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CARBOLIC, PHENIC AND CRESYLIC ACIDS.

A New, Ready and Perfect Mode of Embalming, as exemplified at Bellevue Hospital during the past four Months. Also its Uses as a Disinfectant and Preventive in Contagious Diseases.

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DURING the past few months, it has been my pleasure to have several invitations to be present at Bellevue Hospital College to witness the new process of embalming, before the Faculty, by simply washing the corpse with a solution of carbolic acid of a certain strength, which must not be too strong or yet too dilute. If too strong, it becomes so caustic as to destroy the tissue, and render its minute structure one common mass by coagulation. The proper strength can be determined by making the solution moderately strong, say one part of the acid to one hundred parts of water, and then dip a portion of muscular tissue into the solution and add the acid until it gives the tissue a red and natural appearance, and then, under the microscope, you will have the minute structure in all its beauty. When strong enough, it cauterizes and coagulates, giving the substance the same appearance as a free application of caustic silver. Although the patentee claims, as the following from his circular will show, that "it is simply a wash, the body is not mutilated in any way, no injection is made into the veins, no cut or incision is made upon the body, it is a disinfectant," and other virtues in his compound, we have not been able to discover, in the many *post-mortem* examinations and dissections at Bellevue, any other trace, track, smell or taste than simply that of carbolic acid, or creasote of coal-tar, or, as the chemist calls it, the hydrated oxide of phenyle.

We will now turn to the different dissections made before the medical savans of New York and her suburban cities. First,
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a body of one month's preservation; second, a body of two months' preservation; third, a body of three months' preservation; fourth, a body of four months' preservation; and others of intermediate space of time. Under this simple form, in each case, the results were uniform:—The skin soft and pliant, with the epithelium intact, the body rotund and plump, expression good and natural, the joints free and easy, and upon dissecting the brain it was found sound and free from odor, save a faint smell of coal-tar. Even the fluids were preserved. The same may be stated of the lungs, liver, intestines and spleen, the blood and blood-disks, muscular, fatty and cellular tissues. Even in a subject who died of tubercular disease of the lungs, seventy-three days after death the abscesses of the lungs had not undergone any change, and laudable pus was found from broken-down tubercles. This fact alone struck all present with wonder and admiration. During the whole of these exhibitions, the microscopic and chemical agents were freely used and commented upon, and in all cases the muscular striæ and cellular development were perfect. Dr. Doremus, Professor of Chemistry and Toxicology at this College, said, "he had the honor of embalming Archbishop John Hughes, of New York, and had witnessed the same ceremony in the case of the late Archbishop of Paris, and in many other cases in all circumstances of life, but he never witnessed any process approximating the beauty and perfection of this new mode now being introduced by Mr. Clarke, for with all other methods there would be some discoloration from the metallic injections, and a mutilation of some kind in every instance."

Dr. Sayre, Professor of Surgery in this College, furthermore said, that "he had never witnessed anything like it," and spoke also of the perfect state of preservation hereby secured.

Prof. Smith, of the same College, remarked a curious and striking incident, in the case of a corpse of a little girl. When the solution was applied to the cheeks and lips, they instantly became so florid and lifelike,
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that the parents and friends could but believe that life still existed. This was simply due to some peculiar chemical change. The simple process of bathing and wrapping the body in clothes saturated with this solution, and injecting the natural cavities or openings with the same, certainly is an easy process of embalming, and a process, too, of vital importance to all mankind, and well worthy of a visit to our hospital for verification.

It is my opinion, and that, too, of many others, that to Dr. Squibb, of Brooklyn, is due the credit of the introduction of carbolic acid and its compounds as a disinfectant, a styptic, and a preservative of surgical specimens; for it was through this celebrated chemist and pharmacist, while serving in large hospitals during the late war, that the medical officers' attention (your humble servant among others) was first called to its many good qualities. It was found then to arrest destruction, to destroy foul odors, to ward off the fly and maggot. Hence, in weak solution we used it to dress wounds, with the very best results; in stronger solutions, we used it in scrubbing our wards and privies, in washing and disinfecting clothing, and for many other purposes. Dr. Squibb furnished us a very cheap article of this kind, well known in the market as "Squibb's Impure Carbolic Acid," with full directions as to its use.

The following extracts are from a lecture by Dr. F. Crace Calvert, F.R.S., before the "Society for the Encouragement of National Industry," in France:—

CARBOLIC OR PHENIC ACID AND ITS PROPERTIES.

The disinfecting, or rather antiseptic, properties of carbolic acid are very remarkable. The beautiful researches and discoveries of M. Pasteur have shown that all fermentation and putrefaction is due to the presence of microscopical vegetables or animals, which, during their vitality, decompose or change the organic substances, so as to produce the effects which we witness; and as carbolic acid exercises a most powerful destructive action upon these microscopic and primitive sources of life, carbolic acid, therefore, is an antiseptic and disinfectant much more active and much more rational than those generally in use. It is necessary that I should here make a few remarks explanatory of the distinctions between *deodorizers*, *disinfectants* and *antiseptics*.

