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In the following Thesis, I have ventured to submit for the consideration of the Medical faculty, a few remarks on the Mirror agencies now employed in the diagnosis of Chest Disease - I speak more particularly with reference to Inspection, Pulse and Respiration ratio and Percussion.

As I believe that these means or agencies have been much neglected and the value of the latter two in particular has been much underrated, I have endeavoured to show (and as it seems to me successfully) that modes of investigation somewhat different from those now in use might prove far more effectual not only in obtaining accurate information regarding the progress of disease, but also in classifying and rendering available for the guidance and instruction of others the results of the investigations thus made.

Charles Langstaff.

Inspection.

In a well formed chest, shows the general contour of the surface rounded, unmarked by irregularities, of ample dimensions, and the two sides almost symmetrical. On viewing its surface from above downwards, the shape of the Thoracic cavity is conical, small at the upper part, and gradually bulging until at the Infra mammary region, it attains its greatest lateral diameter; from this point to the false ribs there is a slight but gradual diminution in calibre. - Anteroposteriorly the cavity is flattened; before where the ribs join the sternum, behind where they unite with the spine; so that the whole space may be represented, as two cones with their apices superior, laterally applied to one another, but separated by an imaginary partition.

The proper support to the whole structure, the spine, is inclined towards the right side, which causes the shoulder of that side slightly to project, the opposite is the case with individuals who are left handed. - In front the supraclavicular

regions are a little hollowed; the Intra-clavicular present a groove, from which commences a slight convexity - continued downwards as far as the Mamma. On the left side from the 4th Rib to the bottom of the 6th interspace there is a decided bulge, the Praecordial region. On the Right side there is a distinct and gradual elevation, although slight, from the 6th Rib downwards, marked out transversely by a sulcus, this is the site of the Liver. The Nipples are on the same level, and the Costal angles nearly equal, that of the right side being a little the more obtuse of the two.

The motions of the Chest Walls are during Respiration.
1st The whole cavity of the Chest in Inspiration, is lengthened, by descent of the Diaphragm; the two Superior Ribs are drawn up, the two Inferior pulled downwards, or if not, are held immovable by the muscles attached to them. At the same time the Ribs being moveable upon the Sternum and Vertebrae, the Anteroposterior measurement is increased by their elevation, and by the eversion of their lower borders, the Sternum and Cartilages are carried forwards and upwards, and the Intercostal spaces are enlarged, by the gliding forward of each

Ribs on its fellow beneath.

It is affirmed by Dr. Sibson that the 4. upper Intercostal spaces are narrowed near the Sternum, by approximation of the corresponding Ribs.

2nd Expiration is the reverse of all these movements, the Chest Cavity becoming diminished by ascent of the Diaphragm, descent of the Ribs and their inversion, and falling back of the Sternum.

During both Inspiration and Expiration, the Intercostal spaces are visible, but their depth depends upon, the fatness of the individual, the size of the Mammary glands, and the development of the Pectoral Muscles. The motions occurring in Respiration may be to a considerable extent exaggerated or diminished, and yet within the limits of health.

But this typical form of a healthy chest is often altered in various ways, and yet without inconvenience to the individual, or actual disease existing in the Walls and their contents, although any great divergence from this standard, must be caused, either by some malformation of the Thorax itself, or disease of its contained viscera.

In the Adult Chest, many reminiscences are left of those diseases which attack Infancy and Childhood, they leave such unmistakable marks that a Diagnosis is not difficult.

1st. And 1st. An alteration in the relative proportion of the constituents of the Bones of the Parietes will produce distortion, as occurs in Rickets.

A Rickety Chest has the Clavicles at their inner thirds bent, the spine crooked, where the ribs join the Cartilages, their ends are enlarged; there is not sufficient strength to withstand the Atmospheric pressure from without, and in consequence, a groove appears, from recession of the Cartilages on each side of the chest, beginning at 2nd rib and extending to 7th; so the Thorax looks as if divided into two compartments, the Sternum being pressed forwards, increases the size of the two cavities, relatively, and makes the separation the more evident - A Transverse section of such a Chest, would present an appearance, as if two circles applied one before the other, with the partition between them partially severed. Often there is a circular recession just above the Liver.



2nd Any impediment to the entrance of air, into the Lungs, will cause some form of displacement of the Thoracic Walls.

Croup.

This is the case in Croup, where the fibroplastic matter, thrown out in circular bands around the tube of the Trachea, forms a hindrance to the free passage of air, a small quantity only entering, and yet not sufficient to fully inflate the Lungs, disturbs the balance between the pressure exerted on the Interior and Exterior of the Cavity: then the Chest walls expanding, by the action of the Respiratory muscles, cause a partial vacuum, which something has to fill up; this is accomplished in part, by the air which can only get in, in a small stream and slowly, & also by the Cartilages and any portions of the Chest that are weakened by disease or otherwise, being forced by the Atmospheric pressure from without, upon the partially distended Lungs and other contained viscera. — Now supposing a tickly condition exists in the Parietes, and such a disease as the above should occur in conjunction with it, there is no form of distortion.

into which the Thorax may not be tortured; in fact the Chest walls are, as it were, moulded upon the Organs within the Cavity, the Hepatic Sulcus is greatly deepened, and the Heart bulges as a prominent tumor in the Praecordial region.

Laryngismus Stridulus. —

In Laryngismus Stridulus the same deformity frequently exists, but in this case the entrance of air is impeded by the Spasmodic closure of the Glottis. If this disease should exist independently of Rickets. The Sternum recedes, and very frequently also the angles of the ribs, but not sufficiently so, as to cause any permanent alteration in the form of the Chest: although if the disease continued for any lengthened period, the Little patient does suffer deformity, which is not outgrown as age advances.

Pertussis —

A similar result to the last is often seen in Pertussis. The Glottis contracted, after each forcible expiratory effort, checks the returning current of air into the Lungs and the balance of pressure, exerted on the Interior and Exterior of the Chest, is again destroyed.

No mention
of emphysema
or other
structural
changes
on the
sequela
of influenza

In all of these diseases of Infancy and Childhood, the chest walls are not yet solidified, the bony parts are scarcely more unyielding than ordinary cartilage, and the Cartilages have not attained that density which they acquire at a later period of life; hence any unequal distribution of pressure, continued for any period above a certain time, leads to permanent and lasting displacement.

Adult Chest.

