

and expectoration, weakness of the patient deprives it of this character.

The characters of the matters expectorated sometimes give valuable information as to the cause of the cough, or as to the pathological process with which it is associated. This subject is fully treated under the heading *Sputum*, elsewhere in this HANDBOOK. Here I shall but refer briefly to the yellowish, muco-purulent appearance of bronchitic sputum; the greenish color and unpleasant odor of the discharge in bronchorrhœa; the dark, sometimes black, color of the sputum of pulmonary gangrene and its unmistakable putridity; the rusty sputum, prune-juice expectoration, and characteristic diplococci of acute lobar pneumonia; the sago-like, often black-spotted sputum of influenza with its characteristic bacilli; the greenish or nummular sputa of pulmonary tuberculosis with pathognomonic bacilli; the spirals and crystals of asthma; the membranous casts and Klebs-Loeffer bacilli of diphtheria, as illustrations. The entire absence of sputum suggests as the explanation of a cough, pleurisy, pulmonary tuberculosis, tumor or foreign body in the air passages, irritation of the epiglottis, pressure upon the pneumogastric nerve or its spinal accessory or recurrent laryngeal branch, or some reflex origin.

Coughing may be attended with *accidents* of greater or less moment and severity. Thus in acute bronchitis the lodgment of a plug of mucus so that the expiratory current is blocked may produce a temporary dilatation or emphysema, while in chronic bronchitis the emphysema tends to become destructive and permanent. So in cough of any character the closure of the rima glottidis and the backward pressure may produce forcible distention of the apices, that may even lead to rupture of air sacs, of intervicular or interlobular septa, or of blood-vessels. This is especially the case in spasmodic cough, as in the unproductive effort of phthisis, or in pertussis. During the paroxysm the supraclavicular spaces bulge, partly because the apices of the lungs are distended, partly because of turgescence of veins. Circulatory disturbances are caused, mainly venous. As Westbrook pointed out, in ordinary breathing intrapulmonary pressure is slightly positive during the expiratory act. The forced expiration of cough causes sudden rise of pressure and arrests the current of blood in the large veins of the neck, chest, and abdomen, or may even reverse it. The blood from the right auricle and venæ cavæ is repelled upon the advancing blood. Thus the veins are overfilled in the stomach, the œsophagus, the pharynx, and the larynx, in the pelvis, in the inferior hemorrhoidal branches, in the uterus, in the vagina, and in the bladder, and ruptures and hemorrhages may occur. In women, bloody, serous discharges from the vagina, and in many cases involuntary urination, may occur during paroxysms.

In some persons the eyes bulge or feel a painful pressure during coughing, and hemorrhage of the conjunctiva, and even of the retina, may occur. Not only blood-vessels but other structures may give way under certain conditions. Dr. Max J. Stern communicates to me the case of a physician, aged seventy years, whose clavicle was fractured by the sudden strain of cough; and I have personally observed rupture of the fibres or ligamentous attachments of some of the deeper muscles of the back, incapacitating the subject for a number of days.

The severity of a cough depends partly on the nature, partly on the location, of the irritation or inflammation exciting it. The epiglottis is quite sensitive to irritation, and the reflex of cough readily producible. The superior compartment of the larynx (above the vocal bands) is much more tolerant, except that very slight irritation applied to a point on the meso-arytenoid fold will cause severe cough. On the whole, the greatest susceptibility is that of the mucous membrane of the lower larynx, trachea, and larger tubes, that is, below the vocal bands and above the smaller bronchi. At the latter, irritability diminishes, and the pulmonary parenchyma is still less sensitive. In pneumonia the cough is most largely due to the associated bronchitis; and, as already stated, cough-

ing may be slight or absent in the early stage of pulmonary tuberculosis.

