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THE USE
 OF THE
CHLORATE OF SODA,
 AND THE
CHLORATE OF LIME.

By A. G. LABARRAQUE,

*Pharmacien of Paris, Member of the Society of Medicine, of the
 Free Society of Pharmaciens, Resident Assistant Member of the
 Royal Academy of Medicine, &c.*

TRANSLATED

By JAMES SCOTT, SURGEON.

London:

Printed for J. SCOTT, by W. GLENDINNING, 25, Hatton Garden;
 and Published by S. HIGHLEY, 174, Fleet Street.

1826.

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BY A. G. LABARRAGUE,

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TRANSLATED

BY JAMES SCOTT, Surgeon.

London:

Printed for J. Hunt, by W. Clendinning, 25, Hatton Garden;
and Published by S. Thacker, 171, Fleet Street.

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TO

H. P. HOPE, Esquire,

WHO

*Under a genuine Philanthropy, that marks his inter-
course with mankind,*

URGED THIS UNDERTAKING,

conferring honour on the individual, selected for its execution,

THIS TRANSLATION

IS RESPECTFULLY INSCRIBED,

BY

His Devoted

AND

Obedient Humble Servant,

The **TRANSLATOR,**

TO

H. P. HOPE, Esquire,

WHO

Under a genuine Philanthropy, has made his
course with mankind,

URGED THIS UNDERTAKING

conferring honor on the individual, selected for its execution,

THIS TRANSLATION

is respectfully inscribed,

BY

His Devoted

AND

Obedient House Servant,

The TRANSLATOR

X

OF THE USE OF
CHLORATE OF SODA

AND

CHLORATE OF LIME,

THE discredit which deservedly accompanies those who abuse public credulity, by extolling, through the medium of the Press, some wonderful Nostrum, prevented me from publishing my first experiments on the medicinal use of the Chlorates, at the time when they were instituted, notwithstanding the most satisfactory results. I limited myself, therefore, in the execution of my wishes: communicating my experience merely verbally or by writing to the most eminent men in the profession. This not being considered sufficiently explicit, added to the interest excited by the constant success of my experiments, I became solicited on all sides for information on the use of the Chlorates, and was therefore, under the necessity of giving some instruction on the manner of using them: this instruction subsequently became indispensable to the employment of these powerful antiseptics in the Antilles, and other parts so frequently desolated by serious and contagious affections.

The most useful inventions frequently experience the greatest opposition in their adoption. This, however, was not the case with the Chlorates; for shortly after making known the result of my general experiments on putrefaction (which was corroborated by the Members of the Council of Health, and by other learned men in the capital) the Counsellor of State and Prefect of Police approved of the method which I directed for the disinfection of dead bodies placed in the Morgue, and charged me, by his order of the 19th of October, 1823, to furnish the Chlorate proper for this operation.

To give greater confidence, I thought it right previously, to forward the directions that I had before promulgated upon the use of this powerful therapeutical agent, and I added to this, the opinion bestowed on my labours by the Society for the Encouragement of National Industry. All the cases of medical applications related in my instructions are but an exposition of what had previously been published by eminent physicians, who had experimented with the application, either conjointly with me, or according to my method.

After three years of uninterrupted clinical success, corroborated by observations published in different scientific journals, and above all, a considerable number of experiments on animal matter in a state of putrefaction, the Royal Institute of France declared, in its turn, its conviction of the utility of the application of the Chlorates of Lime, and of Soda, by giving me the first prize in the public sitting of the 20th of JUNE, 1825.

My first instructions being entirely out of print, I have

republished them here verbatim, with the addition only of some new facts, the issue of numerous experiments.

PREFECTURE OF POLICE.

Paris, 19th of October, 1823.

We, the Counsellor of State and Prefect of Police, considering the report of the council of health, from which it appears that the numerous experiments successively made at different places, especially at the Morgue,* have demonstrated the efficacy of the employment of the Chlorate of Lime, as a means of disinfection, according to the method of M. Labarraque, Pharmacien of Paris, Rue St. Martin, No. 69.

Have ordered as follows :

ARTICLE I.

The Disinfecting Preparation, invented by M. Labarraque, shall be established at the Morgue, and at each of the Commissaries of Police hereafter described, &c. &c.

DIRECTIONS

For employing the Chlorate of Lime, after the manner of *M. Labarraque*.

Reiterated experience has shewn that the Chlorate

* A dead-house in Paris, where the bodies of Persons drowned or found dead, are exposed for recognition, — *Trans,*

of Lime mixed with water has the property of disinfecting the atmosphere, and of impeding putrefaction in a sensible manner.

The employment of this process may be useful in numerous circumstances; we shall limit ourselves in the present Instruction to its application in *two* cases of the most frequent occurrence.

It will be easy, by analogy, to employ the same means at any time, that it may be thought proper to have recourse to it.

Disinterment and Inspection of Dead Bodies.

Before approaching a dead body, in a state of putrefaction, it is necessary to procure a vessel, into which a quantity of water (24 litres*) is to be put, and into this about 18 ounces (demi-kilogramme) of the Chlorate of Lime is to be poured, and the mixture well agitated.

A piece of linen cloth is to be put into the vessel containing the fluid, in such a manner that it can be withdrawn easily and quickly—for this purpose two persons open the cloth, and holding it by the corners, immerse it in the liquid, which is to be placed close to the putrid body, and at the same instant the wet cloth is withdrawn from the vessel and spread on the subject, and soon after the putrid odour ceases.

If there should be any blood or other fluid issuing from the body, a glass or two of the *chlorated water*

* About Six Gallons.

should be poured on it. It should then be rubbed with a brush, and the foetid odour will disappear.