In the adult we frequently find that there are different forms of Chest, each form peculiar to individuals having a tendency to some particular Diathesis; in the same manner that we may often judge what classes of diseases persons are liable to, by a consideration of their countenances. Such an amount of experience as is necessary to lay down the Typical Thorax belonging to each class of diseases, unfortunately I have not yet had, but certain differences in the shape, have struck me, (as patients from time to time, have come under my notice,) which lead me to a belief, that an exceedingly accurate diagnosis of the Type of malady to which the patient is liable, may be recognised, nay even more than this, that the very disease

itself is often written in the length, breadth, or undulations of the Thoracic Parietes, as expressions on the countenance are indications of the thoughts of the mind.

1st A Broad short almost circular Thorax, expanded inferiorly, and the two cones into which the Lungs project superiorly blunted, the Intercostal spaces narrow, the Sulci at the Infra-Clavicular regions superficial, the situations of the Liver and Heart not distinguishable, the expansion greater in proportion than the elevation movement, and the Respirations slow.

Such a chest occurs in men, who are muscular, of a Sanguinebilious temperament, Lethargic in disposition, capable of undergoing an immense amount of fatigue, but incapable of great activity.

2^d A Long Oval Thorax, flattened from before backwards, the Lungs mounting comparatively high above the 1st Rib, the Intercostal spaces wide, the Sulci beneath the Clavicles deeply marked, the Liver and Heart having their characteristic external markings, the Costal angles acute, when placed beside the 1st Condition, and the Elevation movement greater in proportion

to the Expansion during Inspiration.

This is the Thaxos peculiar to men of activity, of an energetic disposition, of a Sanguine-nervous temperament, of no great muscular power, but whose nervous excitability supports them, under the most trying circumstances, and to which succeeds a lassitude equal in amount to the excitement with which they were previously buoyed up.

Supposing these two Definitions of Typical Chests to be correct, which from my own limited sphere of observation, I believe to be the case, then a Classification of Diseases of the Chest is already made, according as they may be referred to one or other of these two Divisions.

In the 1st Diseases of a purely Inflammatory and Haemorrhagic Type, find the most suitable soil in which to deposit their seeds, and here are all the elements necessary to feed their raging course. Congestions also are not uncommon, which are often converted into Inflammations or critical Haemorrhages.

Whilst in the 2nd Disorders of the Glandular System, Asthma, Tuberculosis &c find a fitting resting place.

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Here I necessarily confine myself only to those conditions which may affect the chest and its contents, leaving altogether out of the question many tendencies to diseases of other organs of the Body, which might be classed under these two heads.

Diseases of the Adult Chest which produce alteration in the form of its Walls.

1st Those which affect the Parietes of the Thoracic cavity and its lining membrane.

Pleurodynia and Intercostal Neuralgia.

Here the left side of the chest is the usual seat of mischief, and from the pain which the patient suffers on moving the injured side, he is necessitated to keep it as still as possible, this produces flattening of that half of the Thorax, more apparent than real, from want of elevation of the ribs. The Diaphragm makes up for the loss of Thoracic Respiration by extra exertion, and the abdominal movements are much increased.

Abscess of the Walls. -

cannot be mistaken for anything else unless it be an Aneurismal Tumor, which by its

pressure, has caused absorption of the Sternum and its protrusion from the Thoracic Cavity. In such a case as this, (one of which occurred to me, in the course of my Dissecting Studies at University College London) the expansile feel of the Tumor, synchronous with the Heart's impulse, the peculiar thrill, to which if there be added the whizzing sound, the extreme pulsation of the Carotids, and the general disturbance of the circulation, not a doubt would be left on the mind as to the existence of Aneurism.

Pleurisy.

In the first stage of this disease, as in all others where there is pain in the chest, there is flattening of the side affected, with want of motion in the Parietes. After a time ~~when~~ as the fluid becomes poured out in more or less quantity, bulging either over the whole side, or at its lower part becomes evident. The Heart is pushed out of its normal place, The Liver with the Diaphragm is speed downwards, so low sometimes, into the Abdominal cavity, that it lies altogether beyond the margins

of the ribs. Respiration is impeded, the Lung's seat below is occupied by the fluid, and its substance is pushed upwards; so that whilst Respiratory motions are nearly or altogether lost at the Base of the Thorax, yet above, at the Infra and Supra-clavicular regions the movements are tumultuous, struggling to make up for the deficiency of available air-containing-tissue. As the fluid becomes absorbed, the Chest recovers its accustomed size; but the Plastic exudation matter within the cavity, now begins to contract, producing retraction of the Chest-wall, irregular and sharp elevations and depressions; the interspaces between the ribs are lost, their width diminished, and frequently as Dr Walsh observes "the ribs, the shoulder and the nipple fall, the Scapula^{is} tilted outwards at its inferior angle, the movements of the Chest are hindered or gone on the diseased side, and the size of the cavity^{is} permanently diminished. It must not be supposed that in the description given above, every case of an attack of Pleurisy with retraction could be referred without variation; for in no study is it so difficult to lay down fixed inevitable rules,

from which there is no deviation, as in the signs and symptoms of disease in the human body; and yet when an approximation to an ideal Type is attained, a foundation although feeble exists, on which to build up the superstructure of future experience; - Therefore according as the amount of Lymph is greater or less, and as it is endowed with much or little contractile power, so will the deformity of the Chest be increased or diminished.

Hydrothorax

A result of Pleurisy, but often caused by some organic lesion of the Heart, Liver, or Kidneys, or as an accompaniment to General Dropsy. Inspection shows a similar condition of Thorax as in the effusion stage of Pleurisy, only when resulting from any cause, except inflammation of the Pleural lining, the Hydrothorax is commonly double, whilst in that, it usually is single.

If the quantity of fluid is great, the Bulging is general and equally distributed over the whole surface, the Intercostal spaces are obliterated, or if not so, widened, they are pushed outwards from pressure of the contained fluid,

the Thoracic Viscera are displaced from their normal positions, and if the Heart's apex-stroke can be seen at all, it is often $\frac{1}{2}$ inch to 1 inch, or even 1 $\frac{1}{2}$ inch outside the nipple line.

Hæmothorax and Empyema

Little light is thrown upon these two conditions by Inspection; it is true that a fluid, if it is in pretty considerable quantity, may be discovered in the Thoracic-cavity, but the nature of such a fluid it is impossible to determine by this means; one small and inefficient help to Diagnosis is given by the fact, that if such accumulations do occur, they usually result from direct injury to the ribs causing laceration of the Pleura lining ~~the~~ the cavity; hence the collection of fluid, of whatever kind it may be, is confined to one side of the Chest.

