

with as an evidence of senile decay. The patient complains of muscæ volitantes, and the ophthalmoscope reveals numerous white glistening spots evenly distributed through the vitreous and having a very limited amount of motion when the eye is moved. There is some reduction in the acuteness of vision. The condition does not call for any special treatment.

Ossification of the vitreous has been described by Wittich and Virchow as a rare form of degeneration, always associated with phthisis bulbi following a suppurating process or hyalitis. The vitreous body changes into a solid fibrous mass of cord-like shape, enlarged at either end. The osseous tissue is developed in the anterior end of this cord. The occurrence of this change is doubted by many authorities.

PARASITES IN THE VITREOUS.—The presence of entozoa in the vitreous is exceedingly rare except in north Germany. In nearly every instance the parasite has been the *cysticercus cellulosus*. The filaria sanguinis hominis has been seen in the vitreous, with certainty, in only a single instance. The parasite found in the vitreous is the scolex of the *tania solium*, the eggs of which enter the circulation from the stomach, and are deposited in the eye between the choroid and the retina. Perforating the latter it escapes into the vitreous.

When still situated between the choroid and the retina it can be seen with the ophthalmoscope as a bluish-gray opacity resembling detachment of the retina. After entering the vitreous, if still alive, it appears as a pale bluish or bluish-gray cyst from which there projects a short white neck and a head. The latter is provided with minute suckers, which can sometimes be seen to move. When this picture is found, particularly when the head is observed to move independently of motions of the eyeball, the diagnosis can be made with certainty. Very often, however, opacities of the vitreous are present and render the diagnosis more difficult. After the death of the parasite it becomes covered with lymph and thus hidden from view with the ophthalmoscope.

Unless removed while still beneath the retina, there is gradual loss of sight and finally destruction of the eyeball. When discovered early, before the entozoon has escaped into the vitreous, it may be removed by forceps through an incision in the sclera. Quite a number of such operations have been successful and have resulted in the preservation of good vision. After the parasite has entered the vitreous it may also be removed, but then the preservation of sight cannot be hoped for. If the attempt at removal be unsuccessful, enucleation is indicated. Charles H. May.

VIVISECTION.—According to the definition given in the Century Dictionary, vivisection is the "dissection of a living body; the practice of anatomizing alive, or of experimenting upon living animals for the purpose of investigating some physiological function or pathological process which cannot well be otherwise determined. Vivisection strictly includes only cutting operations; but the term is extended to any physiological experimentation upon living animals. . . . Vivisection in competent and humane hands, under proper and reasonable restrictions, is fruitful of good results to the sciences of physiology and pathology."

The necessity for resorting to this mode of experimentation depends on the fact that physiology, pathology, therapeutics, and bacteriology deal with the phenomena of life, and in order to study them successfully the necessary investigations must be made during the life of the animal upon which experiments are made.

The valuable results which have been attained by such experiments constitute a large share of the actual knowledge now possessed in these departments of medical science. The study of the functions of circulation, respiration, digestion, the nervous system, the investigation of infectious diseases, the reproduction of bone, the action of drugs and poisons and their uses and antidotes have all been greatly facilitated by means of vivisection.

The discovery of the true nature of rabies, of anthrax,

glanders, tuberculosis, the Texas cattle fever, and of hog cholera, is due very largely to the assistance afforded by animal experimentation. In the production of a constant supply of diphtheria antitoxin (which has saved thousands of human lives), animal experimentation must necessarily be resorted to. At a hearing before a legislative committee in 1901, which was considering the propriety of legislation to restrict this practice, a witness said: "No father whose child had been saved by such means would care how many lives of animals had been sacrificed in the discovery. We cannot use the rabbit as a unit in estimating the value of our children's lives."

In a lecture before the Royal Society of England, Huxley stated "that the discoveries made by Pasteur alone by means of experimentation upon living animals would have sufficed to pay the war indemnity paid by France to Germany." By means of inoculations practised as the result of Pasteur's experiments, the loss from anthrax in France alone had diminished from ten per cent. in sheep and five per cent. in cattle to less than one per cent. in sheep and one-fourth of one per cent. in cattle.

Galen, Harvey, John Hunter, and others made use of this method in early times, but it has come largely into use in the last half of the nineteenth century.

Like very many practices vivisection is liable to abuse, but, as Bishop Lawrence, of Massachusetts, stated before a legislative committee in 1900, the subject "can be left, with perfect confidence on the part of the community, to a profession that has shown itself worthy of such confidence in its attitude toward humanity, as well as toward the lower animals."

Within the past thirty years vigorous opposition has been made, either to prevent vivisection or to restrict it by law. Scarcely a year now passes in which such restrictive legislation is not proposed in some form or other in one or more States of the Union.

In order to obtain an expression of opinion with reference to the practice of vivisection, a circular was issued by the American Humane Association in 1895, and sent to many prominent physicians, clergymen, educators, and others, and the replies from these sources were classified as follows:

REPLIES FROM PHYSICIANS.

