History of Extraction.—It is uncertain whether the ancients were acquainted with this method; it is probable however, that they were, as passages in Galen and Pliny have been thought to refer to the removal of the cataract from the eye. At all events, if known, it fell into nearly complete disuse and oblivion; and not until the time of Daviel, in 1750, did it begin to be cultivated as a recognized procedure. This surgeon used numerous instruments, consisting of narrow sharp and blunt knives, and scissors; he made at first a small opening in the cornea, enlarged it afterward, and then removed the lens. His followers sought to improve his method by simplifying its application, and soon superseded the various instruments he had used by a single knife. This was subsequently modified, especially by Beer, to whom we owe the form of knife used in flap extraction at the present day. Gradually more exact rules were laid down for the performance of this operation; the situation and size of the cut, the best method of opening the capsule and pressing out the lens were all perfected. Despite the utmost care, however, used in carrying out the various steps of the operation and in the after-treatment of the patient, there was an appreciable percentage of loss; owing largely to one of three causes—diffuse suppuration of the corneal flap, defined suppuration of the same, and iritis. To diminish the danger of the second of these, but more particularly to guard against the last, Mooren proposed, in 1862, that a preliminary iridectomy be performed some two weeks before the extraction. The results which he obtained by pursuing this method were proved to be incontestably superior to those that had followed the simple operation. This was the first great step forward in the path now pursued. It allowed the lens to emerge more readily, and subjected the iris to less danger from pressure and bruising in the process. In 1863 Jakobson proposed the following operation: He narcotized his patient and made a lower section in the sclero-corneal junction, practising a broad iridectomy downward after the removal of the lens. He thus gained the advantage of doing the whole operation at one time, but incurred the disturbing effect of an iridectomy downward. Previous to the bringing forward of either of these methods, Schuft (now Waldau) had invented, and in 1860 published, a series of spoons intended to remove the lens through a small wound at the edge of the cornea. These were, however, large and clumsy, did great violence to the eye, and were, in 1865, superseded by others much more delicate, invented by Bowman and Critchett. Outspooning remained for a time a favorite method in England, but was afterward given up on account of the dangers which it involved. In 1865 von Graefe brought out the method that bears his name, and gave an account of it to the Heidelberg Society at its annual meeting. It quickly found its way into general favor, and, with the modification in the cut described in the course of this article, has remained the popular method up to the present day.

Other modern procedures demand a brief notice. In 1866 Alexander Pagenstecher described an operation for removing the lens in its capsule through a broad incision made with a lance knife, and by means of an iridectomy downward and outward. A specially constructed scoop was employed. In 1867 Weber devised a lance-knife, 12 mm. broad and somewhat concave on its back. With this he entered the anterior chamber at the lower or lower-inner edge of the cornea, in the plane of its basis, and made a wound 10 mm. in length. If he thought it best to remove any iris, he excised but a small piece, and that from the pupillary edge. The opening of the capsule and removal of the lens, which latter was effected by pressure, completed the operation. Kuechler, in 1868, proposed to remove the lens through the natural pupil, making an incision straight across the cornea in its horizontal meridian. Analogous to this are the operations of Liebreich and Lebrun, already described.

A consideration of the following figures will show why flap extraction has fallen into disuse, and why the peripheric linear method has taken its place.

Graefe's own statistics were as follows: Simple flap-extractions, 600—loss, 7 per cent.; flap extractions with iridectomy, 900—loss, 5 per cent.; linear extractions, 600—loss, 2.8 per cent. Horner gives: Linear extractions, 1,088—loss, 2.67 per cent. Noyes has collected from various sources: Flap extractions, 10,094—loss, 10.4 per cent.; linear extractions, 10,661—loss, 5.8 per cent.

