Compendium of percussion & auscultation : and of the physical diagnosis of diseases affecting the lungs and heart / by Austin Flint.

COMPENDIUM
OF
PERCUSSION & AUSCULTATION.

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By Austin Flint, M.D.

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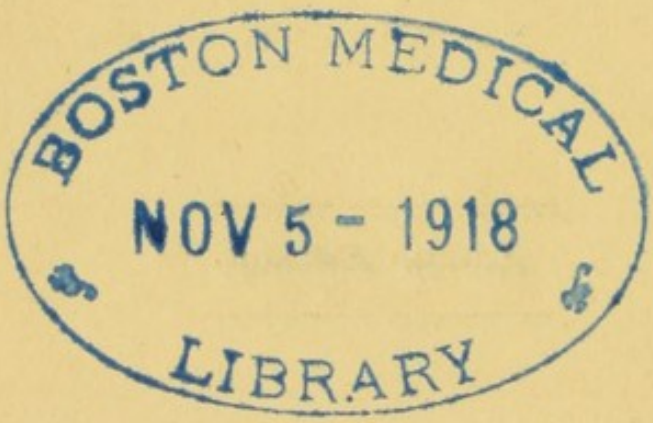

PREFACE.

THIS little compendium was prepared several years ago, by request of a medical friend who intended it for insertion in an annual Physician's Visiting Book. The latter publication was abandoned, and the compendium was published by itself. It has been found convenient in aiding to memorize physical signs, by the private pupils of the writer, and by others, and it has been reprinted in compliance with a demand for this purpose. It is designed, not as a substitute for works treating of auscultation and percussion, but, on the contrary, to promote the study of treatises which consider fully these and the other methods of physical exploration, together with the diagnosis of diseases affecting the respiratory organs and the heart.

COMPENDIUM OF PERCUSSION AND AUSCULTATION,

AND OF

THE PHYSICAL DIAGNOSIS OF DISEASES AFFECTING THE LUNGS AND HEART.

By AUSTIN FLINT, M.D.

SUMMARY OF PULMONARY SIGNS OBTAINED BY PERCUSSION AND AUSCULTATION, THEIR DISTINCTIVE CHARACTERS AND SIGNIFICANCE.*

PERCUSSION.

Normal Vesicular Resonance.—The resonance obtained by percussing the healthy chest, varying in intensity in different persons, the pitch low, the quality peculiar and distinguished as vesicular. The resonance greater, the vesic-

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* For a fuller exposition of the distinctive characters and significance of the signs obtained by percussion and auscultation, *vide* the work of the writer entitled "*A Practical Treatise on the Physical Exploration of the Chest and the Diagnosis of Diseases affecting the Respiratory Organs.*"—*2d Edition. Vide*, also, article in *Am. Jour. of Med. Sciences*, No. for April, 1862.

ular quality more marked, and the pitch lower at the left than at the right summit of the chest in front.

ABNORMAL MODIFICATIONS OF THE NORMAL VESICULAR RESONANCE.

Diminished Resonance, or Dulness.—The resonance less and the pitch higher than the normal vesicular resonance. Denotes that the proportion of solids, or of liquid, over air within the chest, is greater than in health. Incident to partial solidification of lung in pneumonia, tuberculosis, &c., to pulmonary congestion, to moderate or small pleuritic effusion, to moderate œdema of lung, and to collapsed lobules.

Absence of Resonance, or Flatness.—Resonance wanting, i.e. complete abolition of sonorousness. Denotes absence of air within the part of the chest percussed. Incident to complete solidification of lung, to liquid effusion, to great œdema of lung, and to tumor within the chest.

Tympanitic Resonance.—A resonance devoid of the vesicular quality which distinguishes the normal vesicular resonance. The intensity of the resonance either greater or less than in health. It is invariably higher in pitch than the normal vesicular resonance. It proceeds from air in the pleural sac, or in pulmonary cavities, or in the large bronchial tubes sometimes on percussion over the upper lobes; and it may be conducted from the stomach or colon by solidified lung. Incident to pneumo-thorax, to some cases of solidified lung, and to tuberculous excavations.

