

does not in itself cause it. The œdema of nephritis is more probably due to the changes in the vessel walls, caused by the alterations in the blood. The œdema of anæmia may be explained in the same way. œdema ex vacuo occurs chiefly in the central nervous system following a loss of a part of the nerve tissue. The local defect becomes filled with fluid resembling in character that of the cerebro-spinal fluid. It is produced by an increased secretion from the capillaries which is probably caused by the decreased pressure around the vessels. œdematous tissue is swollen, boggy, inelastic, and pits when pressed upon by the finger. Extensive œdema of the skin and subcutaneous tissues is known as anasarca or hyposarca. When the condition is very extreme rupture of the skin may take place and the fluid escape. Incision or trocar puncture may be of service in allowing escape of the fluid. Collections of fluid in the thorax (hydrothorax) and peritoneal cavity (ascites) may be removed by tapping.

Disturbances of Lymphatic Circulation.—The lymphatic circulation through the thoracic duct or larger lymph vessels may be obstructed by pressure from tumors, inflammations, invasion of lumen by new growths, etc. Local œdemas may result, but this is not always the case even when the thoracic duct is obstructed, as the lymph vessels have elaborate anastomoses, and collateral channels may be opened which suffice to carry off the excess of the lymph. Obstruction of large lymph trunks will, however, increase an œdema already resulting from excessive vascular secretion. Escape of lymph (lymphorrhagia) is caused by interruption of the continuity of a large lymphatic. Since the pressure in the lymphatic circulation is practically the same as that of the tissues, lymphorrhagia can take place only from a surface, either externally or in a body cavity. The escape may be checked by very slight pressure. Rupture of the thoracic duct is the most important and dangerous. It is usually traumatic in origin, but may be the result of inflammatory processes involving the duct, or it may be caused by obstruction or compression of the duct by tumors. As a result of such a lesion lymph may be poured out into the thoracic or abdominal cavity (chylous hydrothorax, chylous ascites, etc.). If the opening in the lymphatic vessel is permanent, a lymph fistula may result from which there is a permanent oozing of lymph. In this way large quantities of fluid may be lost and serious disturbances of nutrition may result.

Chyle may also appear in the urine as a result of obstruction of the abdominal lymphatics, which in turn leads to dilatation of the lymphatics of the bladder wall. From the rupture of the latter chyle escapes and becomes mingled with the urine. Chyluria is associated with the presence of the *filaria sanguinis*; but the exact relations between the parasite and the changes leading to chyluria have not as yet been satisfactorily cleared up. Metastasis of tumor cells, micro-organisms, etc., also takes place through the lymph channels (lymphogenous metastasis), and may be either direct or retrograde. The latter plays a very important rôle in the metastasis of carcinoma. (See *Coagulation, Embolism, Hemorrhage, œdema, Thrombosis, etc.*)

Aldred Scott Warthin.

CIRCUMCISION.—(Synonyms: Posthectomy; Lat., *Circumcisio*; Fr., *Circoncision*; Ger., *Beschneidung*.) Circumcision is the partial or complete removal of the prepuce or foreskin. The operation is performed as a religious rite, and as a hygienic or therapeutic measure in congenital or acquired phimosis and in some other diseases of the prepuce and penis. Among females in Arabia, Egypt, Nubia, and some other portions of Asia and Africa, travellers have observed a similar custom, consisting of amputation of the labia minora or mutilation of the clitoris.

As a religious rite, circumcision is a practice of great antiquity and geographical extent. While most commonly performed among the Hebrews and Arabians, it is frequently observed by travellers in other portions of

Asia and Africa where the origin of the custom is easily traced, and it is also seen in parts of South America, in the islands of the Pacific Ocean, in Madagascar, and in other places where no clue to its origin has yet been discovered. The Hebrews are supposed to have derived their knowledge of circumcision from the Arabians or Egyptians, most probably the latter, among whom the practice originated, according to Herodotus. An interesting account of the operation as performed in Algiers is given by Tarneau, in *Gazette des Hôpitaux*, 1855, and referred to by Hamdy in his monograph on circumcision, which also gives much valuable information of the history of the operation (Hamdy, "De la circoncision"). The age at which the operation is performed varies in different places. The Hebrews operate on the eighth day, as is also done in Algiers, while generally the Arabians wait until the tenth or thirteenth year, the age of puberty. The operation consists essentially of three parts: circular section of the extremity of the prepuce, tearing of the remainder of the prepuce to the corona, and denudation of the glans, and suction of the wound and penis by the operator. Hemorrhage is arrested by styptics, powdered coral, or generally tannin; and simple dressings are applied to prevent the inner layer of the prepuce from again covering the glans penis. As the operation has too frequently been performed by unskilful and dirty hands, serious complications and fatal results have often followed. Cases of death from excessive hemorrhage and inflammation can be found in the literature of the operation, as well as cases of various untoward complications, for example, wounds of the glans penis or urethra. Much has been said, too, of the danger of transmission of syphilis in the disgusting third part of the operation, whether from the operator to the patient, or occasionally from the patient to the operator.