This operation ought not always to be prosecuted exactly in the manner above described, as it is necessary, in cases where the surface of the body is uncleanly, that it should be cleansed as thoroughly as possible before the disinfecting process is commenced.

If the taint has extended into the surrounding apartments, galleries, stair-cases, &c. the places infected should be sprinkled with one or two glasses of the liquid, and the stench will cease.

Care should be taken that the cloth covering the body be constantly sprinkled with the liquid contained in the vessel; thus the reproduction of the foetid odour is prevented.

As soon as the body has been carried away, the cloth used for disinfection should be well washed in water; dried and folded.

Disinfection of Water Closets, Urinary Cisterns, &c.

Three or four pints of water must be poured on two ounces of Chlorate of Lime, the whole well mixed and strained, and the solution thrown into and over the tainted places.

If the unpleasant smell be not promptly destroyed, the operation may be repeated in eight or ten minutes.

If the effluvium proceeds entirely or partly from urine or foecal matter, this must be sprinkled in like manner.

Considered and approved by us, Counsellor of State
and Prefect.

(Signed)

G. DELAVAU.

EXTRACT of the "*Proces Verbal*" of the Society
for the Encouragement of National Industry, at a ge-
neral sitting, 30th October, 1822.

The Society for the Encouragement of National In-
dustry in approving my memoir at the general sitting
of the 30th of October, 1822, thus expresses itself.

"1^{mo}. Seeing that the first and principal question
which was proposed by the Counsellor of State and to
which the prize was declared, is completely answered by
M. Labarraque, Author of the Memoir, No. 1. The
Commission declares that the entire prize shall be ad-
judged to him, on one condition, to which he shall wil-
lingly submit, which is, that of publishing a summary of
his experiments, submitting it to the public at large,
pursuing with zeal the execution of it in the necessary
places. This measure, if the discovery of M. Labarraque
is to be rendered profitable, seems indispensable."

OBSERVATIONS

ON THE USE OF THE CHLORATE OF LIME AND OF SODA.

BY A. G. LABARRAQUE, "PHARMACIEN."

I was willing to fulfil the condition proposed by the
Society of Encouragement, and in the Memoir published

the following month, I related cases where these powerful antiseptics (which I am about to describe in this work) received useful and extended application. I, therefore, expressed my wish that dissecting rooms, "the Morgue," and other places corrupted by animal matter, should be disinfected by these means, and the directing authorities, after numerous experiments which were always attended with the most flattering success, gave the requisite orders for its application. I recommended, as particularly indispensable, the use of the Chlorates in cases of disinterment, for judicial examination, of bodies which had been many weeks buried. The propriety of this has been verified by Professor *Orfila*, on a body that had been interred thirty-two days, at the warmest season of the year.*

* Report of a post-mortem examination made, at the request of the "*Procureur du Roi*," 1st August, 1823, by Messrs. *Orfila*, *Hennelle*, *Gerdy*, and *Lesueur*; prepared by M. *Hennelle*.

"On the 1st August, 1823, at the request of the "*Procureur du Roi*," Messrs. *Orfila*, *Lesueur*, *Gerdy*, and myself, went to the Cemetery of Père-là-Chaise, to examine the body of a person named B***, who had been dead a month. At half-past 7 in the morning we proceeded to exhumate the body, which exhaled an infectious odour. It remained till half-past 10 on the ground out of its coffin, the persons who were to identify it not having arrived. The temperature was from 17 to 18 degrees of the centigrade thermometer. The body was taken to an open and airy place, that the examination might be made as conveniently and publicly as possible. The odour had become still more insupportable, and the body swollen very considerably since its disinterment. It was therefore important to make the examination as speedily as possible. We began by sprinkling the body with Chlorate of Lime dissolved in water. This solution introduced by M. *Labarraque*, "*Pharmacien*," produced a wonderful effect, for scarcely had it been applied, than the infectious odour was instantly destroyed, and we could begin the operation."

This remarkable examination, in which the sudden destruction of putrid miasm was effected, elicited the publication of similar performances which had been exhibited before the Savans.

It is, without doubt, a fortunate occurrence to arrest animal decomposition, and to annihilate, as it were, many causes of death; for who is not aware of the fatal influence of putrid animal matter diffused in the air which we breathe, carrying with it the germ of mortal diseases? There was something even more desirable than this, it was to find the means of correcting decomposition in the *living* subject. I have had the satisfaction of seeing this prodigy by the employment of Chlorate of Soda on wounds; thus, *Carbuncle* has been stopped in its ravages and cured; the most intense *Hospital Gangrene*;* ill-conditioned *Venereal Ulcers*; and, in short, *Gangrenous Sores* of the worst characters have been

* "P——, a corporal in the 16th regiment of the line, went into the Military Hospital of *Picpus*, 29th of *January*, 1822, for a chancre on the prepuce and a bubo in the right groin. He was treated by frictions; the bubo supplicated at the expiration of a few days, and was opened with a *bistoury*. The chancre healed well, but the opening of the bubo, which was but little extended, remained stationary for more than six months, notwithstanding the best local and general treatment.

"About this time the digestive and pulmonary organs became the seat of great irritation. The opening of the bubo changed to a spreading ulcer, which became inflamed and painful, the discharge was foetid and abundant, and Hospital gangrene made its appearance in a few days: the ulcer extended over a great part of the skin of the abdomen. The patient was now separated from the others.