The alteration in the size and shape of the Thorax is precisely similar to that which is found in Hydrothorax.

2nd ^{ref} Those Diseases which affect the Bronchi and Lungs, and so cause displacement of the Parietes of the Chest, and alterations in their movements.

Branchitis. Acute.

In slight cases, the absolute shape of the Thorax is not concerned, but the movements of its walls are considerably modified. If there is great Dyspnoea, the Inspiratory action is increased in extent, raising the upper ribs beyond their usual limits, whilst the Sternum and the lower ribs recede. The Expiratory efforts are slow, prolonged, and of small use; the Lungs are not sufficiently emptied of air before an other Inspiration takes place, and the continuation of this recharging with air the Lungs, already occupied by too large a quantity of residual air, is to throw the pressure back upon the Bronchi and cause dilatation of these tubes. The effect of such a condition upon the chest, is to produce a general bulging of its parietes with widening of the intercostal spaces.

But if the air-cells are unable to withstand the force exerted upon them by the increased weight of the superincumbent column of air and give way, Interlobular Emphysema occurs, which effects the same change in the

outward form of the Thorax as in the last case. If as happens in some forms of Bronchitis, there is extension of Inflammation to the Lung substance, with obliteration of the smaller Bronchial tubes, there is recession of the Intercostal spaces over the seat of mischief with flattening of the chest wall.

Emphysema.

No matter of what kind, necessarily, produces distention of the Thoracic cavity, either as a whole or in part; but there is an exception to this general rule viz. That sometimes there exists an Emphysema, described by Dr Walsh, accompanied with Atrophy of the Lung, which kind tends rather to retraction of the Parietes than their increase in girth. There seems to have been a difference of opinions amongst writers on this subject, as to whether the Intercostal spaces were obliterated or not. Now in all cases that have existed for any time, except in the Atrophous Emphysema mentioned above, and that an opportunity occurs for examination after death, the Lung surface is found indented and grooved

by the ribs, and between these markings, projections of its substance, which formerly filled the inter-spaces; such enlargements as these, must from their position have prevented retraction of the Intercostal spaces, if not have caused their absolute distention and obliteration, and especially, when it is taken into consideration, that probably at each Inspiration these enlargements become dilated, or if not so, yet the contiguous portions of the Lung are inflated, and by this means the substance is forced (being next the Walls of the Cavity) into the spaces between the ribs. - Supposing a Bladder partially filled with air is placed in the Bony Thorax, in such a manner that it occupies the whole of the interior, if then the inflation of the Bladder is continued, the effect of such a pressure as is exerted by this Elastic and Expansile body, is to separate the ribs from one another and push them forward, whilst the Bladder is thrown into projections between the ribs. - Just such a series of effects, appears to me, to take place in the living subject when a distended emphysematous

Lung, occupying more than its allotted space in the chest, is charged with air by an Inspiration; in this condition it overfills the cavity and so separates, enlarges, and obliterates the Intercostal spaces.

The Typical form of the Chest of an Emphysematous patient is round, barrel-like. The Infra and Supra clavicular hollows are converted into protrusions and a swelling is frequently observable above the clavicle, rising into the neck in size as large as an egg. - If Emphysema is partial it usually occupies the Apices of the Lungs, and this is the great cause of the roundness of the Thorax: the Lungs are brought together in the Anterior Mediastinum Sup^r and force the Sternum upper Ribs and Cartilages forwards and upwards, making the anteroposterior depth of the cavity almost as much above as below. The Shoulders are raised and the patient, as if by instinct, seeks every means for putting his accessory respiratory muscles in play, by fixing their attachments. The expansion of the Chest-walls is considerably diminished, but their elevation is increased. The Ribs fall back after the

Inspiratory effort slowly and with difficulty, whilst the contained air gradually filters out from the Lung causing unusual lengthening of the Expiratory motion.

Spasmodic Asthma.

Although there is no absolute deformity of the Chest, yet on looking at an Asthmatic patient, it is impossible to mistake the peculiarity of position and seeming alteration in shape of the Thoracic cavity. - During the paroxysm the hands involuntarily clutch any object that may be near to fix them, or the sufferer sitting up, rests his whole weight on his hands and arms, and by this means throws his shoulders up, and gives a fixed point for the accessory muscles to work from during his exaggerated Respiratory efforts. The Head is inclined forwards, the Chest Walls work tumultuously and quickly, but without any seeming expansible movement. There is flattening of the Thorax from before backwards, and during each Inspiration the Sternum and Cartilages of the lower ribs recede. The extreme distress depicted on the countenance is also very characteristic of the disease.

Pneumonia.

There has been a great diversity of opinion, as to whether the size of the Thoracic cavity is increased or diminished during any part of the course of Acute Pneumonia. In the engorgement-stage it might naturally be inferred that from the actual increase in the size of the Lung itself, the chest-wall would bulge at the usual site of disease viz. the Inferior lobe, but this does not appear to happen in all cases; for more frequently the enlargement occurs at the upper part of the Chest, over the sound Lobe of the Lung, where the extra respiratory work has to be accomplished.

In the Red hepatisation-stage there is very little alteration in the calibre of the chest, unless from the limited amount of Respiration that is carried on in the diseased Lung, there is a flattening of that part, with a want of elevation of the ribs. The Expansile movement is also diminished on the affected side, whilst on the sound one is an increase of Respiratory action, and vice, by contrast, making the diseased side appear smaller than it really

is. — In the Resolution-stage, if Pleurisy has existed conjointly with the Pneumonia, no doubt there is an alteration, both in the shape and size of the Thorax, as happens when Pleurisy alone attacks a patient; and, since Pneumonia rarely if ever occurs unaccompanied by Pleurisy, I think that it is a fair conclusion to come to, that the retraction and irregularity after seen in Pneumonia patients during or after recovery, is due to the latter and that the former has little or nothing to do with such results.

The shape of Chest therefore, to which this disease gives rise is not very characteristic, for the complication with Pleurisy, alters and modifies the form and motions of the Parietes to such an extent, that in no two cases of Pneumonia, are they similarly affected. The expansile movement however is almost invariably the first to show by its diminution, the commencement and advance of this affection, and as resolution and recovery progress, so the expansion returns, unless pleuritic exudation prevents.

Phthisis.