The prepuce consists of two folds of integument, separated by very loose connective tissue, that cover and protect the glans penis. They meet and become continuous at the preputial orifice or end of the foreskin, which is usually the narrowest part of the prepuce, although sufficiently large in adults to allow the prepuce to be retracted so as to expose the glans. At birth the prepuce is longer than the penis, and its orifice narrow, often preventing exposure of the glans, so that a greater or less degree of congenital phimosis is pretty constant. The inner surface of the prepuce at this time embraces the glans closely, especially at the corona where there is generally a little circle of adhesions. Sometimes the prepuce and penis are adherent over a much greater extent of surface, either in little patches at various parts of the glans, or from the corona to the meatus. The adhesions are generally easy to subdue, partaking more of the nature of agglutinations than of firmly organized tissue. They are apt to be the source of local irritation, and to cause the retention of the secretion of the glands of Tyson, or smegma præputii. It occasionally happens that the prepuce is imperforate, a condition that soon makes itself manifest and is easily recognized. The child passes no urine, and a soft, fluctuating, transparent tumor forms slowly on the penis. As the tumor grows it pulls upon the skin of the scrotum and pubes, and an inspection shows that there is no preputial orifice. An incision must be made as soon as possible to allow the escape of urine, but circumcision had better be deferred to a later period, when it may be unnecessary to do more than trim up unsightly flaps. In childhood there are not many changes in the prepuce; the few erections rupture a part of the congenital adhesions. Attacks of balanitis or posthitis may result from the decomposition of retained smegma and give rise to contraction of the preputial orifice, or new adhesions between the prepuce and the glans. A child with phimosis and an unhealthy local condition may have no symptoms, and at puberty, with the changes that occur in the penis, the phimosis may disappear. But if there are dysuria or reflex symptoms arising from the phimosis, operative interference is essential, not only to relieve the immediate trouble, but as a prophylactic against various conditions appar-

ently dependent on it, as varicocele, hernia, some cases of masturbation, etc. (see article *Phimosis*). At puberty the glans increases in size, erections become more frequent and strong, and usually destroy any remaining adhesions, while they dilate the preputial orifice so that the phimosis disappears. If any adhesions still persist they are strong and firm, and may prevent the development of the glans, and be the cause of painful erections, tenderness of the penis, etc., as well as of other symptoms more or less evidently dependent on the local condition. Such a condition is best remedied by circumcision, and, indeed, it is a question of considerable interest and importance whether it is not desirable to perform circumcision at an early age as a hygienic and prophylactic measure. The outer lamella of the prepuce is continuous near the corona glandis with the integument that covers the body of the penis. One should remember the elasticity of this integument and the laxity of its subcutaneous tissue, and avoid undue traction upon it in performing circumcision, or it may happen that when the skin has been drawn forward and amputated, an unexpectedly large surface of the prepuce will be found denuded, or there may be a circular wound near the middle of the penis while the parts covering the glans have entirely escaped the knife. Such an accident is usually a surprise to the operator, and may be followed by disagreeable deformities from subsequent cicatricial contraction. Under the circumstances, the best course to pursue is to relieve the phimosis for which the operation has been undertaken, by a dorsal incision, without removing any more integument, and after careful arrest of hemorrhage to approximate the edges of the circular wound as well as possible by sutures and endeavor to secure primary union. The inner surface of the prepuce is reflected forward from the corona glandis to the orifice of the foreskin. In its ordinary condition, protected from friction, and lubricated by the natural secretions of the part, it is soft, pliable, moist, and so much resembles a mucous surface that it is usually referred to as the "mucous membrane," in distinction from the "skin" or outer layer of the prepuce. This layer, and not the skin, is usually affected in phimosis. The constriction is usually at the meatus, although it may be anywhere between there and the corona. The frænum præputialis is a small triangular fold of the inner layer of the prepuce, is inserted near the meatus of the urethra, and when too short may interfere with retraction of the prepuce, pulling the penis downward and producing pain. On each side of it, near the median line, are the arteries of the frænum. When these are divided in circumcision they may be the source of troublesome hemorrhage; accordingly the operator is directed in most of the textbooks to avoid them if possible. Where the frænum is short, it is better to disregard this precept and divide the frænum thoroughly, or remove a portion of it, and be prepared to place fine catgut ligatures on the arteries that bleed.

