

(the raphe) running thence to the edge; externally gray, greenish-gray or light yellowish-gray, silky in lustre and to the touch, densely clothed with a coat of closely appressed, shining hairs; internally hard, very tough, somewhat translucent, consisting of two discs of perisperm which enclose a thin, circular cavity and the embryo which has small heart-shaped, palmately nerved cotyledons; inodorous and intensely and persistently bitter.

Nux vomica seeds are so abundant and cheap that there would appear to be little temptation to adulterate them; yet not only is the powdered drug subject to adulteration, but, what is of more importance, it varies widely in quality. Hence the great importance of insisting upon official standards as to the alkaloidal assay of the preparations.

CONSTITUENTS.—The one important constituent of nux vomica, from a medicinal point of view, is strychnine. The activity of the drug is wholly dependent upon that substance, and the degree of this activity conforms closely to the amount which it contains, although the latter statement is subject to certain modifications, in accordance with the following facts. Associated with the strychnine is a certain quantity of the similar alkaloid brucine,—a quantity which either may be equal to, or may be twice as great as, that of the strychnine present. The action of this alkaloid is almost identical with that of strychnine, although variously estimated at from five to ten times weaker. This variation in the strength of brucine is undoubtedly due to the presence in it of variable amounts of strychnine, which it is almost impossible completely to remove. It is to be remembered that the alkaloids, besides being highly insoluble, exist in nux vomica intimately associated with an extremely tough, horny albuminous substance, so that if the powdered drug be taken, they may be less quickly and completely absorbed than when strychnine alone is administered. Constituents which are not important from a medicinal, though more or less so from a pharmaceutical, standpoint are the tannin-like *igasuric* or *strychnic acid* with which the alkaloids are combined, a considerable amount of fixed oil, a small amount of the glucoside loganin, a little gum, sugar, etc. The combined percentage of strychnine and brucine ranges from two to five per cent. or even more, of which the strychnine represents from one-third to one-half. Strychnine will be fully discussed under that title. *Brucine* (C₂₃H₂₆N₂O₄ + 4H₂O) occurs in very fine colorless crystals, forming a whitish powder, soluble in alcohol. It is distinguished from strychnine by being reddened by nitric acid. It forms salts freely, several being upon the market; the sulphate, which is soluble in water, is the one chiefly employed.

ACTION AND USES.—Excepting as to the preparations and dosage, an account of the action and uses of nux vomica would be a duplication of that given under *Strychnine*, to which the reader is referred. Brucine is somewhat used in a similar way, in doses of gr. $\frac{1}{10}$ to gr. $\frac{1}{2}$, the total daily amount not to exceed gr. ij. It is also sometimes applied externally to relieve itching.

The dose of nux vomica, in very fine powder, is 0.06–0.24 gm. (gr. i.–iv.). Of nux vomica the following are the official preparations, subject to assay by processes prescribed by the Pharmacopœia: The extract, to contain 15 per cent. of total alkaloid, dose 0.008–0.06 gm. (gr. $\frac{1}{4}$ to gr. i.); the fluid extract, to contain 1.5 per cent. of total alkaloid, dose ℥ i.–iv.; the tincture, to be made by dissolving 20 gm. of the dried official extract in 1,000 c.c. of a mixture of three volumes of alcohol and one volume of water—this tincture to contain a total of 0.3 per cent. of the alkaloid, and the dose to be 0.3–1.8 c.c. (℥v.–xxx.). It will thus be seen that the fluid extract is five times as strong as the tincture, and the extract ten times as strong as the fluid extract.

NYE LITHIA SPRINGS.—Wythe Company, Virginia.
POST-OFFICE.—Wytheville. Hotel and boarding-houses.

ACCESS.—Via Norfolk and Western Railroad to Wythe-

ville, thence two miles over macadamized carriage roads to springs.

These springs are located in the southwestern part of Virginia, in a charming, picturesque locality, one-quarter of a mile from the corporate limits of Wytheville. The elevation of 2,360 feet above the sea level gives assurance of a cool and delightful summer temperature. The country about Wytheville has long been celebrated in the South as a summer health resort, and the yearly visitors came from far and near. The average yearly temperature of Wytheville is 53° F. The seasonal temperatures are as follows: Spring, 52° F.; summer, 70.6° F.; autumn, 53° F.; and winter, 32.3° F. The highest summer temperature observed during the past three years has been 88° F. in the shade. The region is quite free from malarial and miasmatic influences. The springs are surrounded by a tract of eighteen acres of the primeval oak forest, which furnishes a delightful shade in the summer. The accommodations for visitors are as yet somewhat limited, but a commodious hotel is in contemplation for the near future. Two good hotels and numerous excellent boarding-houses will be found in Wytheville. The springs are three in number, two lithia and one chalybeate. The summer temperature of the two lithia springs is respectively 53° and 54° F., and the chalybeate 56° F. The following analysis of two of the springs is furnished by Dr. George L. Nye, the resident physician:

NYE LITHIA SPRING, No. 1.

(Analyzed by W. L. Dudley, Vanderbilt University.)

