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Therapeutic and Preventive Medicine.

TREATMENT OF WEAK LABOR PAINS.*

BY STEPHEN RUSHMORE, M.D., BOSTON.

THE subject of weak labor pains is one in which both the specialist and the general practitioner are interested. It is a timely one for consideration, I think, because of the present indiscriminate use of two means of assisting the unavailing efforts of the woman in labor to deliver herself of her child on schedule time. These are the extract of the pituitary gland and Cesarean section. In the past the obstetrical forceps has come in for its share of condemnation, but I think it has fallen somewhat into disuse now that the other methods have come into vogue.

Before discussing whether weak labor pains need any treatment, and, if treatment is indicated, when it should be instituted and how it should be carried out, it may not be out of place to recall some of the features of normal labor for purposes of comparison. Perhaps, by a consideration of the mechanism and physiology of normal labor, some light may be thrown on the pathological condition.

By the term "labor," we mean the effort of the female organism to separate from itself the products of conception. This effort, though largely involuntary in character, is not unconscious, but is accompanied by sensations of a disagreeable nature so acute and severe that

they are called pains. So far as we know, labor is always painful among the higher mammals: the few exceptions are of interest as curiosities rather than as indicating a normal condition from which painful labor is a pathological deviation. To be sure the process seems to make greater demands on the individual in the higher forms, and among human females, the more highly civilized are more subject to difficulties of labor, of one sort or another.

Labor, terminating the period of gestation, comes on in the human female about two hundred and eighty days from the appearance of the last menstruation. But, if ovulation occurs about midway between the beginnings of two menstrual periods, as seems probable, conception takes place no less than two weeks from the beginning of the last menstruation, and gestation is more nearly two hundred and sixty-five days. But gestation is not always terminated on this two hundred and eightieth day, and while the well known rule for computing the date of confinement gives the day on which labor is most likely to begin, a week's variation in either direction is entirely normal.

When labor comes on, the uterus tries to expel its contents by contraction of the muscular fibres. These involuntary efforts recur at rather regular intervals, becoming stronger and more frequent. In time there are added voluntary contractions of the muscles of the abdominal wall and of the diaphragm, aiding in the expulsive effort. At first the contractions are manifest to the patient only as a drawing or tightening sensation, but later they are associated with pain, gradually becoming severe. During a painful contraction,

* Read at a meeting of the Penobscot County Medical Society, April 18, 1916.

the pain comes on at a distinct interval after the contraction has begun, and is due to pressure of the presenting part and stretching of the cervical canal and the vagina as well as to the spasm of the muscle. For a long time three stages of labor have been recognized: (1) the stage of dilatation of the cervical canal until it is large enough to permit the passage of the fetus from the uterus; (2) the stage of expulsion, during which the fetus is expelled from the uterus and the vagina is dilated; it is terminated by the birth of the child; and (3) from the birth of the child to the expulsion of the placenta.

Of the nervous mechanism we know little except in a general way. The uterus is abundantly supplied with nerves and ganglia and can carry on its usual function separated from the central and sympathetic nervous systems, as is shown by experiments on the isolated pregnant uterus of animals. Clinical observations have shown that complete transverse section of the spinal cord does not interfere with labor except in so far as it prevents the contraction of the abdominal muscles. That psychic influences may play a part is well known, but in general the central nervous system has only a regulating function. There may be, and probably are, several centres in the cord from which reflex impulses may inhibit or accelerate labor, but of them we actually know very little.

Experience has shown that the computed date for confinement, two hundred and eighty days after the appearance of the last menstruation, is about the best time for the infant to be born. If it is born much before this date, it is underdeveloped and not likely to live. If born much after this date, not only is the child larger and thus likely to cause more difficulty during birth, but for reasons of which we know nothing its vitality is often found to be reduced, even if birth has been normal and easy. How does the maternal organism know when to fall into labor, and how does it know what is the best time for the child to be born?