"The gastric symptoms soon yielded to judicious treatment,

speedily brought to cicatrization. The foetid discharge of *Cancer* is corrected by this preparation, and its good

but the gangrene continued its ravages; the usual means, however, being resorted to, the ulcer assumed a better aspect.

“The mercurial treatment, which had been suppressed, was again tried, and every thing went on well for some time; soon after, the unfavourable symptoms returned with redoubled vigour, and brought the patient to the verge of the grave. The same means were again used, and again successful, but some time after, an unfavourable change occurred, which was, however, again subdued. In a word the patient remained for nearly twelve months in a state between life and death.

“On the 16th of May, 1823, on which day the application of the Chlorate of Soda was first made, the man was in the following state; thinness and extreme debility; inflammation of the gastric and pulmonary organs; gums swelled and fungoid; skin dry and hot; continued constipation and watchfulness; the ulcer extended from the anterior and superior spine of the ilium, across the abdomen, two inches and a half from the umbilicus, reaching to the opposite os ilium, descending on each side between the scrotum and thigh. The aspect was horrible, and it occasioned excruciating pain; the edges were swollen, jagged, and here and there hanging over in loose flaps; the discharge, very copious and foetid, was mixed with blood issuing from the corroded vessels. He was dressed three times a day with pledgets dipped in the Chlorate of Soda, in the proportion of two ounces to four ounces of water; the following day the odour of the preparation extinguished that of the disease; the quantity of Chlorate was increased one ounce, and the dressing continued, and the next day there was no foetid smell, and scarcely any suppuration,—the surface of the ulcer took a favourable appearance; the edges sunk down; cicatrization proceeded from the circumference to the centre in numerous points, and the inflammatory symptoms disappeared.

“The fifth day, the Chlorate was applied pure, cicatrization continuing rapidly. On the 9th day, inflammation supervened; the use of the Chlorate was discontinued and the ulcer dressed

effects upon this frightful malady as well as upon *Herpes ulceratia*, continue to be experienced. Observations on the cure of *Porriago favosa* have also been communicated to the Royal Academy of Medicine.

In fine, we may deduce from all that has been observed on the use of the Chlorate of Soda upon man, that this liquid is capable of removing the fœtor of sores, of changing their nature, and making them pass into a state of simple ulceration. That it is, above all, efficacious in *atonic ulcers, hospital gangrene, mortification, &c. &c.* It is used pure, or mixed with one, two, or as far as eight parts of water in the form of lotion, and care should be taken that the wounds are covered with lint moistened with this liquid. The dressing should be removed twice a day, and its use suspended when the sore becomes red and inflamed. The applications then necessary, being such as are usually directed in Surgical books.

For *ulcers of the uterus* the Chlorate of Soda should be diluted with twelve or fifteen or even thirty times its weight of pure water, and used as an injection. Prudence recommends that its use should be directed by a professional man, who will increase or moderate its action, or even suspend it if requisite.

The Chlorate of *Soda* is that which I have used on

with lint. The fungoid granulations were cauterised with a solution of Nitrate of silver; the Chlorate was again resorted to about the 14th day, and on the 18th nothing remained but small ulcerated points. The patient recovered his appetite and was able to walk with crutches, his strength gradually returned, and he is at this time radically cured." *Memoir, read at the division of Surgery, of the Royal Academy of Medicine, 24th July, 1823.*

man; the action of Chlorate of Lime is not equally efficacious, though its disinfecting property is the same; for example, it is certain of destroying the miasm which develops itself in the apartments of persons affected by diseases of a bad character, if the chambers be sprinkled with either of the liquid Chlorates well diluted with pure water, or by putting it on a plate which is to be placed in the chamber of the sick person; the Chlorate is to be renewed morning and evening, or whenever it shall have lost its peculiar fumigating character.

Physicians or others, attending persons affected with contagious disorders, will derive great advantage if they are attentive to breathe it when approaching their patients, moistening their hands with it, causing it to be sprinkled on the floor, particularly round the bed.

The Chlorate may be of great use for disinfecting the interior of a ship, and for this purpose about a spoonful may be put into a bottle of water, and this liquid sprinkled about; the proportion ought to be stronger if the foetor is considerable; the operation should be repeated twice a day.

ROYAL INSTITUTE OF FRANCE.

Royal Academy of Sciences.

Extract of the Programme of Prizes adjudged at the Public Sitting, on *Monday, 20th June, 1825.*

Prize founded by the will of Baron Montyon.

“ A prize of 3000 francs is awarded to M. Labarraque, Pharmacien of Paris, for having shewn by numerous

successful experiments, that the solutions of the Chlorates of Lime and of Soda, mixed with water, may be employed with economy and facility for speedily destroying the infectious effluvia of animal matter used by catgut makers, and of bodies in a state of putrefaction, and for purifying places where the air is corrupted.

*On certain Uses of the Chlorate of Soda.**

After reading the preceding observations, every judicious practitioner will perceive in what cases the application of the Chlorate of Soda may be expected to be successful, and determine the degree of credit to which the inventor is intitled, by ascertaining the disorders which claim its use. It would be fastidious to name all the celebrated Physicians and Surgeons who have studied the action of the Alkaline and Earthy Chlorates, but I cannot dispense with shewing my gratitude to those friends of humanity, *M. Biett*, Physician of St. Louis, for his numerous applications upon Herpetic eruptions; to *M. Jules Cloquet*, Chief Surgeon of the same hospital, for his applications to gangrenous ulcers. In many of these formidable affections, the skilful surgeon bathed the mortified limb in the Chlorate, diluted with 10 or 15 parts of water, and directed from 25 to 30 drops of the Chlorate of Soda, to be taken in a pint of "Tisane." His observations will be published.