ONE UNITED STATES GALLON CONTAINS:	
Solids.	Grains.
Calcium carbonate	10.63
Lithium carbonate	6.41
Iron and alumina oxide	.31
Silicic acid	1.19
Total	18.54

NYE CHALYBEATE SPRING.

(Analyzed by J. L. Jarman, of Emory and Henry College.)

ONE UNITED STATES GALLON CONTAINS:	
Solids.	Grains.
Potassium carbonate	0.01
Sodium carbonate	.81
Lithium carbonate	1.89
Calcium carbonate	11.60
Magnesium carbonate	2.35
Iron and alumina oxide	1.33
Silicic acid	.66
Total	18.65

Rating the lithium in these analyses as the bicarbonate it would amount respectively to 11.77 and 3.48 grains per gallon.

The waters have long been highly prized in the treatment of a variety of disorders. Dr. Nye presents numerous reports of cases from competent physicians illustrating the beneficial influence of these waters in diabetes and other urinary disorders. Their action in cases of dyspepsia and intestinal affections is also very advantageous. The chalybeate water is in high repute among physicians for the relief of menstrual and uterine disorders consequent upon anæmia.

James K. Crook.

NYMPHÆACEÆ.—*The Water-lily Family.* This small family of aquatic plants contributes several large, coarse, spongy, dark-colored rhizomes which have been used in medicine. The white water-lilies pertain to the genus *Castalia* Salisb., though long miscalled *Nymphæa*, the latter name still being applied to them as drugs. The species most used are *C. alba* (L.) Lyons (*Nymphæa a.* L.), the European white water-lily, *C. odorata* (Dryander) Woodv. et Wood (*Nymphæa o.* Dryander), the Fragrant or Sweet-scented white water-lily, chiefly of Eastern North America, and the *C. tuberosa* (Paine) Greene, the tuberous white water-lily, chiefly of Central North

America. The yellow water-lilies or pond-lilies, Spatter-docks, or Flatter docks, pertain to the genus *Nymphæa* L., though long miscalled *Nuphar*. The species of this genus which has been most employed, and the nature of which is best known, is *N. lutea* L., the European yellow pond-lily. From this rhizome has been extracted the white amorphous alkaloid *nupharine*, to which its bitter properties are probably due. The constituents of the other species named are but little known, though they contain bitter principles apparently similar to nupharine. All contain resin, tannin, starch, and gum.

The uses of these drugs are not based upon any scientific knowledge other than that they are mild astringents and bitter tonics. In this way they have been used as astringent gargles, intestinal astringents, and for local applications in gonorrhœa, leucorrhœa, etc. The dose of the fluid extract is i.–iv. cc. (fl. ʒ $\frac{1}{4}$ –i.).

Henry H. Rusby.

NYSTAGMUS is an involuntary rhythmic contraction of the ocular muscles producing oscillation of the eyeballs. It is due to imperfect cortical innervation of the voluntary muscles of the eye, and may result from either central or peripheral causes, or from both. The movements, which usually affect both eyes, may be vertical, rotatory, or lateral, but the most common form is from side to side. It is most commonly observed in eyes that are defective congenitally, as in albinos, or from coloboma of the choroid, microphthalmos, etc. Various inflammatory or degenerative diseases of the eyes, chiefly when they occur in early infancy or childhood, frequently cause nystagmus. This condition must not be confounded with the slight tremor observed upon voluntary movement of the eyes in efforts at fixation in various directions which is so often found in association with weakness of the ocular muscles.

Nystagmus may be acquired, and is often seen in those employed in coal mines, and is due to the work being done in cramped positions under poor illumination, the gaze being directed obliquely upward. Fatigue is thus induced in the superior recti and inferior obliques, and also in the internal and external recti muscles, finally causing their spasmodic action. This type of nystagmus may also be regarded as a fatigue neurosis.

Nystagmus also occurs in various diseases of the nervous system, and is often a conspicuous symptom in multiple sclerosis, cerebellar disease, and Friedreich's hereditary ataxia. It occurs in many diseases of the brain, such as tumor, softening, hemorrhage, meningitis, sinus thrombosis, etc. As a localizing symptom it is of no value, but it is an important diagnostic sign in the early stage of degenerative affections of the central nervous system.

In multiple sclerosis nystagmus is a frequent symptom. Spontaneous movements like those seen in albinism or in congenital ocular defects are rare. The nystagmus is usually manifested when the eyes are moved voluntarily in various directions, especially on lateral movement.

In cerebellar disease nystagmus has been classified as an irritative symptom, being ascribed to pressure on the pons and corpora quadrigemina.

William M. Leszynsky.

OAK ORCHARD ACID SPRINGS.—Geneseo County, New York.

POST-OFFICE.—Medina, Orleans County.

ACCESS.—Via New York Central Railroad to Medina, a station forty miles west of Rochester, thence six miles south by stage.

The springs are not used as a resort, but the waters have been sold to some extent. The accompanying analyses show the waters to possess exceptional properties.