The appearances that at once strike the examiner on inspection of a Typical Phthisical Chest are, the flattening of the Infra claviculae regions, and the deep hollowing out of the Supra claviculae regions; the effect of which is, to cause unusual protrusion of the Clavicles; the Shoulders are rounded the Scapulae raised, and the neck forms a decidedly obtuse angle with the Spine at the 7th Cervical Vertebra. The whole cavity of the Chest is contracted anteroposteriorly, and the Ribs appear to be depressed anteriorly in respect to their position to the Spine; whilst the Sternum is brought in closer apposition to the Spine, and the Intercostal spaces are narrowed.

Such is the condition of a case advanced in the disease, at all events during the period ⁱⁿ which Tubercular matter has infiltrated the Apices of the Lungs, and probably has commenced to soften and break down, provided there is no Emphysematous complication.

Frequently deepening of the Intercostal spaces occurs, and it is said by some writers

that in other patients they have found protrusion of the Interspaces, but when such did happen, it would obviously be on account of some Emphysema of the Lung.

Often in the earlier stages of Phthisis, there is so little flattening of the Infra claviclar regions that it is scarcely perceptible, but almost without exception, in Phthisical patients that I have seen, there existed elevation of the Scapulae and the peculiar projection forwards of the Head and Neck.

As the disease is, in its earlier, or more advanced condition, so the form of the Thorax may be less, or more implicated, but in whatever condition it is, the modifications of shape can always be derived from the Typical Phthisical Chest before described.

The alterations in the movements of the Parietes are characteristic; Expansion is almost or entirely lost, the Sternum advances but slightly and the imperfect Respiration is carried on by means of the Diaphragm, yet the elevation, movement is not at all diminished in extent, but often increased, carrying up the Scapulae and Clavicles at each Inspiration "en masse" with the Ribs.

In some cases during an Inspiratory effort, retraction of the Walls occurs at the Apices of the Lungs, and this produces an undulatory appearance over the surface of the Chest, in the female it is more evident than in the male, as the upper thoracic Respiration is greater in the former than the latter.

The Left Lung seems to be ordinarily the one that is affected, but unless the disease is checked in its course the right soon becomes implicated and then the Inspection of one side of the Chest differs little from that of the other.

Pneumothorax.

Is commonly a result of Phthisis, produced by the bursting of an Abscess of the Lung into the pleural cavity, and this communicating with a Bronchus. There are many other sources of this complication Surgical as well as Medical, but however caused, whether such a cause produces simple Pneumothorax, or the combination of Fluid and Gas in the Sac of the Pleura, the inspection signs differ very little, if at all.

Usually general bulging is seen over the

whole of the diseased side, with prominence of the Intercostal spaces, and which is greater than where fluid alone is poured out into the Chest. The Lungs are pushed upwards and the Heart may be carried almost anywhere over the Anterior and Left side of the Thorax, so that the apex beat, if it is seen at all, may sometimes appear unusually high up, or even in the Axilla. In a case of Hydro-pneumothorax of a man in the University College Hospital, in which he had been tapped four times to relieve the urgent Dyspnoea, the motions of the ribs before the operation amounted to almost nothing, the Intercostal spaces were deepened, and the Sternocleidomastoidei became tense and prominent during each Inspiration. The Diaphragmatic movements were much increased and the whole Thorax was rounded and the Sternum and Cartilages of the ribs arched.

Cancer of the Lung.

Dr. Walshe describes the disease as confined to one side, which is equally flattened; he says the Respiratory movements are not much diminished, and the Intercostal spaces but slightly deepened. But Inspection alone appears

to be of less value in this case than others, and never having seen a patient labouring under this malady, I am not therefore aware of the actual influence it may have over the motions of the chest.

The causes which give rise to Inspection signs of the chest, may be classified in the following manner.

1st That Deformities of the Thoracic cavity, in children can be traced.

(a) To the natural cartilaginous condition of the Paries, in conjunction with any circumstances which produce unequal pressure on any part of their surface.

(b) To the tendency to insufficient deposition of Calcareous matter in the Clavicles, Ribs and Sternum.

(c) To the occurrence of any impediment, in the course of the Respiratory apparatus, to the free entrance and exit of air.

2nd That Deformities in the adult may be traced -

(a) To Diseases of childhood which have left marks of their existence in the form of the Chest even to adult life.

8) To Diseases of the Lungs, Bronche. and Pleura which cause permanent or temporary enlargement of the Thoracic Cavity.

9) To such conditions of the Lungs and Pleura as may terminate in retraction with irregularity of the surface of one side; or those which may produce simple flattening of the whole or of any part of one, or both sides of the chest.

The causes of the deviation of the movements of the Chest-walls from their natural and healthy state during Inspiration & Expiration, are able to be referred to the following morbid conditions.

1st The descent of the Diaphragm will be in part if not altogether prevented, by any diseases in the Abdominal cavity, which may cause over distention of its Parietes. From spasmodic contraction of the abdominal walls. From Inflammation of the Peritoneal lining, or of any of the contained viscera; and from Hystical supersensibility of the integument occurring in young Females. In the first two cases the Diaphragm cannot descend, in the last two the patient will not permit it to do so, in

consequence of the pain occasioned by the smallest movement of the Abdomen.

2nd Rigidity of the walls of the Thorax, from calcification of its cartilaginous constituents, will impede the due elevation of the ribs and their proper gliding movement on each other. This is a frequent source of limited Respiratory movement in old persons.

Whatever diseases produce enlargement of the whole cavity of the Chest as Hydrothorax, Hæmothorax, Hydro-pneumothorax, Emphysema &c. will prevent the descent of the Diaphragm to its normal level, in consequence of its increased expansion laterally, and will likewise obstruct the expansile anteroposterior and lateral movements of the ribs.

3rd If the free entrance of air to the Lungs, is impeded in any way, at the commencement of the Respiratory passages, as in Croup, Laryngismus Stridulus, Pertussis, Tonsillitis, Tumors of the fauces, pressure from without upon the Larynx or Trachea, there will be recession of the Sternum and lower Cartilages, and instead of a proper amount of anteroposterior expansion during each Inspiration,

an absolute diminution in the size of the Chest cavity will be the result. In Spasmodic Asthma this decrease in the expansion from before backwards is most remarkable, and especially at the base of the Thorax. In Phthisis one of the best signs of a deposition of Tubercular matter at the apex of the Lung, is the loss of expansion at that part. But besides the last-mentioned disease all consolidation of the Lung substance as from Pneumonia, Cancer, or Atrophy, will hinder the Antero-posterior dilatation as well as ^{the} carrying upwards and forwards of the Cartilages and Sternum.

