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INSTRUCTIONS AND OBSERVATIONS

CONCERNING

THE USE OF THE CHLORIDES

OF

SODA AND LIME.

BY A. G. LABARRAQUE,

PHARMACEUTIST OF PARIS, MEMBER OF THE MEDICAL SOCIETY AND THE
ROYAL ACADEMY OF MEDICINE.

TRANSLATED

BY JACOB PORTER,

MEMBER OF THE AMERICAN ANTIQUARIAN SOCIETY AND THE AMERICAN GEO-
LOGICAL SOCIETY, CORRESPONDING MEMBER OF THE LYCEUM OF NA-
TURAL HISTORY OF NEW-YORK, THE TROY LYCEUM OF NATURAL
HISTORY AND THE LYCEUM OF NATURAL HISTORY OF THE
BERKSHIRE MEDICAL INSTITUTION, AND HONORARY MEM-
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ON THE USE OF THE
CHLORIDES OF SODA AND LIME.

THE disgrace, that deservedly attends those, who abuse the public credulity, by publishing to the world those works, in which they proclaim their wonderful remedies adapted to the cure of all diseases, prevented me from printing any instructions concerning the use of the chlorides in medicine at the time when the first experiments were made with these agents, notwithstanding their happy effects. I limited myself, at that time, to making known my views, verbally or in writing, to the most respectable members of the profession, who could not find, in what had been published on this subject, any disclosures sufficiently extended; but the benefits of them were so constant, and had become so numerous, that, being requested on every side to give some directions concerning the employment of the chlorides, I found myself under the necessity of drawing up instructions to point out the manner of using them. These instructions had become otherwise indispensable for the purpose of spreading these powerful disinfecting agents in the Antilles and other countries so often desolated by distressing and contagious diseases.

The most useful discoveries frequently experience the greatest resistance in their adoption. It has, however, been otherwise with the chlorides; for, soon after making fully known the result of my experiments on putrefaction, which were verified by the members of the Council of Health and several other learned men of the metropolis, the counsellor of state, prefect of police, approved of the instructions for disinfecting bodies removed to la Morgue, and directed me, by his resolution of October 19, 1823, to furnish the chloride necessary for the purpose. I supposed it would be useful, in order to in-

spire more confidence, to introduce with this authentic piece what I should say concerning the powerful therapeutic agent, that I proposed, and to support still more these Instructions by authority, I annex the judgment expressed concerning my labors by the Society of Encouragement for National Industry.

All the facts respecting the application of the chlorides as a medicine, that are related in my Instructions, were nothing more than the statement of what had been already published by respectable physicians, who had kindly made the applications, either jointly with the inventor of the disinfecting process, or alone in conformity to my ideas.

After three years of uninterrupted success among the sick, proved by the observations published in the various scientific journals, and, especially, after a considerable number of experiments on animal matters in a state of putrefaction, the Royal Institute of France proclaimed, in their turn, the beneficial effects of the application of the chlorides of lime and soda by decreeing me a first prize, at their public sitting, June 26, 1825.

The first edition of my Instructions being entirely exhausted, I now republish them, adding only some new facts and discoveries, with which numerous experiments have furnished me.

PREFECTURE OF POLICE.

PARIS, October, 19, 1823.

We, counsellor of state, prefect of police, having examined the Report of the Council of Health, from which it appears that numerous experiments made successively at different places, and particularly at la Morgue, have proved the efficacy of the chloride of lime as a disinfecting agent after the process of M. Labarraque, pharmacist of Paris, have resolved as follows:

ARTICLE I.

There shall be a disinfecting apparatus of the invention of M. Labarraque at la Morgue, and with each of the commissioners of police designated below.

INSTRUCTIONS RESPECTING THE METHOD OF USING THE CHLORIDE OF LIME AFTER THE PROCESS POINTED OUT BY M. LABARRAQUE, PHARMACEUTIST.

It appears from repeated experiments, that the chloride of lime diffused in water has the property of sensibly purifying the air and of checking putrefaction.

Though the employment of this agent may become useful in a variety of circumstances, we shall in the present Instructions, limit ourselves to its application in two of the most frequent cases.

It will be easy, by analogy, to make use of the same process at all times when it shall be thought necessary to have recourse to it.

TAKING UP AND INSPECTING A CORPSE.

Before approaching a corpse in a state of putrefaction, it will be necessary to procure a tray, into which should be turned two pailfulls of water, (24 liters): on this water turn a bottle, (half a kilogram,) of the chloride of lime and stir well the mixture.

A cloth should then be taken and wet in the water of the tray, in such a manner as to be taken out easily, and laid very readily on the corpse.

For this purpose let two persons unfold the cloth, and put it in the liquid, holding the extremities, which should lie on the edges of the tray; this should then be brought to the side of the putrefying body, and, at the same time, let the moistened cloth be taken out and spread on the corpse. Soon after the putrid odor will cease.

If blood or any other liquid proceeding from the corpse should fall on the floor, it will be necessary to turn upon this liquid one or two glasses of the chlorated water; then rub it with a broom, and the fetid odor will disappear.

The operation, however, should not be performed in this manner when the liquids spread on the floor are to become the subject of a chymical analysis. It will then be desirable to collect with care the greatest quantity possible: and, after

this, it will be proper to proceed to the cleansing of the floor as above directed.

If the infection is spread into the neighboring apartments, such as staircases, porticoes, and the like, the infected places should be sprinkled with one or two glasses of the liquid chloride of lime, and the fetid smell will cease.

Care should be taken often to sprinkle with the liquid contained in the tray the cloth, that covers the body. This will prevent the putrid odor from being reproduced.

As soon as the body is removed, the cloth, that has been used for the purpose of disinfection, should be washed in a large quantity of water, dried and laid by.

DISINFECTION OF VAULTS AND VESSELS FOR URINE AND FECES.

On two ounces of the chloride of lime turn three or four pints of water and shake the mixture; then draw off and sprinkled the solution upon or in the vaults and vessels for urine and feces.

If the offensive smell is not quickly destroyed, repeat the operation at the end of eight or ten minutes.

If the infection proceeds, in whole or in part, from urine or fecal matters spread on the ground, it will be proper to sprinkle this likewise with the same solution.

Examined and approved by us, counsellor of state, prefect of police.