Explanations of the cause of labor are numerous and date back to antiquity. Some of them are fanciful and need only to be stated to show their error. Others are more reasonable, but must await further investigation for a final judgment as to their validity. In certain cases of labor before term, we find disease of the placenta, or of the decidua, overdistention of the uterus, or trauma, which may have been the cause of the incidence of labor in that particular case, but in normal labor at term no such factors are present. We might make an exhaustive study of the ways in which labor can be induced, and comparing the changes which occur with the changes in normal labor might find a suggestion as to the usual cause. But this has not yet been done.

One constant fact we have as a basis. There is in pregnancy a growing irritability of the uterus, and with it an increase in frequency and

strength of the intermittent contractions known as pregnancy contractions. But of the cause of this we know nothing. Another characteristic of the pregnant uterus is that if strong contractions are started from any cause, they tend to continue until labor is ended. At the present time, when we are finding the long-looked-for explanation of so many phenomena of living organisms by the help of the finer chemistry, it is natural that the suggestion should be made that some substance circulating in the maternal blood should be the cause of labor pains, and experimental investigations bear this out, though only a beginning of study along these lines has been made. In the first place, experiments have shown that the connections with the central and sympathetic nervous systems are not necessary for labor. These and other experiments indicate that the cause of labor is a substance in the maternal circulation acting on the uterine muscle or on the intrinsic nerves of the uterus.

What is this substance and from what organ or structure does it come? Its nature is wholly unknown to us but its point of origin can be tested in a general way by injecting into animals, near term, extracts or blood from various sources. It has been found that injections of from twenty to fifty cubic centimeters of fetal blood into the vein of a pregnant woman at, or near term, will bring on labor in a few hours. The conclusion has been drawn that labor is due to a substance produced by fetal metabolism, accumulating in the uterus and giving rise to gradually increasing irritability.

While there is no reason, I think, for doubting the experimental facts, the conclusion may be open to certain objection. These experiments, and others which I will not take the time to describe, have established simply the facts that the substance or group of substances which produces labor is found in the fetal and in the maternal circulation. But as an interchange of substances between the two circulations is possible, the primary source of the stimulus is not clear.

The duration of labor depends on a number of factors which may be grouped under the following heads:

1. The force exerted by the uterus and by the abdominal muscles in dilatation and expulsion.
2. The application of this force, whether mechanically advantageous or disadvantageous. The vertex presentation with head well flexed and membranes unruptured gives an application of the force during dilatation of the cervix which is very advantageous. Malpositions of the fetus with ruptured membranes may give a very disadvantageous application.
3. The resistance of the maternal parts, which has to be overcome.
4. The size of the fetus.

The test of normal labor is that the woman should pass through this process without injury

to herself, and deliver herself of a normal child in approximately the same time as other women. It is a test which we can apply easily when labor is over, and which we can apply in a general way during labor, but we are quite at a loss before pains have started. While we can measure the pelvis and determine the position of the child, guess at its size and estimate the resistance of the soft parts, we have little accurate knowledge of these points and we can only be in doubt and ignorance when it comes to judgment as to that most important factor,—the strength of the uterus.

Efforts have been made to study the pains of labor with some exactness, measuring their force and duration and noting their character. The classic tokodynamometer of Schatz, a compressible bag introduced into the uterus and connected by a tube with a column of mercury, has proved very useful in spite of its limitations. But it is applicable only in special studies and is not suitable for routine procedures. Recently Fabre has described what he calls external hysterography, a method of automatically recording the contractions of the uterus during the course of pregnancy, labor and the puerperium. The apparatus is applied to the abdomen and the record is made by means of levers, a drum and revolving cylinders. It may be employed at any stage of labor and is not disturbed by respiration or by the fetal movements.

By this apparatus Fabre was able to get a better idea of the character and strength of labor pains than by palpation, timing the pains and noting the subjective symptoms of the patient. He was able to observe also the effect of drugs on the uterine contractions. He claims that the administration of chloral hydrate, ether and morphia, controlled by hysterography, will give marked diminution of the pain of labor, without interference with the muscular activity and without endangering the life of the fetus.