Amphoric Resonance.—A variety of tympanitic resonance, characterized by a musical intonation like that produced by blowing over the open mouth of a phial. Incident to some cases of pneumo-thorax, and to tuberculous cavities; occasionally produced over solidified lung.

Cracked Metal Resonance.—Another variety of tympanitic resonance. Incident to tuber-

culous cavities, but occasionally produced over solidified lung, and sometimes in the infra-clavicular region of young subjects in health.

Vesiculo-Tympanitic or Exaggerated Resonance.—The resonance of greater intensity than in health; the character not vesicular as in health, nor purely tympanitic, but presenting the tympanitic and the vesicular quality mixed in variable proportions; the pitch raised in proportion as the tympanitic quality predominates. Incident especially to dilatation of the air-cells in emphysema, to lung containing air and floating on liquid within the chest, and to a healthy lobe when its fellow is solidified.

AUSCULTATION.

1. *Auscultation of the Respiration.*

Normal Vesicular Murmur.—The respiratory sound obtained by auscultation in health. The murmur produced by the act of inspiration is more or less intense, low in pitch, and has a peculiar quality distinguished as vesicular. The murmur with expiration is not always present;

when present it is much shorter than the inspiratory murmur, less intense, still lower in pitch, and it has a simple blowing quality. These characters vary considerably, within the limits of health, in different persons. The murmur with inspiration is more intense, more vesicular, and lower in pitch at the left than at the right summit of the chest in front. The expiratory sound is not infrequently prolonged at the right summit, especially in females, and it may be more or less high in pitch.

ABNORMAL MODIFICATIONS OF THE NORMAL VESICULAR MURMUR.

Exaggerated Vesicular Murmur.—Increased intensity of the murmur on the healthy side when the respiratory function on the opposite side is compromised by disease, as in cases of pleurisy with large effusion, pneumonia, etc. The characters of the murmur, irrespective of intensity, not essentially changed; called, also, *supplementary* and *puerile* respiration.

Diminished Vesicular Murmur.—The mur

mur weakened, but its distinctive characters otherwise not materially affected. Incident to dilatation of the air-cells or emphysema, and to cases of bronchitis.

Suppressed Respiratory Murmur.—Absence of any sound with the respiratory acts. Incident to large pleuritic effusion, to some cases of solidification of lung, and to tumor within the chest.

Bronchial or Tubular Respiration.—An inspiratory sound devoid of the vesicular quality, and, in place thereof, a quality distinguished as tubular, the pitch higher than the inspiratory sound in the normal vesicular murmur, and the intensity variable; an expiratory sound as long as, or longer than, the sound of inspiration, the pitch higher than that of the inspiratory sound, the intensity usually greater, and the quality, like that of the inspiratory sound, tubular. These characters of the bronchial, as compared with the normal vesicular respiration, are identical with the characters of the normal laryngeal

and tracheal respiration. The bronchial respiration denotes complete or considerable solidification of lung, from morbid deposit, as in pneumonia, tuberculosis, etc., or from condensation, as when compressed by liquid effusion, and in cases of collapse.

Broncho-Vesicular Respiration.—The vesicular quality of the inspiratory sound more or less diminished, but not entirely wanting as it is in bronchial respiration; the quality approaching the tubular in proportion as the vesicular quality is diminished, and the pitch raised in proportion as the tubular predominates over the vesicular quality. The expiratory sound more or less prolonged, its intensity increased, its quality tubular, and its pitch raised in proportion as the inspiratory sound has less of the vesicular and more of the tubular quality. This abnormal modification is distinguished, as the name implies, by the mixture, in various proportions, of the characters of the bronchial and the normal vesicular respiration. The presence

of any of the vesicular quality in inspiration shows that the respiration is not bronchial, but broncho-vesicular. The characters may approximate, on the one hand, to the bronchial, or, on the other hand, to the normal vesicular respiration; and between these extremes there is every degree of gradation. The sign denotes partial solidification of lung. In proportion as the solidification approximates to an amount sufficient to give rise to the bronchial respiration, the characters of the broncho-vesicular will approximate to the bronchial. On the other hand, the characters will approximate to the normal vesicular when the solidification is slight. By means of this sign, therefore, not only the existence of solidification, but its amount, may be determined. This has been called *rude*, *rough*, and *harsh* respiration. Its intensity may be greater or less than that of healthy respirations.

