

**An essay on the use of the nitrate of silver : in the cure of inflammation, wounds and ulcers / by John Higginbottom.**

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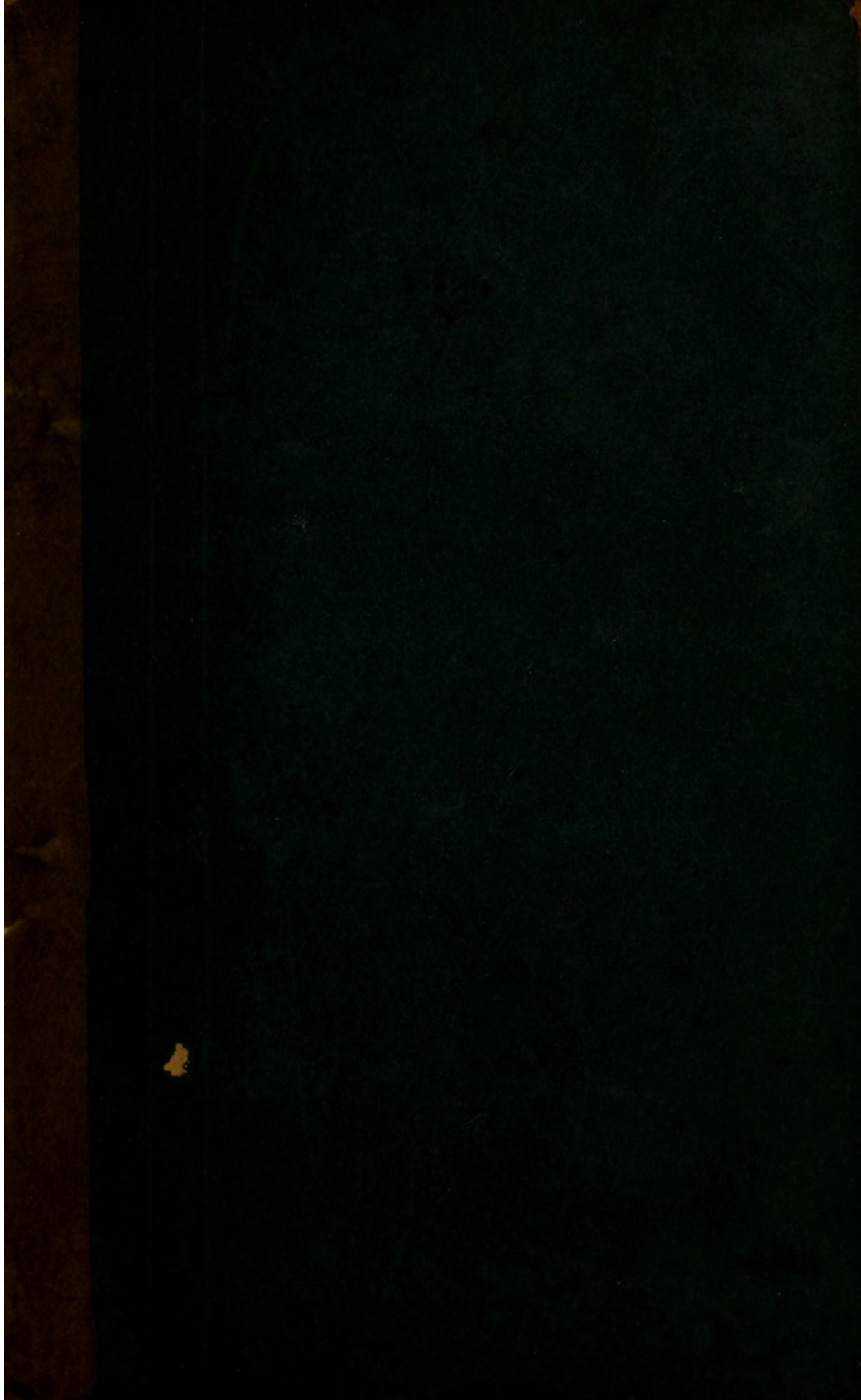
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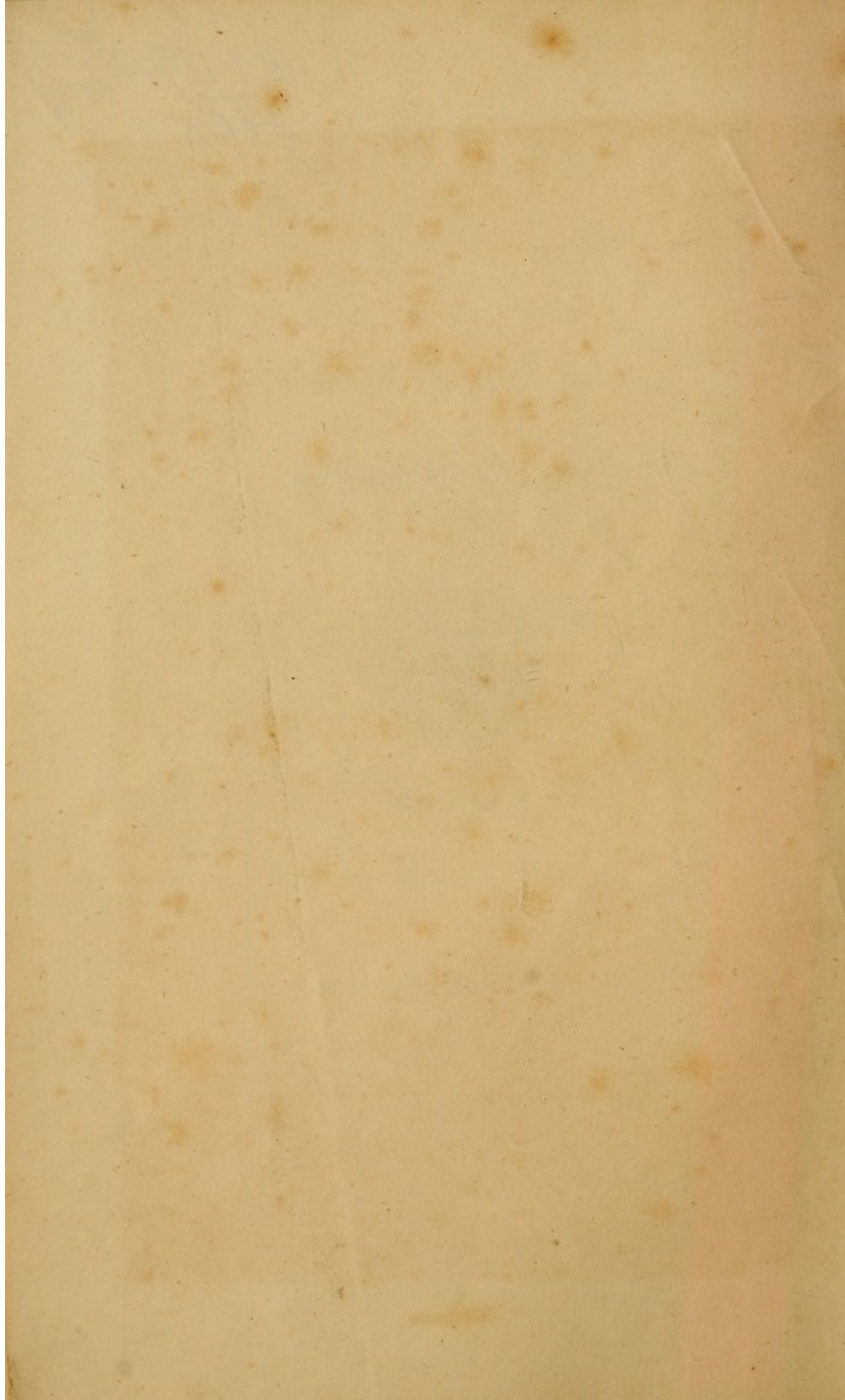


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*E. J. Davison*  
*Boston June. 1833* —

ON THE USE OF  
THE NITRATE OF SILVER.

