tion, when applied to "any one who commits an unlawful malicious act, the consequence of which is his own death, as if, attempting to kill another, he runs upon his antagonist's sword, or shooting at another, the gun bursts and kills himself." For many centuries it was the custom in England to bury each *felo-de-se* on the highway with a stake driven through the body. This ignominious form of burial was abolished in the reign of George IV., by an act of Parliament which ordered the burial of the body of a *felo-de-se* within twenty-four hours after inquest, between the hours of nine and twelve at night, and without the rites of Christian burial[2] (Act of 4 George IV., 1823).

An inquest must be held with, or in presence of, a jury consisting of twelve men. It must also be held *super visum corporis;* that is to say, the body must be seen both by the coroner and by the jury. The jury is sworn by the coroner, and is then charged to inquire how the deceased came by his death. Witnesses are also examined under oath, and the coroner has power to order an autopsy, and the attendance of medical witnesses. The finding of the jury (verdict) is recorded on parchment, and is attested by the signature and seals of the jury and of the coroner. If, on such finding, any one is found guilty of murder or manslaughter, the coroner commits him to trial, and the accused may be indicted on the inquisition without any presentation before the grand jury. Practically, an independent inquiry is always held before a justice in the ordinary way.[1]

Other Modes of Inquiry.—Neither the coroner nor his jury exists among the continental nations of Europe, and the modes of procedure in the case of bodies found dead by violence or unknown causes, in all continental countries, and in Scotland, agree in the absence of these officials.

In France the investigation is conducted by two officers, whose functions are entirely distinct, a legal and a medical officer. The former, the *procureur de la république*, an officer somewhat analogous to the district attorney, takes the initiative in each case, proceeds to view the dead body, summons witnesses, and takes the evidence. Liberal power is granted to him, and he can seize articles, or papers, connected with any crime, restrain persons from leaving the premises, and employ experts and detectives, as the case may require. In the latter direction the French system is, beyond question, an unusually efficient mode of procedure.

The other officer, the medical, is selected for his superior training and knowledge, and has charge of the medical examination of the body. Sometimes two medical officers are employed. The medical officer is also still further associated with the subsequent prosecution of suspected parties, when the legal officer has decided that a crime has been committed. His report must be signed by a police official and submitted to a magistrate. If the evidence presented to the magistrate is deemed sufficient, an indictment is prepared for the *cour d'appel*, and a trial may then take place before a jury.[3]

In Scotland the process employed is similar to that of France. The procurator fiscal, who has the investigation in charge, has for his guidance a code of instructions drawn up by the lord advocate. This code also gives detailed directions to the medical men who have the charge of the medical examinations, two medical officers being employed in each case. The reports of these officials are sent to the office of the crown agent at Edinburgh, and by him are transmitted to the advocate deputé. If he decides that there is suspicion of crime, he refers the report back to the procurator fiscal for further investigation. If he is in doubt, he may bring the case before the crown officers. Beyond this, a criminal trial is much the same as in England.[4]

In Germany there is neither coroner nor any analogous officer, nor a jury, on the preliminary investigation. A judicial officer has charge of the proceedings (Staatsanwalt). His powers are like those of a district attorney. The police are under his control in all matters relating to the investigation of crime. They are also bound on their own part to investigate suspected crimes, cases of sudden or violent death; and no interment is allowed in such cases till after the consent of the district attorney or a competent court is obtained. Medical officers are regularly appointed to make autopsies and medical examinations and report upon them. The German code of regulations as to the modes of procedure in examinations of bodies, both judicial and medical, is very explicit. If the district attorney believes that a crime has been committed, he institutes a trial, and if the court believes that sufficient reasons are presented, it orders a preliminary inquiry (gerichtliche Voruntersuchung) before a justice, the result of which is usually decisive. (Law of October 1st, 1879.)

In Russia the law is similar in its provisions to that of France.

In Denmark the system is also very efficient, a judicial officer being appointed who has charge of all cases, which he decides without the intervention of a jury. He refers all medical questions to a medical officer who is appointed for the purpose, and reports to the judge the result of his examination, and autopsy, if one is made. He also makes a similar report to the Royal Bureau of Health. The trial which follows, in case of indictment, is first before the county judge, from whom appeals may be made to higher courts.[3]

United States.—The laws relating to inquests in the United States all bear the marks of English origin, and were evidently introduced by the early settlers, with most of the peculiarities of the English law, though stripped of some of the singular customs of early times. The coroner, the coroner's jury, and the inquest, exist in nearly all of the United States, at the present time, practically in the English form. Massachusetts made a radical change, abolishing the office of coroner, and also the jury, in 1877, since which time inquests have been conducted with greater care and economy, and to the entire satisfaction of the people and of the State (see *Examiner, Medical*).

Connecticut and Rhode Island have also recently enacted similar laws, of a less radical nature.