Cavernous Respiration.—An inspiratory sound, devoid of vesicular quality, not tubular but blowing, and low in pitch; an expiratory

sound, lower in pitch than the inspiratory. (Contrast these characters with those of bronchial respiration.) Heard within a circumscribed space, and not infrequently surrounded by bronchial respiration. Denotes passage of air into and from a cavity with flaccid walls.

Amphoric Respiration.—A variety of cavernous respiration characterized by a musical intonation resembling the sound produced by blowing over the mouth of an empty phial. Denotes generally pneumo-thorax and perforation of lung, but sometimes due to a tuberculous cavity with rigid walls.

ADVENTITIOUS SOUNDS, OR RALES, PRODUCED WITHIN THE AIR-CELLS, BRONCHIAL TUBES, PULMONARY CAVITIES, AND THE PLEURAL SAC.

Crepitant Rale.—A *dry*, very fine, crackling sound, heard only with the act of inspiration, and, if heard in only a part of this act, always confined to the latter part. Almost pathognomonic of pneumonia. Heard especially in the first stage of that disease. Occasion-

ally incident to œdema of the lungs and to hæmoptysis. Produced within the air vesicles and bronchioles.

Sub-Crepitant Rale.—A *moist*, fine, bubbling sound, conveying the idea of small bubbles, heard with either inspiration or expiration, or with both acts, not infrequently intermingled with the crepitant râle. Produced within the bronchial tubes of small size. Incident to capillary bronchitis, œdema of lungs, hæmoptysis, and heard in the resolving stage of pneumonia.

Moist Bronchial or Mucous Rales.—Bubbling sounds due to the presence of mucus or other liquid in the bronchial tubes of larger size than those in which the sub-crepitant râle is produced. They are called *coarse* or *fine*, according to the size of the tubes in which they are produced. Incident to bronchitis and other affections giving rise to the presence of liquid in the tubes.

Sibilant and Sonorous Rales.—Dry sounds, frequently musical, produced by narrowing of

the calibre of the bronchial tubes. If high in pitch, they are sibilant or whistling, and generally produced within small-sized tubes. If low, they are sonorous or snoring, and produced within large-sized tubes. Incident to asthma especially; also to bronchitis.

Cavernous Rale or Gurgling.—A moist sound produced by the bubbling and agitation of liquid within a cavity. The name *gurgling* is descriptive of the character of the sound. Its situation is circumscribed.

Pleural Friction Sound.—A sound of grazing, rubbing, or grating, due to the movements, in opposite directions, of the costal and pulmonary pleural surfaces with inspiration and expiration. The sound is more or less intense, dry, appears to be near the ear, heard usually with both acts of respiration, and conveys to the mind the idea of friction of roughened surfaces. The sound is generally not continuous, but interrupted; that is, there is a series of friction sounds with either inspiration or expiration, or in

both acts. Denotes that the pleural surfaces are roughened by lymph or other deposit. Incident to pleurisy, especially after the absorption of liquid effusion.

Metallic Tinkling.—A series of tinkling sounds, with expiration, or inspiration, or both acts; also produced by speaking and coughing. Denotes air and liquid within a space of considerable size. Incident chiefly to pneumo-hydrothorax; sometimes produced within a large tuberculous excavation.

2. *Auscultation of the Voice.*

Normal Vocal Resonance.—A diffused, distant resounding of the voice in health, accompanied with more or less vibration of the walls of the chest, or fremitus. Varies much in degree in different healthy persons. Always louder on the right than on the left side of the chest.