These springs are remarkable in the amount of free sulphuric acid which they contain—more, indeed, with one or two exceptions, than is to be found in any other waters known. Waters containing this acid in free state are exceedingly rare. It is said that none of the kind is known in Europe. Among the few known on this side of the Atlantic are the following: One in the town of Byron,

ONE UNITED STATES GALLON CONTAINS:

Solids.	Spring No. 1, (Silliman and Norton.) Grains.	Spring No. 2, (E. Emmons.) Grains.	Oak Orchard, acid water, (Prof. Porter.) Grains.
Sodium sulphate	6.34	....	3.16
Calcium sulphate	74.89	12.41	13.72
Potassium sulphate	5.52	....	2.48
Aluminum sulphate	21.69	....	6.41
Magnesium sulphate	35.60	4.98	8.49
Iron sulphate	....	39.23	....
Iron protosulphate	28.62	....	32.22
Sodium chloride	2.44	....	1.43
Silica	4.50	1.84	3.33
Organic matter	....	10.88	6.65
Sulphuric acid	134.73	129.06	133.31
Total	314.42	118.40	211.20

near the Oak Orchard Spring; the Tuscarora Sour Spring in Canada; the Matchless Mineral Well in Alabama; and several acid springs in Texas, California, and Virginia. According to Prof. J. H. Armsby, of Albany, the Oak Orchard water has been used with advantage in "ill-conditioned ulcers, diseases of the skin, passive hemorrhages, diarrhœas depending upon an atonic condition of the mucous membranes, and in depraved and impoverished conditions of the body from specific diseases and from intemperance." The water requires dilution before drinking.

James K. Crook.

OAK, WHITE.—*QUERCUS ALBA.* *Oak Bark.* "The bark of *Quercus alba* L. (fam. *Cupulifera*)," U. S. P. This species of oak-tree is one of the commonest and most abundant of its genus, as well as the largest, in Eastern and Central North America. It yields one of the most highly prized of American hard-wood timbers. The bark is thus officially described: "In nearly flat pieces, deprived of the corky layer, about a quarter of an inch (6 mm.) thick, pale brown; inner surface with short, sharp, longitudinal ridges; tough; of a coarse, fibrous fracture; a faint, tan-like odor, and a strongly astringent taste. As met with in the shops, it is usually an irregularly coarse, fibrous powder, which does not tinge the saliva yellow." The last character distinguishes it from the largely employed bark of *Quercus tinctoria*. In nearly all temperate countries some locally occurring oak is used as an astringent; the British oak, *Q. Robur* L., in Europe, the holly oak, *Q. Ilex*, in France and elsewhere. In our own country, also, other species besides the white oak are sometimes used and were formerly official (*Q. coccinea vel tinctoria*, Gray, etc.).

White oak bark is simply an astringent. It contains from five to ten per cent. of tannic acid—probably identical with the *quercitanic acid* of *Q. Robur*—and a little coloring matter.

It is used in decoction (5%) for cracked or tender nipples, indolent granulations, leucorrhœa, nasal catarrh, etc., and is occasionally given internally, in doses of i.–iv. gm. (gr. xv.–lx.). Finely powdered white oak is often blown into the nares to check hemorrhage.

Henry H. Rusby.

OBESITY. See *Adipositas*.

OBSTETRIC OPERATIONS.—**INDUCTION OF ABORTION.**—This means the interruption of pregnancy before the period at which the child is viable. It is an operation performed solely in the interests of the mother and, as Hirst says, should be undertaken as reluctantly as justifiable homicide. The indications are: pernicious vomiting, pulmonary and cardiac disease, nephritis, chorea, acute mania, melancholia, and pernicious anæmia. Pregnancy may have a very deleterious effect upon each of the above disorders, and in allowing gestation to continue, the physician may sacrifice the lives of both mother and child; the induction of abortion should be regarded only as the last resort and never be undertaken without consultation. Among the local conditions which may call for the termination of the pregnancy must be men-

tioned incarceration of the retroflexed uterus, hemorrhage from the normally or abnormally situated placenta, and excessive contraction of the pelvic canal. In this last condition the choice lies between abortion and Cæsarean section; the claims of each operation should be presented to the mother.