TREATMENT.—There is no treatment for cough; it may be restrained by the use of local or general sedatives, or stimulated by local or general excitation; but, as already stated, it is merely a symptom, and before it can be brought to an end its cause must be removed either through termination of the underlying disease in due course, or by surgical or medicinal intervention. It is often beneficial even when caused by pathological conditions, preserving its physiological function as an expulsive mechanism. It is only when excessive or unproductive that it needs to be restrained. When insufficient, on the other hand, it may need to be stimulated. Attention, moreover, must be paid to the character of the expectoration, correction of which, whether by stimulation or restraint, may be the only treatment necessary to bring the cough within proper bounds.

Cough caused by local irritation above the epiglottis—such as an elongated uvula, or a relaxed palate, adenoid vegetations in the naso-pharynx, nasal polypi, hypertrophied tonsils, or enlarged glands or vessels at the base of the tongue—is corrected by removal of the offending cause. The uvula may be partially amputated or treated with astringents or the electro-cautery. The relaxed palate may be treated with astringents or by means of electric applications. Hypertrophied tonsils, adenoid vegetations, nasal polypi, should be excised, burned, or otherwise destroyed. Enlarged glands or varicose veins at the base of the tongue should be destroyed, preferably by means of the electro-cautery point.

The cough that sometimes accompanies acute faucial and pharyngeal inflammations is relieved by the treatment of the causative condition. Ice, ice cream, and other cold sedative applications are usually most grateful. In rare instances inhalation of the vapor of hot water, medicated with opium, cannabis indica, hops, and the like, is more soothing. Chronic pharyngitis may be accompanied with cough. In such cases astringent lozenges, such as gualiac, catechu, or rhatany, usually help to relieve it. In singers and speakers especially, there may be cough due to lack of secretions in the mouth and throat. A lozenge that I have found quite useful in such cases contains ℥ ij. of the fluid extract of pyrethrum, gr. $\frac{1}{2}$ pilocarpine hydrochlorate, and ℥ ss. of oil of peppermint or an equivalent of menthol, or of camphor. It may be made up with chocolate, Irish moss, or the artificial "marshmallow" used by confectioners.

Cough due to acute catarrhal laryngitis is not usually excessive, and needs no treatment other than that of the affection of which it is symptomatic; for example, inhalation of the vapor of warm water impregnated with compound tincture of benzoin and paregoric. A spray of adrenal solution is useful in early cases. The cough of chronic laryngitis requires, as a rule, some special attention; it is usually unproductive, and as it is a source of distress, and also mechanically prolongs the irritation and inflammation of the organ, may need to be restrained by sedatives. Of these, the bromides or opiates in very small doses are preferable. The new synthetic preparation of opium, heroin, is much lauded, but has no special advantage over morphine or codeine. The latter is to be preferred in cases in which an alkaloid of this drug is to be used, as it is less likely than is morphine to produce an unfortunate habit. On the whole, however, paregoric will serve the best of the opium group; gr. x. of strontium bromide and ℥ xv. of paregoric given with syrup of garlic or with mucilage of acacia three or four times a day, usually answers every purpose. A cold compress over the front of the neck is often useful in cases of subacute and chronic inflammations of the larynx, and incidentally helps to restrain cough. It is usually applied most conveniently during bedtime. Sprays of zinc sulphocarbolate and the like, or of wine of ipecac, may be used during the day. Morphine oleate (two per cent. in oleic acid) applied externally over the larynx, or endolaryngeally by sponge and carrier, sometimes has a useful sedative effect. When the cough of chronic laryn-

gitis is obstinate and troublesome, and not relieved by the method applied to the treatment of the underlying affection, relief may sometimes be given by the administration of cimicifuga, gtt. x. or xv. of the fluid extract, three or four times a day. In cases dependent on congestion due to deficient cardiac action, digitalis, strophanthus, strychnine, and other cardians, are usually efficient without special sedative treatment; but bromide or opium may be used with caution in these cases also. A small dose of morphine, say gr. $\frac{1}{10}$ to $\frac{1}{20}$, may be combined with some stimulating sialagogue or expectorant, as cubeb or pyrethrum, in a lozenge. As a rule, however, lozenges are not useful in checking cough, except when this is due to local conditions above the epiglottis.

