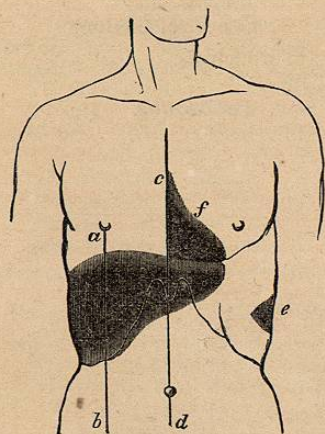


Fig. 35.



Area of hepatic dullness, viewed anteriorly. *a, b.* Right mammary line. *c, d.* Median line. *e.* Splenic dullness. *f.* Cardiac dullness. (Murchison.)

nostician, moreover, it is necessary to understand the *principle* of the exploration, and as far as possible, the *reason* of the meaning of every sign.

Two or three very simple facts explain the use of percussion in diagnosis.

When any solid body is struck, the sound elicited varies according to its *material, form, size,* and, if *hollow,* the *condition of its walls,* and that of its *contents.*

The human thorax (or abdomen) having a certain general form, size, condition of its walls, and proportion of air, blood, and solid structure in its contents, will give forth a certain degree and kind of resonance.

Whatever alters either the *state of the walls* or the *proportion of air, fluid, and solid* contained within them, gives rise to an alteration of percussion-resonance.

Alteration of the state of the *walls* of the thorax seldom occurs in disease in such a way as to modify percussion-resonance. Changes in the proportion of **solid, liquid,** and **air,** in the lungs and pleural cavities, as well as in the similar relations of the heart and pericardium, aorta, etc., are frequent. The *more air,* and the *less liquid or solid* contained within the part of the chest which is percussed, the clearer and fuller the resonance, and, as a general rule, the less the resistance to the finger. Any *increase* in the relative proportion of *liquid* (as in pleuritic effusion), or of *solid* (as in tuberculization), must cause a duller or lesser degree of resonance, and, other things being equal, a greater degree of resistance.

Thus, local **diminution of clearness and duration** of the per-

a sledge-hammer motion from the *shoulder.*)

In using percussion as a means of physical diagnosis, we note—

1. The **clearness or dullness** of the resonance produced.
2. The **duration** of the resonance.
3. Its **special character.**
4. The **degree of resistance** felt.

Certain terms are in common use to describe particular characters of resonance; as, *wooden sound, thigh sound, stomach sound, tympanic* or drum-like resonance, *amphoric* or pitcher-sound, *bruit de pot fêlé* or cracked-pot sound, etc.

It is indispensable, in commencing the study of percussion (or other modes of physical diagnosis), to become familiar with the *normal and natural* sounds observed in *health.* To be anything more than a *routine* diag-

cussion-sound, with **increased resistance** of a portion of the walls of the chest, occurs in—

<i>Pneumonia;</i>	Pulmonary apoplexy;
<i>Pleurisy;</i>	Hydrothorax;
<i>Tuberculization;</i>	Cancer, etc.

The extent over which dullness on percussion is observed sometimes *varies* with the *position of the patient.* This is practically important in the diagnosis of *pleuritic effusion, empyema, hydrothorax,* and *hydropneumothorax.*

**Increased clearness and duration** of resonance, with **decrease of resistance,** occurs in—

<i>Pneumothorax;</i>	Emphysema;
<i>Atrophy of lung;</i>	Anæmia;
<i>Hypertrophy of lung;</i>	Emaciation.

**Increased clearness of sound with increase of resistance** is observed when there is a *tubercular cavity near the surface of the chest, with its outer wall thin, hard, and adherent to the pleura.*

**Tympanic** resonance of the chest is present in—

<i>Pneumothorax;</i>
Emphysema;
Pulmonary atrophy, etc.

**Amphoric** resonance, when there is a large tubercular cavity, with *solid and tense* walls near the surface of the chest.

The **cracked-pot** sound indicates an *anfractuous* cavity, *i. e.* one whose walls are broken or incomplete, communicating with the bronchial tubes. It may be imitated by clasping the hands loosely and then striking the back of one of them upon the knee.

Skoda's classification of percussion-sounds has the merit of great simplicity. He distinguishes them as—

Full; empty ( <i>large and small</i> resonance);
Clear; dull;
Tympanic; non-tympanic;
High; low (pitch).

A sound may be at the same time *full and dull,* or *clear and empty* (small).

Skoda does not value very highly the information obtained from differences in the *pitch* of percussion-sounds. Other authorities (as Flint) differ from him, however, upon this point; and with good reason.

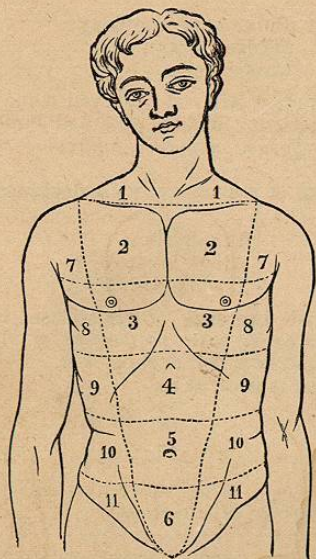
## AUSCULTATION.