* The Formula for the preparation of the Chlorate of Soda which I published in my Memoir, should be *followed exactly*, for if not strictly adhered to, the properties are so changed, that the preparation may be good for nothing; but if the Chlorate be properly prepared, the effects related in this paper are always certain of being obtained.

Professor *Marjolin*, Chief Surgeon at Beaujon Hospital, used the same preparation in gangrenous affections, whether it succeeded amputation of a limb or any other cause. He observed that the slough was quickly detached and the disease checked in the greater number of cases.

Dr. *Ségalas*, one of the Professors of the Faculty of Medicine, after a course of experiments, remarked, more than two years since, that "the application of the Chlorate upon denuded tissues, especially its injection into the genitals, requires great caution. Diluted with water it is less irritating, and does not lose any of those valuable qualities which place it among our energetic medicines." He has lately said, "I rest this last proposition on the report of two cases of gangrenous diseases, recently cured by the use of this agent, commonly called "*Labarraque's Liquid*."

"One of these facts was observed in a man affected with gangrene, the consequence of infiltration of urine; the scrotum was distended with urine to five times its natural size; at the lower part sphacelation extended elliptically four inches in the course of the raphe, and from two to two inches and a half in breadth. I incised deeply the slough, leaving it projecting from the edges of the wound, and passed a small sound into the urethra. I then applied to the dead parts a lotion of the Chlorate of Soda in its pure state. The place, the bed, and the chamber were purified (*desinfectés*) in an instant. I finished with a dressing of lint impregnated with the same liquor diluted in four parts of water. The next morning, to my great satisfaction, I found many sloughs detached, and the patient in an improved condition. I repeated the dressing of the preceding day,

and in the evening the wound was sensible (vive) over the whole surface. I therefore discontinued the use of the Chlorate, and ten days after, the sore was completely healed." The second observation related to a horse treated by *M. Bouley*, Junior, Veterinary Surgeon, of which I shall speak by and by.

M. Samson, Surgeon, (*Ordinaire*) at the Hotel Dieu, has disinfected ulcerations of the mouth with caries of the palate, and suspended for some time the ravages of this frightful disorder. The same surgeon, after having in the presence of Dr. Lefevre put a ligature upon a large uterine polypus, discovered that putrefaction had commenced in it; he accomplished its disinfection by the application of Chlorated water, and the mortified part was detached. The operation was attended with success.

Dr. Lagneau has used the Chlorates as an injection for spongy and ulcerated gums exhaling much fœtor. The state of the patient was improved, and after each injection the fœtor was destroyed. *M. Regnard*, Dentist, was anxious to apply the Chlorate of Soda in stopping caries of the teeth and removing foetid breath, but observed that this medicine disagreeably excited the salivary glands, from which he thought it could not be admitted to the toilette as an application for the mouth.

Dr. Chantourelle treated two cases of Cynanche maligna with the Chlorate of Soda diluted in ten parts of water, and the fœtor, so dangerous to the attendants and physician, was destroyed. These cases were communicated to the Society of Medicin at Paris. More recently he has been again successful in administering

the Chlorate in the dose of twenty-five drops in a glass of water, for removing the Hydro-sulphuric gas, which severely affected a person who had been poisoned by the Hydro-sulphuret of potass, after the latter had been expelled by vomiting. His memoir, read at the Royal Academy of Medicine, gave rise to a learned report.

A very remarkable fact was observed in a case of Asphyxia presenting the most serious tetanic symptoms, the patient was restored by breathing the Chlorate of Soda.

M. Lisfranc, Chief Surgeon to La Pitié, treated his successful cases of burns and common ulcers, by means of the Chlorates; the memoir which he intends publishing on the subject, and which was announced to the Royal Academy of Medicine, will be highly interesting.

Ulcer of the nose (*L'ozène*) has been disinfected by Injections used twice a day, of the Chlorate of Soda diluted with, from 2 to 10 parts of water, and this foetid ulcer cured.

In certain disorders of the bladder, the urine becomes offensive and disgusts the patient; the disinfection is accomplished by placing a few drops of the concentrated Chlorate of Soda in the chamber pot. The same result may be produced on urine scented by eating asparagus; in this case it is necessary to use a greater quantity of the Chlorate.

I am indebted to *M. Ségalas*, who devoted himself particularly to the diseases of the urinary organs, for the knowledge of a remarkable fact connected with the correction of urine *while in* the bladder, from the use of the

Chlorate, and I introduce it here, to draw the attention of Professional men to analagous cases.

M. G. aged 69, affected with paralysis of the bladder, and unable to pass his urine by voluntary efforts, had suffered for several days the painful effects of distension of the bladder. The hypogastric region was swollen and painful; the urine, turbid and smelling of ammonia, deposited a thick, brown and foetid pus; the tongue dry; the skin hot; the breathing oppressed; the voice hoarse and feeble; there was much nervous irritation accompanied at times by delirium. *M. Sègalas* was called in; this physician obtained by an examination with the catheter, a confirmation of the diagnostic established by the symptoms. A sound of elastic gum, introduced with the greatest facility, discharged a large quantity of purulent urine of an insupportable odour. The instrument was suffered to remain for two days, but became often obstructed. Injections were frequently used, but with little success; this, at length, determined *M. Sègalas* to use a catheter with a double barrel, and to wash the bladder copiously with water, after the ingenious method of *M. Jules Cloquet*.

This treatment, which occupied several days, had the desired effect; the bladder was relieved of the putrid matter which occupied it, the urine being easily withdrawn by the aid of a catheter, and the general state of the patient was sensibly improved; but the urine continued to deposit a foetid pus, which sometimes completely encrusted the catheter.