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AN ESSAY  
ON  
THE USE OF  
THE NITRATE OF SILVER,  
IN THE CURE OF  
INFLAMMATION, WOUNDS, AND ULCERS.

BY  
JOHN HIGGINBOTTOM,  
NOTTINGHAM,  
MEMBER OF THE ROYAL COLLEGE OF SURGEONS OF LONDON.

SECOND EDITION, MUCH IMPROVED AND ENLARGED.

PUBLISHED BY R. B. SEELEY AND W. BURNSIDE:  
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MDCCCXXIX.





A 22.E.1829.1

TO

MARSHALL HALL, M. D. F. R. S. E.

&c. &c.

THIS LITTLE WORK IS INSCRIBED

WITH

SENTIMENTS OF GREAT AFFECTION AND ESTEEM,

BY HIS FRIEND AND RELATIVE,

THE AUTHOR.

*Nottingham, Jan. 20, 1829.*

M. J. H. B. H. S. H. S. H. S. H. S.

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BY THE FIRST PART OF THE FIRST

THE SECOND

## INTRODUCTION.

### ON THE USE OF THE NITRATE OF SILVER IN NAVY, ARMY, HOSPITAL, AND DOMESTIC SURGERY.

I THINK it important, in a few introductory observations, to draw the attention of surgeons to the obvious utility of the remedy which is the subject of the following pages, in the several departments of *army, navy, and hospital practice.*

The nitrate of silver is so portable, and renders the multiplicity of dressings usually applied in many surgical cases so unnecessary, that it must be of great advantage in circumstances in which it is of importance to be as little incumbered as possible by baggage.

The application of this remedy is, in general, too, so simple, and its operation so prompt, that the periods of residence in hospitals may, by this means, be, in many cases, very greatly shortened.

Another advantage of the nitrate of silver is, that, instead of the daily dressings required in many wounds and ulcers, an attention to the patient every third or fourth day is frequently all that is required. These advantages are very great in all hospitals, but particularly so in regard to the class of out-patients, the number of which is increased, whilst that of in-patients is proportionately lessened, by the practicability of curing many cases, by means of the nitrate of silver, without rest, which would otherwise require long confinement upon a bed or couch.

In the army and navy surgical departments, the nitrate of silver will be found of the utmost advantage by its obvious efficacy in preventing inflammation in contused and punctured, and especially in bayonet and gun-shot wounds, and in inducing the adhesive inflammation in incised or sabre wounds. Three cases of gun-shot wounds, treated by the nitrate of silver, are given in the Appendix.

In hospital practice, most of the patients with ulcers of the leg, hitherto made in-patients,

may, I am persuaded, be treated as out-patients; and thus the funds and means of these establishments will indeed be greatly economized, and their advantages extended to patients who must otherwise have been excluded.

The nitrate of silver will also, I am persuaded, one day constitute an important article in what may be termed *domestic surgery*.

In *collieries*, in *factories*, and in other situations in which the persons employed are liable to contusions, and similar accidents, a ready remedy possessing the power of preventing inflammation and sloughing, must prove an invaluable acquisition.

I would, in this place, correct a prevailing error in regard to the action of the nitrate of silver. It has been termed a *caustic*. This is altogether erroneous. It is the very reverse of a caustic. It is impossible to destroy any but the most superficial parts by the nitrate of silver. In this it differs widely from some other substances to which the same term has been applied.

I speak of it in its *solid form*. Instead of destroying, it frequently preserves, parts which would inevitably slough except for the extraordinary *preservative powers* of this remedy.

A new term is, in fact, required for the peculiar kind of influence which the nitrate of silver possesses, in subduing and checking inflammation in phlegmon and erysipelas,—in inducing the adhesive inflammation in wounds,—in preserving the health of parts which, in cases of puncture or bruise, are ready to take on the suppurative or sloughing process, and, lastly, in changing various specific actions and inducing one of a more healthy and curative kind.

Is it not, indeed, by subduing inflammation and irritation, that the nitrate of silver relieves stricture of the urethra? And may not this fact suggest the application of this remedy in other similar affections of internal canals?

This suggestion is much confirmed by the case of contracted rectum, successfully treated by the nitrate of silver, given in the Appendix.

May not the nitrate of silver be employed, to exclude the atmospheric air, to close the external wound, and so to reduce the dangerous circumstances of a compound fracture to that comparative simple and innocuous case of a simple fracture ?

May not this remedy become useful by its power of subduing inflammatory action, or as a prompt mode of blistering, in phrenitic, pleuritic, peritonitic, and other *internal* inflammations ?

But the questions in regard to the obvious further advantages of this remedy, are innumerable. By what has been done already, it may, I think, be conjectured how much may yet be effected by a steady and persevering investigation. Each day supplies fresh incentives to exertion, and to renewed trials of the curative powers of this remedy, and I trust that much will still be discovered in regard to the utility and efficacy of the nitrate of silver.

It is but just to add, that this should rather be regarded as a new work upon the same



subject, than as a second edition of my former little volume. My subsequent investigation of the effects of nitrate of silver, has indeed been so satisfactory that the greater part of the following pages are occupied by subjects scarcely touched upon in the first edition; I had but conjectured, at that time, that phlegmon, erysipelas, inveterate ulcers, &c. as well as punctured and bruised wounds, would find so easy and effectual remedy in the nitrate of silver.

There are still affections in which the nitrate of silver should be tried. One of these is inflammation of the vein. I cannot but hope that it will prove a remedy in many cases of this formidable disease.

One final remark I would add in this place. I have never known the nitrate of silver to do the least real harm. It may have induced vesication, when the skin has been tender; but this has been so trifling an affair as scarcely to deserve notice.

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OF THE USE OF  
THE NITRATE OF SILVER.

I. *Of the Nitrate of Silver, as a remedy in external inflammation.*

I AM not aware that the influence of the nitrate of silver, in subduing inflammatory action, has been at all noticed by surgical writers; much less have its unexpected and extraordinary powers in this respect been fully ascertained.

That the application of the nitrate of silver

ERRATUM.

Page 56, line 4, for *presented*, read *prevented*.

OF THE USE OF  
THE NITRATE OF SILVER.

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CHAPTER I.

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I. *Of the Nitrate of Silver, as a remedy in  
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I AM not aware that the influence of the nitrate of silver, in subduing inflammatory action, has been at all noticed by surgical writers; much less have its unexpected and extraordinary powers in this respect been fully ascertained.

That the application of the nitrate of silver



should subdue the inflammation of phlegmon or of a line of inflamed absorbents, arrest the spreading of erysipelas, prevent and modify the formation of pus, are facts, I believe, totally new. I am thus distinct in my statements of the effects of the nitrate of silver, which I am about to describe as the results of my own investigation, because I cannot by any means be supposed to claim or to have suggested all the beneficial applications of this useful remedy.

In some cases of external inflammation it is sufficient merely to blacken the cuticle. How this apparently simple process acts in subduing the inflammatory action, I am quite at a loss to determine. But it is my object simply to ascertain and state practical facts. It is plain, however, that a chemical union takes place between the metallic salt and the animal substance, by which its pores are obliterated and the action of the external air excluded.

In other cases it is necessary to induce a degree of vesication. This kind of vesication is less irritable than that induced by cantha-

rides, and it has a singular and peculiar effect in subduing the process of inflammation.