	Total number.	Per cent.
For vivisection without restriction.....	220	19.1
For vivisection restricted by utility.....	513	44.6
For vivisection without pain.....	186	16.2
For total prohibition of vivisection.....	207	18.0
Obscure or evasive.....	24	2.1
Total.....	1,150	100.0

REPLIES FROM OTHER PROFESSIONAL MEN.

	Clergy-men.	Edu-cators.	Authors, editors, etc.	Per cent.
For vivisection without restriction.....	0	34	4	4.7
For vivisection restricted by utility.....	189	84	63	41.2
For vivisection without pain.....	116	49	26	23.5
For total prohibition of vivisection.....	144	52	30	27.7
Obscure or evasive.....	6	16	2	2.9
Total.....	455	235	125	100.0

Thus far, while much legislation upon this subject has been proposed, not very many laws have been enacted. After a parliamentary investigation in England a law was enacted in 1876 entitled "An Act to Amend the Law Relating to Cruelty to Animals" (Chapters 77, 39, and 40, Victoria). This act has twenty-two sections, and prohibits the performance of painful experiments on animals except under restrictions; with penalties of not over £50 for the first offence and not over £100 for the second offence.

By Section 3 of this act it is provided that:

1. The experiment must be performed with a view to the advancement of science by discovery of physiological knowledge, or of knowledge which will be useful for the saving or prolonging of life or of alleviating suffering.
2. The experiment must be made by licensed persons.
3. The animal must be under the influence of an anæsthetic.
4. The animal must be killed if pain is likely to continue, or if serious injury is done to the animal.
5. The experiment is not to be performed in illustration of lectures.
6. It is not to be performed for the purpose of attaining manual skill.

By Section 4 the use of urari is prohibited.

By Section 5 restriction is made as to experiments upon dogs, cats, horses, mules, and asses.

By Section 6 public exhibition of such experiments is made illegal.

Other sections relate to the registration and licensing of persons desirous of making experiments and the method of instituting legal proceedings.

The provisions of the act do not apply to invertebrate animals.

By several definite exceptions the restrictions in Section 3, clauses, 1, 3, 4, and 5, are very much modified.

In a recent suit for libel, in England, it was shown that Dr. Bayliss, professor of physiology at London University, was charged by Hon. Stephen Coleridge with cruelty in the conduct of certain physiological experiments. Dr. Bayliss was licensed to perform such experiments under the English act here referred to. Dr. Bayliss sued Mr. Coleridge for libel, won his suit, and was awarded £2,000 damages (*Boston Medical and Surgical Journal*, November 26th, 1903).

Although legislation has been proposed in many States, there are but three in which the statutes contain any reference to vivisection. These are New York, New Jersey, and California. The law of New York respecting cruelty to animals runs as follows:

"If any person shall torture, torment, deprive of necessary sustenance . . . or needlessly mutilate or kill, or cause or procure" the same to be done, to "any living creature, every such offender shall for every such offence be guilty of a misdemeanor."

Following this section there is a paragraph relating to vivisection:

"Nothing in this act contained shall be construed to prohibit, or interfere with, any properly conducted scientific experiments or investigations, which experiments shall be performed only under the authority of the faculty of some regularly incorporated medical college or university of the State of New York."¹ In California the law is substantially the same.²

Construing these sections together, according to a familiar legal principle, the law in New York and California regarding vivisection may be stated as follows: Vivisection is lawful when performed under the authority mentioned and when "properly conducted." If improperly conducted, that is, with the infliction of needless or unjustifiable suffering, the offender would be guilty of a misdemeanor, which is punishable in New York by fine or imprisonment, or both, the maximum penalty being one year in the county jail, including thirty days of solitary confinement, and a fine of \$250. In California, also, fine and imprisonment may be imposed for this offence. Vivisection undertaken without the authority prescribed in the statutes is punishable in like manner.

In New Jersey the law and the penalty are substantially the same, except that the authority under which vivisection may there be performed, if "properly conducted," is that of any "incorporated medical society of the State."³

In all the other States, with few exceptions—and the exceptions, doubtless, will soon disappear—there are laws against cruelty to dumb animals. In these States, therefore, vivisection—at least such vivisection as is performed without the use of anæsthetics—might or might not be

adjudged to come within the statute. In each case there would be a question whether suffering had been inflicted needlessly or cruelly, and each case would be decided according to its own circumstances and to the views of the particular tribunal before which it came. In the interest both of the medical profession and of dumb animals, it is to be hoped that the statute of New York will be copied by all the States, and it would be well if the law were somewhat extended. In Great Britain the buildings in which vivisection may be performed are licensed, and there is an inspector to see that the provisions of the statute are carried out. In this way, additional precautions are taken. It is scarcely necessary to point out that such regulations do not hamper the competent and conscientious surgeon, and that they tend to make vivisection legally possible everywhere, because they render it free from objection in the view of the people generally.