A considerable number of operative procedures have been suggested and practised by different surgeons, having in view the more accurate removal of the redundant prepuce, and the coaptation of the wound surfaces. They fall into three classes: preliminary incision of the prepuce, dilatation, and amputation of the prepuce without previous incision or dilatation. The preliminary incision is usually made on the dorsum of the prepuce, as far back as the corona, and the two flaps thus formed are carefully trimmed away. The incision may be made with a pair of blunt-pointed scissors or a bistoury. The bistoury may be inserted into the preputial orifice on a director, or the point may be protected by a little lump of wax and the bistoury passed with the side to the glans as far as the corona, then, turning the back to the glans, the point is pushed through the foreskin, which is divided by drawing the bistoury forward. The trimming of the flaps may be facilitated by the use of curved forceps applied so as to leave out the portion that is to be removed. Instead of making this division the prepuce may be dilated and cotton stuffed between the prepuce

and penis, but this is a tedious and sometimes impossible process, and has no advantages beyond the greater facility of applying needles and sutures in the prepuce, so as to render the coaptation of the surfaces more accurate. The incision, however, is of great value, especially where there is reason to believe that a constricted prepuce conceals a venereal sore that cannot be disinfected. Here a comparatively small incision allows the sore to be exposed, and after it has been disinfected or has cicatrized, the unsightly flaps may be trimmed off. In such cases it often happens that so much tissue has been destroyed by the ulcerative process that there is no excess of tissue when the wound has healed. The most simple and rapid method of circumcision is by a transverse incision made obliquely from behind forward and above downward, in the direction of the margin of the corona glandis, the glans being carefully protected from the cutting instrument. The prepuce may be drawn forward with the fingers or with forceps, and the glans may be protected by Ricord's forceps or the handles of a pair of scissors or other instrument applied obliquely. To insure division of the prepuce at the proper place, if the eye cannot be trusted, it is well to mark with ink or iodine on the prepuce at the point where the corona glandis underlies in a natural condition of the parts, and to make the section a very little in front of this level. Ricord made the mark two lines from the corona, and after applying forceps transfixed the prepuce with needles along the line so as to secure accurate apposition of the two preputial layers after removing the prepuce. Other surgeons, however, sometimes remove more or less of the two layers. Dieffenbach and Redreau removed all the mucous surface, leaving enough of the outer to cover partially the glans. After the prepuce has been drawn forward and divided, the forceps or other protecting instrument is removed, and the integument slides back on the penis, while the inner layer of the prepuce still covers the glans. This may either be turned back if there is no constriction, or divided as far as the corona by cutting or tearing on the dorsum. The two flaps thus formed may be left or trimmed away; it is generally preferable, with a pair of curved scissors and forceps, to cut away evenly on all sides, leaving about a quarter of an inch. At the same time that this layer is turned back any adhesions are carefully broken, or if firm, cut through, doing as little damage to the penis as possible. All hemorrhage should be carefully arrested, fine catgut ligatures being used for the purpose. The edges of the two layers are then united by fine sutures, which may be either of horsehair, silk, or catgut. A continuous catgut suture is very useful, but if many stitches are used there is apt to be considerable swelling of the parts from the contusion and handling. In young children it is not necessary to use sutures, as the dressing prevents the inner layer from again covering the glans, and retains the parts in sufficiently close apposition for union to take place readily. If silk or horsehair sutures are used they should be removed on the fourth day. Instead of sutures, the parts may be held together by serresines, but these are apt to fall off as the patient recovers from ether and may excite erections. If they are used they should all be removed by the end of twenty-four hours. Before the operation an attempt should be made to disinfect the parts, and antiseptic dressings should be applied. In children it is impossible to prevent the soiling of the wound by urine, but in adults, with care, pretty thorough asepsis may be preserved. After urine has been passed the wound should be thoroughly cleansed with some disinfecting solution and a new dressing applied. In children, cold-water compresses and weak carbolic acid solutions, or a light dressing of iodoformized gauze are as useful as any elaborate dressing, and may be frequently renewed.

The operation should not be performed without some anæsthetic. For the surgeon's comfort a general anæsthetic is the most satisfactory, but there are many cases in which local anæsthesia may well be employed. Cocaine or eucaine may be used, or Schleich's mixture

for producing analgesia (see *Anesthesia, Local*). With very young children and when older patients are nervous and emotional, it is not wise to use the local analgesia on account of the alarm that is produced by the preparations for and procedures during the operation. On the other hand, in the case of adults, there may be such a complete absence of pain and fright that the patient can himself assist the surgeon in the operation if necessary.

In some cases, especially where there is danger of hemorrhage, the patient suffering from hemophilia, the écraseur, the galvano-cautery, or caustics have been substituted for the knife or scissors, but they can hardly be recommended.

