strophanthus regulates the contractions of the heart better and overcomes arrhythmia better than digitalis alone, no matter how large the dose of digitalis that may be employed. Strophanthus alone will not do this to the same extent as when combined with digitalis; it has long been my practice to combine strophanthus and digitalis when there is marked arrhythmia.

Dr. E. D. FERGUSON, Troy, N. Y., in closing the discussion, said: My paper did not intend to exhaust the treatment of exophthalmic goitre; it simply referred to the use of one drug, and I indicated that it was not a specific, although proved to be useful. So far as a genuine cure of exophthalmic goitre is concerned, relief of the symptoms relating to the pulse and to the anatomical condition of the neck and the eyes, I have never seen a cure, and so far as our present therapeutical resources are concerned I don't expect to see a cure, but patients have been improved and comparatively relieved of the dyspnoea, particularly upon exercise.

In regard to the preparations of strophanthus, in my article I called attention to a considerable difference in the preparations—that there seemed to be some material in it of an intensely bitter taste, in some instances of a balsamic nature when separated by putting the alcohol solution into water that was quite disagreeable, would disturb the stomach and also the bowels. I have seen the effect upon the bowels and heart which has been referred to, but by changing the preparation have been able to right them.

In regard to the frequency with which we see these things, it is a fact that diseases often hunt in couples, in triplets and in platoons. In my first paper I related a case where I was called to a patient and when I gave my diagnosis the doctor was frank enough to say he did not know what it was, had never heard of it and never seen it before. In a few weeks he brought another case to me, the second he had met after practicing thirty or forty years. I had seen the disease occasionally up to the time of that paper and since then I have seen it more frequently, possibly because some of my professional brethren have brought the cases to me. Whether the locality has anything to do with the development of this trouble, as it has with simple goitre, is a question. I agree with the gentleman that in many cases of tachycardia it is masked, similar probably to what would amount to a genuine case of exophthalmic goitre if allowed to go on.

In regard to the use of strophanthus and digitalis, I do not regard strophanthus as a specific, but if it is of use it would seem to me that digitalis cannot be of use. I am aware that we cannot place too much confidence in the varying effect of drugs, but if the tincture of strophanthus lessens the heart's action and digitalis while lessening the action of the heart increases the tension we have two different effects.

All my cases were fully developed exophthalmic goitre; there was not only the tachycardia but the enlarged thyroid body and protrusion of the eyeballs, the dyspnoea on exercise and the general nervous symptoms that go with this trouble.

Bad Water for Soldiers.—About a hundred members of the Second Regiment, New Jersey militia, encamped at Sea Girt, were recently taken ill with vomiting and purging soon after their arrival in camp. In nine cases the attack was so severe that a fatal result was feared, but all fortunately recovered. The cause of the illness for a time was shrouded in mystery, but an examination by the State chemist of the water taken by the soldiers proved it to be contaminated with surface drainage; the driven wells from which they drank being only fourteen feet deep.

DIPHTHERIA.

Read before the Section on Practice of Medicine at the Forty-fourth Annual Meeting of the American Medical Association.

BY J. B. MURFREE, A.M., MD.

MURFREESBORO, TENN.

Diphtheria is an acute infectious disease, highly contagious and dependent upon a specific virus for its inception and propagation. Usually beginning by an involvement of the throat, characterized by exudations locally, and enlargement of the lymphatic glands, soon to be followed by a general systemic poisoning, attended with various paralyses as sequelæ.

At first seemingly a local disease, caused by an inoculation it soon becomes general and assumes a constitutional form of a most virulent character, constituting one of the most dreaded diseases of childhood, from the frequency of its prevalence, as well as the great fatality that attends it. While it does affect the general system finally, yet primarily it is locally characterized by affecting especially the mucous surfaces of the throat though not necessarily confined to these parts, as it may affect the mucous surfaces elsewhere and even the skin.