Henry Childs Mervin.

Revised by Samuel W. Abbott.

BIBLIOGRAPHY.

- ¹ Revised Statutes of New York, vol. iii., p. 2526.
- ² Derrig's Annotated Codes and Statutes, vol. iv., p. 460.
- ³ Revision of Statutes of New Jersey, p. 28.
- Memorial from a Joint Committee of the Medical and Other Scientific Societies and Educational Institutions of the District of Columbia, protesting against the Proposed Legislation Embodied in Senate Bill 1552, entitled "A Bill for the Further Prevention of Cruelty to Animals in the District of Columbia," and Presenting their Views on the Same. Senate Document 31, Washington, December 21st, 1896.
- Animal Experimentation. A Series of Statements Indicating its Value to Biological and Medical Science, Boston, 1902.
- Unlicensed Anti-Vivisection. Editorial in Medical News, November 30th, 1895.
- Report of the American Humane Association on Vivisection in America, September 26th, 1895, Fall River, Mass.

VOICE AND SPEECH. See *Larynx, Physiology of.*

VOLITION, DISORDERS OF. See *Insanity.*

VOLVULUS. See *Colon (Surgical) and Intestinal Obstruction.*

VOMITING. See *Emetics, and Stomach, Diseases of.*

VOMITING OF PREGNANCY.—By way of introduction it may be assumed that no more common source of discomfort, distress, and even danger besets the condition of pregnancy than the symptom which serves as the subject of this article. It may be asserted, also, that very few who have not experienced it have any adequate idea of how distressing it may, and often does, become. It is doubtless a fact that the nausea accompanying, or at times taking the place of, the actual vomiting is of such intensity, is of such a sickening and depressing character, is so much worse than the ordinary and commonplace nausea due to other causes, as to be to many the hardest to bear of all the trying experiences of the process of maternity.

At other times, it must be admitted, the vomiting is easy, accompanied by little if any nausea, and it is a noticeable fact that even in some cases in which vomiting has been frequent and persistent for months the patients have held their flesh and strength to a wonderful degree. In these latter cases the body must hold its own with a very meagre supply of food, for to a casual observer it would appear that none is retained.

It has been customary to draw a line of demarcation between the slight and the severe cases, or between those which are rebellious to treatment and threaten life and those which do not. The former have been called the "physiological" or "simple" vomiting of pregnancy; the latter the "pernicious," or "incoercible," or "uncontrollable" vomiting of pregnancy. The correctness of these descriptive terms will be called in question elsewhere.

On the other hand, Dr. Graily Hewitt has very properly pointed out the important distinction which exists between the vomiting of pregnancy and the vomiting dur-

ing pregnancy, the latter being merely an accidental occurrence in the course of pregnancy, while the former is a direct result from the fact of pregnancy.

As regards the history of this troublesome complication, it is probably the history of the human race, for from the nature of the case it must have been a frequent symptom during pregnancy at a very early period in the history of the world. What Hippocrates and other ancient worthies have to say upon the matter, however, is of far less importance than the fact that so many men in the present day show plainly by their writings how little they understand either the cause or the treatment of the trouble. The very multiplicity of theories as to the cause, and of remedies for working a cure, serves as a sufficient commentary upon the unsettled state of medical opinion upon one of the most common and important symptoms which the physician is called upon to treat. It does not seem right that so simple and every-day an experience as the vomiting of pregnancy should remain at the present day a matter of mystery, and that its treatment should continue so unsatisfactory, uncertain, and often futile. The writer believes that most cases may be explained according to a very simple theory, and his experience demonstrates that treatment along that same line may be confidently expected to give prompt and complete relief in the vast majority of cases.

SYMPTOMS.—The most common form of this complaint is the occurrence of one or more attacks of vomiting directly after rising from bed in the morning. This may end the attack for the day, or the vomiting may recur during breakfast as well as at intervals throughout the day. So frequent is this experience on rising that the affection has come to be universally known as "morning sickness."

At times vomiting is absent, but the patient experiences attacks of nausea instead. Either the nausea or the vomiting may begin before rising, at times even awaking the patient from her sleep, and may then recur as above stated.

In the severer forms of pregnancy vomiting every attempt to take food is followed by fresh paroxysms, and indeed, not infrequently, vomiting is wellnigh constant, irrespective of anything which is taken into the stomach. The symptoms may be so urgent that sleep is prevented, nutrition wholly fails, loss of flesh and strength is rapid, elevation of temperature, small and rapid pulse, delirium and death supervene, all in the course of a few weeks.

