CHRONIC CONSTIPATION A SYMPTOM RESULTING FROM A DISORDERED STATE OF THE SYMPATHETIC NERVOUS SYSTEM. ITS CAUSES AND CURE.

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Chronic constipation, although commonly considered a disease *per se*, is in reality only a symptom indicating the presence of some more general disorder. This symptom, if such we may be permitted to term it, is one which accompanies a great many disorders, being most frequently met with in persons having some other digestive disturbance. Whenever encountered, it is an indication of some inhibitory power acting through the motor, vasomotor, secretory, or sensory mechanisms of the alimentary canal. These mechanisms, being involuntary in nature, are under the control of the sympathetic nervous system; consequently the primary cause of the constipation must be sought for in some inhibitory influence acting on any or all of the mechanisms referred to.

A brief survey of the anatomy and physiology of the sympathetic system will make clear the anatomic relationship existing between the cerebrospinal and the sympathetic system, and also their control over the functional activities of the alimentary canal.

The sympathetic system, although not wholly removed from the influence of the cerebrospinal, as will be seen later, has to a certain degree an independent action of its own, by means of which it controls nutrition and visceral rhythm. The sympathetic system consists essentially of: 1, a series of small ganglia located on the posterior roots of the spinal nerves close to their emergence from the cord; 2, a series of ganglia located on either side of the vertebral column, extending from the base of the skull to the coccyx, these being joined together by means of nerve-fibers, at the top by the ganglion of Ribes, and at the bottom by the ganglion impar, thus making a continuous chain of ganglia, commonly known as the gangliated cord, or vertebral ganglia; 3, three large gangliated plexuses located in the thorax, abdomen, and pelvis, known respectively as the aortic, abdominal and pelvic plexuses, or prevertebral ganglia; 4, an innumerable number of smaller ganglia located in relation with the various viscera and blood and lymph vessels, known as the terminal, automatic, or visceral ganglia, and 5, a large number of nerve-fibers. These are of two kinds, communicating and distributory. The former connect the ganglia with each other and with the cerebrospinal nerves; the latter connect the prevertebral ganglia with the automatic ganglia located in the viscera and circulatory system. The spinal nerves are connected with the vertebral ganglia by means of the white rami communicantes, which pass out from the anterior roots of the spinal nerves, some fibers passing to the vertebral, others directly to the prevertebral without communicating with the vertebral ganglia. There are also gray rami, consisting of non-medullated nerve-fibers, passing back from the vertebral ganglia to join the main nerve trunk of the spinal nerve, part of the fibers passing back to the cord as vasomotor fibers to supply the vessels of the cord and its coverings, the remainder passing with the main trunk of the nerve to supply the blood-vessels of the periphery.

The white rami are composed of visceral and vascular fibers, which are medullated. The gray rami contain fibers which are non-medullated, and are vasomotor in their function. The white rami are of special import-

ance in connection with the question under consideration, in that they influence the functional activities of the alimentary canal. Certain of these medullated fibers of the white rami pass from the cord between the second dorsal and the second lumbar nerve, to supply the viscera and blood-vessels, which, according to Gaskell's nomenclature, are called splanchnics. These have been divided into three sets, according to location: 1, thoracic; 2, abdominal; 3, pelvic. The abdominal splanchnics consist of three main nerves, or trunks, designated the greater, lesser, and smaller splanchnics. The first is formed by branches from the sixth to the tenth thoracic ganglia. It pierces the crus of the diaphragm, and joins the solar plexus. The second or lesser splanchnic is formed by branches from the tenth to the eleventh ganglion. It pierces the diaphragm and joins the solar plexus. The third or smallest splanchnic arises from the last ganglion, pierces the diaphragm, and terminates in the solar plexus. These three nerves frequently communicate with one another, and all end in the aggregation of sympathetic nerve substance located posteriorly to the stomach and surrounding the celiac axis.

From this, the greatest of the sympathetic nerve-centers, fibers are distributed to all parts of the abdominal viscera. Its functions are to control the secretory, vasomotor, nutritional, and visceral ganglionic activities. The secretory functions of the intestinal glands are directly under the control of Meissner's plexuses, which are located in the submucous coat of the intestine, and are influenced by the solar plexus.