The operation is liable to be followed by the ordinary diseases of wounds, but as it is frequently performed by unskilful hands, it has perhaps had more serious sequelae than other equally simple operations. As already stated, it occasionally happens that too much integument is taken away, in consequence of which there are inflammation and suppuration, and finally a contracted cicatrix. Too little integument is more often removed, and the phimosis returns after cicatrization. The glans penis or urethra may be injured, and severe hemorrhages and deforming cicatrices may result. Occasionally, in tearing adhesions, the glans penis is much damaged, with the same result. Severe inflammation, and even death, may be the consequence. Severe and fatal hemorrhage may occur from small vessels of the prepuce or from arteries of the frenum, or from wounds of the glans penis. From various causes the subsequent inflammation and suppuration may be very severe. Jacobi ("Diphtheria") gives a number of cases in which the wound has been the seat of the diphtheritic process in epidemics of diphtheria, and Hueter ("Chirurgie") mentions fatal cases from phlegmonous erysipelas and gangrene. Gangrene of the penis and retention of urine may also result from tight bandages, or from a thread of circular dressings becoming detached and buried in the swollen tissues at the corona. The latter are exceedingly difficult to discover and remove from the tissues, in which they may sink deeply. Retention of urine is usually reflex, and should be relieved by the use of soft catheters. Primary union may fail from infection of the wound with chancroidal virus, the infection usually becoming evident about the third day. Free cauterization is necessary, either with the Paquelin cautery or by means of some of the acids. Excessive inflammation or erections may delay the union of the wound. Erections are very common, and in the swollen and tender condition of the part usually very painful. To prevent them it is well to keep the patient on a low diet, and to prevent constipation. Of drugs, bromide of potassium, lupulin, opium suppositories, suppositories or urethral injections of iodoform, camphor, etc., are used. Union may also be prevented by patients who masturbate, so that the inefficiency of the operation as a cure for that trouble becomes very apparent. The œdema of the parts on the second or third day after the operation is generally due to rough handling during the operation. The clamp may be applied too tightly, or the parts be much contused in placing numerous sutures.

The indications for the operation are, in children, congenital phimosis when accompanied by hydrocele, or hernia, balanitis, preputial calculi, "ballooning" of the prepuce in voiding urine, or by general or special reflex symptoms which may depend upon the local condition, as dysuria, convulsions, epilepsy, spasmodic contractions. In adults the operation is indicated for the same set of troubles as in children, and for phimosis dependent upon inflammation, excited by venereal sores, gonorrhœa, etc., as well as for simply redundant prepuce without phimosis, when there are any local irritation or reflex symptoms, as spermatorrhœa.

The operation should be postponed when the parts are in a condition of acute inflammation, except when there is a sanious discharge from the meatus. In this case, as there is probably a sloughing sore or severe inflamma-

tion, the dorsal incision should be first practised to enable local measures to be efficiently applied. The operation should not be done when the patient is known to be a "bleeder," or when very feeble and anæmic, or suffering from febrile or severe constitutional disease, unless, indeed, there may be some very urgent symptoms. Here, generally, the complete circumcision should be deferred and the dorsal incision practised.

It is still a mooted point whether hygiene demands circumcision at an early age. It is certain that many cases of varicocele and hernia are due to the straining in micturition and the handling of the penis by young children. In general, however, congenital phimosis does no harm, and disappears at puberty. On the whole, it seems best to await some local disorder or consecutive trouble, and to urge circumcision at the first sign of local irritation, or when general symptoms appear in connection with a phimosis.
William G. Le Boullillier.

CIRRHOSES. See *Liver*. (*Pathological*.)

CITRAL.—(C₁₀H₁₆O). This is the active constituent of oil of lemon, which contains 7.5 per cent., more than any other oil, though it is found in other fruits of that family and in many other volatile oils of widely different botanical origin. It is a liquid of a yellow color and a specific gravity of about 0.899. It is subject to the same uses as oil of lemon, and may be advantageously substituted for it, in doses about one-tenth as great.
Henry H. Rusby.

CITRIC ACID.—Citric acid, H₃C₆H₇O₇·H₂O, is the agreeably flavored acid of lemons and limes, and occurs also in other fruits, such as the cranberry, currant, strawberry, and raspberry. It is official in the United States Pharmacopœia as *Acidum Citricum*, Citric Acid, and occurs in "colorless, translucent, right-rhombic prisms; odorless; having an agreeable, purely acid taste; efflorescent in warm air, and deliquescent when exposed to moist air. Soluble at 15° C. (59° F.), in 0.63 part of water, and in 1.61 parts of alcohol; in about 0.4 part of boiling water, and in 1.43 parts of boiling alcohol, also soluble in 18 parts of ether" (U. S. P.). On heating, citric acid loses its water of crystallization and melts.

Citric acid is the most agreeably flavored of the sour so-called organic acids, and makes, in aqueous solution, a grateful artificial lemon juice. In concentrated solution the acid is irritant, but not corrosive nor specifically poisonous. A six-per-cent. solution of citric acid in water about equals in strength good lemon juice, and if, before solution, a drop or two of the essential oil of lemon be triturated with the crystals, the imitation of genuine lemonade flavor will be quite perfect. Such artificial lemonade can be drunk with the same freedom as the natural article. Taken continuously, and in excess, as in the over-free use of lemons in the tropics, citric acid is capable of producing a peculiarly severe and obstinate form of dyspepsia. The proper dose is from 0.30 to 2 gm. (gr. v.-xx.).

Pharmaceutically, citric acid is of service in the preparation of soluble salts of a number of substances, such as bismuth, iron, quinine, and strychnine. Its principal use is perhaps in the making of the preparations of magnesium citrate.