It has been customary to divide these severe cases, commonly known as the pernicious vomiting of pregnancy, into three stages. During the first stage the symptoms develop with more or less rapidity, as a rule giving no indication of the gravity of the situation which is to follow until, after a period varying from a few days to several weeks, the vomiting becomes so frequent and so urgent as materially to affect the patient's strength. The threatening aspect of the case now visibly augments from day to day. Nothing whatever is retained upon the stomach, and, in default of food or drink, vomiting of mucus, bile, and even blood continues at short intervals.

No one can now overlook the serious nature of the complication. Suffering and anxiety are plainly depicted in the patient's face, the pulse has already become markedly accelerated, and then, with the advent of fever, is ushered in the second stage.

In this stage the temperature remains persistently above 100° F., the pulse varies from 100 to 140 per minute, the skin is hot and dry except that in some cases the extremities remain cold and clammy. Thirst is a prominent symptom, the mouth is parched and dry, the tongue may be cracked, and sordes may appear upon the teeth. Ptyalism and jaundice are commonly present. The urine is scanty, often albuminous and tinged with bile. As a rule, diarrhoea exists.

With the onset of the third stage most of these symptoms abate, the patient being able once more to take and retain small amounts of food. The friends and even the physician may be deceived, thinking convalescence about

to be established, while in fact this is merely the period of grave disturbance of the nerve centres preceding death. Delirium is present, with loss of one or more of the special senses. Neuralgic pains are commonly present. The pulse remains between 120 and 140. Coma gradually supervenes and continues until death.

The period of pregnancy at which nausea or vomiting most frequently occurs is during the first six or eight weeks, though they may appear at any time up to delivery. One case is reported in which the patient was married on Monday, began vomiting on the following Saturday, and was delivered normally at such a time as to establish the fact that conception immediately followed marriage. It is probable, however, that discomfort is first noticed, in the majority of cases, somewhere near the end of the first month of pregnancy. Beginning as a slight nausea on rising in the morning, or at the breakfast table, it may go on to the serious train of symptoms described above, or after a few days may wholly disappear. Usually the experience is one of annoyance rather than of actual suffering, and rarely continues after the fourth month.

DIAGNOSIS.—The points involved in the diagnosis are, first, to determine the fact of pregnancy; second, to decide whether the vomiting is due to the pregnancy or is simply incidental to it—in other words, whether we have to deal with the "vomiting of pregnancy" or the "vomiting during pregnancy"; and perhaps I may be permitted to add, third, to ascertain the local cause of the vomiting.

It is by no means easy to establish the fact of pregnancy at an early stage, and indeed it is often impossible. Until after the first catamenial period has passed it must be chiefly a matter of inference, based upon the opportunity which has been afforded for pregnancy to occur, and upon the possibility or otherwise of the vomiting being due to other causes. As soon as one menstrual period has passed, or when other signs of pregnancy have been discovered, the diagnosis may be made to rest upon a surer basis.

The difficulties in the way of deciding the second point in diagnosis are usually less marked. The peculiar characteristics of pregnancy vomiting are usually sufficiently well marked; yet in some cases it may be necessary to avail one's self of an eliminative diagnosis, making careful examination for disease of stomach, liver, kidney, or other organ which might be productive of the symptoms, and failing to find such cause the diagnosis must rest upon the pregnancy as responsible.

The diagnosis of the abnormal conditions which serve as a cause for the vomiting will be considered under the next heading.

Cause.—Here we reach the great point of difference which exists between observers, and yet the point upon which it is most important that definite and correct views should exist, for upon it must rest the most successful treatment. It has been customary to attribute the vomiting to a reflex irritation proceeding in some mysterious way from the developing ovum, but more stress has commonly been laid upon the condition of the patient, whether as concerning her stomach or her nervous system, which made this irritation potent for evil, than upon the source of irritation itself. Moreover, as regards the nature of this irritation, men have held, and hold to-day, most divergent views, though it is coming to be admitted more and more generally that its origin is to be found in some abnormal pelvic condition.

My own preference is to consider that a number of causes may operate in different cases, or even in the same case, to produce the symptoms, and these causes should be classified as predisposing and exciting.

As to the predisposing causes, the chief is undoubtedly that state of exalted nervous sensibility which shows itself in so many and in such unmistakable ways during pregnancy. It is a matter of universal observation that trifling emotions, whether of fright, grief, annoyance, or otherwise, produce in the pregnant woman results far surpassing those which she would ordinarily experience. Similarly, it is doubtless true that conditions giving rise

to irritation of sensory nerve fibres may produce correspondingly exaggerated results in the way of reflex phenomena.

Undoubtedly an important factor in this connection lies hidden in racial conditions. In no other way can we adequately explain the fact that Carl Braun, in his enormous experience, has never met with a fatal result, nor even with a case sufficiently serious to require induced abortion, while in France, England, and America a fatal termination is far from being a rarity. Hirst, in his "System of Therapeutics," shows a mortality of ninety-five in two hundred and thirty-nine cases reported.