The larger proportion of loss given, according to the figures of Dr. Noyes, would naturally be connected with the large number and varying skill of the surgeons whose results are thus grouped. *Hasket Derby.*

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**CATARRH, NASAL.** See *Nasal Cavities, etc.*

**CATECHU.**—Cutch; Black Catechu. "An extract prepared from the wood of *Acacia Catechu* (L.f.) Willd. (fam. *Leguminosæ*)" (U. S. P.). Catechu is similarly obtained from the wood of *A. Suma* Kurz. That of the present edition of the British Pharmacopœia is discussed under *Gambir*. This species of acacia is a crooked, straggling tree of thirty to forty feet in height, with a trunk about a foot in diameter. It grows commonly in India and Burmah, and yields a very durable, hard timber and a tan bark. The sap wood is whitish, the heart wood of a very dark brown. It is said that both are extracted for the catechu, the process being by boiling the chips. The decoction, more or less purified by straining, is evaporated by artificial heat and is then moulded into various forms. The moulds are commonly lined with leaves, the remains of which adhere to the outer surface of the dried masses. The latter are of various forms and sizes, according to the custom of the locality or the convenience of the maker. The best usually come in the form of slabs or blocks, of the size and form of an ordinary bread pan. In India a superior quality, of a light brown color, is prepared chiefly for mastication by introducing sticks into the thickened decoction, when the catechu collects upon them, after the form of crystals. Dymoch and Hooper ("Pharmacographia Indica," i., 558) describe a very high-priced sort which is collected from cavities in the trunk. This is called *Khersal* or *Khairsal*, and is of a very pale-brown or yellow color. The official description of catechu is as follows:

In irregular masses, containing fragments of leaves, dark brown, brittle, somewhat porous and glossy, when freshly broken. It is nearly inodorous and has a strongly astringent and sweetish taste.

If 20 parts of catechu be digested with 200 parts of alcohol and the liquid filtered, the undissolved matter, after being dried at 100° C. (212° F.), should not exceed 3 parts in weight.

The tincture, diluted with 100 parts of water, acquires a green color on the addition of ferric chloride T.S.

If 2 parts of catechu be boiled with 20 parts of water, a brownish-red, turbid liquid will be obtained which turns blue litmus paper red.

Upon incineration, catechu should not leave more than six per cent. of ash.

To this description it may be added that the color of some which is very good may be better characterized as a brown-black, and that a microscopical examination reveals the presence of a large quantity of minute crystals of catechin. Emphasis should be laid upon the fact that good catechu is nearly odorless. Much of what comes to our market possesses a vile odor. It is toughish, scarcely porous, and has a waxy or greasy looking surface instead of the lively, slightly sparkling lustre of that which is pure. Such is largely used for tanning and similar purposes, but is not fit for medicinal use.

About one-third of catechu consists of *catechin* ($C_{21}H_{14}O_9 + 5H_2O$), and about one-half of *catechu-tannic acid* ($C_{21}H_{14}O_9$). The latter can be obtained from catechin by heating, especially with the addition of water or alkalies.

Catechu, as its composition would indicate, is a pure astringent, which may be generally used either externally or internally, when this effect is desired. We have official a compound tincture, of ten-per-cent. strength, with diluted alcohol and one-half per cent. of cassia, the dose 2 to 8 c.c. (fl. ʒ ss. to ij.). The official troches contain each 6 cgm. (about gr. i.) of catechu, with tragacanth and sugar. *Henry H. Rusby.*

**CATHARTICS.** See *Laxatives* and *Purgatives.*

**CATHETERISM OF THE URETHRA.**—The term catheterism, often erroneously written catheterization, is employed to designate the various methods used in exploring and relieving the many pathological conditions of the urethra and bladder. The term is especially used to designate the introduction of hollow instruments through the urethra into the bladder for the purposes of withdrawing the urine, evacuating blood clots, removing fragments of stone after litholapaxy, exploring, irrigating the urethra and bladder; and the employment of solid instruments for the purposes of dilating stricture, of removing foreign bodies, and of crushing stone.

The word catheter, derived from the Greek καθίημι, meaning a "thing to send down," or "to let into," conveys no idea of the character of the instrument or of its use, nor whether it is solid or hollow, straight or curved, conical or cylindrical, large or small. But the derivation of the word may serve to explain why the term catheterism is employed to indicate the introduction of all varieties of urethral instruments for whatever purpose employed.