In **auscultation,** as well as in percussion and other modes of physical exploration, a comparison is made not only with the normal standard, but *between the two sides* of the chest.

The *stethoscope* is, in auscultation, generally speaking, a superfluous instrument. If any be used, a simple wooden tube with one end slightly expanded is the best. Camman's *double stethoscope*<sup>1</sup> is approved by Dr. Flint; but it requires a good deal of

<sup>1</sup> First invented by Dr. Leared, of London, 1851.

Fig. 36.



1. Supraclavicular. 2. Infraclavicular. 3. Mammary. 4. Epigastric. 5. Umbilical. 6. Hypogastric. 7. Axillary. 8. Infra-axillary. 9. Hypochondriac (right and left). 10. Iliac (right and left). 11. Inguinal (right and left). (Paxton.)

The sounds detected by auscultation of the chest are divided into **respiratory** and **secretory** sounds, **friction-sounds**, and modifications of **vocal resonance**.

#### Respiratory Sounds.

Normal vesicular murmur;  
Puerile respiration;  
Prolonged expiratory sound;  
Harsh, tubular, blowing;  
Bronchial, and cavernous;  
Amphoric respiration.

#### Secretory Sounds.

##### Dry.

Sibilant rhonchus (hissing or whistling);  
Sonorous rhonchus;  
Dry crackle.

practice to use it well. Snelling's<sup>1</sup> addition of an India-rubber rim is an improvement to it, as well as to the ordinary stethoscope.

The beginner must familiarize himself with the *natural breathing-sound*, as heard when the ear is placed over any part of the *lungs*, and with that heard in the *sternal* and *interscapular* regions. The latter is **bronchial**, the former is the **vesicular murmur**. The tubular, blowing character of the respiration as heard in the bronchi, and its soft, breezy nature when the ear is placed over the lungs, are essential elements in diagnosis by auscultation.

The pulmonary vesicular murmur is always *louder in infants and children*, except when they are asleep or very quiet. **Puerile** respiration is, therefore, the name given to **exaggerated** breathing-sound in the adult.

In a healthy state of the lungs, the *expiratory* murmur is very faintly heard. A *prolongation*, and increase in loudness, of the sound of expiration, is sometimes a sign of disease (tuberculization).

The sounds detected by auscultation of the chest are divided

##### Moist.

Fine crepitation or crepitant râle;  
Coarse crepitant râle (mucous râle);  
Humid crackle or gurgling;  
Metallic tinkling or dropping sound.

**Friction-sounds** are peculiar to pleurisy and pericarditis, at the stage of adhesion, or, at least, of effusion of plastic lymph.

Modifications of **vocal resonance** are—

*Bronchophony*;  
*Pectoriloquy*;  
*Aegophony*.

The above is, essentially, the classification commonly adopted by auscultators. That of Skoda is, however, still more simple. He divides *respiratory* sounds into—

Vesicular;  
Bronchial;  
Amphoric;  
Indeterminate.

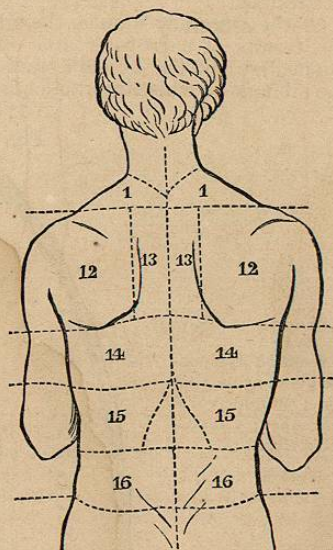
Skoda denies, also, the validity of the distinction between *pectoriloquy* and *bronchophony*; and shows that *aegophony* cannot have the precision of meaning supposed by Laennec and others to belong to it.

No description of the sounds of auscultation can do more than *guide* and *assist* their actual clinical study. For this purpose the simplest and clearest terms are, of course, the best.

The **normal respiratory murmur**, as heard in the *lungs*, is well illustrated by Skoda as resembling (during inspiration) the sound caused by narrowing the opening of the mouth and then drawing in the air. The *consonant* of this murmur is *f* or *p*. The *expiratory* murmur may be represented as somewhat between *f* and *h*. That of the *larynx*, *trachea*, and *bronchi*, by the guttural *ch*, or between that and *h*. The vesicular murmur is slightly louder (Flint) and lower in pitch, on the left side.

By **bronchial respiration** as a sign of disease in the lung, we mean a breathing-sound heard while listening over the *lung*, like that *normally* heard when auscultating the middle regions of the

Fig. 37.