Methods of Inducing Artificial Abortion.—The uncertain methods of drugs and electricity are to be condemned. The induction of artificial abortion should be made a surgical operation, and, if possible, completed at one sitting. There is but little danger if the procedure has not been delayed until the patient's strength is exhausted and if careful asepsis is observed throughout. The instruments required are: rubber pad, leg-holders, weighted speculum, volsella forceps, steel-branched dilators, a large intra-uterine curette, ovum forceps, intra-uterine irrigating tube, and fountain syringe. The patient, having been anaesthetized, is placed in the dorsal position with knees well drawn up and secured with the leg-holders; the parts about the vulva are shaved and cleansed, the vagina is scrubbed with soap and irrigated with warm sterilized water. By means of the speculum and volsella the cervix is exposed and secured; with the dilators the cervix is gradually stretched up to two or two and a half inches. Owing to the softening of the tissues usually yield readily, but this part of the operation must be conducted without haste. The finger is the best instrument for removing the contents of the uterus, and in the first two or three months of pregnancy there is but little trouble in reaching the fundus, especially if counter-pressure be made upon the abdomen with the other hand so as to crowd the womb down upon the internal finger. After the attachments of the ovum have been freed the membranes are drawn out over the hooked finger. In case of difficulty the curette may be used to loosen the tissue and the pieces removed with the forceps, but the finger is the guide for all intra-uterine manipulation, and touch alone will determine when the operation is completed. Finally, an intra-uterine irrigation of hot sterile salt solution will remove clots and act as an efficient stimulant to the uterine muscle. Chemicals should not be injected into the uterus; when strong enough to affect bacteria they become poisonous to the woman. Some operators advise the introduction of a gauze drain, but this should be unnecessary. In some cases the cervix may be rigid or the pregnancy too advanced for the operation to be readily completed at one time. Under these circumstances some authors recommend making use of tents, but the difficulty in rendering them aseptic should forbid their employment. The cervix may be partially dilated with the steel dilators and then the lower uterine segment and cervix firmly packed with gauze supported by a vaginal tampon. Such treatment controls hemorrhage and stimulates the uterus so that at the end of twelve hours the packing can be removed, when the cervix is found softened and contractions are established. If there is no haste the case may be allowed to progress naturally or the operation can be completed, but in all cases the finger must be used before deciding that the uterus is empty. During the performance of artificial abortion there may be profuse hemorrhage which usually ceases as soon as the uterus is emptied and stimulated with the hot saline solution. If oozing continues the hypodermatic administration of ergot and even the introduction of the intra-uterine tampon of gauze are indicated. In bad cases of retroflexed uterus it may be impossible to reach the cervix; in such cases the fundus should not be tapped through the vagina, as some books recommend, but the proper treatment is abdominal section and manual reposition of the uterus.

INDUCTION OF PREMATURE LABOR.—*Indications.*—Many of the indications for this operation are the same as those mentioned under the heading of Induction of Abortion, the pregnancy having been allowed to proceed in the hope of obtaining a viable child. It is evident that the later the operation can be delayed the better the chances for the child, and that the after-care will make a great difference in the infant mortality. Deformed

pelves: Here the operation comes into competition with symphyseotomy and Cæsarean section. Heymann says that in cases of disproportion between child and maternal pelvis the best time for the induction of labor is from the thirty-third to the thirty-fifth week. Among children so born the mortality is 64.3 per cent. In simple flat pelves an internal conjugate of two and three-fourths inches is considered the lowest limit; three to three and three-fourths inches in the generally contracted pelvis. The success of the treatment of deformed pelvis by induction of premature labor depends upon careful measurement of the diameters, accurate estimation of the size of the foetal head, and correct calculation of the duration of pregnancy. Each case must be studied by itself, and for further particulars the reader should refer to the article on *Pelves, Deformed*. Placenta prævia: In the majority of cases the first hemorrhage does not occur until after the period at which the child is viable. Labor should be induced at once, as further delay does not improve the chances for the child and threatens the life of the mother. Eclampsia: most authorities advocate the induction of labor not only when the convulsions appear, but whenever the pre-eclamptic symptoms refuse to yield to treatment. On the other hand, Stroganoff reported fifty-eight successful cases without the induction of labor (*American Gyn. Journal*, May, 1901).

Methods of Inducing Premature Labor.—*Puncture of the Membranes:* This method is uncertain and contrary to nature. *Tamponing the Vagina:* This also is uncertain and not advisable unless there is severe hemorrhage. *Injection of Glycerin:* This is dangerous, although many successful cases have been reported. *Insertion of an Elastic Bougie:* This is known as Krause's method, and is advocated by many. An aseptic bougie is passed up as far as possible between the membranes and the uterine wall; the bougie is then supported by a tampon placed in the vagina. If no contractions set in at the end of eight hours, a second bougie is introduced. When the labor is induced, the bougies are allowed to be expelled along with the fetus. This method is frequently unsuccessful, and there is some danger of sepsis, as a bougie is difficult to disinfect without ruining it. The chief advantage lies in the fact that the procedure is an easy one for a person who has very little skill in manipulation. *Dilatation of the Cervix:* This is the most desirable method and may be carried out in various ways. The patient is anaesthetized, the cervix slightly dilated with the steel dilators, and then the entire cervical canal and vagina are packed with iodoform gauze. If contractions are not evoked at the end of six or eight hours more gauze should be introduced. As soon as the labor is started it may be allowed to proceed unaided. Instead of gauze the rubber bags of McLean or Barnes may be used; these are passed into the cervix and distended with sterile water. Before introduction their strength should be tested and the number of syringefuls of water required should be noted. McLean's bags are divided by a compartment through the centre so that each side can be distended separately. Charpentier de Ribes' bag is made of silk covered with rubber and, when dilated, forms an inverted cone measuring three and one-fourth inches at the base. This bag is folded, introduced into the lower segment of the uterus, and filled with water; the stimulation is increased by making traction upon the tube connected with the apex of the bag. These hydrostatic dilators both open the cervix and cause uterine contractions. De Ribes' bag is very useful in placenta prævia as it makes direct pressure upon the bleeding lower segment. A certain amount of preliminary dilatation is necessary for the passage of any of these bags. When haste is essential, as in placenta prævia, the cervix can be stretched by the fingers, later by the passage of the entire hand; manual dilatation may be independent of, or may supplement, the other methods. The delivery of the fetus may be accomplished by version or by the application of forceps according to the requirements of the case.