Signed,

G. DELAVAU.

Extract from the proceedings of the Society for the Encouragement of National Industry, at their general meeting, October 30, 1822.

The Society for the Encouragement of National Industry, in awarding a prize for my Memoir at their general meeting of October 30, 1822, express themselves thus: "Whereas the first and principal question, that was proposed by the counsellor of state, prefect of police, and for which the prize was instituted, is completely answered by M. Labarraque, author of

this Memoir, the committee think proper to adjudge to him the full prize, imposing on him, nevertheless, a condition, to which he will very willingly submit, that of drawing up a summary of his process, of publishing it to the world, and of following up with zeal the execution of it in the various manufactories. This measure appears to us indispensable, in order to render profitable the discovery of M. Labarraque."

NOTE. This committee consisted of MM. count Berthollet, member of the Academy of Sciences; Bréant, examiner of the experiments at la Monnaie; Darcet, member of the Academy of Sciences; Dartigues, member of the General Council of Manufactures; Despretz, professor of chymistry in the Polytechnic School; Mérimée, perpetual secretary to the Royal School of the Fine Arts; Pelletier, professor in the School of Pharmacy; Roard, member of the Board of Advice of Arts and Manufactures; Thenard, member of the Academy of Sciences; Vauquelin, member of the Academy of Sciences; and professor Robiquet, reporter.

OBSERVATIONS CONCERNING THE USE OF THE CHLORIDES OF LIME AND SODA, BY A. G. LABARRAQUE, PHARMACEUTIST.

I am desirous of complying with the condition, that was imposed upon me by the Society of Encouragement, and even, in the Memoir printed the following month, I mentioned the cases where the powerful disinfecting agents, which I there made known, had been usefully and very extensively applied. I also expressed a wish that all the dissecting rooms, la Morgue and all the shops where animal matters are handled, might be purified by these means. The public authority, after numerous experiments followed with never failing success, gave suitable orders for making the application. I particularly recommended as indispensable the employment of the chlorides in a case of exhumation for the purpose of examining judicially the body of an individual buried several weeks before. The truth of

my assertion was proved by M. professor Orfila upon a corpse, that had been buried thirty-two days and in the hottest season of the year.

This remarkable inspection, performed after the sudden destruction of the fetid smell, fully proved the disinfections, that had been performed before the learned.

It was, indeed, a very important discovery, to arrest the decomposition of animal matters, and destroy, so to speak, many causes of death; for who does not know the fatal influence of putrefying animal matters diffused in the air we breathe, and bearing with them the germ of mortal diseases? But there remained something more fortunate still, that of arresting the decomposition of living animal matter. This prodigy I have had the happiness to see performed by the use of the chloride of soda on sores. By means of this, the carbuncle has been arrested in its ravages and cured; the foulest putrefaction of the hospital, degenerate venereal ulcers, and, indeed, gangrenous sores, that were of a bad character, have been rapidly healed. The cancer has been disinfected, and experiments are made upon this frightful malady, as on herpetic eruptions. Some observations concerning the cure of the scald head have likewise been communicated to the Royal Academy of Medicine.

In general, it may be inferred from every thing, that has been observed in the use of the chloride of soda upon the human system, that this liquor is adapted to destroy the fetid quality of sores, change their nature, and make them pass to the state of simple sores; that it is especially efficacious in atonic ulcers, hospital putrefaction, gangrene, and the like. It may be employed pure, or diluted with one, two, or as far as to eight parts of water; it should be applied in lotions, taking care to cover the sores with lint moistened with the liquor. They should be dressed twice a day; but, when they are red and inflamed, the use of the chloride should be discontinued, and the dressings, in this case, should be performed according to the prescriptions in treatises of surgery.

For ulcer of the uterus, the chloride of soda should be diluted in from twelve to fifteen and even to thirty times its weight of pure water, and used for injections. Prudence will require that this should be done under the direction of a physician, who may increase or moderate its action, or even suspend the use of it when necessary.

The chloride of soda is that, which should be used upon the human system; the action of the chloride of lime would not be equally efficacious, though, as was before observed, it possesses as great a disinfecting power. For instance, it will certainly destroy the offensive exhalations, that are diffused in a place inhabited by persons affected with diseases of a bad character, if care is taken to sprinkle the chamber with either of the liquid chlorides very much diluted in pure water, or even by letting it stand in a pan, that is placed in the chamber. The chloride should be renewed morning and evening, or whenever it has lost its peculiar odor.

Physicians and others attending on the sick, that are affected with contagious diseases, will derive very great benefit from the liquid chloride, if, to the precaution of breathing it before approaching the sick, and of moistening their hands, they add that of sprinkling it on the floor, and particularly around the beds.

The chlorides of lime or soda will be of great utility for cleansing the interior of a ship, and, for this purpose, a spoonful of the chloride should be put into a bottle of water, and this liquid will serve to sprinkle the apartments of the ship; the dose should be stronger, if the fetid smell is considerable. This operation should be repeated twice a day.

Notes containing some of the cases referred to in the preceding paper.

1. Report concerning the Inspection of a Corpse made at the request of the King's Attorney, August 1, 1823, by MM. Orfila, Hennelle, Gerdy and Lesueur, drawn up by M. Hennelle.

“On the first of August, M. professor Orfila and MM. Lesueur, Gerdy and myself, at the request of the king's attorney,

repaired to the cemetery of father Lachaise, for the purpose of examining the body of a man, who died a month before. At half after seven in the morning, we proceeded to disinter the body; it exhaled an infectious odor; it remained on the ground, and out of its coffin till half after ten, the persons, who were to certify its identity, not having arrived. The temperature was from 17 to 18 degrees of the centigrade thermometer. The body was then conveyed to a large and well aired place, that the examination might be made with as much safety and convenience as possible. The odor was still more insupportable, and the corpse had evidently become inflated since its exhumation; it was, therefore, important, in this case, to make the examination with as much expedition as possible. We began by sprinkling the subject with the chloride of lime dissolved in water. This liquor, which was proposed by Labarraque, pharmacist, produced a wonderful effect, for we had scarcely made a few aspersions when the infectious odor was instantly destroyed, and it became practicable to commence the operation." Extracted from the Archives Générales de Médecine for August, 1823.