1. Supraspinous. 12. Scapular or sub-spinous. 13. Interscapular (right and left). 14. Infraclavicular. 15. Inferior dorsal (right and left). 16. Lumbar (right and left). (Paxton.)

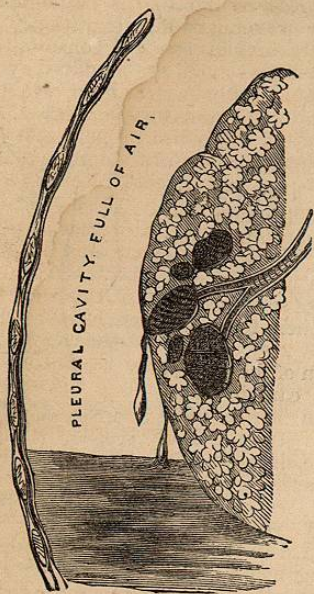
<sup>1</sup> New York Medical Record, March 15, 1870.

chest, over the bronchial tube. It occurs when the lung is *solidified* or *condensed*. (The explanation of bronchial respiration is by *conduction* or by *consonance*. The latter theory, that of Skoda, is preferred.)

**Cavernous** respiration is that which is inferred to occur during the passage of air into or out of a *cavity* in the lung (as in tubercular disease). Notwithstanding the truth of the statement urged by Skoda, that it is *often* impossible to draw a certain demarcation between *bronchial* and *cavernous* respiration, yet, in a *number of cases* this can be done, and the term cavernous, therefore, should be retained.

Of the **secretory** sounds, the **sibilant** and **sonorous rhonchi** are the results of narrowing and obstruction, by congestion, or by mucus, etc., of the bronchial ramules; the *smallest*, in the case of the sibilant or whistling rhonchus; those *somewhat larger*, so that

Fig. 38.



Percussion tympanitic; absent respiration; absent vocal resonance; absent vocal fremitus.

Splash on being shaken; percussion dullness; metallic tinkling.

Diagram of the physical signs in pneumothorax. (Dobell.)

the air passes through in irregular and varying bubbles, in the sonorous (snoring or roaring) rhonchus. Both of these sounds are characteristic of bronchitis. The use of the term *dry* sounds, as applied to them, is not strictly correct; but it is convenient, as designating the impression which they convey to the ear as compared with those technically called moist sounds.

The **dry crackle** is associated with *incipient* or infiltrated *tubercle*.

Among the **moist** sounds, the finest or most delicate is the **crepitant rale**, or fine crepitation of pneumonia. It is very well imitated by rubbing a few hairs of one's head between the thumb and finger, near the ear. Its *cause* is, probably (C. J. B. Williams), the penetration of the air into the air-cells of the lung at a time when their walls are rendered slightly *adhesive* by effusion of coagulable lymph. The gentle *forcing apart* of these adherent walls, or of portions of the viscid lymph itself, produces the fine crackling sound, as a modification of the natural vesicular murmur. It is only heard during *inspiration*; and, in children, with difficulty in any case.

**Coarse crepitant** or "mucous" râles are heard whenever any fluid exists in the lungs in quantity sufficient to modify respiration without arresting it, whether the fluid be mucus, pus, blood, or serous effusion.

The **humid crackle** or *gurgling* is pathognomonic of advanced tubercularization or pulmonary disintegration. It is heard during the later stages of nearly all cases of consumption.

**Friction** or *to-and-fro* sounds are produced by the rubbing of two surfaces, as of the pleura or pericardium, when made adherent or slightly roughened by inflammatory lymph. It sometimes requires an acute and practised ear to discriminate these from other sounds. They are heard both with inspiration and expiration.

**Bronchophony**, or bronchial vocal resonance, corresponds in its history with *bronchial respiration*. It is simply a resonance of the voice, to the ear of the auscultator placed over the *lung* of the patient while he speaks, loud, near, and clear, as it is normally when the ear is placed over the *bronchial tube*. The same reasonings will apply to the explanation of this sign by the two theories of *conduction* and *consonance*, which have been urged in regard to bronchial respiration. The *latter* theory, as in that instance, I prefer; but, practically, all agree as to the *circumstances* under which the sign occurs (solidification of the lungs). Normally, the vocal resonance is loudest under the *right scapula*. Modifications of the sound of the *whispered* voice are spoken of by Dr. Flint as exaggerated bronchial, amphoric, and cavernous whisper.

**Pectoriloquy** (chest speaking) is merely a *yet nearer* and *louder* resonance of the voice, heard on auscultation, than that called bronchophony; the sound seeming to be *vocalized* in that part of the lung which is *immediately under the ear*. Skoda objects that this cannot be definitely distinguished from loud bronchophony. But, although this is *generally* true, a certain number of cases occur in which it may be so distinguished, as indicative of a very different pathological state of the lungs, viz., a large cavity.