Locally, its chief manifestation is the formation of a grayish white film or pellicle upon the mucous surfaces and upon the skin when deprived of its protecting epithelium. Usually the virus of the disease is conveyed through the inspiration of the infected air, but occasionally it is communicated by direct contact of the infecting material with a mucous surface.

The history of diphtheria is interesting as well as instructive, and shows that the marked features of a disease will identify it in spite of a difference in the names assigned to it. From the investigations made of its prevalence, the conclusion is that diphtheria is not a new disease but has prevailed with more or less fatality in the remote ages of the world. Certainly it is a disease of antiquity. The name diphtheria was first applied to the disease by Bretonneau of Tours, in 1824. He called it diphtheria from the supposed resemblance of the exudations to leather or parchment. Notwithstanding the fact that this name was applied at so recent a date yet from the descriptions given by ancient writers of a disease (and epidemics of that disease) affecting the throat and prevailing chiefly among children we conclude, from the similarity of the symptoms presented, the class of patients attacked and the fatality attending it, that it was identical with diphtheria of the present day, as we meet with it. An account is given of a malignant sore throat (and even of laryngotomy being performed to relieve suffocation) before the Christian era.

Again, in the early centuries of the Christian era we have some graphic descriptions of a putrid sore throat, the disease sometimes extending into the wind-pipe and producing death by suffocation.

From the close of the fifth century until the sixteenth the record of diphtheria is broken. It is probable that during the long period embraced in the dark ages, every decade witnessed epidemics of this fatal disease, but if they were observed and recorded the records were lost, the literature of diphtheria sharing the fate of the general literature during this time of intellectual darkness.

Since the sixteenth century medical literature has

contained many essays descriptive of epidemics of an angina whose features tallied well with diphtheria of the present day, so much so that we cannot doubt but that it is the same disease. At different periods and in different countries diphtheria has received different appellations expressive of the leading features of the disease. Introduced into America by adventurers from the old world, diphtheria has prevailed more or less to the present time, with increasing frequency and fatality and has become one of the scourges of our country, no infantile disease being looked upon with more dread than diphtheria. So far as we are informed the natives of America, "the red men of the forest," were not afflicted with any disease except such as were due to climates, seasons and their own indiscretions.

Epidemics of contagious diseases were unknown in this country until the white man put his foot upon the soil and planted the banner of civilization. Cortez and his men in their greedy thirst for gold introduced the small-pox into Mexico. Sailors under Columbus brought the diseases of vice and immorality into America. And in the sixteenth century diphtheria was landed, first manifesting itself at Boston and now "it is to be from appearance above all other maladies, the scourge of America in the future." As the line of civilization advances the physical man deteriorates and with the increase of population there is an increase of epidemics of contagious diseases. Bretonneau investigated the disease extensively in 1821 and with him originated the name of diphtheria. Since then quite a number of eminent medical men have studied and investigated the nature and character of diphtheria. Within the last fifty years diphtheria has prevailed extensively in all parts of America as an epidemic and in some localities as an endemic disease, so much so as to be pretty well domiciled.

It prevails in all sections of the country, in the crowded cities and in the sparsely settled country. Epidemics of the disease have swept over thinly inhabited parts of the country with fatal effects and likewise they have raged in crowded cities with frightful mortality. But it prevails more frequently and with a greater fatality in cities, especially the larger ones. In some of our larger cities the disease has become endemic. The etiology of diphtheria presents an interesting and much disputed question for our consideration. For a great many years past a close investigation of the disease has been carried on and quite a number of experiments have been made upon the lower animals with the endeavor to determine the precise cause of diphtheria.

Its specific cause has been denied by many and for awhile it was considered by some to be due to the same cause as that of scarlet fever. But more recently it has been conceded to be dependent upon a specific, infecting virus. Yet the profession were at a loss to know what this specific cause or virus was. Pathologists labored earnestly to discover the especial cause of the disease, numerous observations were made and many experiments carried on.