Other factors may possibly be found in the hydramic condition of the blood; the condition of fear, or at least the state of introspection and anticipation in which so many newly pregnant women find themselves; the various functional perversions of taste, smell, appetite, and digestion; and lastly, and more generally, in the presence of gastric catarrh in more or less marked degree.

Far more important, however, are the exciting causes which, as has already been suggested, will usually be found in some abnormal condition of the pelvic organs.

The theory which has been held in favor the longest is perhaps that of Bretonneau, who considered that the distention of the body of the uterus by the growing ovum caused pressure upon or tension of the nerve filaments, so setting up a reflex irritation. To a superficial observer this serves as a very satisfactory explanation, yet it fails utterly in many cases and must be rejected as inadequate. This distention occurs in every case, and yet many escape the nausea altogether, while others have it in one pregnancy and not in another. Moreover, the symptoms cease in most cases while this distention is still going on, and often the cessation is sudden and complete.

Another theory rests upon the supposition of metritis; yet metritis is more common in those who have borne children, while the vomiting of pregnancy is more common in primiparae.

Still others, notably Veit, believe that endometritis, pre-existing and aggravated by pregnancy, is the source of the reflex irritation. That this may be a factor in some cases is quite likely, but it can hardly explain the phenomena in most, or even in many, cases.

There are those who hold lacerations and erosions of the cervix responsible, but in most cases such lesions do not exist.

Coming now to the theory advanced and ably advocated by Dr. Graily Hewitt, I believe that we find here the chief, though not the only, cause. He is often quoted as teaching that antelexion is the sole factor, but this interpretation is far from correct. He finds that "the alterations of the uterus proved by recorded cases to be most frequently present in cases of severe vomiting are:

- "(a) Marked flexion forward and backward.
 - "(b) Rigidity of tissues of the cervix.
 - "(c) Impaction or detention of the uterus in the pelvis.
- "These three factors are most frequently associated in various degrees of severity."

Upon these facts rests his theory that the reflex irritation consists in "undue pressure or tension of the nerve filaments distributed in the walls of the cervix, especially those in the vicinity of the internal os"; . . . "this pressure or tension may arise in any case in which that expansion process in the tissues of the cervix which is natural to pregnancy is delayed or obstructed by the condition of the cervix."

Now, if it be borne in mind that during the early weeks of pregnancy the uterus commonly gravitates toward the pelvic floor, it will at once be seen that any previously existing flexion must be exaggerated. If it be still further remembered that the normal condition of the uterus is one of moderate antelexion, which our modern methods of dress, together with other injurious influences of civilization, too often make pathological antelexion, the preponderance of cases of antelexion in these statistics of vomiting of pregnancy will not be wondered at.

It will be noted, however, that flexion need not necessarily be present in order to explain the vomiting in

accordance with this theory. If, by reason of a laceration of the cervix, with subinvolution and chronic metritis as a consequence, the tissues at and about the internal os have become so indurated as to prevent their normal and equable expansion, injurious tension of the nerve filaments is produced. If, again, the uterus be held down in the pelvis by firm adhesions, or by the added weight and bulk of a fibroid, impaction and injurious pressure are just as surely produced as in the case of a flexion. Other ingenious but less plausible theories have been advanced, but aside from admitting the general truth that almost any form of pelvic disease may in isolated and exceptional cases be a prominent factor, these theories need not be considered here.

My own belief is more liberal than is that of many who have written upon the subject, for while I hold most tenaciously to the general fact of a local cause to be found within the limits of the true pelvis, I yet admit most of the special theories above mentioned. Most prominently I should place Dr. Hewitt's explanation in its broadest interpretation, viz., anything that prevents the free and uniform expansion of the cervix, particularly in the immediate neighborhood of the internal os.

Following this are to be grouped indifferently the various factors of metritis, endometritis, lacerations and erosions of the cervix, and the sundry other forms of pelvic disease which may be operable in rare cases.

The above represented the best teaching of a dozen years ago, and it is as true to-day as when it was written; but careful observation and a considerable experience have in the mean time served to crystallize and confirm my beliefs. I find that in the vast majority of the cases antelexion is present and the "impaction or detention of the uterus in the pelvis" is the result of contraction of the utero-sacral ligaments. Schultze has well described this contraction, due to parametritis posterior, which usually accompanies and aggravates antelexion, but its influence upon the vomiting of pregnancy was, I believe, first pointed out by me some three years ago. I am convinced that in cases of this type, "the degree of the intractability of the vomiting and to a large extent the degree of its severity depend upon the degree of contraction in the utero-sacral ligaments."

Having now ascertained that, whatever the degree of pregnancy vomiting, it springs from some abnormal condition and not at all as a natural and inevitable result of pregnancy, we cannot escape the conclusion that there can be no such thing as "physiological" vomiting, and that, therefore, no difference save one of degree exists between the light and the severe cases. All vomiting during pregnancy, as at other times, is abnormal and must be so regarded and so treated.