The vasomotor functions are controlled by means of fibers reaching the blood-vessels through the splanchnics, the greater splanchnic being the largest vasomotor nerve of the body. The nutritional and visceral ganglionic activities of the intestine, while under direct control of the visceral or automatic ganglia, are predominated over by the solar plexus. The independence of action possessed by the visceral ganglia is observed in the rhythmic peristalsis which occurs in the intestine when removed from the body. This is well illustrated in the intestine of the dog.

Auerbach's plexuses, between the longitudinal and circular coats of the intestine, extending from the esophagus to the rectum, are automatic motor centers, and it is through the influence of these that it is possible for peristalsis to take place in the intestine after removal from the body. When these centers are uninfluenced by any stimulus, there is a condition of aperistalsis.

While the automatic motor ganglia are found in both the large and small bowel, there is considerable difference in the rapidity of the peristaltic wave in each. The nerves influencing the small intestine cause rapid peristaltic movements, while those controlling the large bowel and rectum cause slow movements. This difference in activity between the large and the small bowel is undoubtedly due to the difference in innervation; the small bowel is influenced by fibers from the solar plexus, while the inferior mesenteric ganglion of the sympathetic system influences part of the transverse and the descending portion of the colon, the sigmoid flexure, and the rectum. It is a well-known fact that the peristaltic action of the alimentary canal is largely under the influence of the blood-supply, the latter in turn being controlled by the vasomotor nerves.

The relative amounts of oxygen and carbonic acid gas contained in the blood determine to a considerable degree the rapidity with which peristalsis takes place. The greater the amount of oxygen present in the blood, the

less the peristaltic movement; and the greater the quantity of carbonic acid gas present, the greater the peristaltic action. In the absence of other stimuli, and when blood containing a normal amount of blood-gases passes through the intestinal blood-vessels, the usual normal peristaltic movements occur.

The abdominal splanchnics, which contain inhibitory, motor, vasomotor and sensory nerve-fibers, when stimulated, materially alter the peristaltic movements of the small intestine. When the blood-supply of the intestine is normal, stimulation of the splanchnic inhibits peristalsis; when there is an increased amount of blood in the intestinal vessels, stimulation augments peristalsis. The opposite is true when there is an increased amount of arterial blood circulating through the intestinal vessels. The inhibitory fibers are easily exhausted by an increased amount of venous blood. The stimulation of the splanchnics after death always causes peristalsis, which is in all probability due to the fact that there are motor fibers present which remain excitable for a longer time than the inhibitory fibers. The vasomotor function of the splanchnic is observed by the constriction of the blood-vessels which takes place when it is stimulated. When the nerve is severed, there is dilatation of the intestinal vessels. The sensory function of these nerves is observed in the painful conditions arising in certain disorders of the abdominal viscera.

While the functions of the alimentary canal are almost entirely under control of the sympathetic system, the cerebrospinal system has a modifying influence through the action of the vagus on the stomach and the upper portion of the small intestine, and the action of the sacral nerves on the sigmoid flexure and rectum.

KNEADING MACHINE.

In certain diseases of the central nervous system, obstinate constipation results from a disordered state of the reflex mechanism governing the sigmoid flexure and rectum. As a result of this condition, the large bowel is unable to unload itself, while the small intestine keeps forcing its contents onward, thereby overloading the fecal reservoir, and producing obstinate constipation.

Constipation, then, may be considered a symptom characterized by prolonged retention of feces in the alimentary canal, caused primarily by inhibitory influences acting on the motor, vasomotor, secretory, and sensory mechanisms of the alimentary canal. As these mechanisms are chiefly controlled by the sympathetic system, constipation might properly be termed a neurosis of this system.

The etiologic factors in the production of the dis-

orders which give rise to the symptom constipation are many, and, as previously indicated, are those which exercise an inhibitory influence on the motor, vasomotor, secretory, and sensory mechanisms of the canal. The motor mechanism may be disturbed either generally or locally; generally, by anything causing an atonic condition of the muscular or glandular activities of the canal, as cancer, diabetes, chlorosis, anemia, etc.; locally, by strictures, sacculæ, tumors, gravid uterus, enlarged prostate, or anything which locally interferes with peristalsis. Localized pain from hemorrhoids, fissures, tumors, etc., is also an etiologic factor in the production of constipation. This is undoubtedly caused by the individual shrinking from evacuating the bowels because of the accompanying pain. This failure to evacuate soon interferes with the visceral rhythm, which, together with the retained fecal matter distending the canal, soon renders the musculature inactive. Although capable of acting independently, the vasomotor and secretory mechanisms in the main act in unison. This is due to the close relationship existing between the two mechanisms, each being more or less dependent on the other.