Several promising commercial experiments in the artificial production of citric acid are now in progress.
Eduard Curtius.

CITRONELLA GRASS AND OIL.—*Nard-Grass*. *Andropogon Nardus* L. (fam. *Graminaceæ*). This is a coarse, tufted grass of India, having a delightful lemon-like fragrance. It is used for the distillation of *citronella oil* or *verberna oil*. This is of a very pale yellow color, often greenish from the presence of copper, and having a specific gravity of about 0.895. It consists of citral and a terpene, and is used altogether in perfumery and flavoring.
Henry H. Rusby.

CITROPHEN.—C₂H₄(OH)(CO, NH, C₆H₄OC₂H₅)₃. This compound of three parphenetidin groups with one molecule of citric acid, introduced by Roos, is a white crystalline powder of mildly insipid acid taste. It melts at 181° C. (358° F.), is readily soluble in forty parts of water and in carbonated waters, and is split up by the gastric juice into its components. Parphenetidin may be detected in the urine by the ferric chloride test twenty minutes after ingestion.

It has been employed with success in dose of 1 gm. (gr. xv.) three times a day to remove the excessive languor and muscular cramps of morphinism. Kronfeld states that it not only reduces temperature, but in rheumatism and the various neuroses it often acts as a specific. In pertussis and chronic morphine poisoning it is without a peer. Kronfeld uses it also with excellent effect in epidemic influenza, and claims that no cardiac depression results from large doses. David Cerna, on the contrary, quotes Treupel as having found it poisonous in large dose. Frieser, Freudenberg, Benario, and others have used it with benefit as an antipyretic in fevers, in typhoid fever, headache, neuralgia, facial neuralgia, neuralgic dysmenorrhœa, migraine, etc. It is sometimes accompanied by sweating. Dose 0.5 to 1 gm. (gr. viij.-xv.), or even 2 gm. (gr. xxx.) three or four times a day.
W. A. Bastedo.

CITRUS.—(*The Orange and Lemon Genus*.) A genus of the family *Aurantaceæ*, if this be held distinct from the *Rutaceæ*, regarded by Engler as comprising but six species, natives of Southeastern Asia and the neighboring islands, but through long and wide cultivation presenting a great number of varieties and forms which have been regarded as species by various other authors. The great economic value of the edible fruits yielded requires no discussion. The following derivations are accepted by Lyons (Plants' Names, Scientific and Popular) and are probably correctly judged.

The sweet orange from *C. aurantium* L.
The bitter orange from *C. amara* (L.) Lyons.
The lemon, both sweet and sour, together with sweet and sour limes and the citron fruit, from *C. medica* L.; although many authors call the lemon *C. limonium* Risso, the sweet lime *C. limetta* Risso, the sour lime *C. acida* Pers., and the citron fruit *C. cedra* Galesio.

The mandarin or Tangerine from *C. nobilis* Lour.
The shaddock, grape fruit, or pomelo from *C. Decumana* Murray.

The bergamot from *C. bergamia* Risso and Poit, probably an artificial hybrid originating under cultivation.

The medicinal importance of the genus is very considerable, although not so great as in the past. The medicinal products of the orange and lemon will be considered under those titles. Only the general characters of the products will be here considered. The medicinal virtues reside in three constituents or classes of them: (1) *Citric Acid*, separately considered; (2) *Bitter Glucosides*; (3) *Volatile Oils*.

The bitter glucosides appear to reside in the inner portions ("white") of the rinds (*aurantiamarin* in oranges, especially the bitter orange, and in citron fruit, and *naringin* in grape fruits or shaddocks) or in the seeds, as *limonin* in the seeds of the lemon. These substances, medicinally, act like ordinary bitters, and like them are irritant and even poisonous in their pure form, especially the naringin of the shaddock.

Hesperidin, C₂₈H₃₆O₁₂ (fide Merck), occurs in minute white or yellowish crystals and is soluble in dilute alkalies. It splits up into glucose and *hesperetin* (C₁₆H₁₄O₆). *Isoloesperidin* is very similar.

Naringin, (C₂₈H₃₆O₁₂ + 4H₂O) is in yellow crystals and is soluble in alcohol and in 300 parts of water.

Limonin (C₂₂H₃₀O₇?) occurs in minute crystals, and is soluble in alcohol and acetic acid.

Bitter substances also exist in the leaves of these plants, but whether identical with those mentioned above is not known.

The volatile oils in use are derived from the flowers

and from the outer portions of the rinds of the fruits. While they possess the ordinary diffusive-stimulant properties of volatile oils in general, they are scarcely used for their medicinal properties, but almost wholly for their flavoring effects. The differences between them pertain almost wholly to the latter uses. Oil of mandarin rind is in use and is practically identical with that of orange. Oil of Bergamot, or *Öleum Bergamottæ*, is official. It is greenish or greenish yellow and bitter, with a specific gravity of 0.880 to 0.885, and contains limonene, dipentene, linalol, and linaloyl acetate. There is no official preparation.

Volatile oils also exist in the leaves, but these are not employed.