In acute bronchitis, if the cough is easy and the expectoration free, no special indication is afforded for treatment. When the cough is hard and expectoration difficult, a stimulating, expectorant treatment is useful. Ammonium chloride stands at the head of drugs used for this purpose. Its taste, when disagreeable, may be covered with fluid extract of coca or with the powdered extract of licorice, in syrup of tolu or syrup of senega. Paregoric may usefully be added to such a mixture when the cough partakes of an irritative character. In subacute and chronic bronchitis cough is usually due to insufficient fluidity of the secretions, so that they cannot be expelled readily. The terebinthinate and balsamic group of drugs is here of the greatest service. Eucalyptol and fluid extract of eucalyptus, oil of sandalwood, oleoresin of cubeb, turpentine, terebene, and terpine hydrate, are most frequently employed. Myrtol is perhaps better than any of the preceding. The general dose of the volatile oils is from gtt. x. to xv. in emulsion or capsule, or given upon sugar. Of terpine hydrate the usual dose is about gr. v. Small doses of apomorphine or of pilocarpine or of fluid extract of pyrethrum, may be used with discretion. When expectoration is too great and cough too frequent, aromatic sulphuric acid and codeine are among the drugs most useful. Tincture of belladonna, atropine sulphate, or extract of hyoscyamus, in small doses, or, when there is a distinctly neurotic element, hyoscine hydrobromate (gr. $\frac{1}{100}$ or less) may be cautiously used in cases of excessive secretion, or of spasmodic cough.

In pleurisy, cough becomes painful. Strapping of the ribs tends to restrain it, and, by restraining breathing as well as cough, to relieve pain. When this does not suffice, codeine or other opium preparation should be given, when the pain is so great as to justify interference or to interfere with the patient's prospects of recovery; otherwise no interference is necessary. Hot applications, or ointments containing gualiacol, menthol, and birch oil well rubbed in externally over the seat of pain are often useful in restraining the irritation that produces cough. Sometimes a light blister acts happily.

In pneumonia it is unwise to try to check cough, as is so often done, by the administration of opium; especially unwise is the hypodermic use of morphine. The greatest judgment is needed to determine whether or not to interfere, and, in the latter instance, the nature and character of the interference. Cough should be sufficient to permit of free expectoration of the matters contained in the bronchi. On the other hand, it should not be so frequent or so painful as to prevent the patient from sleeping or add to his physical or mental distress. Usually expectorant drugs, of which ammonium chloride and ammonium carbonate stand at the head, are given with good results upon the general progress of the case. Senega, squill, cimicifuga, and the like may be useful, though they should not be employed merely for a secondary influence upon the cough, if not otherwise called for. The inhalation of ethyl iodide also tends to render expectoration freer and to diminish irritation, and thus to keep the cough within due limit. Should it be necessary, as in rare instances it may be, to take active measures to restrain coughing, the cautious inhalation of chloroform or of the *ammoniated chloroform* of B. W. Richardson is to be preferred. The chloroform is best

carried over by means of oxygen passed through a wash bottle containing it. Nothing approaching general anesthesia should be produced. The relaxation of the vaso-motor system is not dangerous in pneumonia, if not pushed to excess. Indeed, the administration of nitroglycerin sometimes relieves cough by diminishing pulmonary congestion and relieving the heart. Similarly the use of digitalis at the appropriate time, and venesection judiciously applied, while not to be prescribed merely for the relief of cough, include this in the sum of their effects. Nitrous oxide may also be used with caution. It is best given mixed with oxygen in the proportion of one part of the former to two of the latter, and may be inhaled after being passed through a wash bottle in the ordinary way. When inhalations are not available, spirit of chloroform, hydrocyanic acid, hyoscine hydrobromate, and if necessary, codeine, may be cautiously employed by internal administration. Some physicians administer tartar emetic in doses of gr. $\frac{1}{2}$ or less to an adult to promote secretion and thus to lessen cough. I have never used it for this purpose.

