

The second sound depends on the contraction of the auricles, and is produced as they propel their blood with force through the auriculo-ventricular foramen into the ventricle during its dilatation.

It appears to follow the first sound as an immediate sequence, as it takes place so quickly after its completion, but it is the commencement of a new beat, and synchronous with the dilatation of the ventricle, and, of course, precedes the ventricular systole.

And as the same principle obtains in warm-blooded animals, the first sound of the heart is produced during the ventricular systole, as the blood is propelled with force into the aorta and pulmonary artery, and attains its intensity as the blood has entered their orifices and is thrown back against the semilunar valves and shuts them, by the re-action of the distended parietes imparting an impulse to the wave, the impulse of the aorta preceding the pulse at the wrist, by an appreciable instant.

The second sound of the heart is produced by the force with which the blood is propelled by contraction of the auricle, through each auriculo-ventricular foramen, into the ventricles during their diastole.

From what has been stated, it will be seen that a bruit sometimes attends one or both sounds, when the action of the heart is weak, and disappears when the action is strong—so that one cause of inorganic murmurs is the want of energy in the contraction of the auricles or ventricles, and whatever restores this removes the murmur.

From the manner in which the first sound is produced, we can perceive how a murmur connected with the contraction of the left or right ventricle is propagated along the aorta or pulmonary artery; a circumstance on which Dr. Hope laid great stress in determining to which side of the heart the murmur belonged

ART. IX.—*Cases illustrating the Use of the Laminaria Digitata Tents.** By JOHN A. BYRNE, M.B., Univ., Dublin; Professor of Midwifery to the Catholic University of Ireland; &c., &c

I.—CASE OF INTRA UTERINE POLYPUS—SEVERE HEMORRHAGE—REMOVAL—RECOVERY.

II.—CASE OF RETENTION OF PIECE OF OVUM AFTER ABORTION—SEVERE HEMORRHAGE—REMOVAL—RECOVERY.

ALTHOUGH it is an easy matter to diagnose extra-uterine polypi by the touch and sight, yet when the polypus is internal great

* Read at Meeting of Dublin Obstetrical Society, June 11, 1870.

difficulties exist in many cases in arriving at a correct conclusion as to the cause and origin of the fearful hemorrhage, which is occasionally the most prominent symptom of its presence. The reason of this is that frequently the entrance into the uterus is so constricted and closed that we cannot pass a sound or uterine probe through the narrow passage, and thus we have no means of forming a correct opinion, unless there be some very apparent enlargement of the uterus, which at once leads to the diagnosis of tumour of some kind. The late eminent Professor Sir J. Simpson, feeling this difficulty, devised the plan of artificial dilatation of the os and cervix uteri by means of sponge tents. He gave the results of his experiments to the profession in a paper read before the Medico-Chirurgical Society of Edinburgh in November, 1849, and thus he may fairly claim to be the originator of the plan of artificial dilatation. Had this great man left no other memoir behind him than this, it would be sufficient to entitle him to the thanks of the profession; but I need scarcely say that his contributions to uterine surgery and therapeutics have been most extensive and varied.

There are, however, certain disadvantages connected with tents made of sponge, such as the difficulty of introduction, their tendency to slip out—as on one occasion I had myself an opportunity of observing, their becoming fetid from the uterine secretions; so that now they are not much used, although, however, we cannot afford to discard them altogether.

Many instruments were subsequently devised for this purpose—such as Dr. Priestly's dilator, on much the same principle as the urethral dilator, Dr. Marion Sim's dilator, and others. These are all, no doubt, useful as temporary means of dilatation, but they fail to afford us the same advantages for operative purposes as Simpson's sponge tent, or that which was introduced to the notice of the profession by Dr. Sloan, of Ayr, in a short memoir published in the *Glasgow Medical Journal*, in the year 1862. This tent, made of the laminaria digitata, or sea-tangle,* possesses all the requirements of a substance necessary to dilate; thus it is light, clean, easily procured, can be made of any length and size, possesses remarkable properties of dilatation, does not become fetid from absorption of discharges, and is very easy of introduction, and, moreover, is capable of being so managed, that one or more can be

* For the first application in Dublin of the laminaria digitata tents in the dilation of the uterus, we are indebted to my friend, Dr. G. Kidd, who published an able memoir on the subject in *Dublin Med. Journal*, 1869 (*vide*).

easily introduced into the cervix, so as to occupy it completely, according to the narrowness of the passage which we wish to dilate.