Since the amount and character of the secretion depends largely on the amount and character of the blood, a condition of intestinal anemia means an absence of intestinal secretion, which has a tendency to produce intestinal constipation. In these disorders in which there is a diminished amount of secretion, as fevers, and diabetes, constipation is a common symptom. In persons whose occupation keeps the perspiratory glands overactive, constipation is of common occurrence. Failure to respond promptly to the demands of nature in this respect interferes with visceral rhythm and soon results in a constipated condition of the bowels.

Constipation is more common in females than in males, due in part to the more sedentary and indoor occupation of the former, and in part to woman's manner of dress, which limits the action of the intestine, and is also a causative factor in the production of enteroptosis. Chronic constipation is a symptom in active and chronic disorders of the brain and cord, as meningitis and myelitis, and is also observed in tetanus. Diet undoubtedly plays an important rôle in the production as well as the relief of this symptom. It is a well-established fact that dyspepsia, with its long train of varying symptoms, of which constipation is a frequent one, has improper food for its origin in the majority of cases.

Drugs, which are almost universally used for the relief of constipation, are certainly one of the chief causes of chronic constipation; but their use usually relieves the symptom by producing another of an opposite character, and one just as disagreeable to the patient. Instead of removing or curing the causative factors, purgatives, by their stimulation of the motor and secretory mechanisms, temporarily increase the sluggish peristalsis, thereby giving temporary relief. After the effect of the drugs has been expended, the original state of sluggishness, but to a greater degree, is usually reached, requiring a more powerful purgative to produce evacuation. This drugging process is frequently kept up until both the patient and the physician nearly exhaust themselves in trying to effect a cure.

Sometimes it is difficult to decide whether or not a person is suffering from constipation, because of the fact that what may be a normal number of evacuations for one person is inadequate for another. However, in a very large percentage of cases, one normal evacuation in twenty-four hours is considered sufficient, while two

evacuations in this period, or one in forty-eight hours, may be considered normal for a smaller percentage. In some one movement per week seems to be sufficient. Besides the retention of fecal matter, there is generally a sense of fulness, lassitude, mental depression, or headache; the tongue is usually coated; the breath may or may not be foul. These conditions are usually relieved as soon as a free evacuation is obtained, but will return again if fecal matter again accumulates. If the bowels remain constipated for a considerable length of time, symptoms of autointoxication are likely to appear. Under such conditions there is likely to be great depression, loss of appetite, sick headache, and even melancholia.

The diagnosis is usually easily made, the patient referring to this particular symptom along with a list of others common to digestive or other disorders. In some cases the diagnosis is not so readily made, and careful physical examination is required before the true condition of affairs can be learned. Diarrhea sometimes accompanies some of the worst cases of fecal impaction, due to the hardened fecal material producing severe irritation, which excites peristalsis, resulting in frequent expulsion of part of the bowel contents.

The prognosis of chronic constipation is favorable unless there is some change in the canal which is not readily remedied. The prognosis is usually favorable, being most so for those patients who can obtain treatment in a thoroughly equipped and scientifically conducted medical institution. While there is perhaps no other symptom so readily relieved by the use of drugs, it is a fact that the fewer drugs used in its treatment the better, for in the vast majority of cases their use is an irrational procedure. It is true that drugs usually promptly relieve the symptom and the patient is satisfied for the time being, but sooner or later the difficulty will return with renewed vigor, and a stronger purgative will then be needed to effect an evacuation. The remedies which once gave such prompt relief have not only failed to effect a cure, but, on the other hand, have been the means of contributing to the causative factors already at work in the production of this symptom.

Constipation, like any other symptom of a general disorder, must of necessity be relieved by directing the remedial agents at hand toward the removal of the cause. The methods of treatment which have been found to be most satisfactory in the cure of chronic constipation are unfortunately such that many of them can not be employed by the general practitioners so as to give the most satisfactory results. Many of these patients require the combined effects of a most carefully regulated diet, hydropathic and electric applications, mechanical and manual Swedish movements, and carefully regulated exercises.