Normal Bronchial Whisper.—A blowing sound heard with whispered words, at the upper part of the chest, in front and behind, and more

marked in proportion as the ear approaches the site of the primary bronchi. The sound varies considerably in intensity in different healthy persons. It is louder at the right than at the left summit of the chest; but the pitch is somewhat higher on the left side. It is comparatively feeble, and often wanting, over the middle and the lower third of the chest. Its characters correspond to those of the expiratory sound in forced breathing.

ABNORMAL MODIFICATIONS OF VOCAL RESONANCE AND BRONCHIAL WHISPER.

Bronchophony.—The voice concentrated, near the ear, raised in pitch, and more or less intense. Denotes solidification of lung, either complete or considerable.

Whispering Bronchophony.—A high-pitched, tubular sound, with whispered words, near the ear, and more or less intense. The signification the same. This and the preceding sign are correlative with bronchial respiration.

Exaggerated Vocal Resonance.—The resonance of the voice diffused and distant as in health, but its intensity abnormally more or less increased. Denotes a degree of solidification insufficient for the production of bronchophony.

Exaggerated Bronchial Whisper.—A sound, with whispered words, abnormally intense, but not so intense, and not so acute nor so near the ear, as in whispering bronchophony. Has the same significance as exaggerated vocal resonance. This and the preceding sign are correlative with broncho-vesicular respiration.

Pectoriloquy.—Transmission of the speech, i.e. articulate words, to the ear. It may be either bronchophonic or cavernous.

Cavernous Whisper.—A sound, with whispered words, notably low in pitch, and blowing or hollow in quality, as compared with whispering bronchophony. Denotes a cavity.

Amphoric Voice or Echo.—A musical

sound like that produced by blowing into an empty bottle. It may accompany or follow the loud voice or whispered words. Incident especially to pneumo-thorax, but also occasionally to tuberculous cavities.

Ægophony.—A modification of bronchophony, consisting in tremulousness of the sound, causing it to resemble the bleating of a goat. Occasionally heard in pleurisy and pneumonia.

Diminished and Suppressed Vocal Resonance.—The resonance either more or less abnormally lessened or wanting. Incident especially to pleuritic effusion, and to pneumothorax.

PHYSICAL SIGNS INVOLVED IN THE DIAGNOSIS OF PULMONARY AFFECTIONS.

Bronchitis Affecting the Large Tubes.—Normal vesicular resonance on percussion. Sibilant or sonorous râles, or both, in early stage, on both sides of the chest; feebleness of respiratory murmur. Temporary suppression

of murmur over portions of chest. Subsequently mucous râles on both sides of the chest. The râles very variable, not always present, coming and going, and changing their situation. The vocal resonance normal.

Bronchitis Affecting the Small Tubes.—Normal vesicular resonance on percussion. Subcrepitant râles on both sides of the chest. Weakened or suppressed respiratory murmur. Normal vocal resonance.

Asthma.—Resonance on percussion either normal or increased. Sibilant and sonorous râles diffused over the chest, often loud enough to be heard at a distance. Normal vocal resonance.

Pulmonary Emphysema.—Vesiculo-tympanitic resonance on percussion over both upper lobes, generally most marked at the left summit in front. Respiratory murmur feeble or suppressed. The inspiratory sound shortened (deferred). The expiratory sound frequently prolonged, but not tubular nor raised in pitch.

Sibilant and sonorous râles frequently present. The superior and middle thirds of chest, in front, bulging, and the lower part contracted. Marked and characteristic deformity of chest in some cases. Vocal resonance not affected.

Pleurisy with Effusion and Empyema. —If the pleural sac be filled either with lympho-serous liquid or pus, universal flatness on percussion over the affected side. Generally absence of respiratory sound except over the compressed lung at the summit, and, here, bronchial respiration. Enlarged dimensions of the affected side, if the liquid be sufficient to dilate the chest, as shown by mensuration or the eye. Deficient respiratory movements or immobility. The intercostal spaces on a level with the ribs, and sometimes bulging. Dislocation of the heart, its site being shown by the impulse or sounds. Normal vocal resonance diminished or suppressed. Vocal fremitus wanting. Exceptionally, the bronchial respiration emanating from the compressed lung is more or less diffused, and

it may extend over the whole of the affected side.