**Ægophony**, bleating, or goat-like resonance of the voice, has been, since Laennec, supposed to be an almost certain sign of the existence of *pleuritic effusion* or *hydrothorax*. Skoda's observations, and those of others also, show that it is occasionally heard in pneumonia, in phthisis, and even in the healthy state of the thoracic organs. It is, therefore, not *pathognomonic* of the presence

of fluid within the pleura; but it is among the signs which render that diagnosis probable.

**Amphoric resonance** is heard especially in connection with the sound produced by *coughing*. A tense condition of the walls of a large cavity will explain it, as well as the phenomenon called *metallic echo* of the voice or cough.

**Metallic tinkling** is usually accounted for by the *dropping of fluid* in a large cavity (as in hydropneumothorax, with collapsed lung) with tense walls.

Resuming the consideration of respiratory sounds, **puerile or exaggerated respiration** occurs in the *healthy* lung, or part of the lung, when the *other* lung or portion of the same is *obstructed*, as by a foreign body, or by bronchitis; or *condensed*, as by—

Pneumonia;	Pleuritic effusion;
Tubercularization,	Tumor.

A lung, a portion of which is permanently expanded by *emphysema*, or *hypertrophied*, may also give an exaggerated vesicular murmur; and, transiently, this is observed in a lung *just released* from the paroxysmal obstruction of *asthma*.

**Feeble** respiratory murmur is heard in one or both lungs in cases of—

<i>Croup</i> ;	Collapse of lung;
<i>Foreign bodies</i> in air-passages;	Pulmonary apoplexy;
<i>Bronchitis</i> ;	Emphysema;
<i>Pneumonia</i> ;	Pneumothorax;
<i>Pleurisy</i> ;	Hydrothorax;
<i>Asthma</i> ;	Intercostal rheumatism;
<i>Infiltrated tubercle</i> ;	Paralysis;
	Cancer; or other tumor.

**Harsh** respiratory murmur, passing by gradations into **blowing and bronchial**, in—

Dry bronchitis;	<i>Pneumonia</i> ;
<i>Incipient tubercle</i> ;	• Pulmonary apoplexy;
<i>Pleurisy</i> (condensing lung);	Bronchial dilatation.

**Cavernous** respiration, in case of—

<i>Tubercular cavity</i> ;	Softening of cancer;
Excavation from	Large bronchial dilatation.
<i>Abscess of lung</i> ;	
Gangrene;	

**Amphoric** respiratory sound is particularly associated with the existence of a fistulous opening between the pleural cavity and one of the bronchial tubes; the cause of which fistula may be either tuberculous softening, or abscess, etc.

The **sibilant and sonorous rhonchi** occur nearly always in *bronchitis*; occasionally in pulmonary *emphysema*, and when the bronchi are pressed upon by tumors, etc.

**Dry crackling** indicates the existence of hard tubercle in the lungs.

**Humid crackling or gurgling**, tubercle in the softened state. The **crepitant rale** has already been explained as peculiar to pneumonia.

The **coarse crepitant<sup>1</sup> rale**, or **mucous rale**, is observed frequently in

<i>Capillary bronchitis</i> ;	Pulmonary hemorrhage;
<i>Bronchorrhœa</i> ;	Pulmonary œdema;
Last stage of <i>pneumonia</i> ;	Pulmonary abscess.

**Friction-sounds** have been before alluded to as connected with *pleurisy* and *pericarditis*.

**Resonance of the voice** is feeble in

Emphysema; Atrophy of the lung; Pneumothorax.

**Bronchophony** occurs in cases of

*Tubercle*;

*Hepatization* (pneumonia);

*Pleurisy* (condensing lung); *Cancer*

*Dilatation of bronchi*.

**Ægophony**, in

*Pleurisy*; Hydrothorax; Pneumonia.

**Pectoriloquy**, in cases of

*Tubercular cavity*;

*Dilatation of bronchi*;

Excavation from

Abscess; Cancer; Gangrene.

**Metallic tinkling and echo**, in

*Pneumohydrothorax*;

*Large tubercular cavity*.

The **sounds of the heart** are heard at an *unusual distance* from the heart itself, in some cases of

Pneumonia;	Pleurisy;
Tubercle;	Cancer, etc.

(This affords some argument for the *conduction* theory of Laennec.)

**Displacement** of the heart, diaphragm, liver, spleen, stomach, sometimes occurs from pleuritic effusion or empyema, cancer of the lung, etc. In *rare* instances, such a displacement may be *congenital*; as of the heart on the right side. A case has been reported by Leidy, in which the situation of all the viscera was reversed; the liver being upon the left side, the heart and spleen upon the right, the stomach being reversed also, and the ileum terminating on the left side, the colon ending in the rectum on the right side.<sup>2</sup>

#### Diseases of the Heart.

The physical diagnosis of **diseases of the heart** is conducted upon exactly the same principles as that of affections of the lungs and pleura.

<sup>1</sup> The term *sub-crepitant rale* or *rhonchus* appears to the author to be very objectionable, as leading to confusion.

<sup>2</sup> Proceedings of Phila. Acad. of Nat. Sciences, 1870, No. 3, p. 134.

By **inspection** we can detect bulging or distortion in the præcordial region, and, in some cases, judge of the extent, force, and character of the heart's *impulse*. By **mensuration**, changes in the thoracic dimensions consequent upon diseases of the heart can be more accurately determined.

By **palpation**, the *impulse* of the heart may always be examined and estimated. This is very important, not only in actual *diseases of the heart*, but also in *fevers*, etc.; in the course of which the movements of the heart, as the centre of the circulation, are often seriously affected.

In *hypertrophy*, this impulse is *increased in force*; in *dilatation*, it is *extended*; in *atrophy* and exhaustion, it is *diminished*.

**Percussion** aids us in detecting some very important pathological changes in the heart; as *hypertrophy*, *dilatation*, *pericarditic effusion*. The percussion-resonance is *unusually clear* in *atrophy* of the heart.

In **auscultation** of the heart there is often a decided convenience, although no actual necessity, in the use of the stethoscope. The learner must in the first place make himself familiar with the *natural sounds* of the heart.

The **first** sound is the longest and loudest; the succession being imitated by the syllables *lub, dup*. If the time from the commencement of one pulsation to that of another be divided into five equal parts, *two* of them will be occupied by the first sound, *one* by the second, and *two* by the interval of repose.

The first sound accompanies the *systole* or contraction of the *ventricles*; the *impulse* of the heart occurs at the same moment. The second sound is *diastolic* as regards the ventricles.

The *causes* of the first sound are believed to be the contraction of the powerful ventricular muscles, the *tension* of the closed *auriculo-ventricular valves*, the rush of blood into the great vessels, and the impulse of the heart against the walls of the chest.

The cause of the **second** sound has been proved to be the *flapping together*, during the diastole or dilatation of the ventricles, of the pocket-like *semilunar valves* of the aorta and pulmonary artery.

The essential points in the "medical anatomy" of the heart are as follows:—

The *semilunar valves* of the **pulmonary artery** lie behind the junction of the cartilage of the third rib with the sternum.

The *semilunar valves* of the **aorta** are just below these, between the cartilages of the third and fourth ribs.

The **tricuspid** or *right auriculo-ventricular valve* is behind the sternum, on a level with its articulation with the fourth rib.

The **mitral** or *left auriculo-ventricular valve* lies behind the cartilage of the fourth rib, a little to the left of the sternum.

The *heart's apex strikes*, during the impulse, at a point just below the left nipple. The point of greatest dullness on percussion is slightly within the left nipple. The diameter of the *normal* region of dullness does not exceed two inches.

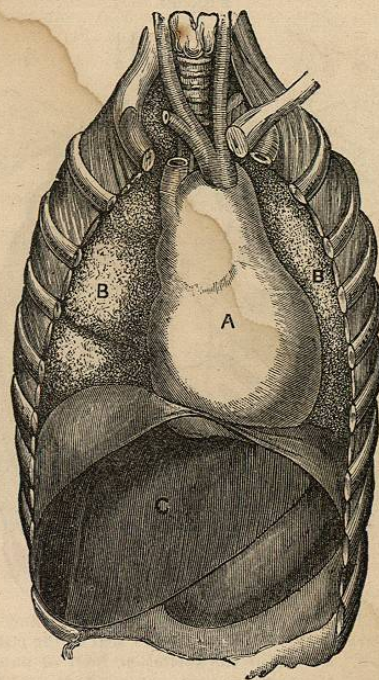
Using terms of *convenience* merely, the valves of the heart may be said to be of two kinds, *cavity* valves and *vascular* valves. The cavity valves are both nearer to the *middle* and *apex* than to the base of the heart; the vascular valves (aortic and pulmonary ar-

terial) nearer to its *base*, *i. e.*, as the heart is situated in the chest, its *upper* part.

By auscultation of the heart we may detect **valvular murmurs**, **anæmic murmurs**, and **friction** sounds. Details in regard to these can be best given in connection with the *special pathology* of the heart. A few main points only require mention here.

The valves of the **left** or *systemic* portion of the heart are much more often affected by disease than those of the *right*. Practically, in most cases, those of the right side may be left out of the question of diagnosis.

Fig. 39.



Increased dullness on percussion, of pyramidal shape.

Impulse lessened.

Sounds feeble, especially the first.

Shows the position of the pericardium when distended with fluid. A. The heart. B. The lungs. C. The liver. (Sibson.)

The following is Harvey's statement of the comparative frequency of the different valvular affections:—

1. *Aortic obstructive.*
2. *Mitral Regurgitant.*
3. *Aortic Regurgitant.*
4. *Aortic obstructive and mitral regurgitant together.*
5. *Aortic obstructive and regurgitant together.*

If a murmur (not anæmic)<sup>1</sup> is **systolic**, *i. e.* is heard with the *first sound* of the heart, and is loudest at the **base** of the heart, it may be inferred to be **aortic obstructive**.

If **systolic**, and loudest at the **apex**, **mitral regurgitant**.

If **diastolic**, *i. e.* with the *second sound*, and loudest at the **base** of the heart, **aortic regurgitant**.

If **diastolic**, and loudest at the **apex**, **mitral obstructive**.

A **presystolic** murmur (Gairdner), that is, one heard after the second sound, and just before the first, indicates **contraction** of the **mitral valve**.

Fig. 40.

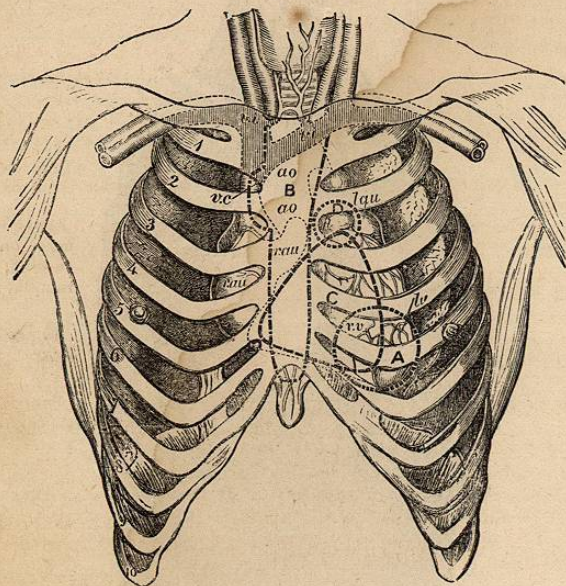


Diagram showing the areas over which the murmurs produced in the different valves of the heart are chiefly audible. A. The seat of the mitral murmur. C. The seat of tricuspid. B. Seat of the aortic. D. Seat of pulmonary murmur. *r. v.* Right ventricle. *l. v.* Left ventricle. *l. au.* Left auricle. *r. au.* Right auricle. *ao.* Aorta. *v. c.* Vena cava. (Gairdner.)

This opinion, at least, has been accepted by Drs. Gairdner, Peacock, Wilks, and others; although Dr. A. Whyte Barclay<sup>2</sup> asserts reasons for believing that the sound referred to is a *systolic regurgitant* murmur.

<sup>1</sup> Dr. Da Costa has shown, however, that functional murmurs (attended by no organic lesion) are occasionally heard in persons not anæmic. See American Journal of Med. Sciences, July, 1869.

<sup>2</sup> London Lancet, March, 1872.

**Duplication** of the *second sound* is reasonably ascribed to the closure of the valves of the aorta and pulmonary artery not being *synchronous*. The condition with which it is most likely to be associated is *mitral obstruction*.

The rationale of these inferences is explained by the physiology of the heart's action, in connection with the position of the several valves. The fact that, in rare instances, organic murmurs vary,<sup>1</sup> from time to time, in the same case, is sometimes perplexing. Murmurs not connected with valvular disease may be quite variable.

Dr. J. H. Hutchinson has emphasized the fact that *anæmic* murmurs are commonly *most intense in the recumbent position*.

Much complexity attaches necessarily to the *exact* diagnosis of affections of the heart; but we have the excellent authority of Dr. Stokes for the principle, that the *important practical* questions in each case are—do the abnormal sounds have origin in **organic** disease or lesion, or not? and, how far is the **functional action** and **capacity** of the heart interfered with or impaired?

Upon these, as upon all other questions in diagnosis, it is proper *never to confine our attention to physical or immediate signs alone*. To rest either upon symptomatology or physical exploration *exclusively*, would be like hopping constantly on one foot, instead of walking upon two.

**Friction-sounds**, in the region of the heart, are connected with *pericarditis*. Their *narrow limits*, and *association, in time*, with the sounds of the heart, serve usually to contrast them with *pleuritic* sounds. It is sometimes difficult to distinguish them from *valvular murmurs*.

*Extra-cardiac* blowing sounds (*souffles*) were mentioned by Laennec, and have been since studied by others, especially Friederich and Potain.<sup>2</sup> They are explicable by the air in the *lung-vesicles* near the heart being forcibly and audibly expelled by the movement of the heart. *Vascular murmurs within the lungs* have been reported upon by Bartels<sup>3</sup> and A. Stillé.<sup>4</sup> They are very rare.

The signs of **aneurism of the thoracic aorta** may be alluded to in another place. They are chiefly: 1. A *second impulse* (often with a *thrill*), apart from that of the heart. 2. Dulness on percussion. 3. Bulging. 4. *Symptoms of dyspnoea, cough, and dysphagia*, from pressure upon the trachea, œsophagus, etc.

#### Abdominal Diseases.

The physical diagnosis of **abdominal** affections comprises inspection, mensuration, palpation, percussion, and auscultation. The belly is divided, externally, into the *epigastric, umbilical, hypogastric*, two *hypochondriac*, two *lumbar*, and two *iliac* regions.

By **abdominal inspection** we can observe the alteration in size and shape caused by *pregnancy, hernia, tympanites, ascites, or ovarian dropsy*. By **mensuration**, we can ascertain the *exact changes*

<sup>1</sup> See, on this subject, a paper by Dr. Sanders, Edin. Medical Journal, Jan. 1869, p. 584.

<sup>2</sup> See a paper by R. Lépine, Gazette Médicale de Paris, No. 26, 1872.

<sup>3</sup> Prager Vierteljahrschrift. 1870, Bl. iv.

<sup>4</sup> Philadelphia Med. Times, April 15, 1871.

which may occur from time to time in dropsical accumulations, etc.

By **palpation** of the abdomen, we may develop the symptom of local *tenderness on pressure*; as in *gastritis, hepatitis, peritonitis, cystitis*, etc. By the same method of examination, more forcibly employed, we detect *enlargement of the liver or spleen, ovarian tumor, mesenteric disease, cancer, aneurism, fecal accumulation*, etc.; and, with the aid of both hands, prove the presence of *fluid* (ascites, etc.) by the sign of *fluctuation*.

**Percussion** assists materially in the diagnosis of diseases of the abdominal viscera. The ordinary percussion-resonance, in health, is clear, full, and *slightly tympanitic*, all over the abdomen. It becomes more drum-like in distension of the intestines with gas (meteorism), or in tympanitic distension of the peritoneum. *Dulness of resonance* occurs, with limits and peculiar characters, in *enlargement of the liver or spleen, ascites, ovarian dropsy, pregnancy, cancer, aneurism, retention of the urine, fecal accumulation*, etc.

**Auscultation** of the abdomen is especially useful in the diagnosis of *pregnancy*, by detecting the sounds of the fetal heart, and the placental *soufflet*.

A localized "bruit" or aortic murmur, heard along the spine, is a probable sign of aneurism of the abdominal aorta.

Morbid sounds are occasionally appreciable in other abdominal affections, as in tapeworm, etc.; but they are subject to so much uncertainty as to be hardly available for practical purposes. *Friction sounds in peritonitis* have been studied by Dr. Seidel.

**Recto-abdominal exploration** (Gustav Simon, 1872) is sometimes resorted to, by the introduction of the hand through the anus, into the large intestine; occasionally as far as the arch of the colon. The hand must first be well anointed with lard; the fingers are then placed so as to make a cone, and passed into the rectum with the back of the hand toward the sacrum. Pronation may be effected at the sigmoid flexure. *Aneurism, cancer*, or other tumors may thus be detected and located.

#### Diagnosis of Diseases of Women.

**Rational signs** or symptoms, and the past history of the patient, are never to be overlooked. Among the questions to be answered in the case of suspected uterine or ovarian disease, are these: Has the patient been married; if so, how long? Has she had children; how many? Did she ever miscarry? Is she, now, probably pregnant? If not, is menstruation regular in frequency, amount, and absence of suffering? Is there any vaginal discharge (leucorrhœa)? What are the symptoms of her present complaint, and what have been their duration and progress?

#### Physical Examination.

Better than a bed will be a table, covered with one or two blankets or a shawl, and a pillow. If a bed be used, its unevenness may be remedied by placing a board over the mattress and under the bedclothes. In either case, a sheet should be thrown over the patient to prevent unnecessary exposure of the person.

At first, the patient should lie on the back, with the knees drawn up; in a position affording a strong, direct light. For some methods of examination, the prone position, on the hands and knees, has decided advantages.

The modes of diagnosing abdominal and pelvic affections in the female by physical examination are as follows:—

1. Vaginal touch.
2. Bimanual palpation.
3. Rectal touch.
4. Vesico-rectal exploration.
5. The speculum.
6. The uterine probe.
7. Dilating tents.
8. The exploring needle.
9. Auscultation and percussion.
10. The microscope.

Space is not allowed in this work to treat of many particulars concerning these methods. The student is referred, in regard to them, and for full information upon all the surgical diseases of women, to the treatises of Thomas, Sims, Simpson, Hewitt, Churchill, Hodge, Meigs, Bedford, Byford, Agnew, Atlee, and others, on the general subject or on the different departments of Gynecology.

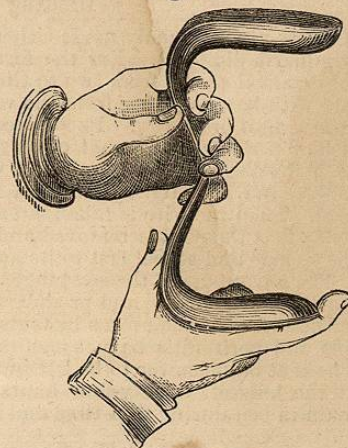
Besides the *vaginal touch, bimanual palpation* and the *speculum* are the most important means available for the detection of uterine affections; *e. g.*, displacements, ulcerations, tumors, etc.

#### The Speculum.

*Cylindrical* and *valvular* forms of the speculum are used. Both have their advantages and inconveniences. Some have two, others three or four valves or movable portions. They are employed not only for inspection of the uterus and vagina, but also for the application of probes, medicaments, etc. Sims's speculum is used with the aid of a depressor. Thomas has modified it so as to fix the depressor in connection with the blade.

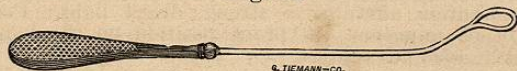
The position of the patient preferred for the introduction of Sims's speculum is *semi-prone*; so as to allow the abdominal viscera to gravitate forward.

Fig. 41.



Sims's Speculum.

Fig. 42.



Sims's Depressor.

Fig. 43.



Fergusson's Speculum.

### The Uterine Sound.

This is a firm rod of metal, of such a size and curve as to enter readily the uterine cavity. It requires skill and much care to use it safely. Very serious accidents are endangered by any over-violence with it. As stated by Thomas, the facts which may be determined by it are these:—

1. The capacity of the uterus.
2. The existence of growths within it.
3. Deviations of its canal.
4. Displacements, as discriminated from tumors.
5. The existence of endometritis.
6. The mobility of the uterus.

### Dilating Tents.

These are commonly made either of sponge or of the *sea-tangle* (*laminaria digitata*). For the former a good clean sponge is cut into conical pieces from two to three and a half inches in length, and with bases varying from the width of the little finger to that of a walnut or an egg. Each piece may be dipped in a *weak* solution of carbolic acid, or oil of cloves, in glycerin; then saturated with mucilage of gum Arabic; a wire is next passed through its centre, and it is tightly wrapped from apex to base with strong cord. Then the wire is taken out and the sponge is allowed to dry. After that the cord is removed and another cord is passed through the sponge and sewed fast to its apex.

The advantage of the sea-tangle tent is that it affords no animal matter to decompose and produce fetor or irritation.

Dilatation of the uterus by tents is not free from danger. Tetanus and peritonitis have sometimes followed their employment. The tent ought never to be left in the uterus more than twelve or, at the longest, twenty-four hours; and the patient ought to remain in bed during that time and for one or two days afterwards.

### The Laryngoscope.

Instrumental aid in examining the interior of the larynx was first thought of by Levret, in 1743. Laryngoscopic mirrors were

devised by Dr. Babington, of London, in 1829. Bozzini, 1804; Senn, of Geneva, in 1827; Selligues, Paris, 1832; Baumès, Lyons, 1838; Liston, 1840; Avery, 1844; Garcia, 1854, and about the same time Jacobi, of New York, gave attention to the same subject. Türk, of Vienna, applied them anew to diagnosis in 1857; but shortly afterwards Czermak pursued laryngoscopy with so much acuteness and energy as to have associated his name with it pre-eminently.

Fig. 44.



Laryngoscope.

The apparatus required (Semeleder) is a laryngeal mirror, an illuminating mirror, and a tongue depressor. Glass or polished metal may do for the mirrors.

The laryngeal mirror may be round or square, preferably the former; and about an inch or less in diameter. It should be attached at an obtuse angle ( $120^\circ$  to  $125^\circ$ ) to a stem, which may be fastened into a slender handle so as to be drawn out or pushed in.

The illuminating mirror is larger (from 3 to 12 inches in diameter) and concave, to concentrate reflected light. It may be held by a handle in the operator's mouth, or fixed by a band to his forehead, or, best, as used by Semeleder, perforated in the middle and fastened to the bridge of a pair of spectacles (with or without the glasses) so as to rest before one of the eyes and be looked through.

The laryngeal mirror is introduced (after being warmed to prevent condensation of moisture) so that its back pushes the uvula upwards and backwards, its lower edge presses upon the posterior wall of the pharynx, and its stem rests in the angle of the mouth.

Sunlight, horizontal (morning and evening), is the best for laryngoscopy, but artificial light, as of a good lamp, may suffice.

The *difficulty* of the operation is produced by the *irritability* of the fauces and larynx. Few can allow of a successful examination on the first attempt; practice makes tolerance. To hasten this, bromide of potassium has sometimes been given. The frequent insertion, and retention for a while, of the finger of the patient, or of an instrument in the fauces, accustoms the parts to pressure. Holding ice to the throat just before the examination, also lulls sensibility. Momentary use of ether spray has been resorted to for the same purpose.

By laryngoscopy, tumors, ulcerations, inflammatory changes, etc., in the larynx may be inspected; topical applications, as of nitrate of silver (H. Green), made, and surgical operations performed, with a precision not otherwise possible.

**Rhinoscopy** is the examination, in a similar manner, of the *posterior nares*. It requires merely a *smaller* mirror (less than three-fourths of an inch in diameter) than for laryngoscopy, and at about a right angle to its handle.