LACERATION OF THE CERVIX.—Slight ruptures of the cervix occur in almost every first labor; they may add

somewhat to the danger of septic infection, but are otherwise unimportant. Deep tears are the result of the rapid passage of the foetal head through a rigid or imperfectly dilated cervix. Precipitate labor, the application of high forceps, and version frequently cause cervical laceration. Malignant disease and the presence of cicatricial tissue are predisposing conditions. The tears usually are longitudinal and situated on the left side, but may also be bilateral or stellate; in rare instances the anterior lip has been torn away by being caught between the inner surface of the pubis and the presenting part. Evidences of Cervical Laceration: The lesion may be suspected whenever the presenting part takes a sudden jump through a partially dilated cervix, but the chief sign of serious rupture is hemorrhage. Whenever hemorrhage continues from an empty and well-contracted uterus the parts should be inspected for lacerations. A speculum is seldom necessary as the parts are so relaxed; the cervix can be caught with a volsella forceps and pulled down into view. *Prophylaxis:* Non-interference with normal labor, care in avoiding premature rupture of the membranes, and the postponement of operative procedures until the cervix is dilated or dilatable are the important points under this head. *Treatment:* Extensive tears, especially those giving rise to hemorrhage, require the introduction of sutures. For this procedure anaesthesia is rarely needed as the parts are not sensitive, particularly just after labor. By means of a speculum and volsella the cervix is exposed and secured; with a curved needle in a holder catgut sutures are introduced from side to side. If the gut be chromicized there is no danger of its too early absorption, although some operators use silkworm gut. No special after-treatment is called for, except the removal of non-absorbable sutures upon the tenth day.

Secondary Trachelorrhaphy.—Neglected lacerations of the cervix may give rise to symptoms and, under some circumstances, they seem to predispose to the development of cervical cancer. The laceration allows the cervical canal to gape open and exposes its interior to friction against the sides of the vagina; hypertrophy and hyperplasia of the epithelial tissue may ensue, giving rise to the so-called "granulations" and being accompanied by profuse leucorrhœa. In other cases there is an extensive deposit of cicatricial tissue making the cervix club-shaped and producing reflex disturbances. A tear in the cervix may cause prolonged congestion of the uterus, thus delaying involution and weakening the supports so that displacements readily occur. *Symptoms:* In chronic cases these may be leucorrhœa, backache, dragging sensations, menorrhagia, and dysmenorrhœa, as well as a wide variety of reflex symptoms. The diagnosis can be readily made by vaginal touch; on inspection we may see a club-shaped cervix or a red, eroded-looking surface covered with exuberant "granulations" and purulent discharge. The varieties of tears are unilateral, bilateral, and stellate.

Trachelorrhaphy.—Lacerations which give rise to symptoms or show signs of irritation should be treated by operation. The instruments needed are: a rubber pad, leg-holders, weighted speculum, a knife or Emmet's scissors for denudation, volsella forceps, tenaculum, hæmostatics, needle-holder, and straight cervix needles with large eyes. The patient is anaesthetized, placed in the lithotomy position, and the vagina cleansed. After the introduction of the speculum and exposure of the cervix the anterior and posterior lips are brought together by means of tenacula so that the extent of the tear and the position of the canal may be judged. Each lip is then denuded, care being taken to remove all the cicatricial deposit from the angle of the tear. In a bilateral laceration a strip of mucous membrane is left in the centre of each lip to form the lining of the canal; stellate lacerations are denuded in such a way as to make the lesion unilateral or bilateral; all diseased tissue containing Nabothian ovoids and hypertrophied glands should be removed. The field of operation is kept clean by means of small sponges on holders or by continuous irrigation. Chromicized or formalin catgut answers every purpose as suture

material, although many operators use silkworm gut. The sutures are passed from the outside of one lip just below the angle of the tear, the needle coming out at the edge of the undenuded cervical canal, then reintroduced into the other lip and brought out so as to correspond with the point of entrance. The first or angle suture is the most difficult to insert. The sutures are caught in the grasp of a pair of hæmostatic forceps and not tied until all are introduced. After knotting and cutting the ends of the stitches iodoform is dusted upon the cervix and the speculum withdrawn. The patient is kept quiet for a week or ten days at which time non-absorbable sutures are removed.