From the above, it is obvious that the Citrus products can be used as simple bitters, as aromatics, or as aromatic bitters, according to whether the constituents are used separately or in a preparation which combines them.

One of the very best of these bitter tonics is the grape fruit, eaten at the beginning of the breakfast, and not too much care should be taken to avoid entirely the bitter portions.
Henry H. Rusby.

CIVET.—A sienna-brown, ointment-like, unpleasantly odorous substance, obtained from two species of *Viverra*; Order *Carnivora*, *Viverrina*. The first, *Viverra Zibetha* Linn., the Indian civet cat, is from the warmer parts of Asia. The second, *V. civetta* Schreber, the African civet cat, is a native of Africa and Southern Europe. Both are kept in confinement for their peculiar secretion. This is formed in a sac-like gland, situated in front of the anus, in both sexes, between it and the external genitals, and is collected from the domesticated animals, either by saving it as it is discharged, or by scooping it out of the glands with a small spoon, while the animals, closely confined in a small cage in which they cannot turn about, are violently teased. When first gathered, it is semi-liquid and brownish yellow, but by keeping it becomes considerably darker and harder. It is a nasty-smelling and dirty-looking substance, usually mixed with hairs and other impurities. Its taste is sharp, bitter, and disgusting. It softens decidedly by warming, and burns with a bright clear flame. The odor, while having a general resemblance to that of musk, is less diffusible and far more disagreeable. Civet is insoluble in water and only slightly soluble in alcohol: not wholly so even in warm ether and chloroform. Its constituents, according to Boutron-Charlard, are *volatile oil*, solid and liquid *fats*, *yellow coloring matter*, *resin*, *mucus*, *ammonia*, *oxide of iron*, and *lime and potash salts*.

It is happily no longer used in medicine. Formerly, it had some employment as an antispasmodic in the nervous derangements for which musk has had deservedly greater popularity. It is used for strengthening and fixing perfumes and for scenting bait for game.
W. P. Bolles.

CIVIL INCAPACITY.—What is civil incapacity? Civil incapacity, for the purposes of this article, is the lack of that mental endowment which the law considers an essential element in every business transaction, whether it concerns only the man himself, or those who legally or morally have a claim upon him or upon his property after his death.

Perhaps all of such transactions may fall under one or the other of the following subdivisions: (a) contracts; (b) deeds; (c) wills; (d) marriage. For a while the law permits all persons except infants and married women to bind themselves and their property by contract, deed, will, or marriage, as they may choose, yet it throws a protection around the insane and feeble-minded in civil transactions, as it does around the insane and feeble-minded when they are called upon to answer before the courts for the commission of crime. Therefore the law will not permit a sane and healthy-minded man in the guise of legal methods to deprive an insane or feeble-minded man of any property or bind him in any contract or contractual relation. Nor will the law allow the legal

heirs or representatives to be deprived of an inheritance by reason of a will which is the product of a diseased mind.

METHODS OF PROOF.

The methods of proof in litigation involving civil incapacity must be ascertained by a careful perusal of discussions or treatises upon expert testimony.

In order to determine such questions, the courts frequently call upon experts in mental diseases to testify before them. However, in this class of cases, as in all other cases, lay testimony is admitted for several purposes.

Where the person whose acts are being construed has previously been adjudged insane, or *non compos mentis*, by a proper judicial proceeding, prior to the transaction in question, this evidence alone will generally suffice, although this may be overcome by evidence of its untrustworthiness or by testimony that since such adjudication, and prior to the transaction, the mind of the person had been restored to a normal condition.

There is rarely any trouble in determining the effect of such transactions when the person whose actions are sought to be avoided is a lunatic or an idiot.

The main trouble is found in cases in which the insanity is partial, when the person suffers from hallucinations and eccentricities or is afflicted with feebleness of mind not so pronounced as to be self-evident to the ordinary mind.

The courts will permit evidence of the following character:

First: The record of former adjudication of other courts that the person was insane, or *non compos mentis*.

Second: The testimony of lay witnesses as to the conduct of the person tending to illustrate the condition of his mind, and even their opinion as to his mental condition, although the courts will receive such opinion evidence with caution and will not give it the weight that is given to the opinion evidence of experts.

Third: Medical experts will be allowed to testify as to facts and conduct as lay witnesses, will be examined by hypothetical questions and asked to express opinions as to the mental status of the person, based on an assumed state of facts. In addition, they will be permitted, after an examination of the person, to give opinions as to his sanity or mental soundness.

As the law makes distinctions between the amount of mental capacity required in different transactions, it is necessary to consider separately the four named: (a) contracts; (b) deeds; (c) wills; (d) marriage.

(a) *Contracts.*—In order to determine whether a person has sufficient mental capacity to make a contract, it is necessary to consider the definition of a contract. A contract is defined by the most eminent authorities to be "an agreement between two or more persons upon a sufficient consideration, to do, or not to do, a particular thing." The two main features in a contract are first, the consideration; second, the assent—"for there is no contract unless the parties thereto assent, and must assent to the same thing and in the same sense." In other words, sane minds meet upon a common ground.