In asthenic conditions, as hypostatic pneumonia, pulmonary œdema, capillary bronchitis of the old and debilitated, and sometimes in infants, cough is deficient. It then needs to be stimulated. Opium and depressants should be avoided, and such agents as strychnine, turpentine, digitalis, mustard oil well guarded, musk, ammonium carbonate or aromatic spirit of ammonia, quinine, hydrogen dioxide, and oxygen should be used.

The cough of pulmonary tuberculosis requires very skilful management. The tendency both of patients and physicians is to try to suppress it. This is a mistake, as it is of the utmost importance for the patient to free the air passages from the morbid accumulations. The cough may be regulated, but no effort should be made to bring it to an end, except naturally as an indication of progress toward recovery. The inhalation of compressed air, especially if conjoined with expiration into rarefied air, tends at first to increase cough by facilitating the expectoration of matters otherwise retained in unventilated regions of the lung. Later the diminution in the quantity of morbid product tends to reduce the cough. The cough is often favorably influenced by the other features of the hygienic treatment, especially by hydrotherapeutic procedures, of which the simplest is the morning cold sponge or shower bath. All medicaments advocated for use in tuberculosis, whether by the laity, by quacks, by physicians, or by those who belong partly in all these classes and wholly in none, number among their alleged virtues the lessening of cough. This is, in fact, true of creosote and its derivatives and congeners, and of the balsamics and terebinthines, of which latter cinnamic acid (sodium cinnamate), Peruvian balsam, eucalyptol, terebene, and myrtol are the best. Ethyl iodide, creosote, chloroform, bromoform, oil of peppermint, and the terebinthines and volatile oils in general are useful by inhalation. Singly or combined in various proportions they may be inhaled from the vial, or from the sponge of Dr. Burney Yeo's perforated zinc respirator.

Stomach-cough, liver-cough, etc., and the cough of rheumatic or gouty bronchitis, laryngitis or pharyngitis, must be overcome by appropriate constitutional treatment; but strontium bromide may usefully form a part of that treatment, and often helps to allay cough.

Whooping-cough is often unamenable to medicinal treatment, and the best remedy is to send the patient, if possible, to the seashore, to be kept in the open air as many hours out of the twenty-four as the sun shines, and as otherwise may be advisable. Among palliative remedies inhalations of various kinds have been recommended. The vapors produced in the manufacture of coal gas, inhaled at the gas works, have a popular reputation not wholly undeserved. Ozone, hydrogen dioxide, hydrofluoric acid, chloroform, ethyl iodide, and bromoform, have all been highly recommended by competent observers, and are doubtless useful in individual cases. The vaporization of menthol or eucalyptol, or both, day and night in the rooms occupied by the patient, and in suffi-

cient quantity to be easily discernible upon entering the room from the outer air, is useful. Creolin, carbolic acid, and various coal-tar and coal-oil products under proprietary names, have been advised for use in a similar manner, and all of them have proved beneficial in a certain number of cases. Toxic effects may be produced by the absorption of such drugs, and the same care must be observed as in the case of internal administration. Formaldehyde solution (formalin) has been advised for inhalation, well diluted, from an inhaler on the plan of a Wolff bottle. The terebinthines, of which eucalyptol is best, may be dropped on a sponge suspended like a locket from a tape about the child's neck, or held over the nose and mouth by the Yeo respirator, and thus the respired air be continuously medicated.

A new preparation of fluorine, difluorodiphenyl, has been advised in the form of an ointment, under the proprietary name of antitussin, and the reports in its favor are accumulating. My own experience with it, however, has not been brilliant.