M. Sègalas therefore had recourse to the Chlorate of Soda diluted in sixty parts of water, throwing it into the bladder by means of the double catheter. The first in-

jection produced *a diminution very remarkable in the secretion and odour of the pus*; a second, performed forty-eight hours after, was followed by a similar success, and two more injections, performed at an interval of two days, placed the patient in a state to attend his occupation, by using the catheter for drawing off the water. He did not experience the slightest ill effects during the use of the Chlorate thus diluted. The destruction of other noxious principles is effected by the application of the Chlorate, but my experience does not yet allow me to assert it as a fact.

The linen and pledgets of lint, which have been used for the dressing of foetid sores, retain their odour for a long time, and contribute to the insalubrity of the room where they are placed. By pouring a glass of the concentrated Chlorate into ten pints of water, and soaking the linen in this liquid, they may be withdrawn immediately, for they will have lost their odour.

The disinfection of the market-places in *August, 1824*, by order of authority, with the facts reported in the notice issued on this occasion, proves to how many useful purposes the alkaline and earthy Chlorates may be applied, if employed for the destruction of the causes of noxious effluvia, and these investigations will terminate by bringing the remedy into habitual and domestic use.

By the foregoing detail, I have complied with the conditions into which I was forced to enter. Public salubrity shews the necessity of sprinkling dead bodies, (which begin to give evident signs of decomposition) with the disinfecting Chlorate, before the time prescribed by usage and by law for their interment. In this case a bottle of the concentrated Chlorate must be put

into three gallons of water; a linen cloth is to be dipped into this mixture and the corpse covered with it, the same liquid being frequently carefully sprinkled over it during the time it is watched. The necessity for this operation is daily perceived at Paris, and considerably more so in hot climates. Also professional men, when examining or embalming dead bodies, preserve themselves from all unwholesome emanation, by using the Chlorate in the manner just described.*

The Chlorate of Soda diluted in 25 or 30 parts of water, has been employed with success in disinfecting and preserving subjects in dissecting rooms; this operation is performed by means of a tin watering pot containing about six quarts, which is to be filled with Chlorated water; the foetid body is to be sprinkled twice a day, and the surface afterwards brushed and washed with clear water. The moment the chemical preparation comes in contact with the body, the effluvium is destroyed, and the impregnated air instantly corrected.

It is here that we should speak of the sanitary operations at the Lazaret at Marseilles, which I recommended to his Excellency the Minister of the Interior, and which the superior council of public health has adopted for some time past, the execution of it being entrusted to the enlightened zeal of the professional men who are charged with the care of this useful establishment; but these views will have more interest after experience has confirmed them. It will not be out of place here, to report the experiments made during two nights at Bicêtre,

* Those who are appointed to attest the death of persons, and others engaged with the sick, may secure themselves from foetid emanation by smelling the Chlorate, carried in a bottle for that purpose.

in eight crowded and unwholesome apartments. These rooms, to the great satisfaction both of the patients, and the physician who attends, have been completely purified by one sprinkling with a bottle of concentrated Chlorate, diluted in thirty parts of water; the rest of the liquid served to disinfect the cisterns, water closets, &c.

It may easily be conceived that this mode of purifying places, inhabited by a vast number of individuals, is very simple and but little expensive, and may therefore be rendered of important utility in being used in barracks, military hospitals, &c.

His Excellency, the Minister of War, addressed a very flattering letter to me on the 7th August, 1824, and the "*Recueil de Memoires*," published by his orders, contains many remarks relative to the use of the Chlorates.

L'Epizootie Meurtrière,* which has been prevalent among horses for several months, furnished occasion for trying the effects of the Chlorate of Soda on carbunculous affections, to which these animals are subject; we may judge of its effects by a note which M. Bouley, Junior, Veterinary Surgeon, has inserted in the "*Receuil de Medicine Veterinaire*," June, 1825, which I think it may be useful to insert without abridgement.

Remarks on the Use of the Chlorate of Soda in the treatment of Gangrenous Tumours, by M. BOULEY, Jun.

"All veterinary surgeons who have used setons in the treatment of horses with Epizootic disease, must have

* A disease of Cows and Horses.

remarked that these means were almost always useless and oftentimes dangerous. I have, in particular, observed eight carbunculous tumours which had been the result of their application; five of the animals affected died; the other three were cured. The five first were treated by cauterization and by the administration of antiseptics, and the other three by the same means with the addition of the Chlorate of Soda of *M. Labarraque*.

“The happy effects which I obtained from this medicine, determined me to make known, with certain details, the cases in which I used it, and the results which were produced.

“*1mo. Case.*—On the 31st March last, a bay horse, five years old, belonging to Count D’Yssy, was attacked with the prevailing disorder; a rational treatment was adopted to combat this affection, which presented no alarming symptom until the fifth day, at which time a considerable tumour, rather painful, appeared at the chest, at the very place where two setons had been made some days previously, and which took, in a short time, all the characters of carbuncle.