2. An Account of a gangrenous Affection of the Jaw, cured by Labarraque's Chloride of Soda, was communicated to the Royal Academy of Medicine, at their sitting of April 10, 1823, and inserted in the *Revue Médicale*, by M. Rey, doctor of medicine.

3. The following memoir was read to the section of surgery of the Royal Academy of Medicine, at the sitting of July 24, 1823.

"Observations relating to complicated Venereal Ulcers, cured by means of the Chloride of Soda, by M. Gorse, doctor of medicine, principal surgeon to the army, and surgeon in chief to the Military Hospital of Picpus, at Paris." Inserted in the 14th volume of *Recueil de Mémoires de Médecine, de Chirurgie et de Pharmacie Militaires*, published by order of his excellency, the minister of war. As this work is not to be found at the bookstores, I think proper to cite, in this place, the first of these cases.

“ A corporal of the sixteenth regiment of the line, entered the Military Hospital of Picpus, January 29, 1822, for an ulcer on the prepuce, and a bubo in the right groin. He was treated with friction : The bubo suppurated in a few days, and was opened with the bistoury. The ulcer healed very well, but the sore of the bubo, which was rather large, remained stationary for more than five months, notwithstanding the most appropriate applications both general and local.

“ At the end of this time, the gastric and pulmonary organs were the seat of a severe irritation ; the sore of the bubo was changed into a phagedenic ulcer, which was inflamed and became painful ; the suppuration was fetid and very abundant, the hospital putrefaction finally attacked him, and, in a few days, the ulcer invaded a great part of the surface of the abdomen. The patient was then removed from the rest.

“ The inflammation of the gastric organs, however, yielded to a suitable treatment ; but the hospital putrefaction continued its ravages. All the means employed in similar cases being resorted to, the ulcer again assumed a good appearance.

“ The mercurial treatment, which had been discontinued, was resumed ; and every thing went on very well for some time.

“ A little afterwards, the same symptoms appeared with far greater severity, and brought the patient within a hair's breadth of the grave. The same means being again resorted to, produced once more a momentary suspension ; but, not long after, he suffered a new return of the symptoms, that had been mitigated ; in short, he lingered, for nearly a year, between life and death.

“ The patient was in the following situation, May 16, 1823, the time when the chloride of soda was first applied ; extreme emaciation and debility ; inflammation of the gastric and pulmonary organs, gums swelled and spongy, skin dry and husky, perpetual constipation and sleeplessness ; the ulcer extended to the upper part of the hips, passing over the abdomen within two inches and a half of the umbilicus ; it descended on each side between the scrotum and thighs ; its appearance

was frightful, and it occasioned the most excruciating distress. The extremities were swollen, indented, here and there decayed, and all the skin, that covered them, was discolored. The suppuration, which was very abundant and extremely fetid, was mixed with blood oozing from the corroded vessels.

“The sores were dressed three times a day with lint wet with the chloride of soda, in a dose of two ounces with four ounces of water. The next day the odor of the chloride destroyed that of the hospital putrefaction. The dose of the medicine was increased one ounce, and the same dressing continued; the day afterwards, there was no fetid odor, and very little suppuration; the surface of the ulcer appeared very favorable; the healing proceeded from the circumference towards the center, and showed itself at once on different parts of the ulcer. The other inflammatory symptoms had disappeared.

“The fifth day the chloride was applied pure; the healing proceeded steadily and rapidly. The ninth day, the inflammation being too severe, the use of the chloride was suspended, the ulcer was dressed with dry applications, and the fungous flesh was cauterized with the dissolved nitrate of silver. The chloride was resumed about the fourteenth day, and, on the eighteenth, there remained only a few ulcerated parts. The corporal recovered his appetite, and walked about on crutches. Soon afterwards his strength returned, and he is now radically cured.”

4. The following memoir was read before the Royal Academy of Medicine. Notice concerning the Use of M. Labarraque's Liquid in the Local Treatment of Certain Ulcers, by M. Cullerier, surgeon, member of the Royal Academy of Medicine. See the first volume of the Archives Générales de Médecine, and the Annales de la Médecine Physiologique for April, 1823.

5. An Account of the Cure of an Ill-conditioned Scald Head was communicated to the Royal Academy of Medicine by doctor Roche. This had resisted the various common remedies.

ROYAL INSTITUTE OF FRANCE.

ROYAL ACADEMY OF THE SCIENCES.

Extract from the Proceedings relating to the Prizes decreed at the public Sitting of Monday, June 20, 1825.

Prize instituted by the Will of M. le Baron de Montyon.

There is awarded to M. Labarraque, pharmaceutist of Paris, a prize of three thousand francs, for having proved, by a great number of experiments, that the solution of the chlorides of lime and soda dissolved in water may be employed with success, economy and facility for destroying, at once, the infectious odors of the animal matters, that are employed in making catgut, and likewise in the process of dissecting bodies in a state of putrefaction, as well as for cleansing places where the air is corrupted.

ON CERTAIN USES OF THE CHLORIDE OF SODA.

REMARK. In preparing the chloride of soda, one should follow exactly the prescription, that is published in my Memoir; for, if this is not regarded, its properties are changed, and its action may be destroyed; whereas, if the chloride possesses all its properties, we may be certain of obtaining always the effects, that are stated in this notice.

After reading the preceding Observations, judicious practitioners have been able to distinguish the cases where the application of the chloride of soda would be followed by a happy result, and enlarge the province of the healing art by pointing out the diseases, that require its use. It would be tedious to mention all the justly celebrated physicians and surgeons, who have studied the operation of the alkaline and earthy chlorides. I cannot, however, refrain from holding up to the gratitude of the friends of humanity M. Bielt, physician to the Saint Louis hospital, for his numerous applications of it to herpetic affections; and M. Jules Cloquet, joint surgeon in chief to the same hospital, for his successful

applications of it to gangrenous ulcers. In several of these extremely severe diseases, this able surgeon caused the sphacelated limb to be bathed in chloride diluted in from ten to fifteen parts of water, and gave inwardly from twenty-five to thirty drops of the chloride of soda in a pint of barley water. His observations will be published.

Professor Marjolin, surgeon in chief to the Beaujon hospital, made use of the same chloride for gangrenous affections, whether they appeared in consequence of the amputation of a limb, or from any other cause. He observed that the slough separated readily, and that the disease, in a very great number of instances, was subdued.