As to internal medication, the collateral bronchitis should be treated on general principles, and to allay cough, bromoform seems on the whole the most useful of all the drugs that from time to time have been recommended, of which the name is legion. To a child two years old gtt. ij, bromoform in glycerin and sherry wine, or in aromatic elixir, may be given every two, three, or four hours, as may seem necessary. In every instance, however, the dose must be adjusted to the age and susceptibility of the patient and the severity of the case. Hydrogen dioxide has, in my hands, proved useful in doses of from $\text{m} \text{xx}$. to lx ., diluted with glycerin and water, and given every third or fourth hour. Sulphurous acid, sodium hyposulphite, and Hope's nitrous acid mixture seem also to have some usefulness. Sprays of adrenalin have been advised, but I have as yet had no opportunity to gain experience with this measure.

Laryngismus stridulus is usually an accompaniment of rhabdismus, the constitutional treatment for which must be instituted. In addition, amyl nitrite inhalations may be used to relax the spasm, and care is necessary to guard against strangulation of the child by incarceration of the epiglottis. Nitroglycerin or sodium nitrite given internally for prolonged periods, in doses appropriate to the age of the patient, sometimes has a beneficial effect in diminishing the frequency and severity of the paroxysm. Tumors and foreign bodies are to be removed if possible.

Retropharyngeal abscess is to be treated surgically, and the associated cough will disappear. Enlarged bronchial glands are not as yet susceptible to direct treatment, but crystallized calcium chloride, given internally in some suitable vehicle, in doses of gr. x. or xv. three or four times daily for a child of seven or eight years, and proportionately larger doses for older persons, often exerts a beneficial influence upon glandular enlargements in general. So, too, the so-called alterative treatment with preparations of iodine, of arsenic, and of mercury, is often useful. When glandular enlargements are due to syphilis, tuberculosis, or other recognizable cause, that will furnish the indication for treatment.

The cough of asthma is rather to be encouraged than diminished, as free expectoration will sometimes assist in cutting short the paroxysm. Otherwise the treatment is that for the underlying condition, and need not here be discussed. The cough of hysteria can be controlled only by psychic influence, the physical medium of which may be an electric application, a blister, or other means, according to the individuality of the patient and of the physician. In my own observation painful electric applications to the larynx or over it have been the most successful; though these should be made only with great caution, and never by those inexperienced in the use of electricity in the neighborhood of the pneumogastric nerve. *Solomon Solis Cohen.*

COUNTER-IRRITATION.—(See also *Cauterization*.) This is a remedial measure the object of which is to pro-

duce a congestion of the vessels at the surface of the body for the purpose of relieving a disturbance of some remote tissue or organ.

The principle of counter-irritation is followed in many therapeutic methods of a general character, all of which relieve internal, or more or less localized, congestions. Those best known are hot baths, steam baths, hot foot baths, heat to the extremities, blood-letting, etc. These general methods, however, are not known as counter-irritants; the term is commonly restricted to such as are more local in their action and which are employed to accomplish a definite object. For this purpose various irritant drugs are utilized, as well as the actual cautery, dry-cupping, and other similar means which cause a local irritation.

The irritation produced by counter-irritants varies in degree, and the difference is expressed by the terms rubefaction, vesication, and pustulation, according as they simply redden the skin or produce a blister or a pustular eruption. These terms do not imply sharply defined groups, as one may merge into the other, and a single drug may cause one or all of these effects according to the strength of the preparation or the length of time it is applied.

RUBEFACTANTS are such as produce a reddening and congestion of the skin, the vessels becoming dilated and the supply of blood increased. The effect is immediate, but of short duration, as it rapidly disappears when the irritation is removed. When the application is prolonged it causes a severe inflammation of the skin which may result in vesication or ulceration. For this reason rubefaciants require to be applied with some care to children and others whose skin is thin and sensitive, as the irritation may be unnecessarily severe. The same caution is necessary when they are applied to the skin of those who are unconscious or in whom the sense of pain is impaired.

Mustard, ammonia, turpentine, camphor, and iodine are the best known of this group.