Deodorizers.—All substances merely acting as such are neither disinfectants nor

antiseptics, as they simply remove the noxious gases emitted from organic matters whilst in a state of decay or putrefaction, without having the property of arresting decomposition or fermentation. For it has been proved that the source of infection or contagion is not due to noxious gases or bad smells (being merely indicative of its probable existence), but, as we shall presently see, to microscopic spores floating in the atmosphere, and which by their ulterior development and propagation are believed to be the true source of contagion.

Disinfectants.—Under this head may be classed bleaching powder, or chloride of lime, sulphurous acid and permanganate of potash; they first act as deodorizers, and then as disinfectants, but they must be employed in large quantities to thoroughly oxidize or act upon organic matters, so as to prevent them from again entering into decomposition; but still it is known that if the organic substances so acted upon are exposed to the atmosphere, they will again experience decay and putrefaction. They are, in fact, more destructive agents than disinfectants, and they are never antiseptics.

Antiseptics.—All of these, such as corrosive sublimate, arsenious acids, carbolic acid, &c., act as such by destroying all source of decay and decomposition; that is to say, they destroy or prevent the formation of the germs of putrefaction or fermentation, without acting upon the mineral or vegetable matters present. The advantage of their use is, therefore, that they act, when used in small quantities, upon the primary source of all organic matters in a state of decay; further, they are deodorizers, for they prevent the formation of offensive odors, and consequently they are antiseptics, disinfectants and deodorizers. The great advantages which carbolic acid possesses over all other antiseptics is, that it cannot be used for any illegal purpose, as arsenic or corrosive sublimate may.

And allow me further to add, that disinfectants—such as chlorine, permanganate of potash, or Condy's fluid—operate by oxidizing not only the gaseous products given off by putrefaction, but all organic matters with which they may come in contact; whilst carbolic acid, on the contrary, merely destroys the causes of putrefaction, without acting on the organic substances. The great difference, therefore, which distinguishes them is, that the former deals with the effects, the latter with the causes. Again, these small microscopic ferments are always in small quantities as compared to the substances on which they act; con-

sequently a very small quantity of carbolic acid is necessary to prevent decomposition. Moreover, carbolic acid is volatile; it meets with and destroys, as Dr. Jules Lemaire says, the germs or sporules which float in the atmosphere and vitiate it; but this cannot be the case with Condyl's fluid, chloride of zinc or iron, which are not volatile, and which act only when in solution, and are mere deodorizers. This is why carbolic acid was used with such marked success, and therefore so largely, in England, Belgium, and Holland, during the prevalence of cholera and of the cattle plague. Mr. W. Crookes, F.R.S., not only states, "I have not yet met with an instance in which the plague has spread on a farm where the acid has been freely used"; but he has also proved, by a most interesting series of experiments, that the gases exhaled from the lungs of diseased cattle contained the germs or sporules of the microscopic animals discovered by Mr. Beale in the blood of such animals; for Mr. Crookes, having condensed on cotton-wool these germs, and having inoculated the blood of healthy cattle with them, they were at once attacked with the disease.

As to the value of carbolic acid for preventing the spread of cholera, among many instances which I could cite, allow me to mention two special instances: First, Dr. Ellis, of Bangor, says—I have, in many instances, allowed whole families to return to cottages in which persons had died from cholera, after having had the cottages well washed and cleansed with carbolic acid, and in no case were any persons allowed to enter such purified dwellings, attacked with the disease. Prof. Chandelon, of Liege, has stated, that out of one hundred and thirty-five nurses who were employed to attend upon the cholera patients—and they must have been numerous, for two thousand died—only one nurse died; but the nurses were washed over and their clothing sprinkled with carbolic acid. In fact, the antiseptic properties of carbolic acid are so powerful that the $\text{C}_6\text{H}_5\text{O}_2$, or even $\text{C}_6\text{H}_5\text{O}$ will prevent the decomposition, fermentation, or putrefaction for months of urine, blood, glue solution, flour paste, &c. &c., and its vapor alone is sufficient to preserve meat for several days in ordinary atmosphere, and prevent its being fly-blown; lastly, $\text{C}_6\text{H}_5\text{O}_2$ has been found sufficient to keep sewage sweet, for Dr. Letheby states, that through the use of such a quantity of carbolic acid in the sewers of London during the existence of cholera last year, the sewages of the city were nearly deodorized.

Allow me to say now a few words on the medicinal properties of carbolic acid. This question deserves to be treated thoroughly, for phenic acid is susceptible of so many applications in this direction, its properties are so marked, so evident, and so remarkable, that they cannot be made too public, and it is rendering a service to mankind to make known some of the employments of so valuable a therapeutic agent.

I would recall to you the words of the good and learned Gratiolet, and those of Dr. Lemaire, showing that carbolic acid is the most powerful acknowledged means of contending with contagious and pestilential diseases, such as cholera, typhus fever, smallpox, &c. Maladies of this order are very numerous, but in carbolic acid we find one of the most powerful agents for their prevention; for besides many instances which have been cited to me, I may add one where it was used in a family in which there were eight or ten children, and none of the family have suffered from these diseases except those who were attacked previous to the employment of carbolic acid about the dwellings in which such diseases existed.