In 1868 Oertel discovered micrococci in the pseudo membrane of diphtheria, in the blood and lymphatic vessels and kidneys in severe diphtheria, appearing as "point like, dark contoured round or oval little bodies, isolated and in zooglea." In later investigations (in 1874) he found a larger or smaller number of the bacteria termo accompanying the micrococcus

and he expressed more firmly the belief that a bacillus lodging on the mucous surface caused the diphtheritic inflammation. But later observations tend to show that the micrococcus of Oertel does not differ from those found in putrescent animal matter. Later, Kleb discovered a microbe which he claimed to be the cause of diphtheria and his observation was afterwards confirmed by Loeffler. The theory which is generally acknowledged by the profession as correct is that diphtheria is caused by a microbe or microbes; that their action is chiefly on the surface and that the blood poisoning or toxemia which is the cause of the malignancy of the disease is the result of the absorption into the system of the products of the decomposition which takes place at the point of infection; that it is the result of the action of the ptomaines on the blood of the patient and that the ptomaines are the products of a micro-organism. The conclusion, then, is that diphtheria is a specific contagious disease and that the constitutional infection is the result of ptomaines produced by microorganisms. Diphtheria does not arise spontaneously, nor does it develop *de novo*, but is produced by a particular cause, a specific virus and that specific virus is a microbe.

The contagiousness of diphtheria is a well observed fact; it is communicated from one person to another as other contagious diseases are, and especially by direct contact. The nature of the disease is such that while it is no respecter of persons, but prevails among the wealthy and refined with as much virulence as among the poor and uncultured, yet the greater prevalence of the disease and the violence of the symptoms in unsanitary localities and conditions are such as to cause it to be classed with the filth diseases.

Whilst it does at times prevail with great fatality in sparsely peopled districts as well as in those that are densely inhabited, yet there is a marked increase in its progress in the groups of cities and towns of our country. Diphtheria is becoming more and more a disease affecting our large centers of population, and less prevalent throughout the country districts.

The disease is fostered and rendered more fatal in its attacks in locations where dampness exists, subject to cold wet winds and where the surface soil is such as favors the retention of moisture and where there is an accumulation of refuse organic matter. Seasons have a marked influence on the prevalence of diphtheria as well as upon its mortality. It is a disease of cold weather and prevails most usually in the fall and winter. The greatest number of epidemics prevail in the fall of the year; the greatest prevalence of the disease is from September to February.

Sex exercises but little influence on its prevalence; there is more excess of attacks in girls than in boys, perhaps because they are more frequently brought in contact with the sick. Age has a decided influence over the incidence of diphtheria. The greatest number of cases by far, both fatal and non-fatal, occur between the ages of three and twelve years. It is preëminently a disease of childhood, yet strange to say it very rarely occurs in a nursing babe.

The prevalence of diphtheria is associated with the prevalence of ill-defined sore throat during its existence from the commencement, during its continuance and after its cessation; and as a conse-

quence many deaths from diphtheria are not recognized but are attributed to croup, laryngitis, etc.

In some instances the prevalence of sore throats progressively develops the property of infectiousness which culminates in a definite, specific type of diphtheria. Diphtheria usually begins as a local disease showing itself first at the point of infection, *i. e.*, where the contagion has been received, whether through the atmosphere or other agents, and an unhealthy condition of the tonsils and surrounding tissues (to whatever cause due) operates strongly as a predisposing cause to an attack when diphtheria is prevalent. Assemblies, especially schools where children are aggregated together tend to increase the number of cases and favor the spread of the disease. Particularly is this true when preceded by a number of cases of sore throat. Diphtheria has been conveyed to distant places by clothing; being carried by means of the exudation. There is a number of instances of the disease being conveyed by means of milk, and in some instances there was strong evidence that the infection was due to the diseased condition of the cow. The direct cause of diphtheria is a microorganism, the bacillus, *diphtheriæ*, which has been cultivated and is capable by inoculation of conveying the disease to others and also to many of the inferior animals.