4th Loss of all the movements of the Chest on one side, are produced, by great Pleuritic exudation binding the two surfaces of the Pleura tightly together, by the pain found in Pleurisy, Pleurodynia, and Intercostal neuralgia; by great consolidation of the Cartilages to the Sternum and to the ribs, from calcification of their constituents, sometimes from extensive Tubercular or Cancerous deposits.

I cannot help alluding to the singular case of M. Groux, the man in whom there is a deficiency of the Sternum, or rather an absence of development of the two halves of that bone.

The motions of the Chest struck me, as being so characteristic of the results of Atmospheric pressure exerted on the yielding walls of such a constructed cavity as the Thorax.

In ordinary Respiration, the Groove in the site of the absent Sternum is little altered in depth or width; but when he makes a forced Expiratory effort, then, immediately a deepening of the Sulcus becomes very marked, the two lateral edges of what represents the Sternum, are approximated and rolled inwards, and the whole chest presents an exaggerated appearance of "Pigeon breast." The cause of this seems to me obvious. In ordinary Respiration the balance of pressure exerted on the Interior and Exterior of the Chest is equal, that is to say, as the Cavity gradually expands under the influence of the Inspiratory act, the air as gradually enters to fill up the increased space caused by such a muscular movement. Sure, no inequality could occur in the Chest walls from the exact counterpoise of the medium within and without the cavity. Now let him Expire

deeply, the balance is lost, he won't let the air in by the *Rima Glottidis*. and therefore the weak Central Parietal portion of his chest is carried inwards from the external pressure of the Atmosphere; and so powerful is this agency that the very margins of the sulcus are pressed inwards.

A practical conclusion to be deduced from the examination of this man, and one perhaps which may be of essential service in Auscultation is, that in coughing the position of the several parts of the Lung are materially altered; we see that when this man coughs, a *Tumor* appears at the upper part of the fissure as large, nearly as an egg, and supposed to be the Lung projected over the Great Vessels at the Base of the Heart, with probably a part of the Mediastinum and its contents. I believe this to be due to contraction of the Abdominal muscles, elevation of the Diaphragm with retraction of the Inferior ribs, so pushing the Lungs upwards and forwards. Now supposing the *Stethoscope* be applied over a Cavity in the Lung and the patient

cough, how is it possible that we should hear the various varieties of Cavumnous Cough, Amphoric Cough, and the like, when the part of the Lung containing the conditions necessary for the production of such effects is carried from beneath the Stethoscope for 2 or 3 inches; the distance we may judge of from the size of the Tumor, suddenly appearing in a part where no tumor existed before, and by the amount which it projects into the Axial Sulcus.

This fact seems to me to modify very much any deductions which might be made, as to the condition of the Lungs in disease, from the sound of the cough during auscultation. ”

The Female Thorax differs in some respects from the Male, especially in regard to the manner in its performance of the Respiratory Act. Whilst the Breathing, in the Male is accomplished both by Costal and Abdominal Expansion and Contraction, the Abdominal predominating, in the Female there is also Costal and Abdominal

Expansion and Contraction, but the Costal is in excess.

This, in some measure, modifies the effect which certain diseases may have upon the motions of the Chest, and requires consideration in diagnosis; for if a Male suffers from Phthisis and the Expansion of the Chest at the InfraClavicular region is lost or diminished, although a very good Symptom (taken with others) yet it is not of so much import as in the Female, in whom the Expansion of that region is further developed, and therefore any lessening in the play of the Parietes is more obvious and denotes greater mischief. Probably Female Dress, may have something to do with the production of this kind of Respiration, and in this instance perhaps is of little moment. But the way in which the Lower ribs and Abdomen are secured in by that horrible instrument of torture, Stays, impedes the motions of Respiration at the base of the Chest, and so throws the work upon its upper part; hinders the functions

of Digestion and circulation, forces the abdominal organs from their proper positions, marks the Liver with Sulci, by pressure of the superimposed ribs, and so far ^{from} being beautiful in its effect upon the general contour of the body, destroys its graceful curves and sweeping undulations, to produce an angular, illshaped, and unsymmetrical part, in a whole which left to nature would be elegant and useful.

Pulse and Respiration in health & disease.

In connection with Inspection, the frequency of the Respirations may here be mentioned, but as the number of Respirations in a given time taken by themselves are of little value, I shall now discuss the Ratio which the Pulse bears to the Respiration in Health and Disease.

Pulse and Respiration Ratio in Health.

Both the Pulse and the Respiration are materially affected in frequency, by the position of the Individual, by the period of the day, by sleep or wakefulness, and by the quantity and kind of food and

drinks taken.

Position exerts a manifest influence, as may be seen by the following experiments which were made in respect to this matter.

Standing-

	Mr. H. average ratio	Mr. G. average ratio	Mr. L. average ratio	Master W. age 13, average ratio
Pulse	84-80	92-80	80-72	72
Respiration	20 = 1 to 4.1	28 = 1 to 3.1	16 = 1 to 4.75	16 = 1 to 4.5
<u>Sitting</u> :				
Pulse	80-72	76-72	68-64	72
Respiration	20 = 1 to 3.75	28 = 1 to 2.68	16 = 1 to 4.13	16 = 1 to 4.5
<u>Lying down</u> :				
Pulse	64	64	60	72
Respiration	16 = 1 to 4	24 = 1 to 2.67	12 = 1 to 5	14 = 1 to 5.14

From this it appears, that the Pulse in Health, is more easily altered in regard to its frequency than the Respiration, being diminished in proportion, more between Sitting and Lying, than between Standing and Sitting.

The number of Respirations were the same both in Standing & Sitting, although numerous trials were made to test the accuracy of the above statements.

In all the four cases the Respirations were

diminished in frequency by the recumbent posture; In three of the individuals there was a decrease of 4 Respirations per minute, whilst in the last experiment on a Boy of 13 years, only a diminution of 2 Respirations was found, but the pulse was unaffected by position.

I was at a loss to understand why, in the case of Mr G. there should have been such an extensive range in the number of the Pulse viz. from 64 Lying to 92 Standing, and especially as he appeared to be in perfect health; the Respirations also were so markedly increased. But on questioning the friends of this young man, it turned out that a year or two previously, he had suffered from Cholera, which in all probability had even then, much to do with the habitual alteration in the Pulse and Respiration Ratio.

The Ratio seems to be Standing from 1 to 4 to 1 to 4 $\frac{1}{4}$. Sitting 1 to 3 $\frac{1}{2}$ to 1 to 4. Lying 1 to 4 to 1 to 5 $\frac{1}{2}$. - The average Standing 1 to 4 Sitting 1 to 3 $\frac{3}{4}$ Lying 1 to 4 $\frac{3}{4}$.