VESICANTS.—In vesication there is a deeper and more severe inflammation of the skin which results in an effusion of serum beneath the cuticle. If the application is prolonged the effusion of serum may be very great. The counter-irritation may also be prolonged for days or weeks, by the application of irritating substances to the denuded surface, after the effused fluid has been removed. In selecting a site for the application of a vesicant it is advisable to avoid any bony prominence, as there may be trouble afterward as regards the healing of the spot. A depressant effect is apt to accompany blistering, and this may become a serious affair if the patient is weak or if the blistered surface is very extensive.

Cantharides is the one drug that is almost entirely used for this purpose. The cerate, spread in the form of a plaster, is the preparation generally employed. It is slow in its action and requires to be kept applied for about eight hours. To increase its action, camphor, ether, acetic acid, and the powdered drug may be applied to the surface. Hot linseed poultices may also be applied after the removal of the plaster, to promote the effusion of serum. Some caution is necessary during the employment of cantharides, on account of the liability of its being absorbed and exerting an irritant effect upon the kidney. If there is any tendency to kidney disease this caution is particularly required. Acetic acid is a very efficient solvent of cantharidin, and the *Liquor epispasticus* of the British Pharmacopoeia possesses a much more rapid action than any other preparation, one application being generally sufficient to cause a blister in the course of an hour. Cantharidal collodion is also an effective preparation, but less rapid in its action than the above.

Ammonia is sometimes employed as a vesicant, but it is less effective and very painful. A piece of lint is saturated with the water of ammonia and kept in contact with the part.

Hydrochloric acid is also sometimes used, the pure acid being applied to the surface.

PUSTULANTS.—Croton oil and tartarated antimony are typical representatives of this group. Their application

results in a pustular eruption accompanied by much inflammatory action. The course of the eruption is similar to that of the rash of smallpox, the formation of pus persisting for several days and leaving the part deeply pitted and scarred. On account of the severe effect which they produce, pustulants should not be extensively applied, nor should they be applied to any exposed part for fear of causing disfigurement.

Croton oil is the pustulant generally employed. When pure the oil is too strong to be used undiluted, and olive oil or spirits are added until the croton oil is reduced one-half.

Tartar emetic in the form of an ointment, one part to four, was formerly much used. It is now rarely employed, as its action is slow, and severe depression may result from absorption of the drug.

The *actual cautery* is particularly serviceable, as by its careful use the physician may establish any degree of counter-irritation. By simply passing the heated iron over the surface of the skin, but not in actual contact with it, he may produce the mildest rubefaction; and if a more severe effect is required, he has only to bring the point of the cautery lightly and quickly in contact with the skin. Very little experience is required to enable one to produce almost any degree of counter-irritation immediately, and readily to control the action of the heated instrument. Any form of actual cautery may be used, but the thermo-cautery is that usually adopted. A very old and simple method is to place an ordinary metal spoon in hot water for a few minutes and then to apply it to the part. It is stated that if the spoon, which has been heated in water at 120° F., is kept in contact with the skin for three seconds, the part will become red and congested, and that if it remains for ten seconds, vesication will follow.

Dry-cupping is a means of counter-irritation that is still frequently resorted to. It produces a rapid and intense rubefaction which persists for some time (see *Blood-Letting*).

Formerly a prolonged counter-irritant effect was produced by the use of *setons* and *issues*. These are not resorted to at the present day, although an occasional reference is made to their value by the older surgeons.

Setons were artificial sinuses formed by pinching a fold of skin and subcutaneous tissue, and, with the aid of a seton needle, passing through it one or more strands of silk, cotton, hair, or some such material. This was left in place and each day moved back and forth. The object was to promote suppuration, and, in order to increase the irritation, some caustic preparation was often applied to the material.

Issues were wounds artificially produced and maintained for the purpose of securing a continuous discharge of pus. When a small issue was desired, the wound was simply an incision made by a knife. When a more marked effect was required, caustics and moxa were resorted to to destroy the part. Various methods were adopted to maintain the discharge, such as the introduction of peas and beads, irritating drugs, and caustics.