Throughout this article the term catheterism will be confined in its meaning to the introduction of hollow instruments into the bladder, through the urethra, for the purposes of evacuating the urine; of examining the urethra and interior surface of the bladder; of introducing various medicaments for the relief of pain or for the cure of diseases; of irrigating the urethra and bladder; of distending the last-named organ with either water or air as a preliminary to operative interference, and of establishing continuous drainage in cases of cystitis after injuries or operations upon the urethra, prostate gland, or bladder.

A catheter is a hollow instrument either open at both ends or terminating at one end in a solid point with an opening placed laterally or on the superior aspect of the instrument; this opening is known as "the eye." Catheters vary in size from 2 to 30 mm. in circumference, and from thirteen to fifteen inches in length. They are either flexible or rigid, straight or curved, cylindrical or conical. If the instrument is cylindrical, a uniform calibre is maintained throughout its entire length; if it is conical, it tapers toward the vesical end and terminates either in a fine point or in an olivary tip, becoming smaller in diameter as the end of the instrument is reached.

The exact method of manufacturing the best grades of flexible catheter is a secret with the individuals by whom the instruments are made; especially is this true of the preparations employed for coating, as well as of the method of giving the high polish and satin finish which the better grades of instruments possess.

Soft rubber, bevelled-eye catheters, the so-called "soft caoutchouc catheters," are made from india rubber which has been vulcanized. There is also a more rigid form, the cheaper grades of which are manufactured from either cotton or linen; these materials are employed as a framework, and are coated with either shellac or resin varnish.

The objection to the cheaper forms of flexible catheter is the readiness with which they absorb water, making them liable to swell, as a result of which the coats crack and peel, the elasticity disappears, and the instrument is rendered stiff, brittle, and worthless. The use of antiseptic solutions causes the instrument to become rough on its surface and so brittle as easily to be broken.

Fig. 1166.—Woven Eye of Catheter.

The most expensive and reliable flexible catheters are made from either cotton, or Lisle, or silk thread woven into a web and usually coated with a gummy material. As soon as this material becomes dry it forms a translucent cover, takes on a high polish, and at the same time remains elastic and pliable. When properly coated the instrument should be able to withstand moist heat, steam, dry heat, or immersion in boiling water for at least five minutes, and should have the power to resist the action of ordinary antiseptic solutions, acid or alkaline urine, and pus. The frame should be perfectly smooth and free from irregularities, the end should be firmly stayed, and the whole instrument should possess the highest tensile strength.

Interesting statistics are given by Gouley in an article on catheterism which appeared in the New York *Medical Journal*, November 4th, 1899, in which he says: "The tensile strength of different qualities of web catheters was ascertained to be as follows: That of an English commercial catheter was 42 pounds; that of an American commercial catheter 54 pounds; that of an American Lisle thread catheter 56 pounds; that of an American silken linen catheter 60 pounds, and that of an English silk web catheter 85 pounds. An American silk web catheter of the best quality was then tested to 115 pounds without breaking, but the varnish was stripped off at each end."

Theoretically these instruments are supposed to be as highly polished on the inside as on the outside, so that they may be more readily cleansed and sterilized, and the danger of infection thereby lessened. Unfortunately, it is wellnigh impossible to arrive at this condition of perfection. The nearest approach is to be found in the high grade of catheter, but at a greatly increased cost. The eye of all flexible web catheters should be woven,

Fig. 1167.—Eye Cut with a Punch.

strengthened, and stayed, whereby the continuity of the frame is left unimpaired. In the inferior grade of web-catheters the eye is formed by cutting with a punch, which is most objectionable, as the catheter is very apt to fracture at that point.

Flexible catheters made of silk web are by far the most serviceable and the best. They cost more than those made from other materials, but are cheaper in the end; for they are more durable, and, with proper care, can be made to last a long time. They are not so liable to crack or break as are the cheaper varieties; they are more easily sterilized, and hence are the safest of all the varieties of web instruments that can be employed. The danger of infection from their use is lessened. They do not become sticky, nor do they blister in warm weather;