In the Evening the Pulse becomes less

frequent, whilst the number of Respirations increase, hence the ratio of the Respirations to the Pulse is increased.

But although Food & Stimulants, Sleep & Exercise increase or diminish the actual number of the Pulse & Respirations, yet for the most part, the ratio remains unchanged, because both are increased or diminished simultaneously, so that the proportion between the two is the same. But as the Pulse in health seems to be subject to a greater variation than the Respirations from external causes, so in Disease the Respirations are more easily influenced than the Pulse, and have a more extended range.

Dr Guy of London gives an instance of so few a number of Respirations per minute as 6, whilst the greatest number he had witnessed was 140. The first was a case of poisoning by Opium in a female, in a deep sleep, but not Comatose; whilst the second occurred in a patient labouring under Hypocic Asthma.

Phthisis.

At the commencement of this disease, when few symptoms would give evidence of the presence of Tubercle, the Pulse and Respiration become altered, the relation of the number of Respirations to the Pulse is increased, and in two cases of this kind mentioned by Mr Hutchinson this fact is confirmed.

Incipient Phthisis.

Age 30.	Respiration 28	Age 39	Respiration 40
	Pulse 100 = 1 to 3.6.		Pulse 100 = 1 to 2.5.

Phthisis.

Age 60 Respiration 40
Pulse 60 = 1 to 1.5. This is

obviously a rare case; but an almost similar ratio was observed in a patient by Dr Watson; (but then there were some Hysterical Symptoms present) viz. Respiration 32
Pulse 80 = 1 to 1.54.

The average ratio which he mentions as the result of his experience is 1 to 3, and this fully bears out the indications which other writers give, although they do not actually state the

ratio.

From the commencement to the termination of the disease the ratio between the Pulse and Respiration remains nearly the same, but both are greatly increased in frequency. In Chronic Phthisis the ratio is almost the same as in health, only as in the last case the frequency of Pulse and Respiration is increased.

Capillary Bronchitis.

Both the Pulse and Respiration are increased in frequency, but the Respiration more so than the Pulse, so that at the commencement of the attack the ratio is usually 1 to 3 and if the disease goes on to a fatal termination, it increases to 1 to 2.5 and 1 to 2.25; just before death the number of the Respirations frequently diminish, so as to reduce the ratio to 1 to 4.5.

Pneumonia.

Here in the first onslaught of the malady, the Respirations are increased proportionally considerably more so than the Pulse; and this often is the symptom which at once attracts attention. The Respirations are from 30 to 80

per minute, whilst the Pulse is not more than from 90 to 108 per minute. The average however is at the beginning about 1 to 2.5. which may increase to 1 to 1.7.

Man Aged 30.

At commencement - Pulse 74
Respiration 24 = 1 to 2.17.

On the third day began to resolve and the Respirations immediately dropped, without the Pulse however being at all altered, the ratio then was -

Pulse 74
Respiration 24 = 1 to 3.1.

Man aged 33.

5 days after } Pulse 108
attack } Respiration 30 = 1 to 3.6. Here the

general febricula was allayed in some measure, and with it the number of the Respirations, before admission, It was deemed proper to bleed the patient to fainting, the effect of which was upon the - Pulse 108 - soft & full
Respiration 24 = 1 to 4.5.

The Respirations never sank after this but the Pulse daily returned step by step to its proper standard, and when he was perfectly

recovered it was- Pulse 80

Respirations 24 = 1 to 3.33.

Therefore the decrease of the Ratio, whether gradual or not, is the best and surest sign of approaching recovery.

Percussion.

The names applied to the sounds elicited on striking the Chest are so vague and diversified, that almost every writer on this subject seems to possess a nomenclature peculiar to himself, and the Student lost in the mazes of Dulness, Clearness, Emptiness, Fullness, Tympanitic, Non Tympanitic, is not only uncertain of the exact meaning thus implied, but wishing to put his own experience of Cases into words, is utterly unable to find terms adequate for the expression of his ideas.

I should wish to attempt here a nomenclature and Classification of the sounds produced by striking the Chest or Abdominal Walls, through the agency of the natural Fleximeter and Hammer viz. The two first Fingers of the right hand applied sharply to the first or second Finger of the Left closely pressed against the part to be percussed -

All Sounds produced by Percussion are of two kinds Solid or Hollow.

The term Solid at one extremity of the

of the scale, is heard by percussing an absolutely Solid substance as the Thigh, a Block of Wood &c. The Hollow at the other extreme limit, as indicating the condition of entire Hollowness, is heard in Percussion of the Stomach distended, but not to its full extent, by air.

The Solid Sound.

Is of two Types. 1st Of a Wooden Character, i.e. in its most prominent effect, tubby, short, nonpersistent, and similar to that elicited by striking a Block of Wood, or the Living Skull.

2nd Of a Flesh or Muscular Character, as is found in the Sound given forth by percussing the Thigh; and this is long, nonvibratile, and diffused, when compared with the last. But both are essentially Solid. - To the first of these Sounds I would suggest the name Woodsolid to the second Fleshsolid.

All circumstances, of whatever kind, which will cause consolidation of the contents of the Thorax, provided such consolidation be limited within its Bony Walls, generate a percussive note of the Woodsolid type.

But supposing the same conditions to occur in the Abdominal cavity, or in a part of the Chest—uncovered by its Bony Parietes, as at the Supra Clavicular regions, then the percussive note is of the Fleshsolid type, and obviously so; for in the first case vibrations are produced in the Bone analogous to those of Wood, whilst in the second the vibrations are negatived by the Muscular substance covering the sound-producing body; hence the last variety of note is heard.

The Hollow Sound.

Has also two typical Characteristic Sounds. The 1st Similar in Type to the Woodsolid, and elicited on percussing an Emphysematous Lung through the bony Thoracic Wall, hence the term Woodhollow would be applicable; "Wood" as denoting the peculiar type, whilst the "Hollow" expresses the condition of the Lung in the Chest. Percussion over the Chest, containing a Gas of any kind, as in Pneumothorax, yields a like Sound.

The 2nd Has for its Type the Flesh note, and percussion of the ~~stomach~~ Stomach through the

Abdominal Walls gives out the sound of
Hollowness with the muscular character, and
this sound conveys its meaning in the
same Flesh-hollow.