In the other States there are certain points of difference, chiefly of minor importance, relating to the functions of the office of coroner, the mode of his election or appointment, his fees, the number of the jury, and the employment of medical officers.

Some of the singular provisions of the English law relative to the vicarious duties of the coroner were introduced into the early colonial statute-books, and are still retained in nearly every State of the Union. Instances, however, in which the coroner officiates as a sheriff are of rare occurrence.

The chief function of the coroner in all of the United States, as in England, is the holding of inquests upon the bodies of persons found dead, from either violent, or suspicious, or unknown causes; and while there is considerable variability in the definition of this function by the statutes of different States, the intent or spirit of the law is evidently similar in all. In Massachusetts, under the old law, the coroner was authorized to hold inquests on the bodies of such persons only as were "supposed to have come to their death by violence," a special provision requiring an inquest in every case of death by railroad accident.

In California, and in several other States, it is specified that inquests may be held upon the body of "any person who has been killed, or has committed suicide, or has suddenly died under such circumstances as to afford a reasonable ground to suspect that the death has been occasioned by the act of another by criminal means."

In a few States an inquest may be held in the case of a person who is seriously wounded, and in imminent danger of death. In Indiana, the jury was abolished by an act of 1879. In Texas, the inquest is also held without a jury.

In Alabama, in addition to the usual duties, it is required that the coroner shall be keeper of the jail when the sheriff is imprisoned, and when the coroner is impris-

oned a special coroner may be appointed. He also performs the duty of sheriff when required, as provided under the English law.

In Kentucky inquests may be held in cases of housebreaking. In several of the Southern States the coroner is a conservator of the peace, and is required to suppress riots and disturbances, and may apprehend and commit felons and traitors. In Mississippi the coroner is also the county ranger, and performs the duties of that office. (It is the duty of the county ranger to take charge of stray horses, mules, jacks, cattle, sheep, or hogs.)

The modes of election in the different States are quite diverse. In Alabama, Arkansas, Colorado, Georgia, Idaho, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Nebraska, Nevada, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Washington, Wisconsin, and Wyoming, the coroner is elected by the inhabitants of the county. In Tennessee he is appointed by the county court. In Virginia a county court appoints a coroner for two years, and can appoint more if necessary. In Illinois, Indiana, Maine, and New Hampshire the governor appoints the coroner. In Texas, Vermont, and Utah, the office of coroner is unknown, a justice of peace acting in all cases in which the presence of such an official is required.[5, 7]

The fees of coroners are also varied. In New Hampshire the fee for holding an inquest is $1.50. In some States it is $5, in others $10. The fees for recording, for mileage, and other items also present a wide range of variation. In some States, by recent statutes, stenographers may be employed at inquests, payable either by a monthly salary as in Kentucky, or by stipulated fees for work performed.

In some States physicians are regularly appointed to perform the necessary examinations for coroners. In others the coroner selects any physician whom he may choose for each case requiring such assistance. The compensation of physicians thus employed ranges from $6 in Minnesota, to $50 in other States, for an autopsy, and $100 in Mississippi, in cases where the body is exhumed.[5] In Missouri the fee for a post-mortem is $10, but if the coroner makes it himself it is $25. In New Jersey the coroner may provide grave-clothes to the amount of $1 each for nude bodies.

In several cities of the United States, the coroner is a salaried officer, such being the case in New York, Philadelphia, Detroit, St. Louis, Cincinnati, Cleveland, Washington, Charleston, Wilmington (Del.), and other cities, a plan which has obvious advantages.

The requisite number of jurors is usually either six or twelve. In New Hampshire it is limited to three, in Louisiana five, and seven in Tennessee. In several States it is required that a larger number of jurors be summoned than is needed to be sworn for the inquest, the number thus summoned ranging from nine to twenty-three.

The amount of the bond required of a coroner varies from as low as $250 in Colorado to $50,000 in the larger cities of Ohio.

The jury is usually selected from the inhabitants of the town or county. In Iowa, North and South Dakota, from the "electors." In Kentucky they must be "housekeepers." In Utah they must be "qualified residents." In Washington a jurist must be a "male inhabitant" over twenty-one years old, and of sound mind. In West Virginia he must be a "suitable resident."

In Washington a jury is thus defined: "A jury of inquest is a body of men, six in number, summoned from the qualified inhabitants of a particular district, before the coroner, or other ministerial officer, to inquire of particular facts."

In Wisconsin the coroner is *ex-officio* a deputy fish and game warden, and must assist the State warden upon due notice. He must resign to the sheriff, who transmits his resignation to the governor. The coroner must also make complaint as to violation of statutes relative to sale of liquor to Indians.

In Colorado the coroner may be tried for bribery and for assault. He cannot practice as an attorney. He must investigate mining accidents. He must seize gambling implements, take snares, traps, nets, etc., and is liable to many penalties.[7]

(See also *Cadaver, Legal Status of*, and *Examiner, Medical.*)

Samuel W. Abbott.