TREATMENT.—It having been established that the chief factor in practically every case of vomiting of pregnancy is some abnormal condition of the pelvic organs, it follows naturally that the most effective treatment must be directed toward the removal or cure of such condition. And just here it should be urged that success in treating the vomiting will be in very close ratio to the accuracy of the diagnosis of the pelvic cause and the intelligence of the treatment applied to it. Let no one who has not good cause to consider himself competent correctly to map out the true condition of the pelvic organs rest content with the delusion that there is no pelvic cause for the vomiting because he can find none. In such a case no one but a well-trained gynecologist is competent to pass final judgment, and it must be confessed that even he is fallible.

Most frequent in the list of abnormal pelvic conditions is antelexion of the body or cervix, associated in most cases with more or less contraction of the utero-sacral ligaments. For this Graily Hewitt recommends gentle elevation of the base of the bladder and the superimposed fundus of the uterus with the finger. Failing thus he advocates the use of the air-ball pessary, which is to be inflated after insertion. This pessary must be perfectly spherical, and must, when distended, measure

not over two and one-quarter inches in diameter, the size rarely needing to be over two inches.

Aseptic precautions are to be observed before and after insertion, the patient to maintain the horizontal position, and the pessary to be removed at the end of six or eight hours. It may be necessary to repeat this treatment daily until the position of the uterus becomes permanently improved. Care must, of course, be exercised to prevent the induction of abortion by too great or too prolonged pressure due to the presence of the pessary.

Personally I have used this method but once, in which case it did good service. I have preferred to rely chiefly upon the frequent use of the knee-chest position, digital elevation, and packing.

In fact, so common is this condition as a factor, and so effective is the first part of the treatment alone, that I am in the habit of prescribing it as a routine treatment in the ordinary cases of pregnancy vomiting as they present themselves in the hospital clinics and in private practice, and I do not hesitate to assert that relief is complete in eighty per cent. of the cases.

The patient is told to assume a position on her knees, her hips high in air, her chest touching the bed, *every band being loose about the waist*, and then, either by opening the vagina with the finger or by introducing a glass tube, to admit air to the genital tract. This is done regularly night and morning, and at any other time when nausea is felt.

This failing, I place the patient in the knee-chest position and pack; lightly at first, but more firmly as she becomes accustomed to it. At first it is well to pack wholly in front of the cervix, so as to straighten out the flexion, but later a few tampons are best placed behind the cervix for the purpose of stretching the utero-sacral ligaments and so breaking up the impaction. Wool is the only proper material for this packing, as cotton soon becomes matted and hard; and the wool carded in sheets is far more elastic and therefore better than the fine tampon wool. The first one or two pieces may be dipped in a ten-per-cent. solution of ichthyol in glycerin, or in any bland antiseptic solution. I am in the habit of having all the tampons tied in a continuous string, like a kite-tail, so that the patient may be able to remove them at the first sign of irritation, or in order to use a cleansing douche before the next visit.

In one of these ways most cases of pregnancy vomiting may be relieved, but there remain those cases in which other causes are operative.

Retroversion and retroflexion are to be corrected by the aid of the knee-chest position, bimanual manipulation, and packing placed as high up as possible behind the cervix and extending down to the perineum. Once replaced the uterus is to be retained by some form of pessary.

In cases presenting erosion of the cervix, and in not a few cases showing no such sign, relief has promptly followed the nitrate-of-silver treatment. Indeed, so successful has this treatment proved in some hands that it has long been a routine method in the Vienna clinics. It is applied as follows: The cervix is exposed by a cylindrical glass speculum, the end of which it just fills, and after a thorough cleansing enough ten-per-cent. solution of silver nitrate is poured in to cover the exposed surface. After ten minutes this is decanted and the mucous membrane is dried. A second, and even a third, application may be called for after an interval of two or three days.

Should inflammatory processes be present, either in or about the uterus, the ordinary measures of rest, hot douches, and vaginal medication are in order. It is probably in such cases that benefit is had from vaginal suppositories or dressings of belladonna, cocaine, and morphine.

In all the more serious forms of the complication absolute rest in bed, in the horizontal position, is of much importance. Besides its general therapeutic value it permits the uterus more easily to rise above the brim, and aids us in our endeavors to correct displacements and

lesser impaction. Coitus, and whatever may tend to cause sexual excitement or otherwise to increase pelvic congestion, must be avoided.

First discovered accidentally, and then practised empirically, Copeman's procedure has an established place in the treatment of severe cases. This consists in the careful dilatation of the cervical canal up to, but not through, the internal os. The index finger is used by preference, though Wylie has used a steel-branched dilator. Whether this acts by separating constricting bands of tissue, by straightening flexion, by breaking up impaction, or by some less apparent means, is not as yet agreed, but in many cases in which abortion has not resulted, a cure has been obtained.