LACERATIONS OF THE PERINEUM.—Schroeder states that the perineum is torn in thirty-four per cent. of primiparæ and nine per cent. of multiparæ. The general cause of laceration is disproportion between the size of the foetal head and that of the vulvar opening. Sometimes the child is so rapidly expelled that the tissues have not time to become pliable, or, as is the case with elderly women, the parts may not be sufficiently elastic. When the mechanism is faulty the axis of the presenting part may be directed too far backward and plough into the posterior wall; this is the case in occiput permanently posterior. The perineum is often lacerated when the delivery is by means of forceps. Tears are divided into complete and incomplete, according as they rupture through the sphincter ani or not; the incomplete tears may extend as far as the border of the muscle or stop short of it. In rare instances there occurs a "central rupture," the child being born through an opening between the anus and vulva. The laceration extends for a variable distance up the vagina on one or both sides, rarely in the median line. It is important to remember that the function of the levator ani may be impaired by overstretching without there being any evidence of external tear. The prophylaxis of perineal laceration is discussed in the article on *Labor, Normal*. Briefly, this consists in carrying out one or more of the following procedures: 1. Restraining the descent of the head to allow time for the gradual stretching of the tissues. 2. Diminishing the power of the expulsive efforts by the administration of chloroform. 3. Keeping the presenting part well forward under the symphysis. 4. Performing manual extension or flexion, according to the requirements of the mechanism, between the pains by means of a finger in the rectum. After the second stage is over every case should be examined to learn the condition of the pelvic floor.

Treatment.—All lacerations should be repaired immediately if possible; the stitches may often be inserted before the delivery of the placenta while the parts are numb or the woman still under the anaesthetic, the sutures not being tied until after the third stage is completed. When circumstances make postponement unavoidable just as good results in the way of union are obtained at the end of twenty-four hours. **Primary Operation—Incomplete Tear:** The instruments needed are: curved needles, needle-holder, scissors, thumb forceps, and suture material. The rubber pad is placed beneath the buttocks and the leg-holders are applied; the parts are cleansed and bits of ragged tissue trimmed away with the scissors; a wad of sterile cotton or gauze may be placed in the vagina to prevent blood from obscuring the field of operation. The closure of the incomplete tear is a simple matter and requires the application of none but the ordinary surgical principles. The rent in the vagina should be closed by a running suture of catgut and the remainder of the tear brought together by side-to-side sutures of silkworm gut. If no vaginal stitches are required the silkworm gut may be introduced and the ends secured with a hæmostatic until the placenta is expressed; but if there is much laceration of the vaginal wall, it is best to defer all suturing until after the third stage. **Complete Tear:** The essential point of this operation is to bring together the ends of the torn sphincter ani. The first suture should be introduced well back, about on a level with the posterior margin of

the anus, then buried in the recto-vaginal septum and brought out at a corresponding point on the other side; usually two sutures suffice for the sphincter. The rest of the operation is the same as that for incomplete tear. If the laceration extends up the rectum, the rent in the bowel should be united by means of catgut sutures introduced from the rectal side of the lesion. There are no special features about the after-treatment; the parts should be irrigated after each urination and kept dusted with iodiform. Even when the tear was a complete one the bowels should be moved on the second and each succeeding day, the feces being softened by the injection of a little olive oil.

If lacerations involving the pelvic floor are not sewed up at the time of their occurrence there may be unpleasant results. The posterior vaginal wall may begin to roll out, forming a rectocele; as the anterior wall is supported by the posterior a cystocele may be added, and these two conditions interfere with the functions of bladder and rectum. The prolapse of the vaginal walls drags upon the uterus until its supports yield and displacement occurs. The attempt to innervate the weakened or ruptured muscles is a severe strain upon the woman's system, and the general health becomes impaired, while the altered position of the uterus interferes with the functions of the pelvic organs so that menorrhagia and dysmenorrhœa may be present. In cases of complete tear there is incontinence of feces. The diagnosis of old laceration is made by inspection and digital examination; the tear may be represented by cicatricial tissue; the vulvar opening may gape; on directing the patient to "bear down," the lack of support is manifested by a protrusion of vaginal tissue. The only treatment is by operation, which must not be performed inside of two months after labor in order to give the uterus time for involution.

Secondary Perineorrhaphy.—During the week preceding operation it is well to direct the patient to avoid milk and live upon a diet of animal broths and food which will produce but little residue; such a course of preparation will add greatly to the prospects for success if the operation is to be for a complete tear. For several days in advance the patient should be given daily laxatives and high bowel washes; a large enema should be administered on the morning of the operation. The instruments required are: rubber pad, leg-holders, long scissors curved on the flat, scalpel, rat-toothed forceps, tenacula, hæmostatics, needle-holder, curved and straight needles, suture material of catgut and silkworm gut. After the patient is anesthetized she is placed in the lithotomy position, the perineum is shaved, and the parts are rendered aseptic. If, by means of tenacula, the two lower caruncles myrtiformes and a point on the posterior vaginal wall are brought together, a good idea of the area requiring denudation may be obtained. There are two typical operations which meet the demands of the majority of cases, Hegar's and Emmet's.

HEGAR'S OPERATION.—The three points to be determined in this operation are the apex of the rectocele and the two lower caruncles. With the scalpel a line is made at the margin of the skin and mucous membrane connecting the lower caruncles of either side, and from these points the line is carried up to the apex of the rectocele on the posterior vaginal wall. This triangular area with a curved base is then denuded with the scissors. Beginning at the point farthest up the vagina catgut sutures are introduced, the needle being directed in a slanting course downward on one side until the centre of the vaginal wall is reached and then upward to a spot corresponding with the starting-point. In this way the upper part of the triangle is closed almost down to the caruncles. A straight needle is now threaded with silkworm gut and a suture is passed from side to side, beginning just above the posterior commissure. The next two sutures are inserted above the first and passed into the vagina and out again on the opposite side, drawing the two caruncles and the centre of the vaginal wall into their correct relations.