It is self-evident that mind is the basis of consent, and when the mind is lacking or radically defective, consent cannot arise. Whenever the mind is sufficiently impaired to negative the idea of consent, then the contract is voidable.

The mere superiority of intellect is not a sufficient ground to set aside a contract, no matter how far the stronger-minded contracting party has overreached the weaker. Contracting parties are rarely equal in business shrewdness, and it would be both impracticable and impossible for courts to settle such subtle questions.

In order to invoke successfully judicial interference the mind must be abnormal from disease or mental infirmity, either inborn or subsequently developed. As stated above, the plain cases of insanity and idiocy present no difficulty; the difficulty lies usually where the contracting party was not sufficiently weak-minded

as to appear *non compos mentis* to the ordinary and lay mind.

It is difficult to express in one rule the degree of mental capacity of the parties that is required to give binding force to a contract. A competent author has expressed the rule to be that a contract is voidable when made by one who "is so lacking in mental capacity from idiocy, lunacy, senile dementia, or other defect or disease of the mind that he is incapable of understanding what he is doing. To render a person thus incapable of contracting, his infirmity need not be so great as to dethrone his reason nor amount to entire want of reason; but, on the other hand, it must be something more than mere weakness of intellect. It must be such as to render the person incapable of what he is about, or, to be more accurate, of comprehending the subject of the contract and its nature and probable consequences (Clark on "Contracts," pp. 264, 265).

When the proof discloses the fact that the person was not permanently insane, but suffered from occasional fits of insanity, before the contract will be set aside it must appear that the contract was made during one of the fits of insanity.

One of the most peculiar divisions of mental derangement is that which subjects the patient to hallucinations, and the books disclose many notable instances in which men, otherwise liberally endowed and possessed of reason, were the victims of strange fancies to the extent that they were mental hallucinations. Wherever this phase of incapacity is relied upon, the general rule is that if these hallucinations have not taken sufficient hold upon the patient as to impair his entire mental faculties, then it must appear to the court that the contract was the result of the hallucinations, or it will not be disturbed. For while it may be doubted if any person who is afflicted with hallucinations is perfectly sane, yet often in the eye of the law he is insufficiently insane to escape the responsibility of all of his civil or criminal acts.

While the law has never had patience with the plea of drunkenness, and even though the great disciple of the law, Coke, pronounced that it aggravated rather than palliated an offence, yet there are instances where drunkenness will be a sufficient ground to avoid a contract. Before, however, the law will permit a contract to be avoided upon the ground of drunkenness of the complaining party, the drunkenness must have been sufficient to destroy the reasoning power, and to deprive the party of the mental capacity to comprehend the nature and effect of the contract.

After giving this rule, it is almost needless to add that slight intoxication, as a general thing, will not be a ground for relief.

However, the law does not require the intoxication to go to the extent of delirium tremens, for when this state ensues the rules in regard to insanity are applied.

(b) *Deeds.*—Deeds are nothing more nor less than executed contracts in reference to the conveyance of land, and the same rules apply to the avoiding of deeds, executed by insane or drunken persons, as to the making of any ordinary contract. And perhaps it may be added that where the deed is voluntary, the same rules are applicable that apply to the contesting of wills. This is especially true where undue influence is exercised over the conveyer.

(c) *Wills.*—Public policy deems an equal distribution of one's estate among those dependent upon him by natural ties of great importance, and while it is true that a person not laboring under a legal disability may bequeath his property to whom he pleases, yet the law requires that in order to do this he must be mentally capable as well as legally capable. It is needless to repeat that if the testator was insane, an imbecile, or an idiot, the will, upon proper proceedings, will be set aside. In wills as in contracts, the difficulty presents itself in persons of doubtful mental capacity.

Every man is presumed to have been of testamentary capacity until the contrary is proven. So the burden of proof rests upon the contesting party to prove that the

testator did not have testamentary capacity. The question then is, What state of mind does the law regard as sufficient to constitute testamentary capacity?

A careful consideration of the requirements of the law in this regard is made by Mr. Pritchard in his book on "Wills and Administration." He says: "It is essential to the exercise of the testamentary power that the testator should understand the nature of the acts and its effects; should understand the extent of the property of which he is disposing; should be able to comprehend and appreciate the claims to which he ought to give effect; and with a view of the latter object, that no disorder of the mind should poison his affections, pervert his sense of right, or prevent the exercise of his natural faculties; that no insane delusion should influence his mind in disposing of his property and bring about a disposal of it, which, if the mind had been sound, would not have been made. If the human instincts and affections, or the moral sense become perverted by mental disease, if insane suspicion or aversion take the place of natural affection, if reason and judgment are lost, and the mind becomes a prey to insane delusions calculated to interfere with and disturb its functions and to lead to testamentary disposition due only to baneful influences, in such a case it is obvious that the testamentary power fails and that a will made under such circumstances ought not to stand."