Personally I wholly disapprove of this treatment, believing it to be dangerous and irrational. The same object is much better attained by the methods already described.

Besides the local cause, however, it is usually desirable to treat the conducting apparatus by which the reflex stimulus is conveyed. In other words, it is well to endeavor to lessen susceptibility to reflex irritation by the use of nerve sedatives, such as bromide, valerian, chloral, and even morphine. Chloral in full dose by rectum, night and morning, sometimes gives great relief, as does also morphine, introduced hypodermically or placed dry upon the tongue.

Chapman's ice bag to the spine has occasionally been found of service.

Then comes the long list of drugs for lessening the real or fancied irritability of the stomach. These must always be of secondary importance, and yet where symptoms are trivial they may answer every purpose at a minimum of annoyance to the patient, and where the outlook is grave we cannot afford to lose any help, however trifling, which may tend toward a cure. While, then, such remedies may always be given a place, reliance should not be bestowed upon them to the extent of wasting valuable time, or to the neglect of more rational measures.

In not a few cases gastric catarrh plays a more or less important part and claims attention. The ordinary remedies may be used, particularly the alkaline salines, taken well diluted before rising. Cocaine in small doses frequently repeated; creosote, or creosote and compound tincture of iodine in equal parts, given in one-drop doses every half-hour; oxalate of cerium in five-grain doses alone or combined with bismuth; calomel and ipecac in minute doses; hydrocyanic acid; tincture of nuxvomica; pepsin; ingluvin; champagne; hot water; ice—these and other empirical means may be employed for their direct effect upon the stomach. In recent years the washing out of the stomach has been tried with manifest relief in not a few cases.

The diet and the mental surroundings of the patient must be carefully guarded. Our endeavor must be to keep up the strength at the same time that we spare the stomach needless effort by giving the lightest and most digestible foods. These are best given in small and frequent portions, it being borne in mind that often food will be retained if given just after a paroxysm of vomiting has spent itself. It must be remembered also that a patient can sometimes retain and assimilate an article of food for which she experiences a marked longing, when seemingly more appropriate articles are at once rejected. The simple expedient of giving a light and easily digestible breakfast an hour before rising will sometimes solve the problem in those ordinary cases which are known as "morning sickness."

When, however, the stomach rebels to such an extent that the patient's strength perceptibly fails, resource must at once be had to rectal alimentation. Peptonized milk, eggs, and predigested beef form the best basis for these enemata, to which may be added, if necessary, a few drops of laudanum and half an ounce of whiskey. Four injections, of four ounces each, given within twenty-four hours, can generally be retained, provided that once daily the lower bowel be well emptied by a

cleansing enema of warm suds. Life can be sustained for weeks in this way when all else fails.

Recognizing the fact that mental conditions play an important part in some cases, the patient must be cheered and encouraged at all times, and so far as possible all causes of worry, anxiety, and undue care must be removed.

We now come to that class of cases which resists all the measures at our command. The patient has reached the second stage described above, and the question of emptying the uterus presents itself. Of course it is assumed that no one will lightly decide upon this last resort without good and sufficient cause; yet, on the other hand, there is need to urge the danger of too long delay. Provided a faithful trial has been made of less radical measures, and yet in spite of them the gravity of the symptoms continues, let no time be lost in producing abortion, preferably by emptying the uterus at one sitting, under ether. The reason for thus urging against delay lies in the fact that even abortion may fail to avert the fatal issue if the third stage be permitted first to make its appearance.

Rufus A. Kingman.

VULVA, DISEASES OF. See *Vagina, Diseases of*.

WACONDA SPRING.—Mitchell County, Kansas.

POST-OFFICE.—Cawker City. Hotel and sanitarium.

ACCESS.—Trains on the Central Branch of the Missouri Pacific Railroad stop within a few rods of the hotel.

This big spring is located within a fine curve of the Solomon River, about three miles from Cawker City, and at an elevation of about 3,500 feet above the level of the sea. The spring is contained in the centre of a huge, circular mound composed of hard rock, which rises to a height of thirty feet above the surrounding surface. The spring is sixty feet in diameter, and is surrounded by a natural platform of rock from eighty to one hundred and fifty feet wide, and so nearly circular as to appear as if artificially cut. The diameter of the base of the mound is one hundred and seventeen yards from north to south and one hundred and nineteen yards from east to west, while its circumference is sixty-six rods. A stone coping has been placed around the spring, and this is surmounted by a light iron fence, to protect the water. Within ten rods of the spring a substantial hotel and sanitarium, supplied with all modern comforts and conveniences, has recently been erected. The water from the spring is supplied to this building and is utilized for the bath-houses, where all varieties of hot and cold or vapor baths will be found. The surroundings of this resort are very attractive, and the climate is of a bracing and salubrious character. The following analysis of the water was made by Prof. G. E. Patrick, of the University of Kansas, at Lawrence:

One United States gallon contains (solids): Sodium chloride, gr. 765.76; sodium bromide, gr. 0.23; sodium sulphate, gr. 183.60; magnesium sulphate, gr. 85.28; sodium bicarbonate, gr. 26.92; magnesium bicarbonate, gr. 27.56; calcium bicarbonate, gr. 31.30; silicic acid and nitrous acid, traces; no organic matter. Total, 1,120.65 grains. Carbonic-acid gas, 91 cubic inches to the gallon; specific gravity, 1.017.