EMMET'S OPERATION.—This operation is particularly well adapted to those cases in which the tear involves the lateral aspects of the posterior vaginal wall. The denudation is triangular on either side, leaving a V-shaped piece of mucous membrane in the centre. The lateral areas are closed by catgut sutures; the edges of the lower part of the denuded area are brought together with silkworm gut, the upper suture being known as the "crown suture," as it secures the apex of the V before emerging on the other side. If the tear has extended into the rectum, great care must be taken to freshen the edges of the sphincter ani; the insertion of the sutures and the after-care do not differ from the description given when treating of the primary operation. Non-absorbable sutures are removed on the eighth or tenth day.

FORCEPS.—Forceps consist of two blades, and are either of the long or the short variety; long forceps may be provided with appliances for axis traction. The curves of a forceps are two, cephalic and pelvic; the former adapts the blade to the side of the fetal head, and the latter coincides with the axis of the pelvic canal. Short forceps have no pelvic curve. To insure a firm grasp good forceps should have a moderately long handle, and should be as stiff as possible without making the construction too clumsy. The cephalic curve should be of moderate sharpness, viz., about that represented by the arc of a circle whose diameter is nine inches; such a curve will grasp the head securely and yet not be difficult to introduce. The tips of the blades should be about one inch apart when the handles are closed. Long forceps should measure not less than nine and one-half inches from the lock; when the instrument is applied to the head the pelvic curve has its concavity directed upward toward the symphysis. The blades of forceps are locked either by means of a pin and slot, or there are grooves on the shoulders into which the shank of the opposite blade sinks. Shoulders upon the handles or a loop in the shank above the lock for the insertion of the forefinger are desirable features. There are many varieties of excellent forceps in the market, and choice is only a matter of individual taste provided the forceps have the characteristics just enumerated.

AXIS-TRACTION FORCEPS.—When the blades are applied to the head at or above the brim of the pelvis the traction should be made in the axis of the superior strait, that is, downward and backward. With the ordinary long forceps traction in this direction is very difficult to carry out, and the force exerted acts at a disadvantage. In all axis-traction forceps rods are applied to the blades in such a way that the traction can be made in the axis of the blades, that is, in the axis of that portion of the canal in which they lie. The handles are held in apposition by means of a screw, and there are joints between the rods and bar as well as between the rods and blades, so that the head can move freely either in rotation or flexion and extension. The standard axis-traction forceps is that which was devised by Tarnier, but there are many modifications of the original instrument, one of the best being the Jewett forceps (Fig. 3611). Edward Reynolds has devised rods which hook into the blades of any pair of long forceps, and are fairly satisfactory. Forceps should be made of metal throughout so as to insure perfect cleansing and sterilization; for the same reason all the parts of axis-traction instruments should be detachable.

Action and Uses of Forceps.—First of all, the forceps is a

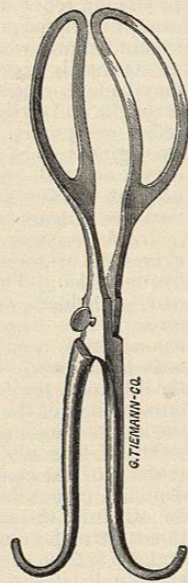


Fig. 3609.—Hodge's Forceps.

tractor; it is also a lever as far as producing flexion and extension of the head is concerned; but leverage carried out by swaying the instrument from side to side is to be avoided as very dangerous to the soft parts of the mother.

In rare instances the instrument is used as a rotator, as in turning an occiput forward; but this also is dangerous, and, as a rule, the blades should be allowed to turn with the head as it descends. Finally, the powerful axis-traction forceps are compressors, and great care must be exercised lest this action of the instrument injure the fetus.

Indications for Application of Forceps.—Most frequently the application of forceps is required because the maternal forces are unable to expel the foetus on account of simple uterine or abdominal inertia. Provided there be no contraindications, it is a general rule that when the presenting part has remained stationary for two hours forceps should be applied; of course such a rule is a very rough one, as each case should be managed to suit particular conditions. Forceps may be demanded either in the interest of the child or in that of the mother, and in many instances these interests are combined. Under the head of maternal conditions should be mentioned: pneumonia, valvular disease of the heart, and eclampsia; accidents, such as placenta previa, accidental hemorrhage and rupture of the uterus; abnormalities of the parturient canal, such as contracted pelvis, tumors, and rigidity of the soft parts. Fetal indications are undue variation in the strength and rapidity of the heart beat, prolapse of the funis, and sudden death of the mother. There are certain definite contraindications to the use of forceps which are important to bear in mind. The forceps never should be applied when the contraction of the pelvic canal is excessive. As a rule, a conjugate of three and one-half inches is the limit in cases of contracted pelvis. Forceps should not be applied to the hydrocephalic head nor to one that has been perforated or is decomposing. Except in a few cases of placenta previa in which version is contraindicated the instruments should not be applied to a head which is still movable above the brim. Before performing a forceps operation the membranes must be ruptured and the cervix must either be dilated or dilatable. The bladder and rectum should be empty and the position of the head known. It is unjustifiable to make traction upon a head which is descending in such a way as to develop an impossible mechanism, as in persistent mento-posterior and brow cases.