[1] Chalmers, M.D.: Local Government, London, 1883.
[2] Encyclopedia Britannica, ninth edition, vols. vi., vii., and ix. Articles Coroner, Deodand, and Felo-de-se.
[3] Bell, Clark: Bulletin of the Medico-Legal Society of New York, January, 1881. Art., the Coroner's Office.
[4] Maclagan, Douglas, M.D., F.R.S.E.: Forensic Medicine from a Scottish Point of View, Edinburgh, 1879.
[5] Lee, John G., M.D.: Handbook for Coroners, Philadelphia, 1881.
[6] The Coroners Act, 1887, 50 and 51 Victoria, Chap. 71, English Statutes.
[7] Recent statutes of the different States of the Union (1890–98).

CORONILLA.—A genus (fam. *Leguminosæ*) of some twenty species, of Europe, Northern Africa, and Western Asia, some cultivated for ornament. Several of these, notably *C. scorpioides* (Medic) Koch, act powerfully upon the heart, stimulating it and, apparently through increased blood pressure, producing marked diuresis. These properties reside in the glucoside *Coronillin* ($C_7H_{12}O_8$), a yellowish powder, soluble in both water and alcohol. It possesses the same properties as the drug, which are almost identical with those of digitalis, and it is indicated and contraindicated like that drug. Coronillin has been given in doses of 0.1 to 0.15 gm. (gr. iss. to iij.) five or six times in the twenty-four hours.

Henry H. Rusby.

CORPORA AMYLACEA.—These bodies are small, round, homogeneous, or concentrically stratified concretions occurring most frequently in the prostate, nervous system, and lung. Their concentric stratification resembles very much that of starch grains, and this with the fact that with iodine, or with iodine and sulphuric acid, they frequently take on the characteristic blue color has led to their name and to their being classed with amyloid. It is, however, evident that they have an entirely different significance from that of the progressive amyloid change beginning in the walls of blood-vessels, and they should be regarded as being of different pathological origin and nature.

While these bodies frequently assume with iodine and sulphuric acid colors varying from blue, brownish red, and green to yellow, it is stated that they but rarely give the amyloid reactions with the aniline dyes, and then only to a slight degree, usually in the central portion of the concretion. The writer has been unable to obtain any reaction from these bodies with the aniline dyes which he regarded as characteristic of amyloid, and it is his opinion that they should be classed with the colloid or colloid-like bodies rather than with amyloid. In the majority of cases these concretions react to stains in a manner similar to that of colloid. With Weigert's fibrin stain they take a deep violet color. They are essentially a local product dependent upon local conditions, and are for the greater part derived from epithelial cells and represent a transformed gland secretion. In this respect their origin is the same as that of epithelial colloid. In the nervous system they arise from degeneration of either the neuroglia cells or the axis cylinders, and the chemical nature of the concretions found in the brain and spinal cord must be different from that of those formed in the prostate and lungs. This is further shown by difference in appearances, staining reaction, etc., exhibited by the concretions found in these different regions.

In the prostate the bodies lie in the lumina of the gland spaces. They vary in size from a leucocyte to large concretions visible to the naked eye. They may be so numerous as to give the cut surface of the organ a brown, granular appearance. The free concretions may be obtained for examination by scrapings taken from the cut surface of the organ and examined upon the slide. Pressure upon the cover glass produces numerous radiating fissures in the firm bodies. In unstained sections these concretions may appear colorless, brown, dark brown,

or yellow, and the striations may show more or less distinctly. In sections from hardened material the majority of the bodies are torn out by the microtome knife, or drop out in the handling of the section. Their consistence becomes very firm, especially in material embedded in paraffin, so that they not infrequently turn the edges of the knife. In this respect they resemble the colloid of the thyroid. In stained preparations the concretions may show a great variety of forms and colors. The gland spaces may be filled with large and small bodies; or concretions of different size, shape, and color may be conglomerated together by a lighter hyaline substance. The darker prostatic concretions show most frequently a concentric or radiating striation. The central portion of the body may consist of a hyaline nucleus, or the periphery may be light-colored and hyaline. Frequently the peripheral zone of the concretion is darker and firmer in consistence than the central portion. The larger concretions may show alternating zones of light and dark colors, or may be made up of conglomerated granules of different shades of color. Deposits of lime salts and blood pigment are not infrequently found in the older brown bodies. As a rule, the number of the prostatic concretions is greatest in old age, but they also occur in the prostates of newly born infants. Moreover, they are not a constant accompaniment of senility, and their exact physiological or pathological significance is as yet unknown. They must be regarded as the product of degenerated epithelium or transformed prostatic secretion.