In some instances the application of the nitrate of silver has appeared to prevent suppuration. In others, a fluid obviously felt fluctuating before, has been absorbed. And in others, the pus which would otherwise have been viscid and opaque, as contrasted with that of similar affections in the same case in which the nitrate of silver had not been applied, is rendered thin and limpid, and perhaps streaked with blood, pierces through a smaller orifice, and leaves the abcess in a state more disposed to heal.

It is evident from these observations, that the influence of this remedy is not confined to the textures constituting the skin, but that it extends more deeply, exerting itself upon the condition of the cellular substance, and even of parts more deeply seated still.

I must be excused for observing, that I consider all these facts, in regard to the effects of the nitrate of silver, applied externally, to be new, whatever was known of its use before. They will be amply established by the cases

reserved for the subsequent parts of this essay.

It is still a question how far the application of the nitrate of silver may be useful in internal inflammations, by inducing prompt vesication over the inflamed part, or even without inducing vesication.

I now proceed to state more particularly the different modes of applying the nitrate of silver, with the view of subduing external inflammation.

It is frequently only necessary to convert the cuticle into an eschar over the inflamed surface. In other cases, the nitrate of silver must be applied more abundantly, so as to induce vesication; the part is first to be washed with soap and water, to remove any oily substance from the skin, and then it is to be wiped dry; the inflamed and surrounding skin then to be moistened, and a long stick of nitrate of silver is to be passed over the moistened surface, taking care that not only every part of the inflamed skin be touched, but the surrounding healthy skin, to the extent of an inch or more beyond it, in severe cases.

The nitrate of silver may be then passed over these surfaces, once, twice, thrice, or more times, according to the degree of inflammation; once in slight cases, twice or thrice in common cases, and more frequently if quick vesication be required. It is necessary to apply the nitrate of silver more freely on the hand or the sole of the foot, where the cuticle is thick, than on other parts. After the application, the part is to be exposed to the air to dry, and is to be kept cool.

In twenty-four hours, if the nitrate of silver has been properly applied, it will be frequently observed that the inflammation has subsided, and its progress been checked; but if there be any inflamed spot left untouched, the patient will complain of it. To every such spot the nitrate of silver must be applied. At this period there is usually a little vesication.

On the third day there is usually more vesication and less swelling, and the patient complains of a little pain, as of that of a blister; but, on pressure, the part has a puffy feeling, and is found to be quite free from inflammation.

On the fourth day the vesications begin to disappear. It is best to leave them undisturbed; for the dried exudation defends the subjacent cutis.

On the fifth day the vesicated crusts separate, leaving the subjacent parts free from soreness and inflammation. It is sometimes a number of days before the whole of these crusts peel off; but I believe it is best to leave them undisturbed.

*II. Of the Nitrate of Silver, as a means of inducing the healing process or adhesive inflammation.*

I have already mentioned that abscesses over which the nitrate of silver has been applied, are left in a state more disposed to heal, than similar abscesses, in the very same case, in which this remedy had not been used. It would therefore appear that the nitrate of silver modifies the action of the parts, so as to induce that form of inflammation which Mr. Hunter has termed the adhesive.

This effect of the nitrate of silver is equally

observed in recent wounds, whether incised, punctured, or bruised. In incised wounds, union by the first intention is frequently secured by the application of the nitrate of silver on the surrounding cuticle. In punctured wounds union is promoted, and suppuration prevented. In bruised wounds the action of the parts is so modified that their texture is often preserved unbroken, and sloughing, which would otherwise inevitably have taken place, obviated. I speak in general terms, merely wishing to state, in this place, the fact of this peculiar effect of the application of the nitrate of silver. The various limitations and exceptions of this statement will be pointed out hereafter. In the meantime it must be confessed that this principle—these effects of the nitrate of silver are equally new with those pointed out in the preceding section; and I confess that I am equally at a loss to account for them. The influence of the nitrate of silver in inducing adhesive inflammation is not less obvious in its application to inveterate ulcers.

In neglected punctured wounds, attended

by ulceration, pain, swelling, and fungous growths, and in cases in which there would have been destruction of the parts, as in deep-seated inflammation of the finger, the nitrate of silver has a most decided effect in checking the inflammation, in preventing that destruction of parts, and in inducing the healing process.

In ulcers which are rapidly spreading, attended with severe and extensive inflammation, the nitrate of silver has frequently an immediate effect in subduing the inflammation, and in inducing the healing process.

In those cases of inveterate and obstinate ulcers of the legs which have been for years unhealed, attended by sleepless nights and painful days, the nitrate of silver, applied under particular regulations, has extraordinary powers in relieving the pain, and inducing sleep, even from the first time of its application; and eventually in healing the ulcers themselves, and effecting a more firm and durable cicatrix than any other mode of treatment.

The mode of applying the nitrate of silver

is somewhat the same in some of these cases as in external inflammation. But each particular case requires its peculiar mode of treatment: this will be best detailed in treating of each of these cases distinctly.

### III. *Of the Nitrate of Silver as a means of healing by eschar.*

#### 1. *Of the adherent eschar.*

It is a singular and interesting fact, that whenever an eschar made over the surface of a wound or ulcer can be preserved adherent, such wound or ulcer infallibly heals.

It appears scarcely necessary to describe the immediate and well known effects of the application of the nitrate of silver to the surface of a wound or ulcer. It may, however, be shortly observed, that it induces, at first, a white film, which, when exposed to the air, assumes in a few hours a darker colour, and at a later period, becomes of a dark grey or black. As the eschar undergoes these changes of colour, it gradually becomes



harder and resembles black sticking plaster. In the course of a few days, according to the size and state of the wound, the eschar becomes corrugated, and begins to separate at its edges, and it at length peels off altogether, leaving the surface of the sore underneath in a healed state.

In the formation of this eschar, several things require particular attention. The application of the nitrate of silver should be made not only over the whole surface of the wound, but also upon the surrounding skin; for the eschar in drying is apt to contract a little, and in this manner might leave a space between its edges and that of the adjacent healthy cutis.

It is sufficient to apply the nitrate of silver lightly over the wound, so as to touch every part of it, and, if there be any surrounding inflammation, the skin should be moistened with a little water, and the nitrate of silver passed once lightly over it.

The importance of avoiding all causes which might detach the edges of the eschar, will be at once apprehended by the interesting

observation already mentioned, which I have deduced from very extensive trials;—that in every instance in which the eschar remains adherent from the first application, the wound or ulcer, over which it is formed, invariably heals.

Not only the cause just mentioned, but every other circumstance by which the eschar might be disturbed, must, therefore, be carefully avoided, and especially as the eschar begins to separate from the healed edges of the wound, it should be carefully removed by a pair of scissors.

To the surface of the wound the eschar supplies a complete protection and defence, and allows the healing process to go on underneath, uninterruptedly and undisturbed. It renders all applications, such as plasters, totally unnecessary, as well as the repeated dressings, to which recourse is usually had in such cases; and it at once removes the soreness necessarily attendant on an ulcerated surface being exposed to the open air. In many cases too, in which the patients are usually rendered incapable of following their

wonted avocations, this mode of treatment saves them from an inconvenience, which is to some, of no trifling nature.

It has already been stated, how important it is that the eschar should be preserved adherent. To secure this still more effectually, I have found it of great utility to protect it by a portion of gold-beater's skin. The skin surrounding the wound is simply moistened with a drop of water, and the gold-beater's skin is then to be applied over it and over the eschar, to which it soon adheres firmly, but from which it may be removed at any time, by again moistening it for a moment with water; the same bit of gold-beater's skin admits of being again and again reapplied in the same manner.

In this manner, in cases in which there would be much and long-continued irritability and pain, as in superficial wounds along the shin, all this suffering, and its consequence in disabling the patient, are completely avoided. A blush of inflammation forms around the eschar, but this gradually subsides without any disagreeable consequences, and the in-

flammation which would otherwise have been set up, is entirely prevented by the due formation of the eschar. In my earlier experiments I often observed this fact; but since that time I have always applied the nitrate of silver on the surrounding skin and beyond any inflammation which might be present or which might supervene.