In the treatment of chronic constipation the question of diet is of paramount importance. It is through this channel that the foundation of most digestive disorders is laid. Dyspepsia, so universal in America that it is sometimes termed "the American Disease," is largely caused by dietetic errors, the principal one being undercooked and imperfectly disintegrated starchy foods, giving rise to amylaceous dyspepsia. Fermentation from this cause results in the production of poisonous substances, these in turn giving rise to autointoxications. These poisonous substances circulating in the blood have a deleterious influence on the delicate structures of the nervous system, which react in various ways, giving expression to the almost innumerable symptoms common to the different forms of digestive disturbance. The use

of condiments and highly seasoned foods has a powerful influence in causing inactivity of the bowels.

The writer is of the opinion that the diet is one of the first factors to be considered in the establishment of a cure for chronic constipation. The patient should be instructed to adopt as nearly as possible an aseptic dietary. This should consist of foods containing the proper amount of carbohydrate, nitrogenous, and fatty food substances required to nourish the body properly. The carbohydrate foods, which make up the largest share of our food, should be taken in the most easily digested and assimilable form obtainable. Foods containing a very large percentage of starch should be thoroughly cooked. Ordinary cooking by means of boiling is not sufficient, for the raw starch by this process is simply changed to amyloextrin, or soluble starch. The soluble starch, however, can be further digested by means of

dry heat. When starch is subjected to a very high degree of dry heat, or moist heat under pressure for a sufficient length of time, it is converted into erythro- and achro-odextrin. The latter, when subjected to the action of the saliva, is converted by the ptyalin into maltose, a product capable of immediate absorption. Food prepared in this manner is so readily digested and absorbed that it relieves the stomach and intestine of the burden of retaining a large amount of starchy material which, under the favorable conditions frequently met with in disorders of digestion, is so prone to undergo putrefactive changes. By the use of such thoroughly cooked starchy foods these fermentative changes are lessened, or entirely checked. The question of nitrogenous and fatty food substances is also an important one. The animal kingdom is relied on to a large extent to furnish these two important elements. The readiness with which animal foods undergo putrefactive changes renders them questionable, especially for those cases in which fermentative changes readily take place. The nitrogenous and fatty material, which can readily be obtained in sufficient quantities and proper proportions from grains, including the legumes, and edible nuts, does not have the tendency to decompose that the same foods from the animal kingdom do. Besides possessing this important qualification, grains are also a very wholesome and economic source of food-supply. When one buys a pound of zwieback or rice, he is not paying for 70 or 80 per cent. of water, as he does when he buys a pound of beefsteak. On the contrary, he is getting more than 80 per cent. of food; he is also obtaining his food direct from nature's garden, and not allowing it to be utilized by some other animal no more capable of storing up energy from it than himself. The use of such pure foods, properly cooked, can not have other than a normal influence on the digestive tract.

Another source of food-supply which might be drawn upon more extensively to good advantage is fruits. In these the quantity of nourishment is not great, but what is present is readily digested and assimilated. Nature does in the fruit, during the ripening process, what art does in the cooking of starch by dry heat, i. e., she converts the starch into sugar. Besides the sugar—and a greater or smaller amount of nitrogenous and fatty food substances—which varies according to the variety, fruit contains succulent juices which promote an abundant flow of the digestive fluids, and furnish the body with a considerable amount of pure water and salts, both of which are essential to proper metabolism. Most fruit juices also have an inhibitory action on germ growth. From the three sources of food mentioned, viz.: fruits, grains, and nuts, an ideal dietary can be selected for both the sick and the well. It was the original diet of man, as outlined in Genesis, and a dietary that will make a sick man well and keep him well. George Cheyene, in his essay on "Health and Long Life," written in 1725, says, "Animal food and strong liquors seem not to have been designed for man in his original make and frame, but rather indulged, to shorten the antediluvian length of life, in order to prevent the excessive growth of wickedness."

In selecting a dietary for a patient troubled with chronic constipation, such dry foods as zwieback, browned rice, etc., are found to be palatable, easy of digestion, and at the same time to present bulk enough to excite gentle peristaltic movements. Nuts, in order to be of service, should go through a special process of preparation. At the present time such specially prepared nut foods as protose, nuttolene, malted nuts, granuts, bromose, and a number of others, can be found on the market. A careful analysis of these nut foods has been made in our laboratory, and they have been found to be sterile and wholesome, and to contain nitrogenous and fatty material in proper proportions to meet the demands of the human economy. A diet consisting of granose, browned rice, protose, steamed figs, prune marmalade, and ripe fresh fruits such as apples, strawberries, oranges, etc., almond butter, and cream, is so palatable, nourishing, and easy of digestion that the most fastidious epicure could find no fault with it.