Counter-irritation is resorted to for three purposes: to relieve pain, to lessen congestion and inflammation of deep-seated organs, and to promote the absorption of the products of inflammation. In selecting the particular counter-irritant by means of which it is hoped to attain these ends, the degree to which it acts must be the guide for its employment. If the trouble is of recent origin, or if the organ is simply a little congested, a mild counter-irritation will usually prove sufficient; but if the disturbance is of longer duration and especially if structural changes have begun, then a more severe and prolonged effect is required. The immediate effect of rubefaciants is much greater than that of vesication and other more active irritants, but the remote effect is much less. For this reason they are selected at the onset of pleurisy, bronchitis, pulmonary, and renal congestion, neuralgias, colic, and gastric pains; the extensive reddening of the surface in the neighborhood of the part affected affording

immediate relief. On the other hand, when the inflammation is established as in advanced bronchitis, pleurisy, endocarditis, peritonitis, sciatica, inflamed joints, and such serious affections, vesicants, pustulants, and the actual cautery produce a prolonged and more effective counter-irritation.

Although the beneficial effect of counter-irritation is very evident, the manner in which it is produced is as yet undetermined. It has been thought to depend upon a direct vascular relation between the affected organ and the adjacent skin surface. This explanation is applicable to superficial and intercostal neuralgias, to inflammation of the costal pleura, and to many joint affections, when there is a blood supply common to both parts; but it is not sufficient to explain the relief afforded to deeper parts which have an independent circulation. The more recent and probably the more correct explanation is that which looks to the sensitiveness of the cutaneous nerves and their reflex action upon the deeper parts. The activity of the superficial reflexes is evident to all, and experimental work has shown that a similar influence is exerted on the deeper organs, as where an irritant to the skin over the kidneys causes a contraction of the renal vessels, or where, in an exposed pia mater, the vessels are similarly affected by irritating the scalp. Further evidence of this relation between the deeper parts and the surface is furnished by the many reflected pains that arise when the organs are diseased. Starting from this explanation as a basis, we may maintain that a careful mapping out of the skin areas most intimately associated with the various organs becomes necessary; and when such a scheme has been prepared, it will at once be possible to employ counter-irritants in a more rational and effective manner. *Beaumont Small.*

COWPER'S GLANDS.—These glands were discovered by Cowper in 1700. They are two in number and have a genital function the exact nature of which is not definitely known. Probably their function is to lubricate the urethra during sexual excitement, at the same time adding somewhat to the volume of the seminal fluid at the moment of ejaculation.

It has been demonstrated that their activity is much increased by sexual excitement. In a case of a cyst of one of Cowper's glands which was opened externally, the fluid excreted through this opening was markedly increased at the time of erections. It is not believed, however, that these glands have an important part in propagating the species. They are believed to be entirely accessory in their function and that their absence would not particularly influence the sexual act or its results. I cannot find any statement in the literature of the subject which would tend to disprove the above belief.

The subject, however, has not been very thoroughly studied, either as regards the function or as regards the pathological conditions of these little glands. I am of the opinion, from my own experience, that they are diseased more frequently than is generally supposed, but that the resulting pathological conditions are not always recognized. Owing to the position of these glands and their ducts they are frequently in the path of a gonorrhoeal infection, and an infection of these bodies may be so mild as to make a differential diagnosis extremely difficult until possibly, by urethral or external irritation, one of the glands becomes acutely inflamed, producing a characteristic swelling and train of symptoms.

I believe that in certain cases of chronic relapsing urethritis of a gonorrhoeal origin, where no focus for the discharge can be found and where the urethra, seminal vesicles, prostate, and other parts are normal, a disease of one of these glands is the cause of the persistent discharge. I have seen a few cases of the kind, and in one of these a most prolonged discharge was cured by the enucleation of Cowper's gland during a period of acute exacerbation produced by urethral instrumentation. This case had been stirred up by sounds on several occasions, the inflammation being accompanied by increased discharge and pain in the perineum. I saw the patient in one of