I may notice in this place some observations on the comparative effects of healing by eschar and scabbing. On the subject of scabbing I must refer my reader to the well-known work of Mr. John Hunter. The advantage of healing by eschar over that by scabbing is quite decided. By comparative trials, I have found that whilst the scab is irritable and painful, and surrounded by a ring of inflammation, the adherent eschar becomes totally free from pain and inflammation; and that whilst the scab remains attended by inflammation and unhealed, the eschar is gradually separating, leaving the surface underneath completely cicatrised. To these observations I may add, that the success of the plan of heal-

ing by eschar is infinitely more certain, as well as more speedy, than that by scabbing.

I shall, in conclusion, briefly recapitulate the advantages of this mode of treatment. In the first place, it will be found far more efficacious and speedy than any other; secondly, it has the great advantage of saving the patient much suffering and inconvenience; and thirdly, it renders the repeated application of dressings and ointment quite unnecessary. Its utility is extremely great, therefore, where the time of the poor, the expense of an establishment, and the labours of the medical officer, as well as the sufferings of the patient, require to be considered; and it will, I imagine, be found of no little advantage in all these respects, in many cases which are incident to the soldier and sailor.

There is one application of the adherent eschar which I think particularly deserves a trial. In some cases of compound fracture the wound might be immediately and permanently closed by this means. The case will then be reduced to the state of simple fracture, and the

advantage of this circumstance must be obvious to every one.

## 2. *Of the unadherent eschar.*

The eschar is generally adherent in cases of recent injuries, and very small ulcers, attended by little inflammation. In other cases the eschar is too apt to be unadherent; and this arises from the formation of pus, or of a scab, underneath.

If the eschar be unadherent by the formation of pus, it may be ascertained in the space of twenty-four hours, by making a small incision into the centre of the eschar, with any sharp-pointed instrument; this will give no pain. The fluid is to be gently pressed out, and the nitrate of silver is then to be applied to the orifice thus made. The same plan is to be adopted if the fluid ooze out at the edge of the eschar; it is to be fully evacuated by pressure, and the orifice is to be touched with the nitrate of silver, as in the former case. Sometimes it may be necessary to make several small incisions in an eschar, if it be rather large. The necessity for this will be seen upon pressure

with the point of a probe, as the parts which are not adherent will yield on pressure; and there may be several such cavities which require evacuating. The healing process goes on best when the orifice thus made is in the centre of the eschar. In this manner the eschar occasionally is rendered adherent; but more frequently the fluid requires to be evacuated repeatedly; and this should be done once a day, taking care that the eschar be not needlessly separated by allowing the fluid to accumulate.

If, from accident, the eschar be separated before the ulcer is healed, I advise the nitrate of silver to be applied anew. At length the eschar becomes adherent, and in due time it peels off, leaving the surface healed.

In every case in which the eschar does not separate favourably, I begin to suspect the formation of a scab underneath. This circumstance occurs from allowing the fluid to remain too long under the eschar without being evacuated. There are pain and inflammation; the eschar does not separate, but remains long over the sore, and there is no appearance

of healing. In this case the whole must be removed by the application of a cold poultice for two or three days ; this plan has not only the effect of removing the eschar, but of allowing any inflammation or irritation to subside ; afterwards the nitrate of silver must be reapplied as before.

The gold-beater's skin is more useful and necessary, as a protection to the unadherent, than to the adherent eschar, as the former would be more liable to be torn off by accident than the latter. The gold-beater's skin must be removed in the manner already described, whenever the subjacent fluid is to be evacuated, and must be reapplied after touching the orifice with the nitrate of silver.

The pain experienced on the application of the nitrate of silver is greater or less, according to the sensibility and size of the wound. In small wounds it is trifling, and of short duration ; it is more severe in recent wounds than in ulcers ; but the pain in every case soon subsides, and the patient enjoys greater ease than would be experienced under any other mode of treatment. Little or no pain is caused



on applying the nitrate of silver, after evacuating the subjacent fluid of an unadherent eschar. Altogether the pain inflicted by the nitrate of silver is less than is generally imagined, and scarcely forms an objection to its employment.

It may be proper, in the last place, to notice such circumstances as render these modes of treatment inapplicable. It is improper to employ the nitrate of silver with a view of healing by eschar, in large ulcers, or wounds which do not admit of the formation of a complete eschar, or where the ulcer or wound is so situated as to render it impossible that the eschar should remain undisturbed, as between the toes, unless, indeed, the patient be confined to bed.

### 3. *Of the eschar and poultice.*

In some cases there is no chance of effecting an adherent, or even an unadherent eschar. The size or situation of the wound or ulcer may preclude the possibility of this. In such a case, the cure may often be effected by first applying the nitrate of silver, and then a poultice; and this from day to day, according

to circumstances, until at length, by the subsidence of the inflammation, and the cicatrization of the ulcerated surface, the case may admit of the formation of an adherent eschar, and of the final healing of the ulcer.

This plan is particularly useful in cases of neglected punctured wounds, attended by ulceration, pain and swelling; and in cases of recently-opened abscesses. By this mode of treatment the pain and swelling are much subdued, and a free issue is secured for the secreted fluid; and in no case have I seen the original inflammation increased.

I have seen many cases in which, by this mode of treatment, much suffering, and perhaps the loss of some of the smaller joints, have been prevented, in deep-seated inflammations of the fingers, which, having been neglected, have issued in severe inflammation, and terrible fungous growth. In these cases it is not only necessary to apply the nitrate of silver to the surface of the sore, but in every cavity, or orifice, which may be formed by the disease, and also on the surrounding inflamed skin, repeating it as may be necessary.

## CHAPTER II.

OF THE USE OF THE NITRATE OF SILVER  
IN THE TREATMENT OF EXTERNAL  
INFLAMMATIONS.I. *Of Phlegmonous Inflammation.*

THE effects of the application of the nitrate of silver in the cure of phlegmonous inflammation will be best understood by reading short details of individual cases. I shall therefore proceed to give such a selection of these as appear to me best calculated to elucidate this subject.

*Case 1.*—Miss ———, aged 21, of gross habit, was seized on Saturday with acute pain across the patella, whilst sitting at dinner, without any previous known cause. On walking a short distance she found that she

was lame, and that her knee was stiff. Half an hour afterwards the knee was observed to be swelled, but there was no redness. A poultice was applied. In a few hours more, inflammation was observed to be spreading up the thigh; the poultice was taken off, and soap liniment was applied.

On the following morning the poultice was applied, and it was continued all day, and until Monday, when I saw her. The inflammation had spread along a third part of the length of the thigh, and downwards, nearly to the ankle; the limb was much swollen, exceedingly hot, and a slight fluctuation was felt just below the patella. I applied the nitrate of silver over the whole surface of the inflamed parts, and did not open the abscess, as I knew from experience, that the tumour would subside, rather than increase, soon after the application of this remedy. I directed an emetic and purgative medicine, and desired a fracture cradle to be put over the limb, which was kept exposed.

On Tuesday the inflammation was quite arrested, and there was no heat. I opened the

abscess below the knee with a lancet, and some fluid was evacuated, which had more a serous than a purulent appearance. I applied the nitrate of silver within the cavity of the abscess.

On the following day there was an increase of inflammation below the escharred part, on the foot, attended with swelling. I applied the nitrate of silver on that part, and directed an opening medicine.

On the next day all inflammation was gone, but the limb was still much swollen.

On the succeeding Monday the swelling of the limb had much subsided, and there was very little complaint. I directed a repetition of the opening medicine.