If a patient is in labor, how can the process be modified, either by increasing or diminishing the pains? Here the same factors by which labor may be induced come into consideration, but I shall only mention at this point some of the results of Fabre's studies of drugs in checking uterine contractions. Chloroform and ether cause a slight diminution in the force of the pains; chloral hydrate makes them more regular as well as diminishes the frequency. Morphia seems to diminish the intensity of the abnormally strong pains while scopolamin seems to cause a cessation of activity. These results have not yet been confirmed by other investigators using his method, but the method would seem to offer possibilities of considerable advance in the accuracy of our knowledge.

What do we mean by the expression, "weak labor pains"? The term is relative, for in the course of normal labor the pains are, at times, of little force and yet are perfectly normal, as, for example, early in the first stage and in the

third stage. Sometimes, too, in the first or second stage, the pains may show a marked remission in force, but they begin again with renewed vigor and continue until labor is terminated within the normal period of time. So that by weak labor pains we mean lack of force over a prolonged period or at a time when we should expect the pains to be forceful. They may occur in the first, second or third stage, and as uterine contractions continue after the expulsion of the placenta; a complete study would cover this period also, for post partum complications may develop as a result of weak uterine contraction.

Weak labor pains may be either primary or secondary. By primary, we mean those in which either the normal stimulus to contraction is weak, or the muscle itself does not react well. Of the normal stimulus to contraction we know very little, but if it is a substance from the fetus accumulating in the uterine wall and sensitizing the uterus, we can see how insufficient sensitizing might be a factor, at term or particularly before term. While this would explain certain cases of defective uterine contraction, there is little more than theory for a basis.

Of defective muscular development, a little more is known. Patients with delayed uterine development, or those who have passed beyond the highest development and are approaching the senium, or those who show developmental malformations, more frequently show anomalies of uterine contraction, which are perhaps due to defective development of muscle. Defective innervation may also play a part. It is my impression that the increasing difficulty which the modern civilized woman has with labor is due to defective hygiene during the period of adolescence, which has its effect not only on the nervous system, making women less capable of standing the strain of pregnancy and childbirth, but through underdevelopment of the genital system actually increasing the strain.

Primary weak pains are not at all infrequent and may be due not only to the causes mentioned, but to any factor affecting the general condition of the patient, as prolonged ill health from any cause, as well as to local disease which has reduced the strength of uterine muscle, once well developed.

By secondary weak pains we mean those which are weak having once been strong. This condition comes on because the muscle is tired from overwork. Here again we have a relative term, for what might be entirely adequate force under certain conditions is not enough if there is slight obstruction, or difficulty of delivery due to occiput posterior or breech, or slight disproportion between head and pelvis, or rigidity of the soft parts.

Now if we have a patient in whom the pains of labor are weak, according to our definition, that is, over a prolonged period or at a time when they ought to be strong, why should we do anything? Will not nature prove adequate

and will not the woman deliver herself in the course of time? The mere asking of this question brings clearly to the minds of all of us the sad memory of times when nature did not prove adequate and when in spite of such assistance as we could render, the mother as well as the child suffered greatly. But it does not give the answer as to when assistance is indicated, nor the kind of assistance that may be most appropriately rendered. These are determined by the stage of labor, the condition of the mother and the child and by the resources which we have at our disposal. I am taking it for granted that thorough examination has excluded as far as may be the presence of any gross anomaly of fetus or pelvis.

A consideration of the resources at our disposal will show what they can and cannot accomplish and thus the indications for their use. Among the resources are, briefly, rest, massage of the uterus, changes in position in bed and by walking, rupture of the membranes, dilatation of the cervix and the administration of drugs. Sometimes in normal labor we see the pains die down and, after an interval of apparent rest, start up again with renewed vigor and go on to the termination of labor. In certain cases after the onset of labor, when the pains are weak or have disappeared, the patient will rest or even sleep following the administration of chloral hydrate, morphia, or scopolamin and morphia, and on waking will complete labor with normal pains. This happy outcome may be expected only when the mother and fetus are in good condition and the inertia is manifest in the first stage of labor, when alone this treatment is justifiable.