If the chest be partially filled, flatness or dulness on percussion from the base of chest, extending upward to a horizontal line, denoting the level of the liquid, when the patient is sitting or standing. Resonance extending below this line, in front, in some cases, when the patient lies on the back, owing to a change of level of the liquid. Vesiculo-tympanitic resonance frequently over the lung above the level of the liquid. Diminution or absence of respiratory sound below the level of the liquid. Above the liquid the respiration broncho-vesicular, and sometimes bronchial near the liquid. Vocal resonance and fremitus diminished or wanting below the level of the liquid, and both may be exaggerated above the liquid. Bronchophony or ægophony sometimes near the level of the liquid. Diminution of intercostal depressions may be apparent when the chest is partially filled. Exaggerated respiration on the healthy side when the chest is partially, and still more when it is

completely, filled. Pleural friction sound sometimes prior to and with liquid effusion; frequently during and after absorption of liquid. A characteristic contraction of the chest on the affected side follows chronic pleurisy with considerable effusion.

Pneumo-Hydrothorax.—Tympanitic resonance extending either over the whole of the affected side, or a certain distance from the summit, when the patient is sitting or standing, with dulness or flatness extending below to the base. The relation of dulness or flatness and tympanitic resonance changing when the patient lies on the back, owing to change of level of the liquid. The tympanitic resonance sometimes amphoric. Amphoric respiration and voice frequently present, also metallic tinkling. Splashing sound on succussion, and this sound frequently amphoric. Suppression of respiratory murmur and of vocal resonance. Dilatation of the affected side in certain cases, with deficient motion, and abolition of intercostal depres-

sions. The heart removed from its normal situation.

Hydrothorax or Dropsical Pleural Effusion.—The signs denoting presence of liquid in both pleural sacs; the amount of liquid often greater in one side. The evidence of liquid afforded by its change of level with the change of position of the patient is almost always available.

Pneumonia.—In first stage, slight or moderate dulness over the affected lobe, and frequently, but not invariably, the crepitant râle, the latter being almost pathognomonic. In second stage, marked dulness, or flatness, over a space corresponding to that occupied by the affected lobe or lobes. Vesiculo-tympanitic resonance over the upper lobe if the lower lobe be alone affected, and over the lower lobe if the upper be alone affected. The relation of resonance and dulness or flatness not changing with change of the position of the patient. Bronchial respiration generally present in this stage, and usually bronchophony with the loud voice, together

with whispering bronchophony. Persistence of crepitant râle in some cases. In stage of purulent infiltration, dulness or flatness continuing, with mucous râles. During resolution, progressive diminution of dulness, the bronchial respiration giving place to the broncho-vesicular, the latter approximating to, and at length eventuating in, the normal vesicular murmur. During this period, sometimes a return of the crepitant râle, and frequently a sub-crepitant râle. Bronchophony, during resolution, giving place to exaggerated resonance, and the latter diminishing and ending in the normal vocal resonance.

Collapse of Pulmonary Lobules in Connection with Bronchitis in Children, or Lobular Pneumonia.—Dulness on percussion, greater or less, and more or less diffused, oftenest on the posterior surface of chest on both sides, with either diminution of respiratory murmur or feeble bronchial respiration. Mucous or subcrepitant râles on both sides.

Pulmonary Œdema.—Dulness or flatness on percussion more or less diffused over the posterior surface of the chest, on both sides. Subcrepitant, sometimes intermingled with crepitant, râle. Absence of respiratory murmur, or feeble broncho-vesicular respiration. No change as regards the situation of, or space over which the dulness extends, with change of position of the patient.

Pulmonary Gangrene.—Dulness or flatness on percussion over a space more or less circumscribed, oftenest over the scapula. Absence of respiration within this area, or bronchial respiration, together with, in some cases, either bronchophony or increased vocal resonance. Mucous or subcrepitant râles within the area of dulness or flatness and its neighborhood. Cavernous signs may be present after the sloughing away of a circumscribed portion of lung. The signs of pneumo-hydrothorax become developed if perforation of the lung take place.

