ON THE MECHANISM OF THE PRODUCTION OF CERTAIN DISPLACEMENTS OF THE UTERUS.

By JOHN WILLIAMS, M.D. LOND., M.R.C.P.,
ASSISTANT OBSTETRIC PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL.

In a paper recently published in *THE LANCET* the limits of the changes occurring normally in the unimpregnated uterus were defined. In no one of those positions were any of the so-called uterine ligaments put on the stretch by reason of the position assumed by the uterus. The utero-sacral and utero-vesical ligaments were, however, put on the stretch when the rectum and the bladder were both distended. The stretched condition of the ligaments was not due to the position of the uterus, but to the distended state of the organs with which they are connected. Of course, when the rectum alone is distended the utero-sacral ligaments only are stretched. It follows, then, that, whatever may be the use of the so-called uterine ligaments, it is not to limit the antero-posterior movements, ascent and descent, of the unimpregnated uterus.

Having premised this much, we are in a position to investigate the mode of production of abnormal positions of the uterus. In the present paper the mode of production of antero-posterior displacements—anteflexion, anteversion, retroflexion, and retroversion—will alone be considered.

A change in the position of any body can be produced by mechanical force only, and therefore the mode of production of displacements of the uterus is a question of mechanics.

The uterus is a semi-rigid tubular organ, having walls traversed by canals which anastomose freely and which are filled with fluid. In what ways is it possible to produce a flexion of such an organ? A bend in an organ so constructed may be brought about in any one of the following ways:—(a) By a force acting at one end in the direction of the flexion, the other end being fixed; (b) by a force acting at each end, the middle being fixed; (c) by a force acting at a point situated between the two ends, the latter being fixed; (d) by gravitation, one end being fixed, when the organ has been lengthened without proportionate increase in the thickness of its walls, or when the canal has been enlarged the thickness of the walls remaining the same, or when the thickness of the walls has been diminished the canal remaining the same, or when the fluid contained in the canals anastomosing in the walls of the organ has been removed or greatly lessened, or when the consistence of the material forming the walls of the organ has been so changed as to become quite soft.

What are the mechanical forces which can act on the uterus? The force of gravitation is one which is quite insufficient to produce a flexion of the unimpregnated uterus in any condition of the organ which I have met with. As a cause of flexion, indeed, it may be utterly ignored, but as a cause of version it is the most prevalent.

The force generated by the distending rectum acts invariably on the under and posterior surface of the uterus in such manner as to raise and push the organ forwards.

The distending bladder produces a force which always acts on the anterior surface of the organ and pushes backwards at the same time that it slightly elevates the uterus.

The force of the diaphragm communicated from above through the abdominal viscera may strike the fundus directly, or may strike the anterior or posterior surface of the fundus—depending on the position which the organ occupies at the time. This force is directed downwards and forwards in the direction of the continuation of the anterior surface of the spinal column; so that when the fundus is raised above or in front of the plane continuing the anterior surface of the spinal column the posterior surface of the fundus will be struck by the diaphragmatic force, and anteflexion becomes possible. If, however, the fundus of the uterus be below or behind the before-mentioned plane, the force of the diaphragm will act on its anterior surface, driving it further back into the hollow of the sacrum.

The force produced by the abdominal muscles is directed backwards, and can usually act on the anterior surface of the uterus only, pushing it back into the sacral hollow.

When the uterus is elevated, however, the force produced by the action of the abdominal muscles strikes the superior surface of the fundus, driving the uterus lower into the pelvis.

The other forces which may act on the unimpregnated uterus are: the weight of the superincumbent viscera, the force of inertia in falls, jolts, &c.

Adhesion of the fundus to the peritoneum in front of or behind the uterus is not very uncommon. Occasionally the organ is closely bound down in a retroflexed position, but usually the bands forming the adhesions are of considerable length, and they allow of considerable movement of the fundus. I think it is very improbable that adhesions ever cause flexion; in most if not all cases where the uterus is closely bound down the adhesions and the malposition were simultaneous in their origin; the adhesions, however, served to maintain the malposition.