Since certain mechanical stimuli increase the rate and force of uterine contractions, massage of the fundus is a rational method of treatment, but experience has shown that it does not accomplish what we want, producing only a single contraction while the stimulus is applied. The same may be said of changes of position in bed, turning the patient from side to side or from back to side. It may produce a few contractions, but that is all.

In the first stage we have all found that having the patient walk around the room is a useful and sometimes a perfectly adequate stimulus.

Occasionally early rupture of the membranes will give increased activity of the uterine contractions, but how it acts is not clear, and in general it does not accomplish much, and if the bag of waters is opened too soon the patient loses the benefit of the hydrostatic wedge in the dilatation of the cervix.

But what we want is a more certain method of inducing labor pains or stimulation to adequate activity if they are present but weak. This is found in forcible dilatation of the cervix. It is perhaps a part of the mechanism of normal labor, the increasing dilatation from pressure of the presenting part producing in-

creased uterine contractions. Two methods have been suggested in practice,—manual dilatation and dilatation with a bag, various forms of which have been employed by different operators. In either case an instrument may have to be used to start the dilatation, until the fingers can be introduced or until the bag can be placed in the cervix, but it is not always necessary.

Manual dilatation requires surgical anesthesia and is rapid and, therefore, more likely to give troublesome lacerations of the cervix. There is a certain increased risk from infection. It should be given up in favor of the bag except when rapid dilatation and immediate delivery are necessary. Here for primigravidae I personally prefer to replace it by another procedure of which I shall speak presently.

The type of bag which is perhaps most frequently used in this country is that suggested by Voorhees of New York. It is cone shaped with a tube attached to the apex of the cone, and is made in several sizes. It is made of linen or cotton fabric, covered on both sides with rubber, and is, therefore, watertight as well as inelastic. It is introduced in a collapsed condition, without an anesthetic, under primary ether, or preferably, under nitrous oxide or nitrous oxide and oxygen anesthesia, and filled with sterile water. The tube is then tied or clamped and the patient left alone. If labor does not come on promptly, or if there is reason for hastening labor, traction on the bag may be made by a weight hung over the foot of the bed. It is a most efficacious instrument and I know of only one objection to its use, namely, the possibility of introducing infection. But it would seem that careful technic would almost eliminate this danger, and I have never seen a case of infection following its use.

I have referred to those cases in which with weak uterine contractions and undilated cervix, immediate delivery becomes necessary in the interest of the mother or of the child. The possibilities are rapid dilatation of the cervix and extraction of the child by forceps or after version, and Cesarean section. The discussion of the indications for either procedure is outside of my province this evening, but I would simply call your attention to the advantages of the so-called vaginal Cesarean section, which is not a Cesarean section at all, over manual dilatation of the cervix.

The operation is to incise the cervix in the median line anteriorly and posteriorly, if necessary on both sides also, until an opening is obtained large enough to permit extraction of the child. The irregular lacerations following manual dilatation, extending an uncertain distance, are replaced by incisions made by a sharp instrument, and therefore, with less trauma, under constant supervision. Suturing after extraction is more easily accomplished. If necessary, incisions of the perineum are made and easily closed.

The last resource which I shall consider, and it is the last in the order of consideration and not in the order of use, is drugs. Among drugs which have been used to stimulate uterine contractions there might be mentioned many which have been tried, but were soon rejected. Recently there have been subjected to the test of practice salicylic acid, sodium borate, cannabis indica, strychnia, cola, cane sugar, milk sugar, digitalis and caffeine.

Certain oils have been recommended as emmenagogues and it is known that they will produce abortion; for example, oil of rue, of thyme, of turpentine, apiol, and sabine. The suggestion was made that under proper control they might be useful in stimulating normal uterine contractions. Careful tests of their action on the isolated uterine muscle of pregnant and non-pregnant animals have been made. It was found that they have a paralyzing action even when very dilute, so that they are to be regarded not only as of no value, but as positively dangerous in practice.