Doctor Ségalas, a professor approved by the Faculty of Medicine, after a series of physiological experiments, said, more than two years since, "Great caution should be observed by the physician in the use of this remedy upon the denuded muscles, and, above all, in its injection into the genital parts. Diluted in water, it is less irritating, and preserves the no less precious qualities, that have placed it among our most powerful medicines."

"I have," said he, "this day verified this last remark in two cases of the cure of gangrenous disorders effected very recently under the influence of this agent, commonly designated by the name of Labarraque's liquor. One was the case of a man affected with a gangrene in consequence of an infiltration of urine." Here follows a description of the disease. "Besides, the scrotum of the patient was five times its natural size, infiltrated with urine and sphacelated in its lowest part, ellipsoid in its dimensions, from four inches in one direction, to two and a half in the other. I made a deep incision into the slough, whence the sore might discharge, and passed a fine probe into the urethra; I then applied lotions to the mortified parts with some chloride of soda in a pure state; the place, the bed and the chamber were purified instantly. I finished with a dressing of lint impregnated with the same liquid diluted in four parts of water. The next morning, to my great satisfaction, I found

several sloughs detached, and the patient in a very good way. I repeated the dressing of the preceding day; in the evening, the sore was alive over its whole surface. I then discontinued the use of the chloride; and, in ten days afterwards, it was entirely healed."

The second was the case of a horse treated by M. Bouley, the younger, veterinary surgeon, and of which an account will be given hereafter.

M. Samson, ordinary surgeon to the Hôtel Dieu, disinfected the ulcerations of the mouth with caries of the bone, and suspended for some time the ravages of this frightful malady. The same surgeon, after having, in the presence of doctor Lefèvre, applied the ligature to an enormous uterine polypus, saw putrefaction attack this foreign body; he effected the disinfection by some applications of chlorated water, and the mortified substance was detached. The operation was followed with success.

M. Lagneau, doctor of medicine, made use of the chloride in injections as an emollient for the gums with ulcerations, exhaling a very fetid smell. The condition of the patient was ameliorated, and, after each injection, the odor was destroyed. M. Regnard, dentist, wished to apply the chloride of soda to arrest the caries of the teeth, and destroy the odor of the mouth; but he observed that this medicine excited, in a disagreeable manner, the salivary glands, and, on this account, he believes that it should not be employed as a mouth wash.

Doctor Chantourelle employed, a considerable time since, the chloride of soda, diluted in ten parts of water, in two cases of malignant sore throat, and all fetidity, so dangerous to the assistants and the physician, disappeared. These cases have been communicated to the Medical Society of Paris. Very recently he derived great benefit from the use of the chloride taken internally, in a dose of twenty-five drops in a cup of water, to prevent the disengagement of hydrosulphuric gas, which was very troublesome to a person poisoned by the hydrosulphuret of potash, previously expelled by vomiting.

His memoir, read before the Royal Academy of Medicine, has given rise to a learned report.

A remarkable fact has been observed in a case of asphyxia attended with the most severe symptoms of locked jaw. The patient was restored to life by breathing the chloride of soda. A notice of this case, (which was caused by the exhalations of substances taken from the vault of a privy,) with experiments adapted to prevent similar accidents, was read to the Royal Academy of Medicine, and inserted in several scientific journals of the metropolis.

M. Lisfranc, surgeon in chief of la Pitié, continues with excellent success the cure of burns and common ulcers by means of the chlorides. The chloride of lime, dissolved in water in convenient proportions, and which is accomplished at three degrees of M. Gay Lussac's chlorometer, has perfectly succeeded with him in cases of this kind. The memoir, which he proposes to publish on this subject, and which he has announced to the Royal Academy of Medicine, will be read with the deepest interest.

Ulcers in the nose have been disinfected and cured by injecting, twice a day, the chloride of soda diluted in from two to ten parts of water.

In certain diseases of the bladder, the urine is rendered infectious and very offensive to the patient. The disinfection may be effected by putting some drops of concentrated chloride of soda into the vessel, in which it is voided. The same result may be obtained on the urine voided after eating asparagus, except that it is necessary, in this case, to employ a larger quantity of chloride.

To M. Ségalas, who devotes himself particularly to giving instruction on diseases of the urinary passages, I am indebted for the knowledge of a remarkable fact respecting the disinfection of urine in the organ, that contains it, and the relief, that the patient experienced in consequence of using the chloridè. I cite it here for the purpose of drawing the attention of gentlemen of the profession to analagous cases.

M. G. aged 69 years, affected with a palsy of the blad-

der, and passing no urine for several weeks, except by overflowing, became, after some days, a prey to all the disasters, that succeed the forced distention of the bladder, a prolonged continuance of the urine in this viscus, and the passing of a part of this liquid into the blood. The hypogastric region was distended and painful; the urine, disturbed and ammoniacal, deposited a thick purulent matter, brick colored and fetid; the tongue was parched, the skin dry, the chest embarrassed, the voice hoarse and feeble; he was very restless, and experienced occasional delirium. M. Ségalas was called. This physician, by the introduction of the catheter, confirmed the diagnostics pointed out by the symptoms. A catheter of elastic gum, introduced with the greatest facility, gave vent to a large quantity of purulent urine, and of an insupportable odor. The instrument was left in the urethra for two days, but was several times obstructed. Several times, in consequence of this, injections were used, but they had little success, which determined M. Ségalas to make use of a catheter of a double course, and wash the bladder with a large quantity of water, following the ingenious method of M. Jules Cloquet.

This expedient, employed several days in succession, had the effect, that was anticipated from it. The bladder was relieved from the influence of the putrid matters, that disturbed it, the urine flowed with facility by the tube, and the general state of the patient was sensibly ameliorated; still the urine continued to deposit fetid purulent matter, which sometimes passed the catheter almost pure.

M. Ségalas then had recourse to the chloride of soda diluted in sixty parts of water, and conveyed into the bladder by means of the double catheter. A first irrigation of this kind produced a very remarkable diminution in the secretion and odor of the purulent matter; a second, made forty-eight hours afterwards, was followed with similar success, and two others, made at two days' interval, so far restored the patient that he was able to attend to his occupation, making use regularly of the catheter for each excretion of urine.

The patient experienced no painful sensation during the irrigation made with the chloride thus diluted in water.