“I was anxious, therefore, to suppress the two setons, and instantly ordered the actual cautery (*douze à quinze pointes de feu*) to be applied to the swelling, and prescribed the Extract of Gentian with Camphor in proper proportions. These means did not produce the effect which I expected, and in the night, between the fifth and sixth day, the disease made rapid progress (*the cautery was reapplied and the medicine repeated.*) At length, on the seventh day, the tumour which had enlarged considerably, began to discharge a sanious humour, foetid and of a particular odour, which left no doubt of the

existence of gangrene; the prostration of strength was at its height, and every thing announced a fatal and speedy termination. Such was the hopeless state of the animal, when Dr. Ségalas saw him, and advised me to use the Chlorate of Soda of *M. Labarraque*, assuring me, that he had observed the most miraculous effects on men, in a similar case. I was eager to profit by the advice of this able physician, and I instantly ordered injections of the Chlorate into the openings made by the cautery. These injections were repeated every hour, and the sores dressed immediately with tow. I also ordered frequent sprinklings in the stable, with the same liquid diluted with five or six parts of water. From the time I first used the Chlorate of Soda, the tumour made no sensible progress, and the disagreeable odour which it exhaled, partly ceased. From the fourth to the fifth day the sloughs began to separate, suppuration commenced and all danger ceased. At last, the large sore which was the result of gangrene, quickly healed, and in less than a month, the animal was in a state to resume his usual labour.

2do. and 3tio. Case.—Two old horses belonging, one to M. Ingé, Butcher, at Paris, the other to Mr. Renoult, Farmer, at Yvry, were affected with the prevailing disease in the month of May, and both experienced the same effects as the former, from the application of setons. These two animals were treated and cured by the same process in the space of twenty or twenty-five days.

“ I do not pretend to say that the Chlorate of Soda will be a panacea against gangrenous tumours, nor do I imagine that this medicine alone will suffice; nevertheless I think that it is a most powerful auxiliary; and I am authorized by facts thus to judge of it, since, five

horses which I treated only by cauterization and tonics died, whilst those which were submitted to the influence of the Chlorate, were cured."

M. Chanas, Veterinary Surgeon of the Gendarmerie of Paris, made a deep and extended incision (on each side of the neck of a horse) into a carbunculous tumour which in a few hours had assumed an extraordinary appearance, without apparently producing the least pain: he then placed pledgets of tow, moistened in the concentrated Chlorate, on the incision; at the end of four hours the animal experienced pain; the dressings were continued morning and night, for five days, with the same liquid; the tumefaction progressively diminished; a cicatrix formed in a short time, and the horse recovered.

Messrs. Dupuy, Giraud, Jun. and Vatel, professors at "L'Ecole D'Alfort," and Berger, Veterinary Surgeon, of the "Garde du Corps," have equally proved the properties of the Chlorate in these affections.

Instructions for disinfecting and purifying the stables of the King's Guards, and of the Gendarmerie at Paris, have been printed, and there is good reason for congratulation, that these directions have been implicitly followed, for death, from this time, ceased its ravages. A great number of proprietors have equally experienced the good effects of the use of the Chlorate of Soda in stables, cow-houses, sheep stalls, &c. *M. Girard*, Senior professor, and director of "l'Ecole D'Alfort," in the third edition of his "*Notice Sur la Maladie qui regne Epizootiquement sur les Chevaux*," prefixes the following remarks:

“This liquid, employed with advantage by *Messrs. Bouley, Junior, and Vatel*, speedily destroys the foetid odour exhaled from tumours, facilitates the separation of eschars, and appears to be a powerful antiseptic. We ought to acknowledge here, *M. Labarraque*, as the first who proposed the use of this Medicine now so generally well known.”

M. Labarraque on the use of the Chlorate of Soda for disinfecting and purifying Stables.

The Chlorate of Soda may be of great use for purifying and disinfecting unhealthy stables and those which have been inhabited by sick horses. It should be used in the following manner: A bottle of concentrated Chlorate of Soda is to be put into a pail of clear water, and the mixture stirred; a strong brush, or a birch broom, is to be dipped into the Chlorated water and immediately rubbed, with force, over the walls, manger, rack, and generally throughout the whole stable: this done, all the parts which have been brushed with the Chlorate are to be washed with clean water; lastly, finish the operation by brushing the parts again with the Chlorate, in the same manner as painters give a second coat. A stable of forty feet in length by twelve in width and ten in height, requires four bottles of concentrated Chlorate; each bottle should be diluted in ten or twelve quarts of soft water; from this we can judge that one bottle will be sufficient for a stable of three or four horses.

The disinfection of the stable being accomplished, the doors and windows should be left open for it to dry; healthy horses may then reside in the stable without fear of being infected; yet, in a case of “*Epizootia*,” we ought,

as a prophylactic means, to sprinkle the stable, night and morning with Chlorated water, prepared in the following manner: A concentrated bottle of Chlorate is to be mixed in four or five pails of water, and the stable to be well sprinkled with this mixture; neither horses nor men will experience the least inconvenience from this mode of disinfection, and great advantages will be derived from the salubrity of the place.

For washing horses, as is the custom when they are cured, and before placing them with healthy horses, it would be well to substitute for vinegar and water, a small quantity of Chlorate and water, prepared in the same manner as recommended for sprinkling.

This instruction is too brief to meet every circumstance that may occur, but the distinct directions given by the Veterinary Surgeons, will supply every thing which may be found incomplete, and the modifications they adopt to different cases and circumstances, will make this mode of disinfection completely efficacious.

On the Use of the Chlorate of Lime as a disinfectant.