On Wednesday the patient was convalescent. The leg required a bandage till the swelling was gone.

*Case 2.*—Miss ———, aged fourteen, was brought to me with considerable swelling, hardness and redness of the skin, situated in the ham, and extending along the back part of the thigh and calf of the leg, which had been spreading for some days. No cause

could be assigned for this affection. The patient was feverish and complained of feeling generally indisposed. I applied the nitrate of silver over the whole inflamed surface, and directed it to be kept without covering. I ordered her no medicine.

Not knowing the address of my patient, I was three days before I heard of her again. She was then nearly well, and there was no vestige of inflammation or swelling. A slight vesication had appeared on the day after the application of the nitrate of silver, for which a simple ointment had been applied. The eschar was separating, in some parts, leaving the surface white. My patient had complained of no pain from the application, but had experienced some heat from the vesications.

In five days the cuticle had nearly all separated, and the patient was quite well.

*Case 3.*—A servant girl, aged sixteen, applied to me with inflammation extending over the fore part of the knee, for which no cause could be assigned except kneeling in washing floors. There were much pain and swelling, and the skin was exceedingly tender

and hard to the touch. The pulse was very frequent, and the patient was feverish and complained of feeling indisposed. I prescribed an emetic and purgative medicine, and applied the nitrate of silver all over and a little beyond the inflamed surface. Two days afterwards the swelling had much subsided, and the tenderness was entirely gone; some vesication existed on the inside of the knee, but over the fore part of the knee, where there was most inflammation, vesication had not taken place. The case gave no further trouble, but got well in a few days.

Similar cases, under ordinary treatment, have continued for many days, or even weeks, attended with much inflammation, and sometimes even with suppuration.

*Case 4.*—Mrs. C——, aged thirty-nine, was seized with acute pain on the back of the fore arm, above the wrist, which appeared to be deep-seated: it was attended with considerable swelling half way up the arm, and on the back of the hand, but with no redness. No cause could be assigned for it: she felt generally unwell. I prescribed an emetic and purgative

medicine, and applied the nitrate of silver on the whole of the swollen surface. This had the effect of affording great relief. The swelling appeared to be subsiding for several days, after which time the pain and swelling increased again, about the spot where she had the first attack; and on examination I could feel a distinct fluctuation. I opened the part with a lancet, and some pus was evacuated. I applied the nitrate of silver, within the cavity, and prescribed a cold poultice. In a few days my patient was quite well.

I state this case because I have several times applied the nitrate of silver over abscesses where they have been rather deep-seated. The nitrate of silver appears to have nearly arrested the inflammation; but, after the expiration of a certain time, perhaps three or four days, there has been a return of symptoms. Whenever this is the case, I suspect the existence of pus, or of some foreign body, as the cause of the recurrence of the inflammation.



II. *Of Whitlow.*

The nitrate of silver is very useful in the treatment of this painful affection. Patients seldom apply to the surgeon before suppuration has taken place. It is then, I think, the best plan to open the abscess freely, to apply the nitrate of silver well within the cavity, and then to envelope the part in the cold poultice and lotion. In this manner the pain and irritation are almost immediately removed, after the smart of the nitrate of silver has subsided.

A second application is seldom necessary. In some cases, however, there is an increase of inflammation in a day or two, which requires the nitrate of silver to be again applied. When the inflammation has subsided, the loose cuticle may be removed, and the nitrate of silver **must** be applied to form an eschar.

In slight cases the nitrate of silver may be passed over the inflamed part, and in this manner suppuration, and the continuance of inflammation, are often prevented.

The following case is copied from the *Lancet*, No. 202. vol. xii.

*Case 5.*—“ A girl, seventeen years of age, became affected with paronychia of the middle finger, which was followed by inflammation of the soft parts, suppuration, and the formation of several sinuses extending along the second and third phalanges, accompanied with thickening, and loss of motion in the last joint. Under these circumstances, she presented herself at St. George's Hospital, and was informed that the only method of cure, was the removal of the finger. Disliking much this proposal, she became a patient at Panton Square. Mr. Wardrop immediately laid open the sinuses to their very bottom. Granulations of a healthy character soon made their appearance, and there was every prospect of a speedy recovery. A week subsequently to this, however, she was suddenly attacked with a most severe pain in the palmar part of the first phalanx, with slight redness and puffiness of the integument in its dorsal aspect, and general febrile derangement. Purulent matter soon formed, but the severity of the symptoms, notwithstanding the employ-

ment of general and local blood-letting, and the exhibition of large doses of opium, continued unabated, and she began to regret that she had not parted with the finger. In this distressing state, it was determined to try the practice lately recommended by Mr. Higginbottom, and the nitrate of silver was applied, not only to the cavity which had contained the matter, but also to the inflamed skin. The relief which this afforded was truly astonishing: after a few applications, the pain and swelling subsided, the small wound healed up, and a slight degree of stiffness in the joints now only remains."

### III. *Of Erysipelas.*

I do not, at first, use the nitrate of silver in slight cases of erysipelas of the face, but resort to every active constitutional means of cure. If these means have failed, I have recourse to the application of the nitrate of silver.

The first case in which I used this remedy upon the face, was that of a young woman who

was affected with erysipelas arising from constitutional causes, which nearly covered the whole face, like a small mask of the figure of a heart, leaving a border of nearly two inches around it free from inflammation. I wished, in this case, to try the effects of a partial application of the nitrate of silver. I accordingly applied it one inch in breadth within the inflamed border, and in the same manner over the adjacent healthy skin, on one side of the face, thus making an escharred surface of four inches in length and two in breadth.

This application had the remarkable effect of entirely subduing the inflammation, and checking its progress on that side. The inflammation spread rapidly on the other side over the whole scalp and neck, and surrounded the escharred surface in every direction, without at all affecting a single point of the healthy skin, to which the nitrate of silver had been applied!

The disease ran its usual course with severity, with occasional delirium, for five or six days, although every treatment was employed which is usual in similar cases, as general

bleeding, blistering the nape of the neck, purgatives, &c.

Having observed in this case, that the nitrate of silver had a most decided effect in subduing the inflammation, and preventing its progress, and that in five days the eschar was peeling off, leaving the subjacent skin white and free from inflammation and swelling, I was led to think that if it were applied in such cases to the whole inflamed surface, and to the surrounding parts, it might effectually check the disease in the commencement, and prevent in a great measure, the severe and continued constitutional affection which follows. In this I was not disappointed. In the following cases it will be found, that the local affection was quickly destroyed by the nitrate of silver, that the constitutional affection ceased, and that the patient became convalescent even in less time than is frequently occupied by the course of the disease under any other mode of treatment.

*Case 6.*—The next case is that of Ann Ward, aged forty-seven, single, and of a delicate habit of body. The catamenia had ceased for three months for the first time, and she had been

indisposed for several weeks with a cold and cough, when she was seized two or three days ago, with violent shivering, succeeded by fever and pain of the head, and soon afterwards the right side of the nose, and the integuments near the right eye became affected with erysipelatous inflammation, for which she took an emetic and purgative.

The erysipelas continued to increase for two days, at which period I saw her. It had spread over the whole of the right side of the face and ear, and more than one half of the scalp. She complained of violent pain of the head, which was much increased by the severity of her cough; the tongue was white and loaded; the skin hot and dry; the pulse 130. She was delirious during the night, and very restless. I took about fourteen ounces of blood from the arm, and prescribed a dose of the submurias hydrargyri, and a purgative with infusion of senna and salts. I desired the head might be shaved, and the head and face washed with soap and water. I then moistened every part of the inflamed surface, and passed a long stick of the nitrate of silver, in a flat direction, over

the whole inflamed surface, and a little beyond it on the surrounding healthy skin, leaving no part untouched.