This case was communicated to the Royal Academy of Medicine at the sitting of August 11, 1825.

It is believed that certain poisons may be destroyed by the contact of the same chloride; but the experiments have not yet been sufficiently numerous to affirm it with certainty.

The linen and lint, that are used for dressing the fetid sores, preserve, for a long time, their odor, and contribute to the unhealthiness of the places where they are laid. This may be prevented by turning a cup of concentrated chloride upon five quarts of water, and soaking the cloths in this liquid. They may be immediately taken out and laid by to dry, as they will have lost their odor.

The disinfection of the halls and markets, effected in August, 1824, by order of the authority, proves, together with the facts reported in this notice, for how many purposes, having for their object the destruction of the causes of fetidity, the alkaline and earthy chlorides may be usefully employed. These substances will finally become of habitual, and even domestic use, which would justify details, into which I have not thought proper to enter.

The public health will lay us under obligation to moisten with the disinfecting chloride, a body, that begins to give evident signs of decomposition before the time prescribed by custom or the laws permits it to be buried. In this case let a bottle of the concentrated chloride be put into twelve liters of water; a cloth dipt in this mixture should then be laid over the corpse, taking care to sprinkle it occasionally with the same liquor during the time that it is preserved. The necessity of this operation is daily felt at Paris, and far more so in hot climates. Gentlemen of the profession, called to inspect or embalm a body, may likewise preserve themselves from every unwholesome exhalation by making use of the chloride in the manner, that has just been pointed out. Physicians called upon to certify the deaths of patients, and persons, that attend the sick, may secure themselves from the

tetid exhalations by applying to the nose a pocket vial containing the disinfecting chloride.

The chloride of soda, diluted in twenty-five or thirty parts of water, has been employed with success to disinfect and preserve the corpses in the halls of dissection. This operation is performed by means of a water-pot of tinned copper, of the capacity of six kilograms, which should be filled with chlorated water. The fetid bodies are sprinkled twice a day, the ground is then swept and washed with a large quantity of water. At the moment of contact the infectious odor is destroyed, and the animal exhalations, that are diffused in the air, are neutralized.

This would be the place to speak of the cleansing processes in the lazaretto of Marseilles, which I developed in my letter to his excellency, the minister of the interior, and which the Superior Council of Health of the kingdom adopted long since, and the execution of which is entrusted to the enlightened zeal of the physicians, who are charged with this interesting establishment; but these things will possess greater interest after experience shall have confirmed them. This would likewise be the place to relate the experiments made during two nights at Bicêtre in eight halls, that were very much infected. These halls, to the great satisfaction of the patients and the physician, who takes care of them, were purified by sprinkling them with a bottle of the concentrated chloride diluted in thirty parts of water. The remainder of the liquor served to disinfect the tubs placed without the halls, and the vaults of the insane. It will be readily perceived that this mode of cleansing places inhabited by a great number of persons is very simple, little expensive, and must be of important service, when applied to barracks, guard-houses, and military hospitals. His excellency, the minister of war, voluntarily addressed to me, on the seventh of August, 1824, a very flattering letter on this subject, and the *Recueil de Mémoires*, published by his order, contains several papers relating to the use of the chlorides.

The epizootic distemper, that prevailed some months since

among horses, has furnished me with the opportunity of stating the effects of the chloride of soda upon the carbuncle-like affections, with which these animals are very often afflicted. One will be able to judge of these effects by the note, which M. Bouley the younger, veterinary surgeon, inserted in the *Recueil de Médecine Vétérinaire* for June, 1825, and which I think proper to republish in this place.

“Note concerning the Use of the Chloride of Soda in the Treatment of Gangrenous Tumors; by M. Bouley, the younger.”

“All the veterinary surgeons, who have employed setons in the treatment of the epizootic malady, have uniformly observed that these means were almost always useless and often dangerous. I have myself particularly noticed eight carbuncle-like tumors, that were the result of their application. Five of the animals, that were thus affected, died, the three others were cured. The five first were treated with cauterization and the antiseptics given inwardly, and the other three by the same means and the use of M. Labarraque’s chloride of soda.

“The happy effects, that I obtained from this medicine, induced me to make known with some details the circumstances in which I made use of it, and the results, that followed.

CASE I.

“On the thirty-first of March last, a bay horse five years old, belonging to the count d’ Yssy, was attacked with the prevailing malady. A proper treatment was adopted to relieve this affection, which did not show any alarming symptoms till the fifth day, when a considerable tumor, somewhat painful, appeared on the breast, in the place where two setons had been made some days before, and assumed, in a short time, all the characters of carbuncle. I then hastened to suppress the setons; I made at the same time, twelve or fifteen punctures by cauterization into the confined parts, and prescribed camphor and the extract of gentian in suitable proportions. These measures did not produce the effect, that I had ex-

pected, and, in the course of the fifth or sixth night, the distemper made rapid progress. He was newly cauterized, and the same treatment was again resorted to. Finally, on the seventh day, there flowed from the tumor, which had newly increased, a sanious, fetid humor, of a peculiar odor, that did not permit us any longer to doubt the existence of gangrene; the prostration of strength was extreme, and every thing indicated a fatal and speedy termination. Such was the almost desperate situation of this animal, when doctor Ségalas saw him and advised me to employ M. Labarraque's chloride of soda, assuring me that he had obtained wonderful effects from it, in a similar case, upon the human system. I hastened to profit by the advice of this learned physician, and made frequent injections of the chloride into the openings made by the actual cautery. These injections were made at all hours, and the sores dressed immediately afterwards by means of cut hemp. I also caused frequent aspersions to be made in the stable with the same liquor diluted in five or six parts of water.

“From the time that I made use of this medicine, the tumor made no sensible progress; and the disagreeable odor which it exhaled, did in part disappear. From the fourth to the fifth day the sloughs began to fall off, suppuration was established, and every danger ceased; finally the considerable sore, that resulted from the decay of the gangrenous parts, was readily cicatrized, and in less than a month, the animal was able to return to his customary service.

CASES II AND III.

“Two horses belonging to one M. Ingé, butcher at Paris, the other to M. Renoult, agriculturist at Yvry, were affected, in the month of May, with the prevailing disorder, and both experienced the same disaster in consequence of the application of setons. These animals were treated and cured by the same remedies as the preceding, in the space of twenty or twenty-five days.