To determine the correctness of these expressions,
I percussed a solid block of Wood, and found
it to elicit precisely the same character in
tone as percussion of the Liver through the
Thoracic Walls, during a forced expiration;
the conditions of the block and the subject
being as much as possible the same, both
placed on the floor over a beam, the patient
on his back. But on percussing the Thigh
or the Lumbar Muscles, a totally different
character in the sound was heard, which
led me to a belief that I was not incorrect
in Cypipyzing all sounds under the two
Heads of Flesh-sounds and Wood-sounds.

Whenever the muscular substance is of
considerable thickness over the Walls of the
Chest as at its posterior aspect in the Supra-
spinatus and Infra-Spinatus fossa of the
scapula, or where the Mammary Glands
are of large size, and there is great deposit

of Adipose tissue, then the quality of sound produced on percussion, is from the Wood character somewhat merged into the Flesh; but the true type of note can always be produced by the firm compression of the superstructure against the Bony substructure.

But as this nomenclature is intended to comprise the extreme limits of the conditions necessary for the Production of perfect Solidness and perfect Hollowness, it is essential that there should be certain intermediate expressions which should indicate any advance from the Solid to the Hollow: and vice versa.

Percussion over the Middle and Anterior part of the Lung on the right side at about the 3rd Rib in a healthy subject elicits a sound which I should take to represent the Medium between Solid and Hollow, and therefore might be called Hollow Solid, and in this case, as such a sound is generated in a Situation where the Type is Woody the prefix Wood would indicate its quality.

It is obvious, from what is above stated, that this sound would be the starting point from which all others are derived, and in proportion as they may have more of the Solid or Hollow character, so the character may be described, in the one direction by the terms Monosolid, Disolid and Solid; in the other by the terms Monohollow, Disohollow and Hollow.

Best
Compound
Word

The use of some such language as this is apparent in the comparison of the two sides of the chest. For instance, if we examine a patient labouring under the first stage of Phthisis, in which according to the usual language, we say one side is duller than the other, such a statement does not indicate the amount of dullness, nor differ in the least from a similar statement which would be made respecting a Lung perfectly consolidated without an atom of air containing tissue in its substance. Now percussion in the two cases gives a dull or Solid sound, but the difference in degree is manifest. In a very early stage of Phthisis

The Solidity is slight on the one side but yet perceptibly more ^{evident} + than on the other: therefore when I say that the Left Infra-clavicular region is Monosolid whilst the Right is Hollowsolid; I mention the degree to which the Left Lung has departed from its Healthy condition towards solidification, and supposing the solidification still further to have increased, but yet Hollowness not to be entirely absent, it could then be indicated by Disolid, and beyond this, air containing tissue being utterly lost, the sound would be Solid.

If any disease should increase the Hollow character beyond the limits of Health, then the sound produced on percussion containing less of the Solid and more of the Hollow type, would be Morehollow; - if two of Hollow to one of Solid by the term Dihollow, and the perfect Hollowness of a further extension of the same condition, would be adequately expressed by the extreme limit of the Scale viz. Hollow.

Perussion Sounds then, as I have here classified them, may be divided into Solid and Hollow. And the peculiar type of a sound whether it be Solid or Hollow, is indicated by the prefix Wood or Flesh. The Woodsolid and Woodhollow being heard chiefly over the Thoracic parietes, whilst the Fleshsolid and Fleshhollow are generally elicited from the Abdomen. Again the Healthy percussion sound produced over a considerable thickness of air containing Lung substance is here taken as the standard, that is as the intermediate sound between the Hollow and the Solid, hence called Hollowsolid. Deviations from this medium standard, whether towards the Hollow, or towards the Solid character, are denoted according to their degree by Morehollow, Dihollow and Hollow; and by Moresolid, Disolid and Solid.

But besides the qualities of sounds before mentioned, there is in addition, that peculiar character given to a sound termed Resonance; it implies such

a state of the Parietes, that the vibrations into which the air is thrown in the contained viscera, are reciprocated by them: so that the Resonance is imparted to any sound producing body by the connection in which it stands to surrounding media. For instance, if I stretch a Violin string on a solid Block of Wood between any two points, and make it to vibrate by striking or drawing the Violin Bow across it, a sound is produced which is generated by the vibrations of the string alone, and these are at once communicated to the air, and such a sound so far from being Resonant or Resounding, is thin, meagre, and diffused, If instead, the string be stretched across a Box, an entirely different quality of tone is heard; it is heightened, rounded fuller and from its reflection from wall to wall, besides the intensity which is superadded through the vibrations of the sides of the Box, it becomes Resonant. Every violinist ^{knows} the effect which the Box has on the quality of Tone which he elicits from the strings of his Instrument, how the difference in Wood, shape of the Belly

or Back, improves or impoverishes it.
The celebrated Cremona or Stadicarius is
bought up at a fabulous price, for this effect
alone.

Now, in this sense, the term Resonant
seems to me best employed, ^{as} implying
a quality of sound which the Walls of
the chest with the superficial stratum of
the air containing Viscus, give to the
vibrations generated in the air of such
a Viscus.

If a lung be taken from the chest, and
percussed on a Solid body, a certain sound
is produced, which is short, and tubby,
although indicative of the presence of air.
Percuss a similar Lung through the
Thoracic Parietes after death, and the
tone is fuller, more intensified and
Resounding, and yet the condition of
the Substance of the two Lungs is the
same; hence the difference in the quality
must be caused by the vibrations of
the yielding Parietes in addition to
those produced in the Lung itself, -

Taking it for granted therefore, that Resonance is given to the Percussion sound through the medium of the Parietes, the finger (used as the Mæximeter, besides the tone elicited by striking) has the sensation conveyed to it of perfect or imperfect-resiliency of the chest Walls, and of the amount to which they are capable of vibrating on Percussion.

A Tympanitic character is given to a Hollow sound when the Parietes of the body percussed, are thin and moderately stretched by the contained Gas, so that they may have sufficient play for the production of vibrations. This quality of Note, it seems to me impossible to produce through the Bony Walls of the chest, for Tympanitism I take to be that kind of sound which is typically heard when a Drum Head is struck, and the idea that it conveys to the mind is as of the vibrations of a stretched membrane. It is evident that such can only be produced over the distended Stomach, Intestines, or that part of a Lung left uncovered by its Bony Parietes. For

Percussion over the Bony Parities gives the character of Resonance (as mentioned before) a different quality to that now described.

From the account here given of the sounds and their characteristics, the following list may be made of those actually to be employed.