On my visit on the following day, I found that the nitrate of silver had had the effect of checking the inflammation on the face, so as completely to prevent its spreading to the other side of the nose ; I found that some part of the scalp beyond the parts to which the nitrate of silver had been applied, had an œdematous feel ; although these parts were free from redness, I immediately applied the nitrate of silver freely over them, and over the whole scalp, as well as round the left ear, which had not been affected by the inflammation. The patient said the head had a benumbed feel, but was much less painful. There was scarcely any vesication occasioned by the nitrate of silver on the inflamed parts, but on the surrounding skin, where it was applied, there was rather more. The patient was delirious in the night, but had been quite collected during the day ; the pulse was 104 ; the tongue rather cleaner ; there was less fever, and the bowels had been moved freely.

On the second day there was no increase of inflammation ; the left ear was not in the least affected ; there was a little swelling of the eyelid, on the left side, arising from the irritation of the nitrate of silver. My patient was better in every respect. There had been a little delirium in the night ; the pulse was 100. The purging medicine was directed to be continued.

On the third day after the first application of the nitrate of silver, there was no appearance of inflammation. There had been no delirium in the night ; but a free perspiration, and less fever, and the bowels were open. The slight vesications which had appeared, were gone, and the eschars were adherent.

On the fourth day the eschars were separating, leaving the skin underneath free from erysipelas. There had been no pain from the eschars, only a little stiffness ; the pulse was 92 ; the tongue rather loaded. There had been more sleep, and no delirium for two nights. There was no fixed pain of the head ; and the cough was not quite so troublesome : the appetite a little better.



On the sixth day the pulse was 88; the skin was cool, the bowels open, and the patient was in every respect better; and from this period my patient might be considered to be convalescent.

In considering this case, it will be perceived that there was no delirium after the external erysipelas was subdued by the nitrate of silver, which was decidedly effected on the third day; and that the patient was convalescent in a little more than half the time occupied by the usual course of this disease; and consequently that this attack was cured before that period in which it becomes the most dangerous.

*Case 7.*—Miss Wells, aged twenty, has for several days felt generally indisposed, with loss of appetite, debility, and drowsiness. During the last night she was very restless, and this morning she had considerable heat of the skin, with shivering at intervals; and this has been succeeded by an erysipelalous inflammation on the nose and left eyelid.

The case not being severe, I did not apply the nitrate of silver, expecting it would give way to the antiphlogistic treatment. I took

about fourteen ounces of blood from the arm, which caused her to faint. I prescribed an emetic, and some infusion of senna with salts. The inflammation spread very little during the day. On the next day I learnt that she had had a restless night; her face was very hot and painful, and the pain of the head was violent; there was fever, attended with shivering; the inflammation had spread a little on the right-side of the face. The purging medicine was continued. In the evening the erysipelas had spread nearly over the whole face, some vesications had formed on the right-cheek, and there was an increase of the constitutional symptoms; the pulse was 112. I applied the nitrate of silver, as in the former case, upon and beyond the inflamed surface, except on the eyelids; having found it in former cases, when applied to that part, to occasion a considerable flow of tears, which, passing over the escharred surface, is rather troublesome, inducing excoriation. The immediate pain given by the application of the nitrate of silver in this instance was severe, and compared by the patient to a scald; it

continued for two hours, and in a less degree during the night: the pain of the head, however, gradually abated.

On the following morning there was no increase of inflammation; there was still a little headache; the pulse was 96; there had been a little perspiration; the bowels were open.

In the evening I applied the nitrate of silver to several parts which appeared a little inflamed.

On the following morning the patient had more headache; the pulse was 92; and on examination I found that the inflammation had spread over the scalp, there being a slight degree of redness, and beyond it an œdematous feel. I ordered the head to be shaved, and I afterwards applied the nitrate of silver on the greatest part of the scalp. In the evening there was no appearance of inflammation; the patient had experienced very sensible relief from the application of the nitrate of silver; in one hour afterwards, indeed, the pain in the head had quite ceased, and she had no return of it.

On the following morning my patient was in all respects better: the pulse was 80. I applied the nitrate of silver on the remaining part of the scalp, although there was no appearance of erysipelas; for as this disease is obscure on the scalp in the commencement, and sometimes cannot be ascertained except by the œdematous feel, or by the sensation of pain to the patient when pressed upon by the finger, I would advise the whole scalp to be escharred, if any part of it be inflamed. The pain from the application of the nitrate of silver to the scalp is much less than that arising from its application to other parts; and the immediate benefit, in relieving the pain of the head, by destroying the inflammatory action, is very apparent.

On the fourth morning after the application of the nitrate of silver, the pulse was eighty; the catamenia appeared; the patient felt rather low, with a little hysterical affection and delirium.

On the fifth morning, the cuticle was separating and the patient was convalescent. The opening medicine was directed to be continued.

On the eighth day my patient was quite convalescent, and on the tenth most of the cuticle had separated from the face, leaving it in its natural state.

In the last case, the delirium appeared to be decidedly prevented by the prompt application of the nitrate of silver to the scalp. The ears and chin were also kept from being in the least affected, and the patient might be considered convalescent even on the fifth day. I had therefore much satisfaction in observing the certainty and regularity of the effects of the remedy, in this interesting case.

I have great pleasure in adding the following testimony of Dr. Storer, the well known physician of this place, to the utility of the nitrate of silver in erysipelas. That testimony will be received with the greatest satisfaction by those who best know Dr. Storer's extreme accuracy in observing facts, and caution in admitting them.

*Nottingham, April 10, 1827.*

DEAR SIR,

Your late treatise had apprised me of your mode of using lunar caustic in the treatment of certain wounds and ulcers. I had not lost sight of the facts there detailed, and have been gratified to find, by repeated inquiries, that this plan of treatment continues to be confirmed by its success in your hands, and by other surgeons who have adopted it. It is now understood that it is capable of being extended with signal benefit, to old and extensively ulcerated legs; of which one case that I have seen is certainly an example. In cases of local disease, such success does not exceed the ordinary bounds of expectation; nor is it without analogy to the general application of this substance. When I heard that for some time past you had adopted the same plan of extinguishing cutaneous inflammation, not merely in symptomatic erysipelalous affection, but also in that constitutional erysipelas, which

is often epidemic and always ushered in and accompanied with fever, I confess that I could expect no success from a practice militating so directly against the views generally entertained of the nature of this disease, and would give no ear to it without ocular demonstration of its utility.

I have now seen two cases of constitutional erysipelas treated upon this principle, and as far as two cases well marked will go to authorize a conclusion, mine must be greatly in favour of the practice.

The first was that of a healthy young woman, upwards of twenty years of age, seized with rigor, followed by smart fever, and on the second day by a complete erysipelas of the face, extending to the hair on the forehead. The fever continuing with a further extension of the inflammation, after bleeding, purgative and saline medicines, and a small vesication having arisen on the cheek, it was judged necessary on the third day, to apply the caustic over the whole extent of the erysipelas. The patient's own account was, that she suffered considerable

pain for ten hours : but from that time, the feverish symptoms ceased, and the inflammation was arrested and subdued.

When I saw her the fourth day after the application of the caustic, there was neither fever, nor any remains of erysipelas. The face was as black as that of an African, but in a few days more, I found her free from all symptoms of disorder, the epidermis peeling off, and the complexion underneath quite natural.

The other was a fine healthy boy of sixteen months old, who after a feverish attack had erysipelas on one hip and thigh, and extended partially to the leg. In this case also the fever and inflammation had subsided in forty-eight hours and upwards, after the application of the caustic. The account of the child's mother was that it cried very much for one hour after, then fell into a long and calm sleep, out of which it waked without fever, and calling out for food. In three days afterwards when I saw the child, it was quite well, and the scarf skin of the inflamed parts separating.