“I do not pretend that the chloride of soda is a panacea

for all gangrenous tumors, nor do I suppose that this medicine alone would be sufficient ; but I believe that it is a powerful auxiliary, and I am authorized by the facts to think so, seeing the five first horses, which I treated only with cautery and tonics, died, while those, that were submitted to the action of the chloride, are cured."

M. Chanas, veterinary surgeon to the king's cavalry at Paris, in a carbunclelike tumor, which, in a few hours, had very considerably increased, made a deep and very extensive incision on each side of the horse's neck, the animal discovering no signs of feeling. He then applied tow, dipt in concentrated chloride, to these incisions. After the expiration of four hours, the animal experienced some pain. The dressing was performed morning and evening for five days with the same liquor. The swelling gradually diminished ; the healing of the sore was effected in a short time, and the horse was cured. MM. Dupuy, Girard the son, and Vatel, professors in the school at Alfort, and Berger, veterinary surgeon to the lifeguards, have in like manner verified the efficacy of the chloride in these affections.

M. Dard, a young veterinary surgeon, wrote to me, July 17, 1825 : "The good effects, that I obtained from the chloride of soda in several cases, and especially in the treatment of a horse affected with the glanders, which is now completely cured, induced me to repeat the same method upon another horse, affected with the farcy, a disease almost equally obstinate." I give this extract from the letter to induce gentlemen of the profession to try the experiments.

Instructions for disinfecting and cleansing the stables of the king's lifeguards and cavalry at Paris, were drawn up some time since. The writer has reason to felicitate himself on their having been exactly followed. The distemper has ceased to spread its ravages. A great number of proprietors have, in like manner, shared in the good effects of using the chloride of soda to cleanse their stables and sheepfolds. M. Girard, late professor and director of the school of Alfort, has in the third edition of his "Notice sur la Maladie, qui

règne épizootiquement sur les Chevaux," thought proper to print these Instructions, introducing them with the following note.

"This liquor, employed with advantage by MM. Bouley the younger and Vatel, quickly destroys the fetid odor, that the tumors exhale, facilitates the healing of the sores, and appears to be a powerful antiseptic. We consider it a duty to publish here a note of M. Labarraque, who first proposed the use of this method already advantageously known in medicine."

Note of M. Labarraque concerning the Use of the Chloride of Soda for disinfecting Stables.

The chloride of soda will be of very great utility in purifying and disinfecting unwholesome stables and those, that have been occupied by sick horses. It should be employed in the following manner.

Let a bottle of the concentrated chloride be put into a pailfull of pure water, and stir the mixture.

Dip a broom or stout brush into the chlorated water, and immediately rub it forcibly over all the sides of the walls, over the manger, the rack, and generally over all the upper and lower parts of the stable. This done, wash with pure water all the parts, that have been wet with the chloride. Finally, proceed in this operation after the manner of the painters, who wash a second time the ceiling of an apartment.

A stable forty feet long by twelve in breadth and ten in height, requires four bottles of the concentrated chloride. Each bottle should be diluted in ten or twelve liters of the water of the Seine. After this, a single bottle will be sufficient for a stable of three or four horses.

The disinfection of a stable being effected, the doors and windows should be opened to let it dry; horses may then be kept there without fear of infection. Nevertheless, should any disease prevail, it will be necessary, as a preventive, to sprinkle the stable, morning and evening, with the chlorated water, which should be prepared as follows: A bottle of the

concentrated chloride should be put into four or five pailfulls of water, and the stables sprinkled freely with this mixture. Neither horses nor men will experience any inconvenience from this means of disinfection, and great advantages will be obtained with respect to health.

In washing the horses, as it is customary to do after they are cured, and before they mix with other horses, it will be very useful to substitute for vinegar and water, some of the water containing a small dose of the chloride, that is to say, prepared as has just been pointed out for sprinkling.

These instructions are too short not to leave, in certain circumstances, something to desire; but the intelligence of our veterinary surgeons will supply what may be incomplete, and the alterations, which they will think proper to adopt in conformity to cases and localities, will render this method of disinfection perfectly effectual.

CONCERNING THE USE OF THE CHLORIDE OF LIME AS A DISINFECTING AGENT.

The public authority, in the distinguished mark of approbation, which, with the sanction of the learned, they bestowed on my process of disinfection, seemed to give a preference in favor of the chloride of lime over that of soda. These two chlorides are equally proper for arresting putrefaction; both, however, have not the same secondary properties. I will explain myself. In the process of disinfecting putrid animal matter, the chloride passes to the state of hydrochlorate, and the hydrochlorate of lime, possessing the property of absorbing the moisture of the air, fixes it upon the disinfected body. Thus, one of the conditions of putrefaction being humidity, it follows that whenever the disinfecting process is effected, the chloride, after a longer or shorter time according to its quantity, changes its state, and affords one of the conditions proper to reproduce fetidity. The chloride of soda, on the contrary, in passing to the state of hydrochlorate, causes the formation of a very dry salt, which acts as a preservative by coagulating the principle, that begins the putre-

faction. It is this, that I call a secondary property. Thus the chloride of soda will be proper at all times, when it is desirable to disinfect a body and prevent the putrefaction from being reproduced; it will be peculiarly proper for ill-conditioned sores on account of the property, which it possesses, of detaching the portion of flesh already disorganized from that, which retains its vital properties; while the chloride of lime, if it is well saturated, will serve only for a simple disinfection, that is to say, for the exhumation of a body, that is to be immediately examined. It will, however, be convenient for the disinfection of the bodies deposited at la Morgue, as the sprinklings with chlorated water may be repeated several times a day, if it is necessary.

The chloride of lime will likewise be suitable for the disinfecting of vaults; and it will be sufficient, in order to effect this, to make some slight sprinklings, repeated whenever there appears to be a necessity for doing it. For this purpose the solution of chloride should be prepared as pointed out in a former part of this pamphlet. When the filth is thrown out of the ditches, mephitic gas is extricated in abundance, and fills the apartments of the house where the filth is thrown out. One may secure himself from this noxious gas by putting before the doors, (on a paper spread out for the purpose,) a train of the dry chloride of lime, and spreading large cloths wet with the aqueous solution of this chloride behind the same doors; the windows and other openings require similar precautions. In this way the fetidity does not penetrate into the apartments. By doing this to a part only of the stories of a house, and designedly neglecting to make use of the same process for the intermediate stories, one will perceive that the latter are infected, while those, that have been treated with the chloride, contain only pure air. The same effects may be obtained from the chloride of soda.