The corpora amylacea of the nervous system are found most abundantly in the ependyma of the ventricles, in sclerotic areas of the brain and cord, and in atrophic nerves. They are especially common in the areas of degeneration in tabes dorsalis, and are also of frequent occurrence in the senile atrophy of nervous structures. They differ in many respects from the concretions of the prostate and lung, being, as a rule, much smaller than the latter, though many times larger than the nuclei of the neuroglia cells. They are usually homogeneous, and only rarely show faint striations. They are round or oval in form, possess no definite nucleus, and are sharply outlined peripherally. They stain very deeply with hæmatoxylin, and for this reason have been thought to be formed from degeneration products of the nuclei of the glia cells. By some writers they are regarded as myelin products arising from the degeneration of nerve fibres. Others consider them to be derived from changed albuminous constituents arising from the cells.

Corpora amylacea are found in the lungs under many varying conditions: in acute and chronic pneumonias, in emphysema, in hemorrhagic infarction, in the neighborhood of tumor nodules, in tuberculous areas, and in the alveoli near the inflamed pleura. The writer has also observed them in lungs showing no pathological changes. In pneumonia they are frequently found embedded in masses of cellular and fibrinous exudate. They appear as round or oval homogeneous bodies, the larger ones frequently showing striation. In the central portion of the body degenerated cells, particles of carbon, blood pigment, etc., are often found, forming a nucleus around which the deposit of the concretion has taken place, through the precipitation of albuminous exudate or the accumulation of the products of degeneration of epithelial cells. In so far as the writer's experience goes, the corpora amylacea of the lung never give an amyloid reaction with the aniline dyes. With other stains they react similarly to the concretions of the prostate.

Corpora amylacea have also been observed in carcinomata, in inflammatory areas, in old extravasations, and in the glands about the beginning of the urethra in the female. The writer has also seen them in tumors of the parotid and mammary glands, in cysts of the ovary and kidneys, in the seminal vesicles, vas deferens, and epididymis, and in the small closed gland spaces near the prostate which are probably vestiges of the ducts of Müller. In all of these cases the origin of the concretions is apparently the same; the bodies represent transformed albuminous constituents of epithelial secretions. *Aldred Scott Warthin.*

CORYZA. See *Nasal Cavities, etc.*

COSAPRIN. — $C_6H_4.NHCO.CH_3.SO_3Na$. This is a whitish, crystalline mass or fine powder obtained by acting upon sodium sulphanilate with acetic anhydride. Its taste is slightly salty; it is freely soluble in water, slightly so in alcohol, and almost insoluble in ether. Its solutions have a weak alkaline reaction, and it is decomposed by heating with acids. Vámossy and Fenyvessy find that it is strongly antipyretic like phenacetin, but its action is more prompt and less lasting. *W. A. Bastedo.*

COTO.—The bark of an unknown Bolivian tree of the family *Lauraceæ*. The writer of this article is probably the only botanist who has seen a botanical specimen from this tree. It was furnished him in La Paz, coming from the Indians of the lower La Paz River region, and consisted of a twig with several thick, coriaceous, lance-oblong leaves nearly a foot in length, and a fruit like a large acorn. It was evidently a species of Nectandra or of a closely allied genus. The specimen was forwarded but disappeared in transit.

The bark first appeared in market confounded with cinchona, but later with individual claims. It occurs in good-sized flattish pieces, four to twenty inches long by five to ten in width and one to two or three in thickness. It is of a deep red-brown color throughout, often with a violet or purple tinge to the brown. If, as is usual, the entire thickness is present, the outer surface is grayish, and little furrowed and fissured. The inner surface is very roughly striated or splintered, like the ends. The outer third is cellular, the remainder a mass of splintery bast tissue. The bark is very hard and heavy. It has a camphoraceous, aromatic odor, and two distinct elements are recognizable in the taste. It is immediately pungent, and very quickly peppery-biting in addition (see *Coto, Para*).

Its volatile oil, resin, and *piperonylic acid* ($C_6H_3[O_2CH_2]COOH$) are all active, but the *cotoin* ($C_{22}H_{18}O_6$), which occurs as a yellow, crystalline powder, soluble in alcohol and slightly in water, is regarded as the important constituent and has been used alone. Tannin is not present.