This is the extent of what I have observed of this novel mode of treating erysipelas, and which has surprized as it has satisfied me. Sincerely wishing success to your endeavours to improve the practical part of your profession,

I am, Dear Sir,

Yours faithfully,

JOHN STORER.

*Case 8.*—Sarah Siddons, aged sixteen, has complained of pain in her legs for several weeks, and for the last ten days, felt low and chilly at times. This morning, Wednesday, the 7th of March, she was seized with an increase of pain in her foot, and on examination, perceived a vesication on one toe, with surrounding inflammation. This inflammation spread, during the day, over the instep, which was considerably swelled and tense, and on the leg extending to the calf; the inflamed surfaces had a bright red appearance, and there was much heat; there were shiverings, succeeded by fever and sickness.

On the following morning the head was giddy and painful, when raised from the pillow ; there was much thirst ; the pulse was 120. I applied the nitrate of silver over and beyond the inflamed surface, and directed the part to be kept exposed to the air. I prescribed an emetic and an active purgative.

In twenty hours the inflammation was found to be quite checked in its progress. Several parts of the inflamed surface had not been touched with the nitrate of silver ; I applied it on those places. Large vesications had taken place over one part of the inflamed surface. The pulse was 80. The thirst, heat of skin, and head-ache had subsided. There was a little smarting from the application, but my patient complained more of those places where the nitrate of silver had not been applied. The emetic and purgative operated well.

The next day my patient made no complaint. The pulse was natural. There was no fever or head-ache. The vesication was disappearing, and there was no increase or spreading of the inflammation.

On Monday the inflammation and pain were gone, but there still remained some œdema of the foot.

In about a week from this time, from exposure to cold, from eating too much, or from not having rested, there was a return of the inflammation, which spread even more rapidly than at the first, with very great tension of the instep, so that I was much afraid of sloughing of the integuments; there were rigors; the pulse was exceedingly feeble and quick. An emetic and purgative were prescribed, and the nitrate of silver was applied over the whole inflamed surface. I had the satisfaction to find that the same success followed this application, and all inflammation was extinguished as before.

Some fluid formed under the thick cuticle of the great toe, which caused irritation, and required evacuating with the lancet.

I thought it necessary for my patient to rest in bed for a few days, to have a bandage, and to take purgative medicines, to prevent a recurrence of the affection. By these means she was preserved from any relapse.

*Case 9.*—Mrs. Taylor, aged seventy-six, perceived a little pain on the outside of the calf of the right leg on Saturday. On the following morning this pain had increased, and on examining the leg I found it much inflamed along the calf and towards the ancle. In the evening when I saw her she was labouring under a severe rigor, the pulse was 140, and the inflammation had spread all over the leg, except a little on the calf. I prescribed a bolus and purging draught, and applied the nitrate of silver over the whole of the inflamed surface.

On the following morning the pulse was under 100; the medicine had operated well, and there was no increase of inflammation.

The nitrate of silver had been well applied. There were some vesications. My patient had passed a restless night, and had suffered more pain than from an ordinary blister.

In the afternoon Mrs. Taylor had another violent shivering fit. I prescribed an emetic, which operated both on the stomach and bowels, and caused a free perspiration. I directed the saline effervescing medicine to be taken frequently.

On Tuesday morning the pulse was 80 ; the skin cool ; there was no increase of inflammation, the swelling was nearly gone. There were still more vesications from the application of the nitrate of silver.

On Wednesday morning the pulse was 80 ; the skin cool, and the vesications were disappearing. The inflammation was gone and the patient might be considered convalescent.

On account of the œdematous swelling of the foot she was enjoined to rest for several days. She could not bear a bandage. There was a little excoriation, to which I applied the neutral ointment.

*Case 10.*—Monday, January 21. Mrs. Saunders, aged fifty-seven, was seized with faintness, succeeded by a violent rigor, which continued a great part of the day ; she took some brandy and water, and had a very bad night ; the skin became very hot with chilliness at times ; and there was violent pain in the head and back.

On the following day it was found that the inside of the leg was inflamed from the ankle up to the calf. On the evening of this day I saw

her, and found the whole of the inside of the leg affected with violent inflammation, having a dusky red hue extending nearly round the limb, with patches of inflammation in several places on the thigh, and one on the groin. The absorbents were likewise inflamed. I prescribed an emetic, a dose of the submuriæ hydrargyri and a purgative medicine, and applied the nitrate of silver extensively over the whole of the inflamed surface.

On the twenty-third I found that my patient had passed a painful night. The burning pain of the disease had ceased, but the smart of the nitrate of silver continued for some hours. The emetic had not acted, but the purgative had operated well. The inflammation was quite checked.

On the twenty-fourth there were vesications over the whole inflamed surface, but no increase of inflammation. My patient had slight shivering during this day. She was directed to take a purgative.

Twenty-fifth. The vesications are disappearing; there is no irritation, inflammation, or fever; my patient is indeed convalescent.

### III. *Of Inflammation of the Absorbents.*

*Case 11.*—Mrs. H. aged thirty-four, had a swelling similar to a boil, on the fore arm, near the wrist, the centre of which had a vesicular appearance; and on removing the loose skin, presented an ulcerated surface, with highly inflamed and irregular edges. The absorbents were inflamed on the inside of the fore arm, nearly to the axilla. Mrs. H. could assign no cause for this affection, which had been coming on for four or five days. She complained of feeling indisposed and feverish.

The nitrate of silver was applied to the ulcer, slightly over the surrounding inflammation, along the course of the inflamed absorbents, and on the surrounding skin wherever there was any swelling. A blue pill, and infusion of senna and salts were administered.

On the following day the inflammation was observed to be completely checked. The patient stated, that in about half an hour after the application of the nitrate of silver, she experienced sensible amendment, and that the

arm became much cooler and easier ; and that it had remained so during the night.

On the second morning, there were increased heat of the parts to which the nitrate of silver had been applied, and slight vesications on the parts which had been before most inflamed, viz. along the course of the absorbents, and around the ulcerated surface.

On the third day, there was vesication nearly all over the parts which were previously inflamed ; but on the fourth day, it had disappeared, and the cuticle was peeling off, leaving the parts free from inflammation. The eschar was adherent over the ulcer.

On the fifth day, there was a slight discharge from underneath the eschar, which continued for several days ; afterwards the eschar remained perfectly adherent, and from this time no further attention was required.

*Case 12.*—Ann Shipman, aged eleven years, fell upon the elbow, about a fortnight ago, and removed the skin. This little wound was neglected till it began to inflame, when her parents dressed it with some sticking plaster, but the inflammation continued to increase.



At the time this little girl was brought to me, the sore on the elbow was very much inflamed, and very irritable; the surrounding skin was also inflamed to the extent of an inch and a half; the absorbents presented well marked red lines, up to the axilla, where there was an enlargement of the glands, attended with great tenderness. The patient complained of shivering, the tongue was furred, and there were head-ache and loss of appetite.

I wished to try the effect of the nitrate of silver, without using any other remedies whatever, so that I ordered her no medicine. I applied it along the inflamed absorbents, over the tumor, in the axilla, and slightly over the wound, and the surrounding inflamed part. I then applied goldbeaters skin over the ulcer; the other parts were exposed to the air, and directed to be kept free from covering.

On the following morning, I learnt from my patient, that she had passed a restless night, and had experienced some smarting pain; her countenance however was improved; and though the tongue still remained furred, she expressed herself as being much better,

having now no headache. There was some vesication on the parts most inflamed, with slight tenderness, but no pain; that along the inflamed absorbents and in the axilla having entirely subsided.