Besides its antiseptic action, the caustic properties of carbolic acid are found useful; most beneficial effects are obtained from it in the treatment of very dangerous and sometimes mortal complaints, such as carbuncle, quinsy, diphtheria, &c., as shown by Dr. Turner, of Manchester; and also in less severe affections, such as hæmorrhoids, internal and external fistulas, and other similar complaints. But what must be especially mentioned is the employment of carbolic acid in preserving in a healthy state certain fœtid purulent sores, and preventing the repulsive odor which comes from them, an odor which is the symptom of a change in the tissues, and which often presents the greatest danger to the patient.

The services which carbolic acid renders to surgery can be judged of by reading several most interesting papers on compound fractures, ulcers, &c., lately published in the *Lancet* by T. Liston, F.R.S.; and allow me to draw your special attention to the following paragraphs which are to be found in his paper published in that journal of the 25th of September, 1867:—

"The material which I have employed is carbolic or phenic acid, a volatile organic compound, which appears to exercise a peculiar destructive influence upon the low forms of life, and hence is the most powerful antiseptic with which we are at present acquainted. The first class of cases to which

I applied it, was that of compound fractures, in which the effects of decomposition in the injured part were especially striking and pernicious. The results have been such as to establish conclusively the great principle that all the local inflammatory mischief and febrile disturbance which follow severe injuries are due to the irritating and poisonous influences of decomposing blood or sloughs. These evils are entirely avoided by antiseptic treatment, so that limbs which otherwise would be unhesitatingly condemned to amputation may be retained with confidence of the best result. Since the antiseptic treatment has been brought into full operation, and wounds and abscesses no longer poison the atmosphere with putrid exhalations, my wards, though otherwise in precisely the same circumstances as before, have completely changed their character, so that during the last nine months not a single instance of pyæmia, hospital gangrene or erysipelas has occurred in them."

The same remarkable results have likewise occurred in the two sick wards of Dr. Maisonneuve, at the Hôtel Dieu. Further, I must not overlook the valuable application made of it to gangrene in hospitals by the eminent physician, James Paget, Esq.; and, lastly, it has been used by many of the most eminent medical men with marked success in those scourges of humanity—phthisis and syphilis.

R. Ogden Doremus, M.D., Professor of Chemistry and Toxicology in Bellevue Hospital Medical College, says:—"Of late years carbolic acid has taken a prominent position among the agents capable of destroying infection. It has been found, in our hospitals, that even washing the woodwork of the rooms with a diluted solution of this substance causes certain diseases to disappear. This disinfecting property will, no doubt, be recognized by the Board of Health, as it tends to rid us of pestilence by neutralizing the filth of hitherto diseased districts, and increasing the value of property not only in those localities, but throughout the city."

Dr. Lugo, of New York, says:—"The only proper way to introduce carbolic or cresylic acid into general use, is in the shape of soap."

Dr. Harris, Registrar of the Metropolitan Board of Health, in his circular to the public, issued during the summer of 1867, says: "The disinfecting and antiseptic powers of good carbolic acid are so great that one part of it to fifty or one hundred parts is sufficient," and that, "if every tenement

house in the city were frequently and thoroughly scoured with the cresylic soaps, the seeds of disease and insect annoyance would be greatly diminished."

A NEW FORM OF CONCEALED KNIFE.

By A. J. STONE, M.D., Assistant in Practice to Prof. H. R. STORER, and Assistant Surgeon to the Franciscan Hospital for Women, Boston.

I WOULD, through the columns of this JOURNAL, call the attention of the profession to the merits of a concealed knife, of my invention, which, although contrived for the relief a single case of phymosis, may be made useful in a number of ways.

As will be seen by reference to the annexed cut, it consists of—

1st. A cylinder the size of a No. 1 catheter, seven inches in length, at one end of which is a male screw thread, also loops by which the instrument may be steadily held in the hand. At the other end is a slot, two lines in length by one third of a line in width, approximating as nearly as possible to the extreme end of the cylinder, within which is laid an inclined plane of hard solder.

2d. Within this tube fits a steel shaft holding, by a rivet-hinge, a fine steel blade, three lines in length by a line and a half in width, the same being of "scythe" shape, thus affording a convex back, which slides easily upon the inclined plane contained within the cylinder. At the opposite extremity is a "cap-screw," with internal female screw-thread fitting over, and consequently allowing the cylinder to fit between the shaft and itself, being retained in place, and, at the same time, allowed rotary motion by the shaft being riveted through it.

Where phymosis results from the cicatrizing of old sores, there are but two ways of operating, namely, the usual ones of circumcision and of slitting up the prepuce to either the *corona* or to its jointure with the *corpora cavernosa*. When, on the contrary, the phymosis is congenital, it may be of two, and possibly of three, classes