		Character of Sounds
(a)	Solid.	Wood : Flesh
(b)	Disolid.	} Resonant. Tympanitic
(c)	Monosolid.	
	Hollow-Solid.	
(a)	Monhollow.	" " "
(b)	Dihollow.	" " "
(c)	Hollow.	" " "

In description for the sake of abbreviation the word "Sound" is left out, as also the terms "Wood" and "Flesh" unless where it seems essential to the understanding of these characters.

Percussion of the chest in Health.

The Infra Clavicular Regions present the true typical Resonant Wood Hollow-Solid sound. The Right-Mammary Region differs very little in its character from the

above, until at the 5th Cartilage where two sounds are produced, according to the degree of firmness of Percussion.

A slight stroke elicits a Monosolid, whilst a strong stroke — — Disolid sound.

Along the Right border of the Sternum the Heart makes the sound Monosolid or Disolid according to the depth of Percussion.

The Right Infra Mammary Region yields a Wood Solid. The Left Mammary Region is Resonant Hollowsolid, except near the Sternum where it becomes Disolid and at the Nipple Monosolid.

Two characters of sound are to be heard here, as on the Right side, by a difference in the forcibleness of Percussion.

The Left Infra Mammary Region: Is Solid at its outer and lower part, but gradually as we percuss inwards there is a Monosolid which reaches to a Monohollow.
1st the Spleen, 2nd a portion of Lung, and 3rd the Stomach produce these gradations.

The Clavicular Regions at their centre

give a Resonant Hollow-Solid; at their
Inner extremities a Resonant Monohollow
from the effect of the Trachea, and towards
the Humerus the Note shades off from Monosolid
into Solid.

The Supra Clavicular Regions have
generally the Flesh Character and are for
the most part Monohollow, especially
when the Trachea is percussed along with
the Lung. A Wood character may be
heard by pressing the Pleximeter somewhat
backwards and downwards, from the Tone
of the Rib coming out through the Lung
substance.

Percussion over the Sternum at its
upper part produces a Dihollow sound,
this diminishes passing downwards, till
at the 4th Costal Articulation a little
to the left of the median line a Solid sound
is given out - which generally continues
to the Base of the Xiphoid Cartilage where
pretty forcible percussion yields a Monosolid
from the presence of the Stomach heard
through the Liver. Below this spot the

Stomach gives a Hollow solid, Mon-
hollow &c, as it is more or less full.

Percussion over the Posterior aspect of the
Chest produces characters of sound from
the Monosolid to the Solid, and the
thicker the superjacent Structures, as at the
Supra Scapular and Infra Scapular
regions, the greater is the degree of Solidity.

Percussion over the Posterior surface of
the chest is never so Resonant as on the
Anterior aspect, in consequence of the thick
layer of muscles which cover its Walls.

The "Cruit de pot fêlé" of Laennec.

Is a good sign in the Adult of the existence
of a circumscribed Cavity in the Lung containing
air, & communicating at one point with the
external air. "It seems essential that the
posterior wall of the cavity should be backed
up by an unyielding substance, whilst the
Anterior wall is flexible and yielding. It
can be produced in Children at the end of
Expiration without any disease being present." (Dr Jenner)

Dr
Jenner
Virens
Owells

A very common source of fallacy, and which I have seen, in others, and experienced myself repeatedly, is, that the finger used as the *Fleximeter* contains between it and the surface of the part about to be percussed, a small quantity of air, which on the application of the blow, is forced from beneath the finger, and a sound very like the cracked pot sound is heard.

Diseases of Lungs causing different degrees of Solidity, in Percussion Sound at the Infra-Clavicular Regions.

Phthisis, Cancer. extending downwards.
Mammary Regions.

Pleurisy commonly in the Plastic Exudation and Effusion stages, but it may occur at any part of the Chest Walls.

In Hemothorax, Hydrothorax Solidity is variable.

Posteriorly at the Bases of Lungs. In Pneumonia Solidity extends upwards till it may occupy the whole Lung. Sometimes at the Base of the Lung Bronchitis causes a Monosolid sound. Fluid of any kind in the Cavities of the Pleura, produces a difference in the extent of Solidity.

Supra Scapular Regions are, more or less Solid in Phthisis and Cancer.

A Suprabundance of Adipose tissue on the Walls, Oedema of Walls, Intercostal Neuralgia, and Pleurodynia, will give rise to a variable Solid sound. The thickness or thinness of the Parietes, and the fact of their being yielding or non-yielding, will also have a similar effect.

Diseases of the Lung &c. causing different degrees of Hollowness in Percussion Sound.

Supra & Infra Clavicular Regions.

Emphysema of Lung, Pneumothorax, Interruption to the function of any other part of the Lung substance, Dilatation of the Bronchi, a Cavity filled with air, as in Phthisis.

At the Inferior part of the Chest Anteriorly, Bronchitis sometimes causes an increase in Hollowness. But it is almost impossible to limit the site of Solidity or Hollowness, to any one part of the Chest, for as many patients so many differences in the extent or limitation of their Maladies, nevertheless Solidity at the Infra Clavicular region is one Symptom of Phthisis as Solidity at the base is

one Symptom of Pneumonia.

When a Clinical Clerk under Dr Jenner, I had an opportunity of witnessing a case, in which a peculiar Hollow sound was heard on percussion at the Infra Clavicular Region of the Right side. The patient was a Child, age 5, who had been admitted into University College Hospital after an attack of Scarlet fever, and there was suffering from general Anasarca. A day or two after admission he was attacked by Pneumonia which occupied the lower lobes on the right side and partly the Left. There was also effusion into the cavity of the Pleura. The Cough was very severe and he could not lie down, The Respiration Bronchial in character over the Posterior part of the Right Lung. He died 13 days after admission and when in the Dead house, percussion was made over the whole Chest. From the Base of the Right lung, dulness extended upwards posteriorly to the Supra Spinatus fossa; Anteriorly it reached to about the upper level of the Mammary region, when the Note suddenly was described as becoming

Tympanitic.

On opening the Chest, a large quantity of fluid was found in the Right Pleura, little in the Left. The Lungs broke down easily at their bases, and were of a dusky red colour, whilst at the upper part there was, especially on the right side, collapse of the substance. This accounted for the Phenomenon of the Tympanitic Note as laid down by a rule which Akoda gives in his work on Auscultation, who says "That when the lower portion of a Lung is entirely compressed by any pleuritic effusion, and its upper part reduced in volume, the percussive sound at the upper part of the Thorax is distinctly Tympanitic."