The patient should be instructed to use no liquid with his meals, other than that which is contained in the food. A glass of cold water half an hour before each meal, and as much hot or cold water as is desired $2\frac{1}{2}$ to three hours after each meal, will prove beneficial. He should also be instructed to eat the dry food at the beginning of the meal. The dryness of the food will necessitate thorough mastication and insalivation, resulting in the thorough digestion of the starch.

After arranging a proper dietary and giving the patient explicit directions concerning it, treatment should be instituted at once to relieve him of the accumulated mass of fecal material. This can usually be done by means of cleansing enemas of warm water, using from one to two quarts at a temperature of 100 to 102 F.; if this fails, two ounces of olive or sweet oil followed by a strong solution of soap-suds, one to four pints, at a temperature of 100 to 102 F. The cleansing enemas should be employed for three successive days, and should be followed by the graduated enema, which is given as follows: The first day after the last cleansing enema use seventy-two ounces of water at a temperature of 102 F.; the second day, 64 ounces at 98 F.; the third day, 56 ounces at 92 F.; the fourth day, 48 ounces at 88 F.; the fifth day,

40 ounces at 84 F.; the sixth day, 32 ounces at 78 F.; the seventh day, 24 ounces at 74 F.; the eighth day, 16 ounces at 70 F.; the ninth day, 8 ounces at 64 F.

The effect of this treatment is to keep the lower bowel from becoming obstructed, and at the same time to give tone to the walls of the bowel by gradually reducing the temperature and the amount of water used. The impressions thus made on the mucous membrane of the bowel reflexly excite the splanchnics, which in turn, through Auerbach's and Meissner's plexuses, excite normal peristalsis. This treatment should be taken at the same time each day to establish a rhythmic movement of the bowel. The cold also stimulates the secretion of the liver, and the portal system, which in turn affects the intestinal circulation. Besides the graduated and cleansing enemas, other hydiatic procedures, such as the hot enema, the cold enema, the umschlag or moist abdominal bandage, the cold sponge both, cold mitten friction, cold douches, and alternate hot and cold douches to the abdomen, wet sheet pack, and cold sitz bath, are very effective through their influence on the sympathetic centers and splanchnic nerves in exciting the various functional activities of the intestine. The Scotch douche, which consists of rapidly alternating applications of heat and cold, when applied to the abdomen, has a strong tonic influence on the abdominal muscles and also on the involuntary muscles of the intestine. So far as external applications are concerned, the Scotch douche is the one par excellence in exciting to greater activity the motor, vasomotor, and secretory functions of the abdominal viscera.

Abdominal massage, both manual and mechanical, is a very valuable aid in strengthening the abdominal and visceral muscles. Special movements to replace viscera are also valuable. An atonic condition of the abdominal muscles favors enteroptosis, which might properly be termed an etiologic factor in chronic constipation. By properly executed massage movements the abdominal muscles are strengthened and the viscera replaced. In cases of prolapsus of the stomach, after replacement by means of carefully executed manual Swedish movements the organ may be retained in place by the natural abdominal supporter. Great relief is frequently experienced by the use of this support.

The support should be adjusted while the patient is in a reclining position.

The value of abdominal massage in the treatment of chronic constipation has received insufficient attention, undoubtedly from the fact that there are comparatively few scientifically trained masseurs. The bungling work frequently done by many masseurs, instead of giving satisfactory results, has frequently resulted in increasing the patient's discomfort. When given properly massage works wonders in relieving a constipated condition of the bowels: by it the blood-supply is increased, the musculature is toned up, normal secretory functions are established, all of which aid in the re-establishment of a normal peristalsis.

Mechanical devices have been constructed, which, when judiciously employed, give excellent results. Of these the one employed in giving abdominal kneading is of great service in relieving constipation. The apparatus consists of a table with a large aperture near the center of the top. In this opening plays a series of six vertically-placed bars. Each bar is separately connected with an eccentric, to give it an independence of motion. When in motion, these bars have an undulatory movement. The top of the table is so constructed that with

each vertical movement of the bars it moves back and forth, thus bringing the entire abdomen in contact with the kneading bars.

Cannon-ball massage is a valuable adjuvant to other forms of mechanical and manual treatment. This treatment may be employed by the patient himself. It consists in rolling a four-to-six-pound cannon-ball covered with leather over the colon from right to left.