The period of incubation in diphtheria is rather short, more so than that of the majority of infectious diseases. It is usually from two to five days, sometimes longer, but rarely, if ever, longer than eight days. The symptoms manifested by diphtheria are characteristic of the disease and are generally well marked. However, in some instances they are so obscured that they are overlooked by the family and even by the medical attendant.

The disease varies greatly in severity; from a very mild attack to the most malignant form of the disease that perhaps we ever have to cope with. I have seen cases so mild that the little patient was scarcely sick enough to be confined to the house, and again I have seen cases so violent from the very outset of the disease that the system was soon overpowered by the poison and in a few days life was extinct. In general it is said by authors that at the commencement of an epidemic the symptoms are more severe than at its decline. In my observation the severity of the disease is the greatest at the height of the epidemic. The cases are milder at the beginning and at the decline of an epidemic and this holds good in all epidemics.

Usually the symptoms of a commencing diphtheria are slight. The patient complains (or shows signs) of languor, lassitude, headache, chilliness, succeeded by a fever, aching in the limbs, thirst, anorexia and sore throat, as evidenced by pain on swallowing. Small children cannot tell their complaints, but the mother notices they are not well; that they fret while nursing, and the expression of the child indicates that it does not feel well. In mild attacks the child may not be in bed and sometimes children with diphtheria run outdoors with other children and thus convey the disease to others. The sore throat may be so slight that very young children may manifest very little if any dysphagia and older ones may not complain.

It is a good plan to examine the throats of all the children under our charge when diphtheria is prevailing and at all times when ill-defined general

symptoms are presented. From a neglect of this precaution we sometimes overlook diphtheria until the case is far advanced. A few years ago I was called to see a little boy whose case the attending physician had diagnosed to be only simple croup. There was a difficulty of breathing with a beginning cyanosis. Upon exposing the throat the characteristic exudation was plainly seen upon the tonsils. The mother who stood behind me when she saw into his throat, uttered a piercing scream, and ran from the room exclaiming, It is diphtheria. In less than twenty-four hours the child was a corpse.

In the initial stage of diphtheria the general symptoms so closely resemble those of a bad cold that the disease is liable to be mistaken for it unless there is had an inspection of the throat. In the beginning there is a redness of the soft palate and fauces with swelling of the tonsils, and upon their inner surface are spots covered with a grayish white coating which is quite firmly adherent to the mucous membrane and these will likely be found also upon the soft palate and uvula. These patches may not be observed at the first examination but will be quite evident in a few hours. This is the exudation of diphtheria and may appear as points which sooner or later coalesce, forming a patch or pellicle which becomes thicker and firmer.

In the severer forms of the disease the attack begins abruptly and its symptoms are well pronounced from the commencement. There is a decided fever, with general malaise, thirst, loss of appetite and sore throat, possibly delirium and convulsions, but usually the mind remains clear throughout the attack. The temperature rises to 102°, 103°, or 104° Fah. rarely above this. In my observation a very high temperature is not a characteristic of diphtheria, nor is it apt to continue high long; after the third or fourth day the temperature is but slight. The diphtheritic poison when fully disseminated throughout the system does not tend to markedly increase the animal heat, but so overpowers the nerve centers as to prevent reaction, and when the toxemia is profound there is scarcely any elevation of the temperature; sometimes it is subnormal.