Technique in Applying Forceps.—The operation is known as high forceps when the head is at the brim; as low forceps when on the perineum; and as intermediate forceps when it is between these points. Only the operations of high and low forceps need to be described.

High Forceps.—The operator should have at hand whatever is necessary for the treatment of post-partum hemorrhage and the repair of ruptured perineum; strict asepsis should be observed throughout. The forceps are sterilized by boiling, and the outer surfaces of the blades smeared with sterile vaseline. The patient is anesthetized and placed across the bed, or better, upon a table, the knees being held by assistants or secured by leg-holders. After the urine is drawn and the parts are cleansed the physician should make a thorough examination in order to determine the exact position of the head. The left blade is introduced first; this is the one lying in the left hand of the operator and occupying the left side of the pelvis.

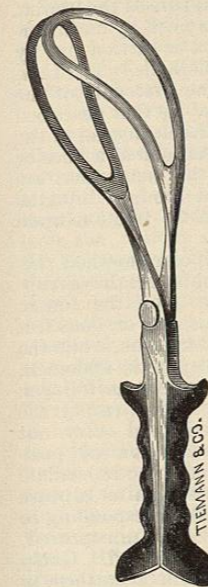


Fig. 3610.—Jenks' Long Forceps.

The operator grasps the handle of this blade near the lock, holding it lightly between the thumb and fingers of the left hand in a position almost parallel with the right groin of the mother; two fingers of the right hand are introduced into the vagina, and the tip of the instrument guided gently along their palmar surfaces until the blade comes to lie beside the fetal head. During introduction the handle of the forceps swings toward the median line of the mother and at the same time downward so as to cause the pelvic curve to adapt itself to the axis of the superior strait. The shank of the instrument presses back the edge of the perineum when the blade is in place. Giving the handle to be steadied by an assistant, the physician passes the other blade in the same way over the one already inserted, reversing the position of his hands to do so. If at any time during the operation contractions of the uterus are evoked the physician must suspend operation until they have passed. The next step is locking the forceps. To do this the handles are gently depressed. If the blades do not readily come together no force must be used, but with a finger within the vagina they should be carefully rotated until they come into proper relation. If it is now impossible to lock them, it is because they are improperly applied, so they should be removed and reinserted. After they have been locked, the handles are brought together or a towel can be placed between them if the operator wishes to avoid the danger of making too much compression upon the head. Before making traction it is well to make an examination to assure one's self that the blades are within the cervix, and that neither the hair nor any of the soft parts are caught in the instrument. At first the tractions are made in a direction downward and as far back as possible; they should imitate the action of the uterus by being intermittent, and the handles should be slightly separated during the interval of rest so as to relieve the head from compression. In difficult cases the traction may be made with the pains, the patient being placed in Walcher's position, viz., at the edge of the table with her heels just touching the floor. This posture increases the antero-posterior diameter of the inlet, but diminishes that of the outlet; so when the head has passed the brim the woman is returned to her original position. As the head descends in the curve of Cürus, the direction of the traction changes more and more to the front until, when the head is on the perineum, the handles of the forceps point almost directly upward. The forceps should now be grasped in the right hand with the palmar surfaces toward the operator; with the left hand he supports the perineum and shells out the head by swinging the handles until they are almost parallel with the woman's abdomen. As flexion or extension of the head is under perfect control when the forceps are applied, ample time may be taken to allow for full dilatation. Sometimes it is wise to remove the forceps just before the largest diameter of the head comes through the vulva. When axis traction is used, the handles are secured by means of the screw and the force is exerted upon the cross-bar. As the axis-traction instruments are very powerful, it is most important to relax the handles between pulls.

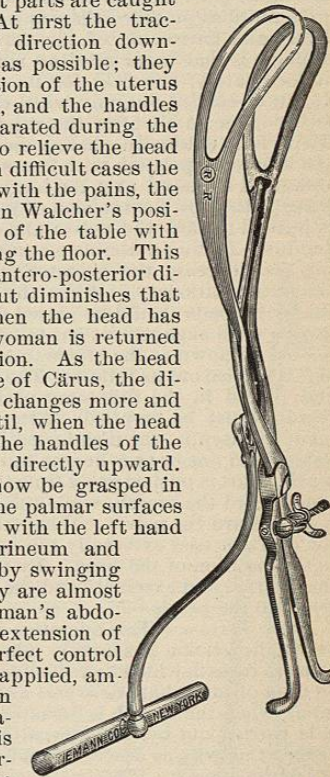


Fig. 3611.—Jewett's Axis-Traction Forceps, with Separate Traction Rod Attached. (For a detailed description of this instrument see the *Brooklyn Med. Journal*, January, 1895.)