Electricity, although little utilized for the relief of the condition under consideration, in many cases can be used with good results. This is particularly true of the sinusoidal current, which can be used with great advantage where there is an enteroptosis due to relaxed abdominal muscles. When the abdominal muscles are relaxed, the stomach, bowels and other viscera become pendant, and drag on the branches of the prevertebral ganglia of the abdomen, resulting in reflex disturbances which give rise to pain and other symptoms, among which constipation is not an infrequent one. After replacement of the viscera, the application of the slow sinusoidal current to the abdominal muscles, produces results which can not be accomplished by any form of passive exercise.

CANNON-BALL MASSAGE.

By means of a rectal electrode introduced into the rectum, and a pad electrode placed over the abdomen, the musculature of the lower portion of the alimentary canal can be gently exercised by the rapid sinusoidal current. This form of treatment gives most excellent results in those cases in which there is a semiparalyzed condition of the musculature of the rectum due to failure on the part of the patient regularly to evacuate the bowel.

Exercises calculated to develop the body as a whole, and especially to develop the abdominal muscles, are of great importance. If the general musculature of the body is in an atonic condition, that of the alimentary canal is likely to be in a similar condition, and vice versa.

It is indeed surprising to note the readiness with which a functionally disordered sympathetic system will respond to such rational measures as have been outlined, and when these are directed toward assisting the *vis medicatrix naturæ*, the most gratifying results are obtained.

ONE OF the features of the Exposition of Hygiene at Naples is a reproduction of the heating, lighting and water-supply arrangements of a Pompeian house. Naples now boasts of the finest water-supply in the world since the waters of the Serino have been piped into the city, and the transformation of most of the famous Naples slums into handsome boulevards during the last ten years is an interesting feature to be seen in connection with the exposition.

THE PATHOLOGY OF CRIMINAL ABORTION.*

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CHICAGO.

The pathology of criminal abortion has to establish: 1. The causal nexus of premature expulsion of the ovum with the employment of internal medicinal or external mechanical means, adopted for the accomplishment of the desired criminal attempt. 2. To account for the illness or death of the mother during or after abortion.

The latter part of our subject, that referring to death of the mother, is comparatively easy to handle, because in the latter event cases have been frequently thoroughly investigated. The employment of modern histologic and bacteriologic methods to clear up the pathology of such cases is within easy reach. It is different when we approach the other part of our task. It is a notorious fact that only a small minority of the non-fatal cases, more particularly of the cases not complicated with serious, threatening disease of the mother, ever come to the notice of reputable, scientific members of the profession. Consequently our observations are made on a very small fraction of the cases, of which necessary details are, as a rule, lacking. Our data, therefore, lack reliability when we want to draw correct conclusions or establish general principles. Nor is the numerical insufficiency of the material that may be studied, compared with the enormous total figure of cases, the only ground why our conclusions must be unsatisfactory. The main reason lies in the fact that we know so little about the intrinsic cause of causes which normally lead to the beginning of the act of parturition at full term.

By far the largest number of criminal abortions are brought about by internal, medicinal agencies which enjoy the reputation of being "reliable abortifacients."

Lewin, in a recent extensive monograph on "Abortion by Poisons and other Means," considers in general and in special the dynamics of these abortifacients. In the subsequent consideration of the physiologic and pathologic effects of these abortifacients, we follow the views of the distinguished pharmacologist who has gone over the subject in a very thorough manner.

Lewin states that there are certain medicinal and other preparations which have the property to primarily or secondarily exert a pathologic influence over the uterus and the ovum contained in it. We possess certain poisons which can influence the uterus in such a manner that phenomena similar to those in parturition are produced and that the ovum becomes detached from the fruit bearer. But all internal means which, if taken in sufficiently large doses, may bring about this cycle of changes, are substances poisonous to mother and child alike. They have the property to bring about morbid disturbances of physiologic functions. Even a premature irritation of the muscularis uteri itself must be looked on as something pathologic attaining its highest degree in tetanic contraction. Abortifacients can neither theoretically nor practically be looked upon simply as means to produce prematurely a normal labor. In fact the labor and expulsion are generally brought about secondarily. The primary factors are the damaging pathologic influences disturbing the nutrition, or killing the embryo outright. Internal abortifacients generally act first by indirectly disturbing the nutrition of the embryo, by making the mother sick or even moribund, by producing hemorrhages and by detaching the ovum from the uterus. Artificial abortion by internal means is to

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