The water has a strong saline taste, and when properly carbonated is clear and sparkling. The analysis shows a water of great potency. It should be fully possessed of the qualities found in the waters of this class. Taken in proper doses it is said to stimulate the appetite, to tone up the nervous system, and to invigorate the spirits and general bodily condition to a remarkable degree. It may be safely recommended in all cases in which this class of waters has been found useful. It is bottled and shipped to any desired point.

James K. Crook.

WAHOO.—(*Euonymus*, U. S. P.; Spindle tree. Burning bush, etc.) The dried bark of the root of *Euonymus atropurpureus* Jacq. (fam. *Celastraceae*).

This plant is a graceful shrub or small tree of the Middle and Western States, and is frequently cultivated for

its beauty. It is usually about eight to twelve feet high, with opposite, oval-oblong, pointed, serrate leaves, and small, regular, dark purple flowers in axillary cymes. Sepals, petals, and stamens usually four; the latter inserted on a disc which extends over the ovary; pistil one; ovary three- to five-lobed and three- to five-celled, with several ovules in each cell; pods deeply lobed, smooth, bright crimson, drooping on long slender peduncles.

The bark occurs in quilled strips or pieces of very irregular size, usually with a few fine hair-like roots adhering; bark 1-5 mm. ($\frac{1}{8}$ - $\frac{1}{4}$ in.) thick; outer surface ashy or pale brownish-gray, usually with some small dark patches, shallowly fissured and ridged, with a somewhat scaly and soft, friable cork; inner surface whitish or slightly tawny, indistinctly short striate; fracture short, whitish, or the inner layer pale-brownish in bark which has been long kept; when it is slowly broken, the fractured ends are held together by fine, somewhat elastic fibres; odor distinct and characteristic, more or less saponaceous; somewhat gummy in the mouth, the taste sweetish, bitter, slightly acid.

The stem bark, which is in long, tough strips, with a dark gray or blackish cork, should be rejected.

The constituents of wahoo are not very well made out. Several resins, oil, wax, and numerous more ordinary substances have been obtained from it, as well as a glucoside named *euonymin*; indeed, several "euonymins," of somewhat different characters, have been separated by as many chemists. From all of these, again, is to be distinguished the resinoid "euonymin" obtained by precipitating the tincture. Of the latter there are two forms: the "brown," made from the official bark, and the green, made from the stem bark, the latter being inferior.

USES.—Wahoo is a not very certain, usually gentle, but sometimes griping laxative, with a reputation as a cholagogue. It may be given in chronic constipation, or perhaps better in occasional attacks of constipation with dyspepsia, heaviness, and symptoms of diminished hepatic action.

Dose of the extract (*Extractum Euonymi*, U. S. P.), 1 or 2 dgm. (gr. i. ad iij.) in pill form once or twice a day.

Henry H. Rusby.

WALLERIAN DEGENERATION.—The degeneration which occurs in the peripheral portion of a severed nerve fibre is known as the Wallerian degeneration. It is due to the separation of this portion of the fibre from its corresponding ganglion cell, and is usually explained as resulting from a loss of trophic influences, the severed portion being cut off from the source of its nutrition. The fact that a nerve when separated from its trophic centre degenerates in the direction in which it normally carries impulses is known as the *Wallerian law of degeneration*. It is also true that the central portion of a severed nerve—that portion which retains its connection with the ganglion cells—undergoes retrograde changes; but these differ from the changes seen in the Wallerian degeneration, being more of the nature of a simple atrophy.

The first recognizable change in Wallerian degeneration is a loss of the translucency of the nerve fibre. This is followed by a breaking-up of the myelin. Under the microscope the medullary substance is seen to be fragmented into small lumps or segments which become separated from each other. This is followed by a complete degeneration of the medullary sheath in which the latter is distintegrated into small fat droplets, the process suggesting an emulsification. At the same time there is a great increase in the size and number of the nuclei of the sheath of Schwann. Formerly it was believed that the neuraxones degenerated secondarily to the changes in the medullary sheath; but it has been shown that the changes in the former occur coincidentally with those of the sheath. The neurilemma finally becomes filled with the remains of the axis cylinder and medullary sheath, the fat droplets are taken up by fat granule cells, and the detritus is in time absorbed by the cells of the neurilemma. In the neighborhood of the injury the nerve nuclei become en-