluded from the influence of the atmosphere. Also, when an exudation is found out on the external surface of the second layer into the subserous tissue which envelopes it, we have the same tendency to a higher form of organization for in interlobular pneumonia or the chronic form, we have Cirrhosis of the lung as the result of an exudation, and increased formation of fibroid tissue, contracting, pressing, and destroying the proper lung tissue. The bronchi at the same time become dilated in an irregular manner. This condition is confined to one lung, the thoracic wall on that side being very much.
Contracted and on auscultation, tubular breathing is heard or it may be the sounds are moist but no vesicular murmurs is heard. Or what is occurring as it does in persons of advanced age and the other lung being healthy thus differs from tubercular disease as well as by the destructive tendency of the individual. The lung is also subject to cancerous deposits. In that case, the glands or some other organs are likewise affected. There are signs of internal presence besides the cachetic appearance of the patient. Should there be a tendency to disease of the heart or vascular system in general, we find blood frequently extravasated into the tissue of the lung or air cells constituting pulmonary alveoli and the same may happen when the blood is impoverished as in scurvy or fever. But the most common cause of irritation and ultimate disorganization of the lungs is the inflammation of tubercle. This deposit an ill-constituted form of blood plasma causes irritation and sets up a low form of inflammation around it, resulting in the softening, breaking down of development of tubercle cords. Flecks or Development of tubercle cords which when expectorated or the fluid portion absorbed may result in the
contraction & healing of the cavity so formed or the tubercle may undergo calcareous degeneration. The happy result is favoured by attending to proper hygienic rules which tend to remove the cause viz, the abnormal condition of the blood. Gangrene of the lung may supervene on embolism of the pulmonary artery or one of its branches or after injury and exposure to cold, the vital power being lowered for the time being or may be the result of a pneumonia in patients previously debilitated by disease and intercurrent infections. The texture of the organ may present a circumscribed or diffuse softened pulpy condition with a case filled with various fluid or pus. In connection also with the inoperative state of surgical force, we frequently find purulent defects forming in the substance of the lung as the result of the absorption of caseous produced by the absorption of effete matter not fitted for elimination by the proper secretory apparatus, this is often associated with other fluid collections in the other tissues of the body & contribute to a fatal result in most cases.

William Henderson