In diphtheria a very high temperature long continued indicates some inflammatory complication. Ordinarily the thermometer is of but little service to us in diphtheria as the amount of fever does not bear any relation to the extent of blood poisoning. A severe attack of diphtheria with great malignancy, rapidly tending to a fatal termination may have a temperature but little above the normal while a mild case may present a comparatively high temperature. A continued high temperature in a case of diphtheria rather indicates some inflammatory action going on than the degree of blood poisoning. But the thermometer is of value inasmuch as it enables us to form some idea of the extent and severity of the complicating inflammation that may be present, whether it be a pharyngitis, tonsillitis, laryngitis, bronchitis, pneumonia or a nephritis or any constitutional disease that may exist as a complication. The pulse in diphtheria is usually feeble and frequent, often very rapid and small. The more malignant the attack the greater will be the feebleness and frequency of the pulse. In slight attacks ordinarily neither the local affection nor the constitutional symptoms are at all violent, but maintain a moderate degree of severity for a week or ten days when they decline and a steady

convalescence sets in. In the malignant type of diphtheria, however, from the beginning or early in the course of the disease, dangerous symptoms are evident and the child's life is in great jeopardy, either from the exudation extending to the neighboring organs or from the development of a deep constitutional infection. The exudation extends into the nares and this is usually a grave sign, not that the infection of the mucous membrane of the nose itself is so dangerous but it affords opportunity for a deep poisoning of the general system that will be severe and prolonged. The inflammation of the Schneiderian membrane may be simply purulent but usually it is croupous and attended with exudations and these sometimes extend outward and cover the excoriated lip. The involvement of the nares is generally secondary to that of the pharynx, yet it may be primary. As the disease advances the swelling of the nasal mucous membrane increases and the breathing is accompanied with a whistling sound, a snuffling; finally the nostrils are occluded and the child breathes only through the mouth; whilst at the same time the glands at the angle of the jaw become inflamed and enlarged.

The extension of the disease into the nares is a source of great danger, for the great number of lymphatic vessels in the connective tissue in and around the nose tend to increase the absorption of the virus and the infection of the system and it also begets a tendency to hemorrhage, which is often profuse and exhausting. Occasionally the disease extends through the Eustachian tubes to the ear producing great pain and impairing the hearing. In some instances it has produced inflammation of the internal ear with the rupture of the tympanum and necrosis of the bones. The eye is also subject to invasion, either through the nasal duct or by direct contact. The exudation may also extend to all parts of the mouth, the tongue, gums and lips—very rarely it involves the esophagus. But the most dangerous implication of all is the extension of the exudation into the larynx, where it creates a mechanical obstruction to the respiration and may produce suffocation. The extension of the exudation into the larynx is characterized by a hoarseness of the voice, croupy cough, difficult and laborious respiration, while the face becomes pale and livid and the lips cyanotic. Possibly the membrane may become loose and be coughed up and the child relieved, but unhappily this is an unexpected termination for most usually the stenosis increases, respiration becomes superficial and more frequent, the pulse feebler and very rapid, stupor ensues and death closes the scene.

Heart failure, the result of the overwhelming of the nerve centers by the poison of the disease is often the cause of death. The kidneys are very frequently implicated in nearly all the severe cases; albuminuria to a greater or less extent is present. Paralysis is a complication of diphtheria, occurring usually as a sequelæ. It most generally affects the throat and materially interferes with deglutition and the voice; occasionally the muscles of the trunk and extremities are paralyzed. The prognosis in diphtheria is not very favorable and at all times is uncertain. The robust and healthy children succumb to the disease as well as the feeble and unhealthy. Many cases of a severe type get well while some mild cases terminate fatally. Therefore we are to be

guarded in our prognosis; still under good hygienic management and skillful treatment a fair proportion of cases get well, but diphtheria is to be regarded as a formidable disease attended with a large mortality. The course and termination of a case of diphtheria is uncertain and deceptive. Death may be the result of the poisoning of the blood by a specific virus of the disease or its ptomaines, of septicemia, diphtheretic croup, heart failure, or congestion of the lungs with cedema. The unfavorable symptoms are extensive deposits of exudations, anorexia with nausea, paleness of the surfaces, decided prostration, albuminuria, hemorrhage of the nose, extension of the deposit into the larynx.