Noteworthy among the substances which have been given up after trial is pilocarpin which has a distinct oxytocic effect as shown by clinical experience as well as by laboratory experiments. Its use was begun about forty years ago and it was administered hypodermically during the period of dilatation. Troublesome symptoms, however, as salivation, possible unfavorable action on a weak heart and occasional tetanus of the uterus led to its disuse.

Quinine also had a vogue and was warmly recommended. Then followed a period of neglect and a recent period of revival of its use. Experimentally its effect in toning up the uterus is evident. But while it has this use clinically also, and is quite safe for the mother and child, its effect is inconstant, may not appear at all, may appear late or may be very slight. It is most effective in the period of dilatation. Very recently it has been used after pituitrin in cases in which the desired effect did not appear, and it has given gratifying results.

In considering ergot and its preparations and derivatives, we come at once to a field of active controversy. It is not because of any doubt as to the intensifying effect of ergot on the uterine contractions. This was known to Hippocrates. The drug is mentioned in the early Chinese literature and in the Middle Ages was much used as an abortifacient. Its use was known to be associated with danger and there occurred isolated cases of poisoning as well as epidemics of ergotism, the so-called sacred fire.

For over a century efforts have been made to obtain from the crude drugs the active principle in a pure state, and the effort, continued to the present time with the resources of modern chemistry, has not been crowned with unqualified success. Various substances have been isolated, one of which produces effects closely resembling the typical effects of ergot; the second is much like adrenalin, and a third is like preparations

of the pituitary gland. Still other substances have been obtained by other investigators. While this is very interesting from the theoretical point of view it has not much practical bearing, though very recently preparations have been produced which at first sight seem promising. As yet there has not been opportunity for their thorough trial.

The old question of when to use ergot, closed as some of us thought, has been opened again by Kehrer who found that in a series of closely watched cases, ergot at the end of the stage of dilatation had no tendency to cause tetanus. This differs from the generally accepted view and so the controversy has begun again.

Ergot is acknowledged to be the sovereign remedy for relaxation of the uterus following the expulsion of the placenta, but likely to cause some embarrassment if used during the third stage of labor. With reference to the use of ergot early in labor, Schatz, by means of the tokodynamometer, showed that small doses of ergot would increase the force of the uterine pains, without tetanus. But he also called attention to the difficulty of getting the exact dose required. Others tried fractional doses and claimed excellent results, but the weight of opinion has been, and still is, to wait until the end of the third stage.

It would seem that these difficulties are not inherent in ergot itself, but in the preparations of ergot, which deteriorate rapidly. The crude drug itself varies greatly in value according to conditions of growth which vary from season to season, and from district to district in which the ergot grows. These facts shift the problem to the pharmacologist or to the chemist, at least from the clinician for the present.

In view of all these facts, it is not to be wondered at that Hofbauer's communication in 1911, in regard to extracts from the hypophysis, was received with great interest. In 1885, Pierre Marie had first called attention to a relation between the genitalia and the hypophysis, in noting that there was some connection between acromegaly and tumors of the hypophysis. The etiological significance has been made clearer by surgery, in that removal of the tumor relieves and sometimes cures the symptoms. The description of Froehlich in 1901 of the clinical picture known as dystrophia adiposogenitalis showed that there were metabolic relations between hypophysis and sexual organs. Among other signs there is defective development of the secondary sexual characteristics. In the female, the hypophysis increases in size, during pregnancy, with fairly characteristic changes which regress after labor, but never entirely disappear. Increase in size of the hypophysis is found also following castration and in the senium, according to some investigators.

The effect of the secretion of the gland on the uterus was first determined by laboratory experiments in 1909 by Kehrer and by Dale. Clinical possibilities were at once recognized,

and it was soon used to control post partum hemorrhage and as a prophylactic in Cesarean section. Two years later Hofbauer used the extract to stimulate and strengthen labor pains, since which time it has been widely employed for this purpose. Factors which have favored its free adoption are its relative constancy, permanency and uniformity of composition, in marked contrast with ergot.