The honorable assent which has been given to the value of my method of disinfection, by legislative authority, through the recommendation of competent persons, appears to have decided a preference in favour of the Chlorate of Lime to that of the Chlorate of Soda. These two Chlorates are equally proper for checking putrefaction, yet have not both the same secondary properties. I will explain myself.—In the act of disinfecting putrid animal matter, the Chlorate passes into a state of *Hydro-Chlorate*, and the *Hydro-Chlorate* of

Lime having the property of absorbing humidity, combines with the moisture of the disinfected body. Now, one of the conditions of putrefaction being moisture, it follows, that when once the disinfecting action is in operation, the Chlorate, after a longer or shorter time, according to the quantity, changes its state, and furnishes materials for reproducing the fœtidness. On the contrary, the Chlorate of Soda, in passing to the state of an *Hydro-Chlorate*, produces the formation of a *very dry salt*, that absorbs the moisture, which is the principle of putrefaction. This is what I term a secondary property. The Chlorate of Soda, therefore, when used for disinfection, prevents, at all times, the reproduction of putrefaction. It is particularly suitable for application to sores of bad character, from the property which it possesses of detaching the disorganized tissue from that which preserves its vital qualities; whilst the Chlorate of Lime, if it is well saturated, can be used only for simple disinfection, such as in the exhumation of bodies which are to be immediately examined. It is also suitable for the disinfection of the bodies lying at the Morgue, because the sprinklings of the Chlorated water are there frequently renewed.* The Chlorate of

* *M. Idt*, a distinguished "Pharmacien" at Lyons, writes to me from that town, under the date of 5th. August, 1825.

"During the whole of the month of July, the Thermometer
 "was constantly at 34 degrees, and bodies, a very few hours after
 "their death, exhaled an odour of such an infectious nature, that
 "whilst mass was performing for the repose of their souls, the
 "Priests and Mourners forgot their duty, (the one, resignation to
 "their ministry, the other, their grief) to complain and hold their
 "noses. The Surgeon Major of the Hotel Dieu, *M. Gensaul*, justly
 "fearing that such mephitic emanations might occasion an epidemic
 "disorder, proposed to the Major, to have a glass of your solution

Lime is eligible for disinfecting water closets, and for this purpose, gentle sprinklings only are necessary, renewed from time to time as required. The solution of the Chlorate to be prepared as directed at page 9.

In emptying places of night soil, Mephitic gas escapes in abundance, and fills the Apartments of the house from whence it is removed; we are able to secure ourselves from this loathsome effluvium by placing under the doors, on a piece of paper, a train of dry Chlorate of Lime, spreading linen dipped in an aqueous solution of the Chlorate behind the same doors. The windows and other openings require the same precautions. In this manner the effluvium is prevented from penetrating into the Apartments.

By thus operating in one part of a house, and neglecting it in another, it is found that those chambers which have been *Chlorated* remain free from smell, whilst those parts of the house in which it has been neglected are contaminated. The same effects may be obtained with the Chlorate of Soda.

The Chlorate of Lime will be found equally advantageous for purifying corrupted water, and to effect this, one or two ounces is required to a hogshead of the impure water; what I now advance was demonstrated

“poured on the shroud, by the Commissary of Police, as soon as
 “the coffin lid was removed to prove the presence of the body.
 “The Mayor immediately adopted the proposition of the young
 “doctor, and its success could not have been more satisfactory.
 “The *Journal du Commerce* of Lyons, in noticing this fact, expresses
 “a wish that a process so simple and useful should be generally
 “employed.”

at the beginning of the year 1824, to M. Keraudren, Inspector general of the Health of Seamen, who, at this time, was charged by the Minister of Marine, to make a report of my propositions, the subject of which was the purification of his Majesty's Navy, propositions which were adopted, and which I shall make known elsewhere. *Dr. Marc*, member of the Royal Academy of Medicine, who in 1823, was appointed by the Council of Health to assist at my experiments on Animal matter, Water Closets, &c. and was one of the first who saw the whole, of the applications, desired much to be present at this experiment of disinfecting water. The Chlorate of Lime is previously dissolved in water, and added, a little at a time, stirring the impure water until the disinfection is complete. If the Chlorate predominates it is merely necessary to expose the water, thus purified, for a few minutes to the air, and then filter it or let it subside, when it is potable. It may easily be conceived of what utility this process must be, either at Sea or in marshy Countries where the water is unwholesome, or in places where persons are reduced to the necessity of drinking water from Cisterns, which is frequently impure.

I could multiply examples without end, either in narrating facts of the medicinal applications of the Chlorates observed in France and in the Colonies, or in reporting authentic operations amongst ourselves; also that which was performed at St. Domingo by order of the Government of that Country the proceedings of which were inserted in the official gazette of the 20th February 1825; but this would be leading me beyond the limits allowed for this treatise, which I consider as the mere Epitome of a more extended work, in which I shall endeavour to show the causes and Phenomena of putre-

faction in Animal matter with the means of checking, in many circumstances, the process of disorganization.

Just as these pages were going to press, a new fact presented itself, which I think worthy of being reported. *M. Caulin*, "*Regisseur de l'Administration generale du Canal St. Martin*," called on me 11th August 1825, to request (on the part of *M. Berard*, vice President of the Council of Health) some Chlorate of Lime, with the manner of using it, for the purpose of disinfecting a sewer, where several workmen had fallen into Asphyxia the preceding day. I offered my services for the intended operation. The labourers were ordered to empty about twelve or fourteen feet, which was to be finished the next day at eight o'clock. The mud and dirt to be thrown out, was four feet and a half in thickness. I ordered a vessel containing about Sixty quarts of water, and a pound of the Chlorate of Lime to be placed near the sewer. A pail of this liquid was placed also close to the workmen occupied in removing the wall, who were directed to wash their hands and arms with the Chlorated water, wetting their nostrils with the same. The men employed in emptying the sewer, took the same precaution whilst raising the mud, which having been thrown several feet over their heads and mine, was sprinkled over its surface with the solution of the Chlorate by one of the workmen. By repeated sprinkling every fresh quantity of mud was thus disinfecting; the operation lasted more than four hours without a single accident occurring. Either out of deference to me, or that I succeeded in convincing them of the efficacy of the disinfecting agent, the workmen were perfectly obedient to my directions; the security in which they saw me during the whole time of their labour, merely holding a bottle of Chlorate in my hand, applying it sometimes to the nose,

might, perhaps, have contributed to this confidence. We were in an infected sewer, which had not been cleaned for more than forty years, eight workmen had been seized with asphyxia shortly after entering it. This occurrence happened in 1782, and was the subject of a paper written by *M. Cadet de Vaux*, which gave rise to the enquiries of the celebrated *Hallé* and may have contributed more recently to those of *Thénard, Dupuytren, Baruel, &c.*