The chloride of lime will likewise be very useful for disinfecting corrupted water, and to effect this it will be necessary to mix about one or two ounces with two hundred and fifty liters of infected water. What I assert was proved, at the

beginning of the year 1824, by M. Keraudren, inspector general of the health office of the marine, who was, at that time, charged by his excellency, the minister of marine and of the colonies, to make a report concerning my proposals for cleansing the king's ships, proposals, that were adopted, and which I shall make known elsewhere. Doctor Marc, honorary member of the Royal Academy of Medicine, who, in 1823, was appointed by the Council of Health to assist in my experiments on animal matters, and who was one of the first to discover all the beneficial effects of the chlorides, was kindly present at this experiment of the disinfection of water. The chloride of lime is previously dissolved in water, and added by little and little, stirring the vessel of corrupted water till it is completely disinfected. If the chloride predominates, it is necessary to expose the disinfected water, for a short time, to the air, and filtrate it or let it settle in order that it may become potable. It will be readily perceived of what utility this process must be, either at sea, or in marshy countries, where the water is unwholesome, and still more in places where one is obliged to drink of the water of cisterns, which is often changed.

I might multiply these citations indefinitely, either by reporting the facts of the medicinal applications of the chlorides observed in France, and in the colonies, or by giving authentic accounts of the disinfections, that have been made under my own eyes, and what has been done in Saint Domingo by order of the government of that country, and the account of which is inserted in the Gazette Officielle of February 20, 1825; but it would not comport with the brevity of this notice, which must be considered as merely an extract from a larger work, in which I shall endeavor to point out the causes and phenomena of the putrefaction of animal substances, accompanied with directions for arresting, in various circumstances, this disorganizing agent.

NOTE. M. Idt, a distinguished pharmacist, of Lyons, writes to me from that city, under date of August 4, 1825:

“ During the whole month of July, the thermometer was constantly as high as 34 degrees, and the corpses, a few hours after death, diffused an odor so infectious that, while the mass was celebrated for the repose of their souls, the priests and bystanders forgot, the former the duties of their ministry, the latter their grief, to bemoan themselves and stop their nostrils. M. Gensoul, surgeon in chief to the Hôtel Dieu, fearing with reason, that emanations so offensive might cause an epidemic sickness, proposed to the mayor that a glass of your solution should be turned on the sheet by the police officer, when the coffin was opened to ascertain the presence of the body. The mayor directed that the proposal of the young surgeon should be immediately adopted, and the success has been most satisfactory, so that the “*Journal du Commerce*” of Lyons, in reporting the fact, expresses the desire that a practice so simple and useful should be generally adopted.”



While this pamphlet was in the press, a new fact came under my observation, which I think proper to record in this place.

M. Paulin, superintendent of the Saint Martin Canal, applied to me, August 11, 1825, requesting, in behalf of M. Bérard, vice-president of the Council of Health, some chloride of lime with the directions for using it, in order to disinfect a portion of the Amelot sewer, where several laborers had fallen down in a state of asphyxia the day before. I offered my assistance for the intended operation. The scavengers had been directed to cleanse a part of the sewer about twelve or fourteen feet in length, which must be completed the next morning by eight o'clock. The slime and other impurities to be removed were four feet and a half in thickness.

I caused to be placed not far from the sewer a tray containing about sixty liters of water and a pound of the chloride of lime well dissolved in this liquid. A pailfull of this liquor

was placed by the side of the workmen employed in taking down the wall, who, whenever they removed what they had taken down, washed their hands and arms and moistened their nostrils with the chlorated water. The scavengers took the same precaution on removing the slime, which, being thrown several feet above their heads and mine, was sprinkled with a solution of the chloride, dashed on by a workman on the surface of the ground; this slime, by means of a new sprinkling, was still further disinfected. The labor occupied more than four hours, and no accident happened. Whether out of deference to me, or, perhaps, because I impressed on their minds my conviction of the efficacy of the disinfecting agent employed, these men were obedient to my advice. The security, in which they saw me during the whole time of their painful labor, holding only a bottle of the chloride in my hand, and sometimes to my nostrils, was sufficient to contribute to theirs also. Yet we were in a sewer, that had been infected and useless for more than forty years, and in which eight workmen had been seized with asphyxia a short time after entering it. This disastrous event, which took place in 1782, was the subject of a paper by M. Cadet de Vaux, which gave rise to the excellent researches of the celebrated professor Hallé, and more recently may have contributed to those of MM. Thénard, Dupuytren, Barruel and others.

It may be readily seen that the Amelot sewer, neglected through the just fear of the workmen and the authority, contains a considerable mass of impurities, which increasing every day, will finally obstruct it entirely. Would it not be possible to effect the cleansing of it without having to deplore any fatal accidents? Such was the question, that I put to myself when I was surrounded with its deadly exhalations, a question, to which I thought that I could give an affirmative answer; but, in order to attain this object, it would be necessary to combine the stove of Darcet, one of the most useful applications, that I know of, with an abundant use of the chloride together with such other means of health as might be pointed out by the localities.

As I was preparing to descend into the sewer, a disconsolate female came to solicit some aid from the superintendent of the workmen. Her husband was one of those, that had been thrown into a state of asphyxia, and the one, that had been struck in the severest manner; he had lost his recollection for a long time, having been conveyed to the street des Tournelles without recovering his senses. An emetic was administered; the physician, seeing the alarming situation of his patient, advised that he should be transported to a hospital, and supposed that his advice had been followed. The asphyxia, nevertheless, continued to distress him. He vomited, for forty-eight hours, the light tea, that he was made to drink, and, several times during this space, lost his reason. I thought proper to prescribe gum water made cold by the addition of four drops of lemon juice to each half glass, and the antiemetic potion of Rivière, in the dose of a spoonful every hour. The physician of the Board of Charity, who then came to visit the patient, approved this treatment.