In its own home, Coto possesses the highest reputation as a remedy, not only for diarrhœa, but for dysentery, which is there one of the commonest and most fatal of diseases. It is an excellent stomachic and a very powerful intestinal stimulant, especially to the sympathetic system and to the functions of absorption, at the same time exerting a disinfectant action. It is of great value in controlling intestinal discharges. The fluid extract is the best preparation, the dose being 0.3 to 1.5 c.c. (ɱ v. to xx.). The powdered bark is very effective in equivalent doses. Cotoin is given in doses of 0.03 to 0.2 gm. (gr. ss. to iij.). *Henry H. Rusby.*

COTO, PARA, or Para Coto, is the bark of a tree apparently very closely related to the last and comes from the same locality. The bark is very similar in appearance, but is commonly a half thicker and in larger pieces, their curvature greater. It is more commonly deprived of the outer bark. When this is present it is rougher and browner. The best distinction is in the taste, which has a similar prompt pungency, but lacks the secondary peppery-biting element. It contains, in addition to the constituents of the last other than cotoin, *paracotoin* ($C_{19}H_{12}O_6$), which is yellow, crystalline, soluble in both water and alcohol, and acts similarly, but two or three times weaker; also *protocotoin* ($C_{16}H_{14}O_6$), yellow and crystalline, soluble in alcohol.

This bark acts similarly to the last, but is much weaker. It is also much cheaper, and is very generally supplied in the United States when coto is called for. *Henry H. Rusby.*

COTTON.—The plant *Gossypium herbaceum* L. and other species of *Gossypium* (fam. *Malvaceæ*). It yields to the materia medica, besides various fabrics of use in surgery, the following articles, which will be considered in

order: cotton-root bark, cotton-seed oil, absorbent cotton, pyroxylin, collodion.

The specific identity and nativity of the different cotton plants are still subjects of controversy. Apparently some are of Asiatic, others of tropical American origin. As they agree in their properties, these questions are not here of practical importance. The plants are either herbs or shrubs, some reaching the dimensions of small trees, though the *tree cottons* proper of tropical America do not belong to this group at all. The cottons have alternate, stipulate, coarsely toothed or lobed leaves, and handsome large hollyhock-like flowers, white or yellow or changing with age to rose color. The fruit ("boll") is a large, ovoid capsule, bursting at maturity into three or four lobes. The seeds are numerous, white, dark brown, or black, and completely concealed in the cotton-fibre, which consists of long white or tawny hairs developed from the seed coat. The plant abounds in mucilage, and its herbage and flowers have some domestic use for poultices, and the juice, as well as a decoction of its leaves, internally, as a demulcent.

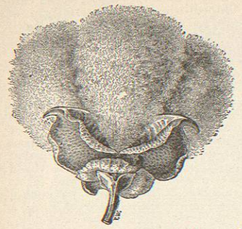

Fig. 1521.—Cotton Boll, one-half natural size. (Baillon.)

Cotton-Root Bark. Gossypii Radicis Cortex.—"The bark of the root of *Gossypium herbaceum* L. and of other species of Gossypium" (U. S. P.). There are few official drugs so much in need of pharmacological study as this. There is the widest variation in the activity of different samples, apparently genuine, but of the causes of this variation we are ignorant. It has been claimed that the bark should be extracted in the recent state, also that the bark of the stem is frequently furnished instead of that of the root. It is by no means impossible that the age of the plant when the bark is collected, or its previous destruction by frost, affects its quality. Finally, it would seem that the bark of the shrubby tropical forms might be more active than that of our annual plant. The bark is thus described in the Pharmacopœia:

"In thin, flexible bands or quilled pieces; outer surface brownish yellow, with slight, longitudinal ridges or meshes, small, black, circular dots, or short, transverse lines, and dull, brownish-orange patches, from the abrasion of the thin cork; inner surface whitish, of a silky lustre, finely striate; bast fibres long, tough, and separable into papery layers; inodorous; taste very slightly acrid and faintly astringent."

The drug contains fat, resin, red coloring matter, and a small amount of tannin.

Our first knowledge of its properties came from its use among the negroes of the Southern United States for the production of criminal abortion. Speculation as to the source of their knowledge, and of its introduction from Africa, raises important questions as to what species may have been there employed. Our slight knowledge of the drug's action is entirely clinical, and most of the testimony is against its activity, yet there is sufficient evidence that in some form it has been active as an abortifacient, parturifacient, and emmenagogue, acting much like ergot. The fluid extract is official, and the dose is 2 to 8 c.c. (ʒ ss. to ij.).

Cotton-Seed Oil. Oleum Gossypii Seminis.—"A fixed oil expressed from the seeds of *Gossypium herbaceum* L. and of other species of *Gossypium*, and subsequently purified" (U. S. P.). The seeds are decorticated and lightly cooked before expression. The cake which remains is a most valuable fodder. The crude oil is largely used in the mechanical arts and for soap-making; but for domestic and pharmaceutical purposes it is purified by decantation after standing, boiling with water, and treatment with a weak alkali. The official oil is thus described:

"A pale yellow, oily liquid, without odor, and having a bland, nut-like taste.

"Specific gravity, 0.920 to 0.930 at 15° C. (59° F.).

"Very sparingly soluble in alcohol, but readily soluble in ether, chloroform, or carbon disulphide.

"On cooling the oil to a temperature below 12° C. (53.6° F.), particles of solid fat will separate. At about 0° to −5° C. (32° to 23° F.), the oil solidifies.