Having had several opportunities lately of testing its peculiar advantages, I have selected from my note-book the following two cases in which its use proved eminently useful in producing satisfactory dilatation of the os and cervix, and thus enabled me to observe the source of long-continued and severe hemorrhage:—

Mrs. M., aged 21, consulted me on 12th October, 1869, for uterine hemorrhage, which had continued some time. Her statement was to the following effect:—She had been married about two years, had one child in April, 1869; when she was three months nursing this child she became pregnant, aborted at three months, had a good deal of hemorrhage; after this she again became pregnant, again aborted at three months, or thereabouts, and since that time has been in very delicate health, having been scarcely ever free from hemorrhage. When she came to consult me she was very anemic and feeble from the frequent attacks. She was a healthy-looking woman in every respect, and with this exception had been always so. Before marriage she had suffered from dysmenorrhea.

On my examining her with the speculum there was no appearance of anything which could account for this—the os uteri was healthy; on examining, however, with the finger, the cervix uteri felt rigid, the os uteri was closed, and I detected an enlargement and hardness of the uterus at the junction of the body with the cervix; the os itself was so contracted that it scarcely admitted the point of the sound, and I could not introduce it for even the smallest distance without causing considerable pain, so that I was obliged to desist. She was very hysterical, and I could not arrive at any conclusion derived from this source of examination. I told her my opinion was that there was a tumour seated within the uterus, and that it was most probably the cause of the hemorrhage, although it would be impossible then to form an opinion as to its curability. I ordered her cold lotions and ferruginous preparations; and, as she then absolutely declined any more interference, I said I could not be of much service to her.

On the 14th inst., just two days from her first visit to me, I was hastily summoned to see her in the evening. She had been suddenly attacked that morning with flooding and had lost an alarming quantity of blood. She had tried the usual remedies—cold, vinegar, &c., but they all failed. When I saw her she was really almost

moribund, her pulse was scarcely perceptible, her lips were pallid, and on looking at the bed I perceived that several large clots were lying in napkins. She was so ill that I was obliged to use the tampon—give brandy freely, gallic acid—and I thus succeeded in checking it for some days. When the tampon would be removed, it would cease for a few days, again return, and several times she was nearly moribund from the great losses which she sustained. After two or three days' cessation of the hemorrhage, she would again acquire strength, her lips would regain their colour, and she, thinking that it would no more return, would get up, move about, and then, after a short interval of freedom from bleeding, she would rapidly lose a large quantity, expelling it partly in coagula, partly fluid; treatment would arrest it for a time, but it would return. Thus from the 14th to the 30th October matters passed. I wished to explore the uterus; explained my views to her friends and husband; but I could not induce them to consent to any operation for the purpose of effecting a permanent cure. In this state of things I told them to obtain other advice, as I would no longer be responsible, and I did not see her for several days, when on the 24th of November I received a note from her husband, stating that she would consent to anything which I proposed. I asked my friend, Dr. G. Kidd, who had seen her for me during an unavoidable absence on two days, and who entertained the same view of the case as I did, to assist me. On the 25th of November he proceeded to explore the uterus. The first thing necessary was to place her under the influence of chloroform, which was carried out effectually by Dr. Kidd for me, as it was utterly impossible to do anything to relieve her otherwise, she was so nervous and unmanageable. This having been effected, I introduced a duck-bill speculum into the vagina, and seizing the anterior lip of the os uteri with a strong vulcellum, so as to fix it, the sound was passed up through the narrow and constricted cervix. In doing so there was some difficulty, which was caused by the tumour; but this difficulty having been overcome, a piece of the laminaria, about four inches in length, was passed through the os, and into the cervix; another was passed alongside this, and so on, until five of them were passed. Dr. Kidd suggested this plan, instead of using those which are sold for the purpose and prepared, on account of the latter being too short; and as our object was not only to dilate the os and cervix uteri, but also the body of the uterus, I fully concurred with him. Having introduced them nearly the entire length, I passed a small plug of

cotton wadding into the vagina, and the first part of the operation was finished.

In a few hours she began to complain of pain over the uterine region, but this was relieved by a suppository of morphia introduced into the rectum.

She slept well on that night, and Dr. Kidd and I met again the following morning.

She was placed in the usual position, and the plug and tents removed.

The os and cervix uteri were so much dilated by the process adopted, that I could easily introduce the index and middle finger of my left hand. On doing so, I felt a soft tumour of about the size of a grape, attached to the anterior and lateral wall of the uterus, near the cervix, and corresponding exactly to the tumour felt on examination previously; it was not pedunculated, but sessile, and very soft and pliable. Dr. Kidd also examined it, and satisfied himself of its nature; intending to pass a loop of wire around it, and extract it with the ecraseur, I grasped it with a vulcellum, but it was so soft and pliable that it came away, and I was obliged to tear it out in fragments; any portion which I could not grasp I scraped with my nails, and having taken away it all, the interior of the uterus, where it was attached, was touched with strong nitric acid.*

I need not occupy the Society with details as to subsequent treatment. She recovered without a single bad symptom. For two or three days there was a dark-coloured discharge, which appeared due to the contact of the acid.