In the treatment of diphtheria quite a variety of remedies have been suggested and many different plans proposed, for which great success is claimed. But in my own experience there are but few remedies that are of much avail and certainly none that are specific.

Although the treatment of diphtheria is not very satisfactory and in the hands of the most skilled many patients die, yet with a well formulated plan of treatment faithfully carried out we can hope for gratifying results.

The prevention of the development and spread of the disease is of the utmost importance. Being eminently contagious (in a small area) with a tendency to rapidly spread, the necessity for isolation is absolute and second to isolation is disinfection. Isolation and disinfection constitute the preventive treatment. In the treatment of the disease there are certain general principles by which we are to be guided and we cannot rely upon any particular medicine to cure the disease. The indications for treatment are to destroy or neutralize the local infection, to limit the exudation, to prevent the absorption of septic matter, to loosen and remove the membranous exudation, to prevent the disintegration of the blood, to disinfect and cleanse the diseased parts, to support the patient and to secure ample ventilation and the utmost cleanliness. The treatment of a mild case consists in regulating the secretions, the use of an antiseptic mouth wash, such as a weak solution of carbolic acid, bichloride of mercury, boracic acid or the chloride of sodium and an occasional touching of the points of exudation with some stimulating antiseptic, (not an escharotic). The following has served my purpose well:

Recipe:—Acidi carbolici, gtt. x; tinct. iodini, tinct. ferri persulphatis aa, gtt. xx; glycerini qs ad 1 oz. M—Sig.: Apply daily. For the relief of the inflammation surrounding the exudation astrigent gargles are used, and frequent swallowing of lumps of ice. Pepsin, lactic acid, trypsin, papoyatin are used for solvents of the membrane and as the membrane loosens or comes away the parts should be thoroughly disinfected with a solution of carbolic acid or mercurial chloride and this is best done by an atomizer. The general treatment will be best directed by keeping the patient quiet in bed, ordering a nutritious and easily digested fluid diet. To improve the condition of the blood, iron with a bitter tonic is given; to destroy or stay the destructive effect of the poisonous tox albumins the bichloride or mild chloride of mercury is given in small and frequently repeated doses. Later on, the muriated tincture of iron with muriatic acid and chlorate of potash is substituted for the mercuric. At the

first indication of increasing weakness the alcoholic stimulants are given; the best of these is good whisky—the wines are not active enough. The whisky must be given in large and frequent doses. Where the prostration is very great, French brandy should be substituted for whisky.

If the disease extends into the larynx and the stenosis is such as to threaten suffocation, tracheotomy is the only remedy that offers any hope. The operation is indicated by the persistent obstruction of the larynx. The operation will fail of success if the exudation has already extended into the bronchi, or the system is overwhelmed by the infection, and incipient paralysis of the heart exists. The result of tracheotomy in this condition is not very encouraging, but it is a forlorn hope and should be done.

DR. JENKS, Keokuk, Iowa—The majority of the profession agree with the doctor in believing that diphtheria is a disease which is primarily local. In a majority of cases the germ finds lodgment in suitable soil in the tonsil; from there it excites inflammation and probably the toxalbumin is absorbed. I wish to emphasize the importance of local treatment. The first thing I do when called to a case of diphtheria is to make an application of Smith's solution of persulphate of iron and carbolic acid; I frequently make the solution of pure persulphate of iron. I make the application with a piece of absorbent cotton, saturating the cotton in the solution, then pressing it firmly on one side, then on the other, touching the membrane firmly. I have used a great many other preparations but I prefer this. It coagulates the albuminous exudate and if applied early it contracts the dilated and enlarged blood vessels and in that way prevents absorption. If this application is made early, little constitutional treatment is needed. This application should be repeated two or three times a day or more. The constitutional treatment should be, calomel given freely for a day or two, then the tincture of chloride of iron, and if you choose the chloride of potash; in mild cases, give liquid diet, keep patient in bed. Give plenty of whisky towards the close of the disease if there is evidence of asthenia, or the disease invades the larynx.