"When the oil is brought in contact with concentrated sulphuric acid, a dark reddish-brown color is instantly produced.

"If 6 gm. of the oil be thoroughly shaken, in a test tube, for about two minutes, with a mixture of 1.5 gm. of nitric acid and 0.5 gm. of water, then heated in a bath of boiling water for not more than fifteen minutes, the oil will assume an orange or reddish-brown color, and, after standing for twelve hours at the ordinary temperature, will form a semi-solid mass.

"If 5 c.c. of the oil be thoroughly shaken, in a test tube, with 5 c.c. of an alcoholic solution of silver nitrate (made by dissolving 0.1 gm. of silver nitrate in 10 c.c. of deodorized alcohol and adding 2 drops of nitric acid), and the mixture heated for about five minutes in a water bath, the oil will assume a red or reddish-brown color."

Cotton-seed oil consists of olein and palmatin. It is quite devoid of medicinal properties. If thoroughly purified, it is an excellent and delicious article of food, scarcely distinguishable by the average palate from olive oil, for the adulteration and substitution of which it is very largely employed. It in turn is adulterated with maize oil. It is also very largely used for the adulteration of lard. In the pharmacy it has many uses in taking the place of other more expensive and not superior oils.

Cotton, Absorbent. Purified Cotton. Gossypium Purificatum.—"The hairs of the seeds of *Gossypium herbaceum* L. and of other species of *Gossypium*, freed from impurities and deprived of fatty matter" (U. S. P.). The cotton fibre is separated from the seeds, to which it is firmly adherent, by means of machines called gins, which, either by a series of circular saws revolving between the teeth of a comb-like guard or by cylinders which catch the cotton between them, pull or tear it away from them. It is then compressed in large bales and so exported. It consists entirely of long, thick-walled, collapsed, and spirally twisted tubes of glistening clearness, and high refractory power as seen under the microscope. It is nearly pure cellulose, with one or two per cent. of mineral matter, and has also a small amount of oily and resinous substances upon its surface—enough to make it repellent to water. For medical and surgical uses it is now beautifully purified from most of these impurities, and consists of more than ninety-nine per cent. of pure cellulose, $C_6H_{10}O_5$. The official purified cotton is thus characterized:

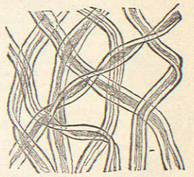

Fig. 1522. — Fibres of Cotton, magnified.

"White, soft, fine filaments, appearing under the microscope as hollow, flattened, and twisted bands, spirally striate, and slightly thickened at the edges; inodorous and tasteless; insoluble in ordinary solvents, but soluble in copper ammonium sulphate solution.

"Purified cotton should be perfectly free from all visible impurities, and, on combustion, should not leave more than 0.8 per cent. of ash.

"When purified cotton, previously compressed in the hand, is thus thrown on the surface of cold water, it

should readily absorb the latter and sink, and the water should not acquire either an acid or an alkaline reaction (evidence of proper purification)."

Purified cotton is daily employed by the apothecary as a rapid filter or strainer for turbid solutions; it is also employed in the laboratory of the bacteriologist as a stopper for the tubes in which his "cultures" are made; but for this purpose it has to be specially "sterilized" by heat or other means. It is also used in the preparation of the aromatic "*Aquæ*" to distribute the essential oils over, in order to insure their most complete solution. It is also very extensively used, either with or without medication, as a surgical dressing. Dried from a solution of boric acid, 1 to 100; corrosive sublimate, 1 to 1,000; or carbolic acid, 1 to 20; or impregnated with powdered iodoform, it can be rendered antiseptic; but such preparations need to be recently made, especially that with the carbolic acid. Exposure to a heat of something more than 100° C. (212° F.), for say half an hour, renders it practically aseptic, and in this condition it is very largely used as a dressing in antiseptic surgery. Nearly all surgical bandages, compresses, and gauze materials in this country are made from cotton.

The only preparation of purified cotton is the following, with its preparation, collodion:

COTTON, GUN, or GUN COTTON; SOLUBLE GUN COTTON; PYROXYLINUM; PYROXYLIN; COLLOXYLIN; DINITRO-CELLULOSE (U. S. P.). The following is the official formula and method of preparation:

℞ Purified cotton	.....	100 gm.
Nitric acid	.....	1,400 c.c.
Sulphuric acid	.....	2,200 "
Alcohol,		
Ether,		
Water	.....	āā q.s.