This sewer, neglected in consequence of the terror with which it inspired the workmen and the authorities, having collected a considerable quantity of filth, which increased daily, seemed likely to become obstructed altogether. Would it not be possible to empty this sewer without the occurrence of accidents? Such was the question I proposed to myself, at a time when I was surrounded by fatal exhalations, and to which question, I thought myself justified in giving an affirmative answer. But to obtain this object it will be necessary to employ the Stove of *Darcet*, (one of the most useful inventions with which I am acquainted,) with an abundant use of the Chlorate, together with other hygienic means, which might be directed by the local Authorities.

As I was about descending into the sewer, a woman in tears came to solicit the assistance of the superintendant of the workmen; her husband was one of the suffocated men, and was affected in a most serious manner. He had lost all perceptibility, and was carried senseless to the "*Rue des Tournelle*," where a vomit was given him. The physician seeing the formidable condition of his patient, recommended that he should be taken to an Hospital, and thought that his advice had been followed: the man, however, preferred remaining at home. He vomited for forty eight hours the weak tea which was

repeatedly administered, and frequently during this time became comatose. I prescribed four drops of lemon juice in half a glass of cold mucilage with a table-spoonful of the "*anti-emetie*" of *Rivière* every hour. The physician of the "*Bureau de Charité*," who then came to see the patient, approved of this treatment.

The emptying of the sewer being just finished, I went to see the sick man, the vomiting had ceased after the first cup of acidulated mucilage; but, though only 41 years of age, he appeared in a situation extremely decrepid; Pierre Aimé (the patient's name) was lying on a truckle bed; his pulse was feeble; he complained of great heaviness and violent pains in the head, and of difficulty in breathing, with a sense of an unpleasant taste, "*which*," he said, "*resembled the flavour of lead, causing him to loose his senses.*" His voice was low and he thought himself dying, I relieved his mind by assuring him that he would soon be well, and that he would be paid as though he were at work, at the same time I made him respire the concentrated Chlorate, which he seemed to breathe with great satisfaction. His countenance now appeared less shrivelled, he assured me, that he breathed more freely, and that he had no longer the unpleasant taste in his mouth. The following day I learned that the patient had slept for five hours, he again took the medicine *which had relieved him of heaviness and head ache*; I ordered the room to be sprinkled with the weak Chlorate. On the 14th of August, Pierre Aimé was well, and was able to go out. I enquired into the circumstances of his accident, "*A rough stone*," he said, "*having fallen into the mud of the sewer, and sinking, I raised it a little with my pick axe, and bending with my arms forward, to seize and lift it, I fell insensible as if struck with death.*"

The effect of the Chlorate will, perhaps, appear surprising in this case, considering the time that had elapsed since the accident (48 hours). Persons who have breathed gases, exhaled from animal matter in a state of putrefaction, must have remarked, that the foetid condition of some of the excretions produced by the inhalation of the gas, continues for a long time afterwards.

It appears to me very desirable to recommend patients to breathe the Chlorate of Soda, and of Lime, in all cases of asphyxia, occasioned by sewers and privies, even long after the occurrence of the accident, should they still find themselves under the influence of the deleterious gas.

Extract from M. Labarraque's Directions for preparing the Chlorate of Soda.

CHLORATE OF SODA.

Pure Carbonate of Soda, $2\frac{1}{2}$ * Kilogrammes,
Distilled Water, 10 Killogrammes.

Mix in a Bottle that will be about one quarter empty—then into a Glass Balloon Bottle (of about Two Quarts) with a long neck and a large mouth, put the following mixture.

Hydro-Chlorate of Soda, 576† Grammes,
Peroxide of Manganese, powdered, 448 Grammes.

* A Kilogramme is 2lb. 3oz. 5dr. Avoirdupois.

† A Gramme is about $15\frac{1}{2}$ Grains.

In the mouth of the Balloon Bottle, lute a large curved tube, and one also in the shape of an S; the first tube is inserted into a bottle containing a small quantity of water, a similar tube passing from this into the Bottle containing the saline solution. The lutes being dry, a mixture of 576 Grammes Sulphuric Acid, and 448 Grammes water, is to be poured into the Balloon through the curved tube S, heat is next applied and gradually regulated until the disengagement of Chlorine gas ceases.

TEST.

Powdered Bengal Indigo, one part,
Concentrated Sulphuric Acid, six parts,

Mix, and add Nine Hundred and Ninety-three parts of distilled water—one part of the Chlorate of Soda, mixed with Eighteen parts of this liquid, should deprive it of colour.

The saline solution should be of the specific gravity of 12° * by Baumè's hydrometer—if the liquid be too concentrated, add the requisite quantity of water; if, on the contrary, the solution is too weak, add as much of the carbonate of Soda as will bring it to the proper strength.

* 1,089 of common standard; tempertatur 55, Fah.

FINIS.