AN INSTRUMENT FOR APPLYING MEDICAMENTS TO THE URETHRAL, UTERINE AND RECTAL CANALS.

Read before the Section on Surgery and Anatomy at the Forty-fourth Annual Meeting of the American Medical Association.

BY A. B. KIRKPATRICK, M.D.

PHILADELPHIA, PA.

In October, 1891, I showed this instrument to the Philadelphia County Medical Society, and read a brief paper on the subject. But the applicator has been so much improved and has been used so successfully since then that I think the subject merits further consideration.

The applicator is made in different sizes, the largest eight inches long with a caliber of half an inch, and the smallest of the same length and caliber of one-eighth of an inch. The medium sized one, three-sixteenths of an inch in diameter is best for general use. The tube is made straight or slightly curved at the distal extremity. It is composed of a seamless aluminium, silver or hard rubber tube. On the upper end of the tube is screwed a collar, on each side of which is fastened a ring for the first and second fingers. There is a steel rod or piston, on the upper end of which is a ring for the thumb, and just

below it is a spiral spring which withdraws the aluminium tip which screws on the other end of the piston rod. This tip which is two inches long, is for the absorbent cotton when the instrument is used for liquid applications. When used for powder this tip is unscrewed and replaced by an aluminium plunger one-half of an inch long, which fits the tube accurately.

The parts of the applicator which come in contact with the liquid or powders being made of aluminium or vulcanized rubber, are not oxidized or corroded. It is so simple in construction that it is easily cleaned and kept aseptic, and is very light yet strong, and it cannot get out of order. It is very easily manipulated with one hand.

The instrument was designed primarily for the introduction of a slightly compressed pencil of powder into the uterine cervix, in the treatment of endocervicitis, endometritis, etc. Almost any power can be used, such as iodoform, iodol, aristol, boric acid, salol, sulphate of zinc or tannic acid, or a combination of them with sedatives such as cocaine, morphine, atropine, etc.

In using aristol, salol, iodoform, iodol, or sulphate of zinc, I have found it best to use an equal quantity of powdered boric acid; otherwise, they pack too solidly in the applicator and are rather hard to push out and not so readily soluble. The different powders or combinations should be in screw top bottles, about an inch in diameter and two or three inches long, and the powder should be moderately loose in the bottles, so that it will not pack too firmly in the tube.

To fill the applicator, remove the piston and press the tube down into the powder several times according to the length of the pencil desired. It can be made from one to four inches long.

After filling the instrument, before introducing it I cover the end with carbolized cosmoline, or round it out with a small piece of cocoa butter, and dip it in a solution of iodoform or aristol in liquid alboline.

If the tube is passed into the cervix half an inch to an inch, and supported while the pencil is forced gently out it will follow the canal, even to the fundus of the uterus. Several pencils can be thus introduced in rapid succession, if desired.

In introducing powders into the male urethra, the instrument should be passed in in the same way as a catheter or steel bougie, and even the straight instrument will pass nearly to the prostatic portion of the urethra. If the prostatic portion of the urethra is to be medicated support the instrument in that position, and press the pencil gently out and it will follow the urethra. If the part of the urethra anterior to the prostatic portion, is to be medicated, gently withdraw the instrument while pushing out the pencil. It is well to force a piece of absorbent cotton through the tube before sterilizing, to cleanse it and make the piston work freely.

When used as a liquid applicator, the plunger is replaced by the roughened tip on which is wrapped the absorbent cotton. This is dipped into a solution of nitrate of silver, iodine, carbolic acid or peroxide of hydrogen, and then passed into the tube and the end filled with a little piece of cocoa butter and oil. Filling the end with cocoa butter prevents any of the solution from passing out before the part intended to be medicated is reached and protects the