The results are not uniform, but certain facts seem to be pretty well established. For example, the dose is about one-tenth of a gram of the gland substance, corresponding to one cubic centimeter of pituitrin, but varying somewhat with preparations of other manufacturers. Increasing the dose above this quantity does not seem to increase the action and such variations in result as appear seem to be due to variations in the susceptibility of the patients. For if the contents of a one cubic centimeter ampoule be divided equally between two patients, there may be a marked effect in one and no effect in the other.

It may be given subcutaneously, intramuscularly or intravenously. While there is little difference between the subcutaneous and the intramuscular injection, the latter method is generally preferred. It should be given intravenously only in an emergency to check post partum hemorrhage, for its action is not only almost immediate, but stormy and accompanied by unpleasant but not serious general symptoms. By mouth it has no effect. After intramuscular injection the action is evident in from five to fifteen minutes, though sometimes later; if there is no reaction from the first dose in half an hour, a second may be given. But if no reaction follows the second dose, the patient is considered refractory and no further injection should be made.

The effect on the uterus during labor is peculiar and characteristic, producing a type of pains which closely resemble the normal. There is an increase in the uterine tone, with an increase in the force of the contractions, and a shortening of the duration of the contraction as well as of the interval between the pains. The shortening of the interval is most marked at first when the pains may occur in such quick succession as to give rise to a tetanic contraction of several minutes' duration. But generally no tetanus results, the interval, though short, being clearly defined. The effect lasts for about an hour, with its acme in the first half hour, and is generally not followed by a period of noticeable relaxation. It seems more active the nearer the patient is to physiological term, and if in labor the nearer the patient is to the end of labor. But in inducing labor it is of no value.

In regard to its use after the birth of the child there is wide difference of opinion, indicating that more study and observation are necessary to clear up this aspect of the question. Its injection has been recommended at the mo-

ment of birth to diminish normal bleeding and is undoubtedly valuable for intravenous use in post partum hemorrhage, where it acts promptly and uniformly. Thus it removes the need for intrauterine manipulation and to that extent diminishes the danger of infection.

Certain reports on the use of pituitrin would lead us to think of it as almost a panacea, with no failures, no bad effects and no contraindications. But a more thoughtful study of cases and a review of the literature show that it sometimes fails and sometimes does serious harm.

The failures ought to be studied with great care. They may be divided into two groups: first, those in which there was no uterine reaction—found chiefly in elderly primiparae and in women with undeveloped uteri; second, those in which the reaction was not of sufficient force to produce the expulsion of the child. It is this second group that especially demands attention, for here are the cases in which the misuse has been most obvious.

The bad effects outside the uterus are occasional, but never serious, at least as hitherto reported, and consist of pallor, faintness, cyanosis and irregularity of the pulse. The serious bad effects are in causing tetanus of the uterus which had led to asphyxia of the child and occasionally to rupture of the uterus.

The indications for the use of pituitrin may be summarized briefly. But before it is administered a careful examination should be made to determine whether the child can be born through the birth canal. The cases of rupture of the uterus have come chiefly from the neglect of this precaution. If it seems probable that the child can be so born, pituitrin may be given, first, for uterine inertia in the first or second stage. It has been recommended for both primary and secondary inertia, but I am inclined to be very cautious in its use before the cervix is dilated two and one-half inches.

The second group of cases comprises several subdivisions: those cases in which labor pains are normal, but for some definite cause increased activity is needed, as in a breech and occasionally in a face presentation; if the disproportion between the presenting part and the pelvis is slight; to avoid exhaustion of the mother from undue prolongation of labor; in eclampsia in connection with dilating bag. The only indication that needs comment is the use in eclampsia. Some have feared the dangerous effect of the rise in blood pressure, but this is not great, and I think we have a choice of evils, of which I consider the rise of blood pressure less than the prolongation of labor. It may also be used as a prophylactic against bleeding in Cesarean section.