The same rules in reference to hallucinations, partial insanity, and temporary insanity apply to wills as to contracts and need not to be repeated here. However, there is one phase of mental peculiarity that often is presented in contests over wills that rarely is presented in contests over contracts, namely, the eccentricity of the testator.

Many men of thoroughly sound mind have entertained various eccentric ideas and fancies. These eccentricities frequently relate to the future state of man and the occult in reference to life. The general rule is that mere eccentricity of the testator is not sufficient to overturn a will, especially where the eccentricity was not manifested in the will itself.

D. Marriage.—While marriage partakes largely of a religious and social relation, yet it is also a legal relation. So much is this true that an insane person cannot bind himself by taking marriage vows.

One of the ablest judges that ever adorned the Supreme Bench of Tennessee, Judge Robert L. Caruthers, speaking for the court, in the strange case of *Jemima Coles*, said: "The test question in all such cases is, whether the party is capable of making any binding contract. The identity of the doctrine that unsoundness of mind vitiates this as well as all other contracts is well established. But every consideration of policy and humanity admonishes us that a contract so essentially connected with the peace and happiness of individuals and families, and the well-being of society, should not be annulled on this or any other ground not clearly made out. The general rule is that those who have not the regular use of their understanding sufficient to deal with discretion in the common affairs of life, or the weakness being so considerable as to amount to derangement, are incapable of contracting a valid marriage."

In the case involved, which illustrates the opinion of the court, complainant, the wife, had been married before the marriage in controversy. At the time of the marriage in question she was about forty-six years of age. For a number of years prior to the marriage she suffered with *prolapsus uteri*. During this period she was afflicted with paroxysms and in these paroxysms was subject to delusions. These delusions were ungrounded apprehension of conspiracies against her life by her own slaves. They were attempting to kill her. She was wild and foolish when in those spells, and when not under them was very eccentric. She had great weakness for beaux before this marriage, and boasted of conquests and showed her many love letters. She became permanently insane in 1850, three years after the marriage in question.

The court held that as the marriage was not consummated while under the effects of a paroxysm, and as the proof showed that at other times, though eccentric, she managed her own business with judgment and understanding, the marriage was valid. *John Bell Keeble.*

CLAREMONDE CHALYBEATE SPRING.—Washington County, Georgia.

POST-OFFICE.—Worthen.
ACCESS.—Via Georgia Central Railroad to Tennile; thence by Sandersville and Tennile Railroad three miles to Sandersville; thence by private conveyance nine miles to Worthen. Following is a qualitative analysis of the water:

Iron carbonate.	Potassium sulphate.
Potassium carbonate.	Sodium chloride.
Calcium carbonate.	Alumina (trace).

The iron carbonate is present in the proportion of about four grains per gallon. The quantity of other ingredients is small. This is a very good chalybeate water, and will no doubt be found beneficial in all diseases in which the carbonated iron waters are indicated. The spring is pleasantly located in a private park.

James K. Crook.

CLARENDON SPRINGS.—Rutland County, Vermont.
POST-OFFICE.—Clarendon Springs. Hotel and cottages.

ACCESS.—Via Delaware and Hudson Railroad to West Rutland Station; thence four miles to springs. This point is seven hours by rail from New York, five hours from Boston, three hours from Troy and Albany, and two hours from Saratoga.

The springs are four in number, and are located in a beautiful valley among the green hills at a level of one thousand feet above the sea. This is doubtless one of the oldest resorts in the country, the medicinal character of the water having been discovered by one Asa Smith, it is said, in the year 1776. From fifteen hundred to twenty-five hundred persons visit the springs annually in pursuit of health and pleasure. Amid the beautiful scenery, pleasant drives, and rare opportunities for trout fishing, the visitor may while away the summer days in a delightful manner. The hotels are said to be of an excellent character. The following analysis was made by Professor Hayes, State Assayer of Massachusetts:

ONE UNITED STATES GALLON CONTAINS:	
Solids.	Grains.
Calcium carbonate.....	3.02
Calcium chloride.....	
Sodium sulphate.....	2.74
Magnesium sulphate.....	
Total.....	5.76
Gases.	Cu. in.
Carbonic acid.....	46.16
Nitrogen.....	9.36

The analysis is evidently incomplete, and a re-examination is desirable. The water is a very pure and wholesome beverage, independently of its medicinal qualities. It is used commercially. *James K. Crook.*

CLARK'S RED CROSS MINERAL WELL.—Mecosta County, Michigan.

POST-OFFICE.—Big Rapids.
This water was discovered on the farm of A. L. Clark, adjoining the southern limits of the town of Big Rapids, in June, 1890. The workmen were boring for gas, but at the depth of thirteen hundred feet they struck a vein of water which escaped under such a heavy pressure that the drill, weighing nearly twenty-five hundred pounds, was borne up with it. The water was submitted to Prof. Albert B. Prescott, of the University of Michigan, who found the following list of mineral ingredients: