

orrhages at menstrual periods. Very irregular. Marked premenstrual pain. Had chronic leucorrhœa, very offensive at times. Had back-ache, headache and disordered stomach. Had had repeated attacks of pelvic peritonitis during last six years confining her to bed for weeks at a time. Had been completely cured by electricity. Had been unable to sleep on either side since cured. Suffered constant pain on both sides of pelvis, much increased at menstrual periods. After being constipated, suffered great pain on left side whenever bowels moved. Walked in a stooping or bent posture. A sudden jar or shake gave her great pain. Could not run up or down stairs nor run a sewing-machine without attacks of pelvic pain following such exercise. Sexual intercourse markedly painful.

Was called to see her in an attack of pelvic peritonitis which lasted six weeks. Temperature ranging from 101 to 105. Pulse running up to 155. Belly over region of ovaries most exquisitely tender to the touch. Digital examination showed uterus firmly fixed by adhesions, vaginal vault full on both sides, while bimanually, an ovarian abscess could be felt on the right, and a large mass of some sort on the left. Both tubes were distended, hypertrophied and tender. Her suffering was so great that the attending physician was compelled to administer large doses of morphia hypodermically to enable her to endure the awful pain of which she complained. Death seemed only a matter of days. She was informed that surgery held out the only hope of cure for her, and she eagerly accepted it. In the meanwhile my friends Dr. Byers and Dr. Fullenwider saw her, and concurred in both diagnosis and prognosis.

On the morning of November 17, 1891, twenty-four hours after she had been prepared, I proceeded to do a section assisted by Dr. Fullenwider, Dr. Clark, and Dr. Byers and Dr. Lamar. Through a median incision I removed both tubes and from each side a large ovarian abscess. The one on the right was so thinned by distention that it burst at once upon attempting to draw it from the pelvis, deluging the pelvic cavity with pus and blood. The collection on the left side was buried in adhesion and was bound to the sigmoid flexure by adhesive inflammation. It was enucleated and delivered whole. It contained thick creamy pus and was of such size as to obliterate both tube and ovary. After irrigating the abdominal cavity with hot water and putting in a drainage tube patient was put to bed suffering some from shock from which she soon rallied. On second day she was attacked with catarrhal pneumonia which kept her temperature up and caused great annoyance from the resulting cough for two weeks. Her pelvic pain entirely disappeared and the drainage tube was removed on the third day. Her convalescence was uneventful from the second week on. She is now in the best of health, doing her own work, has no pain or soreness, walks erect and has gained in weight as well as strength.

Case 2.—Mrs. F. V. Married. III. para. Nine years ago had a miscarriage and suffered at time from puerperal peritonitis. Never been well since. Face and hands swelled every month. Was in bed two weeks of every four vomiting and cramping. Pain radiating from left iliac fossa running across bowels and locating itself apparently in region of gall-bladder. Vesical tenesmus most distressing. Constant desire to urinate. Back-ache almost constant. Profuse leucorrhœa. Sexual intercourse almost un-

endurable and she suffered with a most intense and excruciating headache for days afterward. She was losing her memory and feared that she would go crazy. She had had almost every kind of treatment following divers diagnoses. Malaria, neuralgia of the stomach, gall-stones, gravel, hysteria, dyspepsia, had each its turn, and yet she suffered.

Digital examination disclosed a uterus completely retroverted and firmly bound in that position by adhesions. There was a bilateral laceration of the cervix, which was soft and patulous. On each side the vault was very tender, in the right, moderately filled, the broad ligament thickened, and on the left a large mass could be felt, but fluctuation could not be elicited. Tubo-ovarian disease with tubal and ovarian pus was diagnosed and a section advised as the only means of relief. It was accepted. But to set at rest all doubts in the matter, I asked Dr. McMurtry to examine the case, which he did, finding the pathological conditions as above, and he fully seconded both the diagnosis made and the treatment suggested. On the morning of the first day of December, 1891, assisted by Dr. Byers, Dr. Hatfield and Dr. Clark, I opened the abdomen in the median line, broke up the adhesions binding down the uterus, enucleated a large sanguino-purulent tubo-ovarian cyst on the left, and a hydro-salpinx and atrophied ovary on the right. After irrigating the abdominal cavity with hot water and placing a drainage tube, she was put in bed suffering very little from shock. She made a rapid recovery, temperature, pulse and respiration remaining normal throughout. On the fifteenth day she sat up, and on the twenty-first day walked about the house. Her health has been constantly improving. Her pains are gone and she now is able to go about and enjoy life, instead of spending from one-half to two-thirds of her time in the doctor's hands.

The chief objection urged against such treatment is that it unsexes. This objection is more imaginary than real. The disease has already completely unsexed. Rotten eggs bring forth no chickens, and degenerated ovaries, pus tubes, and displaced, diseased, adherent uteri are poor machinery with which to conceive, nurture and bring forth children. Even sexual intercourse in most cases is impossible on account of pain. And if a section cannot make a mother of any such, it at least restores to her the power of discharging her duty to her husband. A thing about as important as child-bearing.

HEART SOUNDS AND CARDIAC MURMURS.

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The study of heart sounds and cardiac murmurs, with reference to their diagnosis by physical signs, requires an accurate knowledge of the anatomy, and physiological mechanism of the heart.

By heart sounds we mean the normal sounds produced by the action of the heart, while new or additional or adventitious sounds are called cardiac murmurs. Murmurs are not modifications of the normal heart sounds, but are new sounds, which are added to, or take the place of the normal sounds, on account of mechanical defects in the action of the heart. These mechan-

ical defects are usually the results of pathological lesions.

The præcordial region or præcordia, is that part of the surface of the chest, which immediately overlies the heart. The upper boundary of this space, which corresponds to the base of the heart, is a horizontal line drawn across the sternum at the level of the third costal cartilage. The lower boundary is a horizontal line drawn through the fifth intercostal spaces. The left lateral boundary is a vertical line situated three and one-half inches to the left of the median line of the sternum, while the right boundary is represented by a similar line, situated four or five lines outside of the right margin of the sternum. The apex of the heart is found in the fifth left intercostal space three and one-half inches to the left of the median line of the sternum. I think this a better and more accurate description of its position, than to say it lies just within the *linea mammilaris*, for the reason that the nipple varies much in different persons in its relative position to the median line of the body.

The heart sounds consist of two successive sounds, following each other in a perfect rhythmical relation, and with a short interval between them called the short pause of the heart.

After the two sounds of the heart is a longer interval called the long pause. The two heart sounds are called respectively the first and second sounds. The first sound is longer, duller and louder than the second. The first sound corresponds with the systole of the ventricles and with the apex beat, while the second is synchronous with the diastole of the ventricles. In health there is no trouble in distinguishing the two sounds. In diseased conditions of the heart, the two sounds are apt to be confounded with each other, but may always be distinguished if we remember that the first sound corresponds with the apex beat and with the carotid pulse.

Regarding the mechanism of the production of the heart sounds, there has been a diversity of opinion. I believe all are agreed that the second sound is caused by the sudden closure of the aortic and pulmonary semilunar valves. The first sound is probably caused by the forcible tension of auriculo-ventricular valves, the contraction of the muscular walls of the heart, and the thumping of the apex against the parietes of the chest.

Cardiac murmurs are, as I have said, usually the result of valvular lesions. They are classified as direct or obstructive and indirect or regurgitant murmurs. All endocardial murmurs, are produced by the blood flowing in a normal or in an abnormal direction.

¹ "The common law which governs the seat of development and the transmission of all cardiac murmurs, may be stated as this: The abnormal sound called a murmur, is heard with greatest intensity just beyond the point of its development, and is transmitted from this point, forward or backward in the direction of the current of blood, which, together with the valvular defect, is the cause of the murmur. Forward and backward in this instance refer to the current of blood and not to the antero-posterior positions of the body."

With reference to the left side of the heart, we may have a mitral direct and a mitral indirect murmur, an

aortic direct and an aortic indirect murmur. A mitral direct murmur is produced by the blood flowing in the normal direction, through an obstructed or roughened auriculo-ventricular orifice. It is heard with the greatest intensity over the left ventricle, at the junction of the fourth rib on the left side with its cartilage. With reference to the ventricular systole, this murmur is diastolic in character—it follows the second sound of the heart. In other words it occurs during the long pause of the heart and is synchronous with the contraction of the auricle.

The mitral indirect murmur is systolic in point of time, and is produced by a current of blood, which, by the ventricular contraction, is regurgitated through an incompetent mitral orifice. It is usually blowing in character, and is heard with the greatest intensity at the apex. It accompanies the first sound and is transmitted below the apex and to the left, along the sixth rib, and may also be heard behind, between the eighth dorsal vertebra, and the inferior angle of the scapula, on the left side.

The aortic direct murmur is also systolic in point of time, i. e., like the mitral indirect murmur it is produced during the ventricular contraction. It is caused by the direct current of blood flowing through an obstructed aorto-ventricular opening. It is not heard, however, at the apex, but just beyond the aortic valve, in the second intercostal space on the right side and close to the sternum. It is transmitted in the direction of the current of blood which produces it, i. e., along the greater blood vessels, and may usually be heard over the sub-clavian and carotid arteries. It may also be heard behind over the fourth and fifth dorsal vertebra, this being the point where the aorta strikes the spine. The aortic indirect or regurgitant murmur is diastolic in point of time, and is produced by current of blood being forced back through an incompetent aortic opening by the recoil of the large arteries. It accompanies the second sound of the heart, and is just behind the aorto-ventricular opening, or in the third left intercostal space, close to the sternum. It may also be transmitted down the sternum and heard at the ensiform cartilage.

In the right side of the heart there may be produced four murmurs, corresponding to the ones we have described in the left side of the heart. These are called respectively the tricuspid direct and indirect, and the pulmonic direct and indirect murmurs. All of these four murmurs are extremely rare and of no practical importance so far as physical diagnosis is concerned. In the first place lesions in the right side of the heart are seldom found in adults, and secondly, when present they are usually the result of lesions at the mitral and aortic orifices, and are so masked by murmurs at these orifices that they cannot be diagnosticated.

All valvular murmurs, as we have observed, either precede, take the place of, or immediately follow one of the heart sounds, and having distinguished these sounds from each other, we may easily determine the rhythm of a murmur. When we have done this, our diagnosis is completed by determining its seat. We shall be able readily to do this if we bear in mind the areas to which murmurs, arising at the different orifices, are propagated, and these we have already stated. Furthermore, I believe we shall always be able to determine the character of a murmur, by reference simply to its area, and direction of transmission,

¹ Porter.

without studying its rhythm. Thus a murmur which is heard in the right second intercostal space close to the sternum, and is transmitted in the direction of the greater blood channels, is always an aortic direct murmur.

A murmur heard in the left intercostal space close to the sternum, and often distinctly heard at the xiphoid cartilage, is always an aortic indirect murmur. Again, a murmur heard over the fourth rib, on the left side, at its junction with the corresponding costal cartilage, is always a mitral direct murmur. This murmur is not transmitted, but is heard only within the limited area here described.

Finally, a murmur heard at the apex and transmitted below and to the left, as far as the anterior axillary line, is always a mitral indirect or regurgitant murmur.

Having become familiar with the location of these areas, and bearing in mind the direction of transmission of the different murmurs, their diagnosis is extremely simple.

Two, three or even four of these murmurs may be found in combination, but having become familiar with the above points in their diagnosis, their differentiation is not difficult.

There is another class of murmurs, of considerable importance, to which we will briefly refer. These murmurs are not produced by endocardial lesions, and are called inorganic or chlorotic murmurs. Their cause is somewhat theoretical. They are due, however, to changes in the blood produced by anæmia, and probably also in part to innervation of the heart muscle from the same cause. These inorganic murmurs may be present at the mitral or aortic orifices, and may be either direct or indirect.

Indirect murmurs are far more common than direct, and of these a murmur at the base is oftener present than one at the apex. This indicates the preponderance of the aortic indirect over any other variety of chlorotic murmurs. These murmurs are heard over the same areas, and are transmitted in the same manner as organic murmurs.

A chlorotic murmur is usually soft, and blowing in character, and is accompanied by the general signs and symptoms of anæmia. These murmurs usually disappear under treatment directed to the general condition.

Dilatation of the ventricles is sometimes produced in connection with these chlorotic conditions, as evidenced by changes in the location of the apex beat. This dilatation of the ventricles sometimes causes organic lesions, principally at the mitral, and occasionally also at the aortic orifice. In other words, and finally, the cardiac condition in chlorosis sometimes culminates in permanent organic lesions.

CARBONIC ACID AN INDEX OF DANGER IN GIVING CHLOROFORM, AND HOW TO LESSEN THE DANGER.

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We assume in this brief paper, from several analogies, that the activity of the respiration as shown by the amount of CO₂ exhaled, is an index of danger in administering chloroform, and renders the production of anæsthesia more difficult.

Hence, we argue the comparative safety and ease

of administration to weakly persons, and the danger and frequent difficulty to the mechanic.

For this reason doubtless its safety in military life has been much overrated.

The more muscle the more CO₂ generated, greater seems the danger, and greater the amount of chloroform required.

The latter statement is well proven in dogs and rabbits, they being chloroformed with much difficulty.

The majority of deaths from chloroform are probably superinduced by asphyxia, not, however, commencing in the lungs, as the older physiologists taught, but in the systemic capillaries.

We will consider the administration of chloroform, with respect to greater safety, under the conditions of age, sex, digestion, etc.

Age.—The ages which seem most obnoxious are adolescence and the adult age, twelve to sixty. In the first there is an absolute increase in CO₂ as the muscular system is attaining its highest development, and in the second the muscular development being complete, the danger is greater.

As all medical men of experience know, infants, children, and old persons take the anæsthetic with comparative impunity.

Sex.—It is conceded that more than twice as many men are killed by chloroform as women, but during pregnancy and in the absence of menstruation the danger to the woman increases.

For Flint states "that the absolute increase in the evolution of CO₂ with age in the female is arrested at the time of puberty and remains stationary during the entire menstrual period, provided the menstrual flow occur with regularity."

Women are not as quickly killed by gases and vapors as are men.

Digestion.—CO₂ is greatly increased during digestion, but there is no necessity for waiting longer than *four and a half hours* after the patient has taken food *before commencing* with the *inhalation*, for Dr. Edward Smith found the CO₂ as much diminished after that interval as after twenty seven hours of fasting.

Foods and drinks.—Dr. Smith divides these into excito-respiratory and non-excito-respiratory.

The excito-respiratory foods and drinks are as follows: The nitrogenous ones, the cereals, potato, sugars; milk and its components, tea, coffee, cocoa, chicory, rum, beer, stout, and the ales.

The non-excito-respiratory are starch and fat. Hence, the propriety of not allowing a patient to partake of articles of the first class within an hour of chloroforming.

The vomiting which such allowance may produce is a minor evil, in fact is conservative, diminishing CO₂ by its sedation, and putting an end to digestion.

Prout demonstrated that CO₂ was diminished by a concentrated infusion of tea, and this accounts for the success of certain German surgeons who prefer tea given before chloroforming, to alcoholics—tea possessing the convenience over alcohol of not being so likely to produce vomiting.

But stimulants have not been given with the view now advocated in this paper, to lessen the formation of CO₂, but with the purpose of stimulating the heart and lungs.

Fortunately, this purpose as concerns the respiration is contravened by the teaching of physiology.

Flint states "that the most constant effect of alcohol, such as wines and spirits, is to diminish the