She was well in a few days. She rapidly regained strength. She had no return of the hemorrhage, and she menstruated regularly until February, when she again became pregnant, and she never has had the slightest annoyance since.

DR. HAYDEN'S REPORT.

"Shreddy portion consists entirely of fibro-plastic structure, *i.e.*, fibre-cells drawn out at extremities into fine filaments with large oval nuclei in central portion. Under strong acetic acid the filamentous portion disappeared in some measure; a few red blood corpuscles were likewise visible. The soft pulpy portion consisted of mucous exudation entangled in the foregoing structure."

On looking at those small broken pieces, which once formed a single mass, it could scarcely be believed that so small a substance

* Dr. Ringland was the first to recommend the application of nitric acid in these cases.

could give rise to such alarming symptoms as those just detailed ; but those who are conversant with such matters are aware that hemorrhage of the most alarming nature is a frequent attendant upon polypi, whether seated within the uterus or external to the os. I have myself seen very severe hemorrhage to arise from the small vascular polypus, scarcely the size of a small pea, which is occasionally seen to be seated just at the orifice of the os uteri, and we know very well the fearful flooding which proceeds from the ordinary pedunculated extra-uterine polypus. I have not the slightest doubt in my mind that this lady would have died in some attack of flooding, or else that she would have gradually become exhausted from the frequent attacks, were it not that we were fortunately able, by exploration of the os and uterus, to ascertain the origin and source of it, and thus remove the cause ; and this could not possibly have been effected without the aid of some substance such as the laminaria digitata, whose properties of expansion are so wonderful, and, at the same time, so innocuous.

The second case in which I had an opportunity of testing its efficacy was the following :—

On November 13, 1869, at 2 a.m., I was hastily summoned to see a lady residing at Waterloo-road. When I reached the place, I found the lady in a most piteous condition, the entire bed was saturated with blood, napkins, and everything which could be obtained were full of it ; large coagula lay scattered about, and she herself was pulseless—cold—in a state almost of syncope, and, in fact, almost moribund.

Having administered stimulants, and stopped the hemorrhage, I inquired her history. It was this :—She had been some years married ; was 32 years of age ; had three children, the eldest of whom, a boy, about six, was with her ; she had been under treatment in Dublin for some time previously, she told me for uterine complaint, and, according to her statement, had on one occasion a small polypus removed, which had given rise to considerable hemorrhage. Since then she had aborted twice. She recovered very well after her last miscarriage, which took place about three months before ; and she was going about in her usual manner. At the next menstrual period she thought that it was more abundant than usual. Soon afterwards she began to notice that she had a discharge every fortnight, then every week, and then every second or third day ; rest and cold would stop this, but surely it would come on again. She

began to become alarmed, and had come up from the country that day with the intention of consulting me on the following day. She was a very healthy looking woman; very large, and well formed; of florid complexion, and very strong-minded. She had been so frequently under the care of some of our best metropolitan gynecologists, that she was quite conversant with the names of all the instruments used by us.

The sudden and nearly fatal hemorrhage precipitated her intention of sending for me, and I found her in the condition which I have attempted to depict.

On examination, when she had sufficiently recovered, I found the vagina filled with coagula; but I could detect no cause for such severe hemorrhage. It was metrorrhagia evidently depending upon some internal cause. I applied a large pledget of cotton, steeped in a saturated solution of perchloride of iron, to the os—having syringed her with cold water—then plugged the vagina, administered stimulants freely, and gallic acid and ergot. Next day she was improved; there was no return, and so matters went on for a few days. I examined very carefully; there was no ulceration of any kind—simple or malignant; there was not the slightest abrasion even. I examined her with the sound; it afforded no positive information; the uterus was normal in size and position.

She soon recovered from the effects of the hemorrhage, and regained strength; but in a few days she was again attacked, and lost a considerable quantity of blood. I determined now to explore the os uteri; and, with this intention, I introduced a piece of sea-tangle of large size, and left it in for 24 hours. It produced no inconvenience. On the next day, when I removed it, and passed my finger into the cervix, I found a small piece of something tipping against my finger, which, on removing my finger, fell out into the vagina. I need scarcely say that there was no return of the hemorrhage. In a few days she was quite restored to health; and was delighted to get rid of her annoyance, which she examined herself.

On examination of the substance expelled, it proved to be a piece of the fetal membranes, consisting of thickened chorion and amnion, which latter was quite evident from its white glistening appearance, and which had remained from the previous conception and abortion. The lady has returned to the country, and I believe, but of this I am not certain, that pregnancy has taken place.