When the cleansing of the sewer was nearly finished, I requested to be conducted to the patient. The vomiting had ceased after the first cup of acidulated gum water. This man, aged 41, already showed symptoms of decrepitude. He was lying on a bed; his pulse was miserable, he complained of sharp pains in the head and of great heaviness; he said that his respiration was painful, and that he was distressed, above all, with a bad taste, that he had constantly in his mouth, and which, he said, was like lead, and had made him lose his recollection; his voice was stifled, and he feared that he had but a few moments to live. I relieved the mind of this unhappy man by assuring him that he would be speedily cured, and that his wages would be paid just as if he labored. At the same time I directed him to breathe some of the concentrated chloride, which he seemed to inhale with delight; his attacks appearing to me less severe, Pierre Aimé, (for this was his name,) assured me that he breathed more freely, and that he no longer had the offensive taste in his mouth. The next morning I learned that he had slept five hours; he called again for the

water, that had freed him from so great heaviness and pain of the head. I gave directions for sprinkling his chamber with a weak solution of the chloride. The fourteenth of August Pierre Aimé was cured, being able to get up and walk abroad. I informed myself concerning the circumstances of the accident: "A rough stone," said he, "having fallen into the filth of the sewer and sunk down there, I lifted it up a little with my pickax, and stooping down, with both my hands forward, to take hold of it and lift it out, I fell senseless and as if struck with death."

The effect of the chloride will, perhaps, appear extraordinary in this case, considering the time, forty-eight hours, that the asphyxia had continued. Persons, however, that have inhaled the gases, that are disengaged from animal matters in a state of putrefaction, must have observed that they have been followed, for a long time, by the fetidity, and that even a part of their excretions are impregnated with it. To me, therefore, it appears very desirable, that the patients should inhale the chloride of soda or lime in all cases of asphyxia from sewers or vaults, seeing that, a long time after the accidents, they find themselves under the influence of the deleterious gas.

NOTE, BY THE TRANSLATOR.

La Morgue, which is several times mentioned in the preceding pages, is the place where the bodies of suicides and others, who have died from casualities, are deposited to be claimed by their friends.

"In crossing the Seine, a small building was pointed out to me, called la Morgue, in which dead bodies are laid, that are found in the river and elsewhere, that they may be examined, recognized and claimed by their friends. There happened to be none there, the morning that I called, though I was told that it was rather an unusual case, as the average number is more than five hundred a year." See Sprague's Letters from Europe in 1828.

By the kindness of professor Silliman, I am enabled to publish the following extract from the Bibliothèque Universelle for June, 1828. It was translated by professor Griscom, and forwarded for the American Journal of Science, in which work it will very soon appear.—TRANSLATOR.

TEST OF THE STRENGTH OF CHLORINE OR CHLORIDE OF LIME.

THE solution of indigo which has long been employed in estimating the quantity of chlorine in any fluid is found to be uncertain, or at least inconvenient on account of the variable quality of indigo, and also of the changes of color which a diluted solution of indigo in sulphuric acid, spontaneously undergoes. If the solution be concentrated, the sulphuric acid expels the chlorine too rapidly from its solution, and thus prevents a portion of it from reacting on the indigo. *Muriate of manganese*, proposed by A. Morin, is a more certain and preferable test. He has been able to appreciate the half of a hundredth part of chlorine by this reagent; and nothing is more easy, he remarks, than to prepare it in determined proportions, and to preserve it unaltered for a long time. To prepare this chlorometric fluid, it is sufficient to dissolve some oxide of manganese in hydrochloric acid taking care to have an excess of the oxide. Filter the liquid, which is of a pale rose color, and scarcely reddens litmus. A single drop of a weak solution of subcarbonate of soda produces in it a white precipitate which does not disappear by agitation. These characters indicate that the saturation is sufficient. In this state the solution of muriate of manganese is precipitated of a deep brown, by the chloride of lime, the oxide being set free by the union of the muriatic acid with the lime which the chlorine kept in suspension. It is obvious that the solution of the chloride contains lime foreign to its own composition, only in the state of muriate, of chlorate, or of lime water. Now the muriate and chlorate of lime give no precipitate with muriate of manganese; lime water it is true yields a brownish

color, but this proves to be of no importance, for on decomposing muriate of manganese by equal volumes of lime water and solution of chloride reduced to 11 more than 100 parts of hydrochlorate of manganese were necessary for the chloride of lime, while less than one part was sufficient for the lime water.

The advantage which the solution of muriate of manganese offers as a chlorometric substance are threefold :

1. The uniform condition of the test.
2. The disengagement of the chlorine is produced by an acid which acts only while the metallic oxide with which it is combined is precipitated.
3. The precipitation of the oxide, which indicates the quantity of chlorine, precedes the disengagement of the gas, or at most is simultaneous with it; whereas in employing a solution of indigo the chlorine becomes at first free to react on the coloring matter, the destruction of which serves as the measure of its quantity. Hence the trial by muriate of manganese can be made slowly, and consequently more certain.

INSTRUCTIONS AND OBSERVATIONS
CONCERNING
THE USE OF THE CHLORIDES
OF
SODA AND LIME.

BY A. G. LABARRAQUE.

TRANSLATED
BY JACOB PORTER.

NEW-HAVEN,
SOLD BY H. HOWE, AND BY A. H. MALTBY.

PRINTED BY BALDWIN AND TREADWAY.

1829.

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THE facts stated in this pamphlet, have been abundantly confirmed by experiments in this country. See the late numbers of the American Journal of Science.

NOTICE. The Chloride of Lime is manufactured on a very large scale at the Maryland Chemical Works at Baltimore. The Chlorides of Lime and Soda may be procured from Carpenter's Chymical Warehouse, 301, Market-street Philadelphia, price, by the small quantity, 25 cents per pound.

They are also manufactured very extensively by Mr. Frederick Fincham, and sold by Mr. Mellor, northeast corner of Fourth and Walnut-streets, Philadelphia. The following is an extract from his advertisement. "I have at length succeeded in preparing a Chloride of Soda, three times as strong as by the French formula; so intimately combined, that the Gas will not occasion the slightest inconvenience to the most delicate patient; and it will keep any length of time by exclusion from the air. It is of great importance that the practitioner should be able to rely on one uniform strength, by which to regulate his application of it, and in my preparation I guarantee that it shall never vary."

The following is Mr. Fincham's direction for using his Chloride: "Dilute one part of the liquid with forty parts of water: a pint with five gallons, or a wine glass full to three quarts of water, stir the mixture, and it is then fit for use."





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