Mix the acids gradually in a glass or porcelain vessel, and, when the temperature of the mixture has fallen to 32° C. (90° F.), add the purified cotton. By means of a glass rod imbue it thoroughly with the acids, and allow it to macerate, until a sample of it, taken out, thoroughly washed with a large quantity of water and subsequently with alcohol, and pressed, is found to be soluble in a mixture of *one* (1) *volume* of alcohol and *three* (3) *volumes* of ether. Then remove the cotton from the acids, transfer it to a larger vessel, and wash it, first with cold water, until the washings cease to have an acid taste, and then with boiling water, until they cease to redden blue litmus paper. Finally, drain the pyroxylin on filtering paper, and dry it in small, detached pellets, by means of a water bath or steam bath, at a temperature not exceeding 60° C. (140° F.).

Keep the pyroxylin, loosely packed, in well-closed vessels containing not more than about 25 gm., in a cool and dry place, remote from lights or fire.

Pyroxylin owes all its usefulness in medicine to the fact that it can be dissolved by a mixture of alcohol and ether, and forms with it an adhesive varnish which dries to a waterproof film or coating, that can be made to cover and protect or hold injured surfaces, or be used as a vehicle for certain medicaments. The following is the formula for collodion (*Collodium*, U. S. P.):

Pyroxylin	.....	30 gm.
Ether	.....	750 c.c.
Alcohol	.....	250 "
Dissolve and decant.		

The film produced by this collodion as it dries contracts with considerable force, and is sometimes useful where a local compression is desirable; but for most purposes this quality is an objection, and it is partially overcome in the next preparation, flexible collodion (*Collodium Flexile*, U. S. P.):

Collodion	.....	92 parts.
Canada turpentine	.....	5 "
Castor oil	.....	3 "

Styptic Collodion (*Collodium Stypticum*, U. S. P.), is a preparation of collodion, alcohol, and ether, containing twenty per cent. of tannic acid.

Cantharidal Collodion or *Blistering Collodion* (*Collodium Cantharidatum*, U. S. P.) is a preparation of collodion containing the active constituent of 60 gm. of cantharides, extracted by chloroform, for every 100 gm. of the preparation.

Henry H. Rusby.

COUCH GRASS.—TRITICUM. *Dog-grass.* "The rhizome of *Agropyrum repens* (L.) Beauv. (fam. *Graminaceæ*), collected in the spring and deprived of its roots" (U. S. P.) It is a perennial grass with a straggling, zigzag stem, and a two-rowed ear of pointed spikelets. It spreads principally by means of long subterranean, horizontal rhizomes of most remarkable vitality and persistence of growth. Introduced from Europe and Asia, it has become a troublesome weed in some parts of this country. The drug comes principally from Germany. The dried rhizome is generally cut in short pieces (1 cm. or so long), about 2 mm. in diameter. It is hollow excepting at the joints, dull-yellow, and odorless, or having a slight mixed smell of hay and earth; taste sweetish, not remarkable. There is nothing notable in its composition or medical qualities, still it has some reputation in chronic inflammation of the bladder and kindred disorders. It is a favorite article for preparing patients for operations for cystic calculi. It contains sugar, gum, and *triticin*, which is very similar to inulin. We have an official fluid extract, dose 2 to 8 c.c. (fl. ʒ ss. to ij.), and it is commonly given in decoction.

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COUGHING.—According to Webster, the English word cough (Lat., *tussis*; Fr., *la toux*; Ger., *der Husten*) is of Anglo-Saxon origin, and comes from the Dutch, *Kuch*—M. H. Ger., *kuchen*, to breathe; N. H. Ger., *keuchen*—whence the German term, *Keuchhusten*, for whooping-cough.

Cough is primarily a physiological act, protective in character. Under pathological circumstances it occurs as a symptom of local or general morbid conditions, and may be of mechanical or reflex origin. It is essentially a quick and forcible expiratory effort or series of such

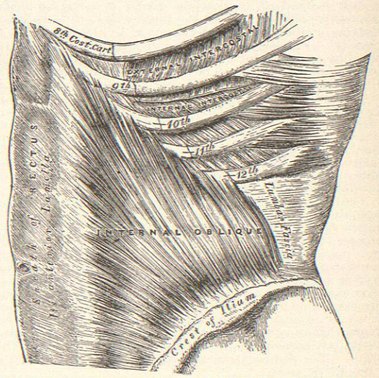

FIG. 1523.—Attachments of Rectus and Internal Oblique Muscles.

efforts, performed with complete or partial closure of the glottis, and is usually preceded by one or more deep inspirations. It has for its object the removal from the air

passages of obstructive or irritating materials. It may be excited by irritation of the nerves when there is nothing to be extruded, and is most annoying and persistent

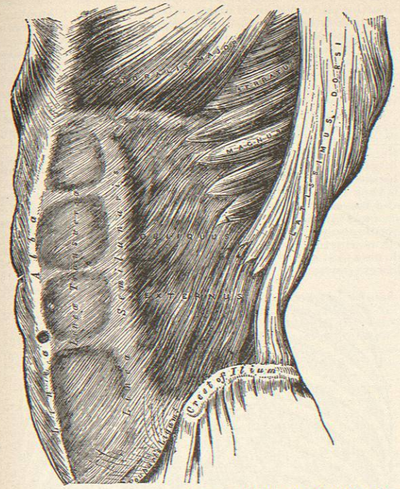

FIG. 1524.—Attachments of Rectus and Lateral Oblique Muscles.

under such circumstances. Its mechanism is thus described by Westbrook in the first edition of this Handbook.