A word should be said about adrenalin in this connection. Its effect in producing uterine contractions was noticed in 1901, but the study was not prosecuted with much vigor at first, and later interest was distracted by pituitrin. But it is the most powerful and promptly acting

oxytocic that we have, causing contractions in dilution of one to two hundred millions, and producing a powerful effect in dilution of one to fifty million. It is contraindicated during labor because it produces tetanus, but for post partum hemorrhage it is prompt and efficacious though temporary in its effect. It is best injected into the uterine muscle, as intravenously it is dangerous and subcutaneously not very effective. Ten minims of the one to one thousand solution may be injected into the wall of the uterus as high as may be reached on pulling down the cervix.

Original Articles.

A STUDY OF THE SYMPTOMS AND TREATMENT OF CONGENITAL TRANSDUODENAL BANDS.

BY JOHN HOMANS, M.D., BOSTON,

Surgeon to the Peter Bent Brigham Hospital.

THE investigation, of which the results are here presented, has been undertaken to throw light upon the question whether transduodenal bands of congenital origin give rise to such symptoms as to cause them to be considered a pathological entity, having a definite course, symptomatology, and treatment.

The most convincing exposition upon this subject was made several years ago by Dr. M. L. Harris.* Following the teaching of various anatomists, he holds the bands to be remnants of the original anterior mesentery of the upper gut, which, persisting after rotation of the stomach and duodenum in foetal life, remain stretched from the gall bladder and inferior surface of the liver across the duodenum to the region of the hepatic flexure. In general, the cases described by Harris run a long course, their symptoms resemble in certain respects both those of gastric and duodenal ulcer as well as chronic gall-bladder disease, and the Roentgen examination gives evidence of dilatation of the first portion of the duodenum.

Having met with a number of instances of these bands or adhesions, it has seemed to me worth while to make a study of all such cases occurring over a period of several years at the Peter Bent Brigham Hospital. There are now available eleven cases in which definite bands passing from the gall bladder and liver across the duodenum have been found, and in which gastric or duodenal ulcers or gall-bladder disease have been held to be absent. The symptoms of these cases have been tabulated for comparison with a series of six duodenal ulcers

* Harris, M. L.: Constrictions of the Duodenum Due to Abnormal Folds of the Anterior Mesogastrium. *Jour. A. M. A.*, 1914, Vol. lxii, pp. 1211-1216.

and six gastric ulcers, picked out at random, one combined gastric and duodenal ulcer, eight cases of chronic cholecystitis with and without stones, and two cases of chronic appendicitis with reflex gastric symptoms. The late results in all patients whose bands have been divided are of course known.

The lesion, as I have met it, can best be described by quoting from one or two operative records and by reproducing a sketch made at operation. The first: (Surg. No. 3934, J. McG., Case IX.)

"There were a number of adhesions, apparently of a congenital type, passing between the lower part of the gall bladder and the cystic duct across the duodenum to the region of the head of the pancreas. These did not appear to indent or constrict the duodenum There was another band of adhesions, narrow and rather tight, which passed from a point just proximal to the pylorus to the liver itself rather high up beneath the inner part of the right lobe mesial to the gall bladder. These adhesions made a slight constriction in the upper part of the duodenum at about the point indicated in the x-ray as the seat of ulcer. After dividing these adhesions it was possible to feel exactly the whole duodenum and pyloric region and no induration or deformity could be made out."

Or again (Surg. No. 4247, D.T., Case XI, Figure I.)

FIG. I. Diagram taken from sketch made at operation. Case XI, D. T. (Compare with Fig. VI, a Roentgenogram of the same patient.) The gall bladder is attached to the hepatic flexure by a broad, flat band of adhesions passing across the duodenum. A second smaller band passes from the liver to the lower border of the pylorus indenting the duodenum slightly.

"At a point just below the pylorus a very broad band of what appeared to be congenital adhesions attached the gall bladder, from a point beginning at the cystic duct downward for perhaps an inch and