Anteflexion.—When the uterus lies in the pelvis below and behind a line drawn in continuation of the anterior surface of the spinal column, the only forces that can act on its posterior surface are the distending rectum and growing tumours. Growing tumours may cause anteflexion, but the distending rectum cannot. When, however, the uterus is elevated above or in front of the line drawn in continuation of the anterior surface of the vertebral column, other and most powerful forces may act on the posterior surface of the organ and push the fundus forward. These forces are, the force of the diaphragm, the weight of the intestines, and inertia from falls, &c. When the rectum is full and the bladder is full the uterus occupies a higher position in the pelvis than in any other condition of these organs. It is raised above or in front of the imaginary continuation of the spinal column. In this position the fundus is free to move and is quite unsupported anteriorly, for there is a space between the anterior wall of the uterus and the posterior wall of the distended bladder. The cervix, however, is fixed, and cannot be moved in any direction. This is brought about by several agencies: the rectum is distended, and resists any movement of the cervix in a posterior direction; the anterior wall of the vagina and the base of the bladder are stretched to their full tether and prevent any backward movement; the utero-vesical ligaments are stretched, and the connective tissue medium uniting the cervix of the uterus to the posterior angle of the bladder is put to the full stretch, so that the neck of the uterus is firmly bound to the bladder and all movement is prevented. This is one position of the uterus in which anteflexion can take place; indeed, it is the only one, for in all other positions of the organ in which a force can be exerted on the posterior surface of the fundus of the uterus, so as to drive it forwards, the cervix is freely movable. A strain, or severe exertion, or a fall, when the uterus is in the above position, will produce anteflexion.

A fibrous tumour growing in the posterior wall of the uterus, involving the cervix and a great part of the posterior wall, but leaving a free portion near the fundus, may enlarge, fill the pelvis, elevate the uterus, and fix the lower part of it, so as to bring the organ into a condition in which anteflexion is possible.

Adhesions between the anterior wall of the uterus and the bladder are not very common. In the cases of adhesion which I have seen the connecting bands were of such length that it would have been impossible for them to have caused flexion. In one such case anteflexion existed. The adhesions were over an inch long, and probably came on from an attack of pelvic peritonitis after the flexion had occurred.

Anteversion.—There is a form of anteversion described, but said to be very rare, which is called “complete anteversion.” I have never seen such malposition. There are two ways in which it is possible for it to occur. I pointed out in a former paper that when the bladder is empty and the rectum full the uterus is anteverted—the whole length of the organ lying on the collapsed bladder and the anterior wall of the vagina, the fundus being immediately behind the symphysis pubis. In the so-called complete anteversion the uterus lies on the bladder and anterior wall of the vagina, but the fundus is at some distance behind the symphysis. This may be congenital or acquired. In the former case the anterior wall of the vagina is naturally too long. In the second case the anterior wall of the vagina has been artificially elongated. Dr. Marion Sims relates a case in his “*Uterine Surgery*” which favours this view. He

performed an operation in order to shorten the anterior wall of the vagina, and the malposition was cured. The acquired elongation of the anterior wall may possibly occur after pregnancy, but more probably from great exertion when the uterus is already anteverted—that is, when the bladder is empty and the rectum is full.

Retroflexion and Retroversion.—When the uterus occupies a position below or behind the plane which would form a continuation of the anterior surface of the spinal column, the action of the diaphragm, of the abdominal muscles, weight of viscera, inertia from falls, &c., is to push the fundus backwards and downwards. When the rectum is empty the uterus occupies such a position; the bladder may be full or empty. The condition of the rectum, then, is the important matter in the consideration of retro displacements. The rectum may be empty under a variety of circumstances. The bowels may be regular, and then the rectum is occasionally full and occasionally empty. When the rectum is empty the uterus is somewhat retroverted. Any sudden exertion, strain, or fall under these circumstances will increase the retroversion, or may even produce retroflexion. But the bowels may be constipated—that is, they may be open every three or four days,—and there is much straining at stool; and what is passed consists of a few small, hard fecal masses. The condition of the rectum in these cases is one of comparative emptiness; it is not at all distended: indeed it contains only a few small, hard masses of feces lodged in its folds, and great force is necessary to dislodge them. (This is the usual condition of the rectum in patients suffering from constipation and passing such stools as described; at the same time there are cases of constipation in which the rectum is much distended, but the state of the stools in these cases is totally different from the condition stated above. Of cases of constipation, some of the most obstinate are those in which the rectum is immensely distended.)

The physiological actions performed at a healthy stool (the rectum and bladder are always full) are, first of all, evacuation of the bladder: as the bladder collapses the uterus becomes anteverted; the rectum is then emptied, and, in consequence, the bladder and the uterus sink somewhat lower in the pelvis; and as soon, probably, as the woman begins to walk the uterus falls to its lowest normal position—the cervix comes to rest on the top of the inclined plane of the vagina. When, however, there is constipation with much straining at stool this does not happen. The rectum is from the first comparatively empty, the bladder is full, and the uterus is somewhat retroverted. The first physiological act performed at stool is evacuation of the bladder. As the rectum is almost empty the uterus does not become anteverted as the bladder collapses, as it does in health. It was from the first somewhat retroverted, and it only descends slightly by the evacuation of the bladder: it still remains retroverted. Having emptied the bladder, the person proceeds to empty the rectum, which is by no means easy. She strains, and the uterus becomes still more retroverted. She strains again until a few small, hard masses are passed. The uterus by this means is driven still lower, especially the fundus. The uterus lies now with the fundus directed backwards and somewhat downwards; the cervix is directed forwards and slightly upwards; and the uterus, at the junction of its neck and body, rests on the posterior wall of the vagina, so that the organ cannot descend lower as a whole. Here we have the middle point of the uterus fixed, with both extremities movable; for the fundus may descend until it reaches the bottom of Douglas's pouch, and the cervix may descend, or it may ascend until the anterior vaginal wall is fully stretched. This position of the uterus is one of great retroversion.