"The *mechanism* of cough is as follows: When a foreign body or other irritant comes in contact with the peripheral expansion of the pneumogastric nerve (or of those with which it is intimately connected), impulses are generated which, travelling along the afferent fibres, are conducted to the respiratory centre in the medulla oblongata. In the ganglion cells of this centre the impulses are translated into others, which are conducted through the efferent fibres of certain cerebral and spinal nerves to the muscles of respiration, whose force they liberate.

"A study of the muscular relations of the thoracic walls shows that, while the muscles of *inspiration*—with the exception of the diaphragm and some small ones, *e.g.*, the *levatores costarum*—are attached to, and act upon the upper ribs, the *expiratory* group make their principal traction upon the lower portions of the thorax. This is particularly the case with those auxiliary muscles which are brought into play in forced respiration. The expiratory group, in which we are especially interested, are, anteriorly and laterally, the *triangulares sterni* above, and the *recti*, *obliqui*, and *transversales abdominis* below.

"The action of the *triangularis* is simple, and does not require special notice. Arising from the sternum and xiphoid appendix, its fibres pass upward and outward, to be inserted into three or four of the costal cartilages. It reinforces the natural resilience of the cartilages, helping to restore them to the expiratory position. It may also have some effect in counteracting the displacing force of the muscles on the exterior of the chest, *e.g.*, the *pectoralis minor*. The action of the *rectus* is equally simple. Its sole influence over the respiratory movements is to draw the sternum downward, and so to diminish the size of the anterior wall of the abdominal cavity. The action of the *obliqui* is more complicated. In the first place their posterior portions, which pass directly from the crest of the ilium to the ribs, exert an immediate and powerful downward traction upon the thoracic walls, not only diminishing the size of the lateral walls of the abdomen, but acting as *adductors* to the ribs, which have been put in the position of *abduction* during inspiration. In the second place, the more anterior portions have a crossed action, and make diagonal traction across the abdomen. This has been well described by Henle. It will be seen by reference to Figs. 1523 and 1524 that the upper portion of the *external*, and the middle portion of the *internal oblique* muscles of opposite sides, attached, as they both are, to the intervening sheath of the *rectus*, are equivalent to one long diagonal muscle, which passes from the ribs on one side to the iliac crest on the other, and is capable, by its contraction, of drawing the ribs downward and inward, so as to contribute much toward the expiratory diminution of the thoracic cavity. It acts upon the abdomen as well. The function of the *transversalis* is equally important. Its middle portion is attached by a strong fascia to the transverse processes of the lumbar vertebræ; while the fibres below arise from the iliac crest and outer half of Poupart's ligament. Above, it arises from the inner surfaces of the costal cartilages.

"The fibres of this part of the muscle pass horizontally across the abdomen, and, by the mutual attachment of those from the opposite sides at the *linea alba*, one continuous muscle is formed, the contractions of which strongly adduct the lower costal cartilages and thus diminish the epigastric angle. The middle portion of the *transversalis* acts directly upon the abdominal wall. This is best illustrated in a horizontal section of the trunk just above the level of the umbilicus (see Fig. 1525).

"In its contraction the *transversalis* acts from the outer border of the *quadratus lumborum*, as that muscle fixes its tendon in the lumbar region. It tends, first, to draw the *linea alba* toward the fixed point; but the antagonism of the muscles of the opposite sides prevents lateral displacement, and simply allows the anterior abdominal wall to approach the vertebral bodies, shortening the antero-posterior diameter. The muscular fibres intermediate between the anterior and posterior attachments, which, during distention of the abdomen, are sharply curved, become straightened during contraction and make strong lateral compression.

"The lower fibres of this muscle, when they contract, tighten the line across the inferior abdominal regions, and compress the intestines. The *transversalis*, then, by its

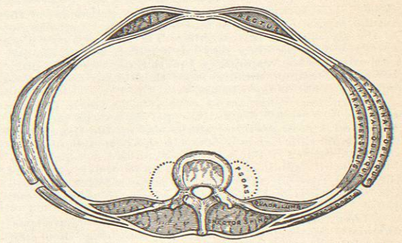

FIG. 1525.—Horizontal Section of Trunk Illustrating the Action of the Transversalis.

contraction, first, assists in diminishing the size of the thorax; second, it contributes, more than any other muscle, toward the diminution of the abdominal cavity; and, third, it acts in a manner analogous to that of the lower portions of the oblique muscles.