Pulmonary Apoplexy.—Dulness or flatness

on percussion within a circumscribed space or in circumscribed spaces. Absence of respiratory murmur within the limits of the extravasations, or bronchial respiration. Mucous or subcrepitant râles.

Carcinoma of Lung.—The signs of solidification, greater or less in degree, and more or less diffused. Sometimes contraction of one side and lessened respiratory movement.

Pulmonary Tuberculosis.—If the deposit of tubercle be abundant, dulness on percussion at the summit of the chest on one side, greater or less, with bronchial or broncho-vesicular respiration, bronchophony or exaggerated vocal resonance, whispering bronchophony or exaggerated bronchial whisper, and increased vocal fremitus. Frequently, depression below the clavicle, and diminished respiratory movement in that situation. The signs of solidification may show a less amount of deposit at the other summit. Exceptionally, the signs may denote a tuberculous deposit at the base. A cavity, or

cavities, may be shown by cavernous respiration, amphoric respiration and voice, cracked metal or amphoric resonance on percussion, and gurgling.

If the deposit be small or moderate, slight dulness on percussion at the summit on one side, or sometimes a vesiculo-tympanitic resonance due to emphysematous lobules in the neighborhood of the deposit, with diminished respiratory murmur, or a broncho-vesicular respiration, increase of vocal resonance, and exaggerated bronchial whisper.

Accessory signs important in determining the existence of a deposit of tubercle, when the amount is small or moderate, are, mucous or subcrepitant râles, limited to the summit on one side; a friction-murmur, crumpling or crackling sounds, interrupted or jerking respiration, limited in like manner; also, abnormal transmission of the heart-sounds, and a subclavian bellows murmur.

Diaphragmatic Hernia.—Tympanitic reso-

nance on percussion not otherwise explicable, with suppression of respiratory murmur, and the presence of the characteristic intestinal sounds.

PHYSICAL SIGNS INVOLVED IN THE DIAGNOSIS OF AFFECTIONS OF THE HEART.

Aortic Obstructive Lesions.—An organic endocardial murmur accompanying and following the first sound of the heart (systolic); loudest at, or limited to, the base of the organ; generally propagated into the carotid arteries; its maximum of intensity in the second intercostal space on the right side near the sternum, provided the normal relation of the aorta to the chest walls be preserved; the aortic second sound of the heart, as heard in the situation just designated, weakened or lost, if the aortic valves be damaged.*

* An aortic direct murmur may be inorganic or anæmic. This is to be inferred when the murmur is variable in its intensity, or intermittent, unaccompanied by weakening of the aortic second sound, the heart not enlarged, and murmurs heard in the large arteries and in the veins of the neck.

Aortic Regurgitant Lesions.—An endocardial murmur accompanying and following the second sound of the heart (diastolic); loudest just below the base of the heart on the left side of, or over, the sternum, propagated thence downward toward the ensiform cartilage. The aortic second sound weakened in proportion as the aortic valves are defective. This murmur is frequently conjoined with the aortic direct murmur.

Mitral Regurgitant Lesions.—An endocardial murmur accompanying and following the first sound of the heart (systolic); loudest at, or limited to, the apex of the organ; extending more or less to the left of the apex laterally around the chest, and heard at the lower angle of the scapula; not propagated into the carotids. The aortic second sound of the heart weakened in proportion to the amount of regurgitation, and the pulmonic second sound (heard in the left second intercostal space near the sternum) intensified in proportion to the amount of hypertrophy of the right ventricle induced by the

mitral lesions. A mitral murmur, beginning with the first sound of the heart, does not always denote mitral regurgitation. Such a murmur may be distinguished as a mitral systolic murmur, or an intra-ventricular murmur.

Mitral Obstructive Lesions.—An endocardial murmur not connected with the second sound of the heart, but preceding the first sound (præ-systolic), and abruptly arrested at the occurrence of the first sound; the murmur limited to a circumscribed space around the apex of the organ; the character frequently peculiar, resembling the sound caused by throwing the lips or tongue into vibration with the breath of expiration. The pulmonic second sound of the heart intensified, if the mitral lesions have led to hypertrophy of the right ventricle. This murmur is frequently associated with the mitral regurgitant. It does not denote mitral lesions, in all cases, when it is associated with aortic regurgitant lesions.

Tricuspid Regurgitation.—An endocardial

murmur with the first sound of the heart (systolic), heard within a circumscribed area at the lower part of the sternum. Frequently, if not generally, associated with pulsation or undulation in the jugular veins.

Lesions at Pulmonic Orifice.—An endocardial organic murmur with the first sound of the heart (systolic), at the base of the organ, in the left second intercostal space; not propagated into the carotids.*

Endocarditis in cases of Articular Rheumatism.—An endocardial murmur, loudest at the apex of the heart, i.e., a mitral systolic murmur, developed (i.e., not having existed previously) in connection with articular rheumatism.

Pericarditis.—A pericardial friction murmur

* A pulmonic direct murmur is frequently inorganic or anæmic. This is to be inferred when the circumstances are present which have been mentioned in connection with an inorganic aortic direct murmur.

(exocardial), distinguished from an endocardial murmur by the following points: Conveying the idea of rubbing or friction; apparently superficial; usually two sounds for each beat of the heart; varying in intensity and character during auscultation; its relation to the heart sounds not definite, or the rhythm irregular; not propagated much, if at all, beyond the limits of the heart, and frequently limited to the superficial cardiac space; intensified notably by firm pressure with the stethoscope; disappearing, in some cases, during the stage of pericardial effusion, and finally ceasing after pericardial adhesions have taken place. Generally associated with endocardial murmur or murmurs.

The existence and amount of pericardial effusion are shown by increased dulness or by flatness in the pericardial region, within a triangular or pyriform space, corresponding to the size and figure of the distended pericardial sac; the base situated a little below the level of the apex of the heart, and the summit extending toward or quite to the sternal notch; the præcordia some-

times projecting, and the intercostal depressions pushed out; the impulse of the heart lost, or, if appreciable, raised to the fourth or third intercostal space; the heart-sounds weakened and distant; the first sound short and valvular like the second sound.

In chronic pericarditis, with large effusion, the dilatation of the pericardial sac is shown by dulness or flatness extending laterally, more or less, from the præcordia, on both sides of the chest, together with the other signs just mentioned.

Hypertrophy of Heart or Enlargement with Predominant Hypertrophy.—The apex-beat lowered from the fifth intercostal space to the sixth, seventh, or eighth, according to the amount of enlargement, and often removed to the left of its normal situation one, two, or three inches. The apex-beat in some cases notably strong, but in other cases weak, in consequence of the change in form of the heart. Impulses in the intercostal spaces above the apex-beat, and these notably strong. Heaving movement of the whole of the

præcordia, with more or less power. Enlargement of the superficial cardiac space, as shown by percussion, and the degree of dulness notably greater than in health. The left margin of the heart extending without the left nipple, as determinable by deep percussion. The intensity, length, and booming quality of the first sound of the heart, over the apex or body of the organ, increased.

If the hypertrophic enlargement exist without valvular lesions (which is rare), absence of organic murmur.

Enlargement of the Heart with Predominant Dilatation.—The fact of enlargement and its degree determined by the same signs as when the enlargement is due to predominant hypertrophy. The predominance of dilatation shown by feebleness of the apex-beat and of other impulses; by absence of heaving of the præcordia, and by the diminished intensity of the first sound, and its being short and valvular like the second sound. Absence of organic murmur if valvular lesions do not coexist, which is rare.

Fatty Degeneration of the Heart.—Persisting feebleness of the apex-beat or other impulses; weakness of the first sound, with shortening, and valvular quality like the second sound, these signs not being referable to dilatation.

Functional Disorder of Heart.—Absence of organic murmur and of enlargement, and the heart-sounds normal in all respects save intensity.*

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* For a fuller exposition of the physical signs, etc., of affections of the heart, *vide* a practical treatise on the diagnosis, pathology, and treatment of these affections, by the writer.