During the act of straining (the uterus having been driven into the above position) the mass of the intestine acted upon in front and above by the diaphragm and the abdominal muscles is driven into the pelvis, and acts like a wedge. One of two things may happen. Should the anterior wall of the vagina be sufficiently long to allow the fundus of the uterus to be pushed to the bottom of Douglas's pouch, that may take place. The fundus of the uterus by this means becomes fixed, and the middle point is also fixed; any further straining will bend the cervix downwards into the vagina, and retroflexion is the consequence. But the anterior wall of the vagina is, as a rule, not so long as to allow the cervix to ascend to such a degree as to permit the

fundus to descend and become fixed in Douglas's pouch. In this case, as soon as the anterior wall of the vagina has been fully stretched, the cervix becomes a fixed point, the fundus is by further straining driven lower down into Douglas's pouch, and retroflexion is the result. The fundus of the uterus with its broad ligaments having been driven into Douglas's pouch, the veins of the latter become constricted by the utero-sacral ligaments, which form the upper margin of the pouch, and in this manner is caused the congestion of the body of the uterus so commonly associated with retroflexion of the organ. In cases of simple ante flexion of the most acute kind occurring in virgins, the enlargement of the body of the uterus is not marked. In women who have borne children, however, there is often considerable enlargement; but this enlargement is due to complications accompanying the flexion.

In many cases of retroflexion in which there is difficulty in replacing the body of the retroflexed uterus, the cause of the obstruction is to be looked for, not in adhesions, but in the state of the uterus itself and of the utero-sacral ligaments. The fundus and part of the broad ligaments in these cases have been for a long time lodged in Douglas's pouch; the utero-sacral ligaments compress the broad ligaments and the lower part of the body of the uterus; the portions of the broad ligaments immediately adjacent to the uterus and the uterine body itself are mechanically congested and swollen, so as really to be too large to pass up between the somewhat stretched sacro-uterine ligaments. If in some of these cases the cervix be pushed back, the utero-sacral ligaments are somewhat relaxed, and the fundus of the uterus can be pushed up between them, and the displacement reduced.

Diminution in the amount of blood in the vessels of the uterus is little, if at all, known, though congestion—a condition most unfavourable to the production of flexion—is said to be not uncommon. Probably those curious cases of flexion which are sometimes directed forwards and sometimes backwards are due to a deficiency of the circulating fluid in the uterine vessels. This view is favoured by the fact that such cases occur almost invariably in very anæmic women.

Softening of the tissue of the uterus is a condition of the organ the pathology of which has yet to be elucidated. I have seen it only in cases of pregnancy, some cases of fibrous tumours, and some cases where the uterus had contained foreign bodies. This would point to its being due to rapid growth or to rapid change of tissue. I have never seen a uterus whose tissues were so soft that it could be said that the soft condition was capable of causing flexion; nor have I seen a flexed uterus so soft that the flexion could in any way be ascribed to that condition.

Anteflexion of the uterus, then, is possible only when the bladder and rectum are both full enough to raise the fundus of the uterus above and in front of an imaginary plane continuous with the anterior surface of the spinal column.

Anteversion is only possible when the rectum is full and the bladder empty, except when the uterus is considerably elongated, in which case it is the permanent condition. The so-called "complete anteversion" is only possible when the anterior wall of the vagina is of unusual length.

Retroversion is only a step towards retroflexion. Both conditions may be produced when the rectum is empty, and that is a necessary condition for their production.

Elongation of the uterus, enlargement of the uterine canal, and diminution of the thickness of the uterine walls, are questions which can be discussed only in connexion with pregnancy and fibroid tumours.

On the influence of the above conditions in the production of displacements, as well as on the pathology of flexions generally, I hope to publish on a future occasion.

A QUANTITY of arseniate of soda, which had been thrown away from a manufactory at Blackburn last week, was mistaken for sugar by some children, who greedily devoured it. One boy died, and thirty children are now suffering from the effects of the poison. At the inquest on the deceased, the jury returned simply a verdict of "Accidental death." It is difficult to understand how it was that no rider was appended to the verdict dealing with what we cannot but regard as culpable carelessness in the disposal of so powerful a poison as arseniate of soda.