On the second morning, she made no complaint; the tongue was quite clean; there was no tenderness on pressure in the axilla, nor any fluid under the vesications, except a little in the most dependant part near the elbow. The cuticle above was becoming shrivelled; the eschar remained adherent on the wound from the first application.

On the third morning she appeared quite well. On the fourth morning, the tongue had become white, and I directed a little opening medicine. The arm remained perfectly well.

*Case 13*—Mr. W——, aged sixty years, had laboured under symptoms of a cold, for several days, with uneasiness of the right leg. On the day on which I saw him he had rested, and taken nothing but gruel, as solid food had been rejected the day before. I saw him late in the evening, when he complained

of chilliness, pain in the back, severe cough, and considerable swelling and inflammation of the instep and small part of the leg, with inflammation of the absorbents all along the leg and thigh, and a broad inflamed patch about the size of the ball of the hand, near the groin. There was a small ulcer on one side of the nail of the great toe, which probably was the source of irritation. I prescribed an emetic, a dose of submurias hydrargyri, and a purging draught. I removed a portion of the toe nail which appeared to irritate the ulcer, and applied the nitrate of silver to the ulcer itself, on the inflamed instep and leg, and in the course of the absorbents. I then directed a cold poultice to be applied to the ulcer, and left the other parts to dry, protecting the leg by means of a fracture cradle.

On the following morning I found that the nitrate of silver had not taken effect in some parts, owing to the oily state of the skin, the parts not having been washed previously with soap and water. But where it had been effectually applied, the inflammation was completely checked. I perceived some

fresh lines of inflamed absorbents. I applied the nitrate of silver on every inflamed spot. The medicines had operated well, my patient had passed a tolerable night, having slept several hours together. He made little or no complaint of the operation of the remedy, but said it was similar to that of a blister, but not so severe. He had a severe cough, I ordered him a mixture with ipecacuanha. In the evening vesication had come on, and I found that the sole of the foot and the side of the inner ancle was inflamed. I applied the nitrate of silver freely, and directed a pill with calomel, antimony, and opium, to be taken at night, and a purgative draught in the morning.

On the next day there was more vesication, but no increase of inflammation, and my patient made little complaint; he had no fever from irritation but the room had been too hot; the pulse was 100. He had an opiate draught at bed-time, and castor oil, the following morning.

On the Friday morning the vesication was subsiding, the inflammation was gone. The

castor oil had made him rather faint. The pulse was eighty. He made no complaint.

From this period, no further attention was required to his leg. The catarrhal affection continued troublesome for some days, for which the usual remedies were applied. The patient was kept in bed during several days.

I have here to notice very particularly that in the case of the nail growing into the side of the toe, I would never trust to forming an adherent eschar; but after removing the portions of nail, I would apply the nitrate of silver to remove the irritation and pain, a little lint to separate the nail from the ulcerated part, and afterwards the cold poultice, kept moist and cold with water. By taking these precautions, every source of irritation is removed, and the nail is often preserved. Whereas the increased irritation of attempting to form an adherent eschar, and the confinement of the matter would inevitably destroy the nail.

There is also another practical fact I would mention in this place. A too free application

of the nitrate of silver round the nail will separate it in the same way as a blister.

I cannot conclude this subject better than by inserting the following letter from my brother-in-law, Dr. Marshall Hall.

MY DEAR BROTHER,

I have had an interesting opportunity of watching the influence of the nitrate of silver in a case of inflammation of the absorbents, and I will endeavour briefly to state the obvious effects of this remedy. The case was that of a young lady, aged twelve years; it began by a chilblain upon the heel; inflammation of the absorbents up to the groin followed; suppuration took place in twenty-four spots. The nitrate of silver was not applied during the first five weeks; this was very much regretted after its effects had been observed. The patient was seen by Mr. Lawrence and Mr. Wardrop, who both expressed themselves much interested in it.

As the case would be long, I shall simply

enumerate the effects of the application of the nitrate of silver in this case, as they presented themselves to my observation:—

1. It presented suppuration in many places where the redness and tenderness were recent, yet such as before had inevitably led to the formation of pus.

2. If suppuration had taken place, the tenderness was still promptly removed and the pus from being thick, white, and opaque, was rendered first thin and somewhat limpid, and perhaps streaked with blood, and then by degrees perfectly watery and limpid.

3. When the pus approached the surface, a small opening formed, by which it exuded, and it became unnecessary to use the lancet.

4. The abscess was far more disposed to heal than any of those to which the nitrate of silver had not been applied.

I may add that in several other cases I have seen the application of the nitrate of silver early, along the course of the inflamed absorbents, subdue the disease at once, rendering all other remedies totally unnecessary. I

believe this would have been the case in the instance mentioned, had this remedy been applied very early.

I am, my dear Brother,

Your's very truly,

MARSHALL HALL.

*London, May 14, 1827.*

P. S. It may be well to subjoin the outline of another case, in which the nitrate of silver was useful.

A little girl fell and cut the ring-finger. The joint became permanently inflamed and swollen. The affection had subsisted three months when I saw it, preventing the little patient from attempting the piano-forte. The nitrate of silver was applied every fourth or fifth day, so as to form an eschar over the whole inflamed surface, but not so as to give pain. The finger was quite well in a few weeks.

The powers of this remedy in subduing external inflammations are altogether very remarkable, and, I think, not at all generally known.



## CHAPTER III.

OF THE TREATMENT OF PUNCTURED  
WOUNDS.

IN cases of recent punctured wounds, the orifice of the wound must first be examined. If there be any loose portion of skin closing this orifice, it is to be removed by a pair of sharp pointed scissors, or by a lancet: the puncture and surrounding skin are then to be moistened with a little water, and the nitrate of silver is to be applied within the puncture until some pain be experienced, and rather lightly, so as not to occasion vesication, to the skin, for an inch round the puncture; and to a greater extent even, if the swelling exceeds that space: the part is then to be exposed to the air. It does not appear neces-

sary to apply the nitrate of silver deep in the puncture ; and it would occasion unnecessary irritation. In this manner it is astonishing how completely the terrible effects of a punctured wound are prevented. The eschar, indeed, frequently remains adherent, and the case requires no further attention.

At a later period after the accident, when the puncture has been neglected, some degree of inflammation is usually present, the orifice is nearly closed with the swelling, and a little pus, or fluid, is formed within : a slight pressure will evacuate this fluid. The nitrate of silver may then be applied within the puncture and over the surrounding skin beyond the inflammation, and must be allowed to dry. In this manner we frequently succeed in forming an adherent eschar, and in subduing all the inflammation. If there be any vesication, it may be simply left to nature : the fluid is soon absorbed, or evaporated.

If there be reason to suppose that an abscess has formed deeply, it must be opened freely by a lancet, and the nitrate of silver is then to

be applied within the cavity ; a poultice of bread and water, and cold water as a lotion, are then to be applied over the whole. The application may be repeated every second or third day, if the swelling, or inflammation require it, and the cold poultice may be renewed every eight hours. I have several times applied the nitrate of silver over an inflamed surface, in cases where I was not aware that suppuration had taken place. Even in these instances an immediate check is given to the surrounding inflammation, and relief to the pain ; but in two or three days there is an increase of swelling, attended by some pain, which is not usual, except when there is matter, or some extraneous body, underneath. In these cases, I make a free incision with the lancet, and apply the nitrate of silver, and a cold poultice.

In cases of puncture, where the orifice is healed, and where an erysipelatous inflammation is spreading, attended with swelling, I have applied the nitrate of silver freely over and beyond the inflamed parts, to form an eschar ; and I have had the satisfaction of

finding that the inflammation has been arrested in its progress, and has shortly subsided.

This mode of treatment is particularly useful in cases of punctured and lacerated wounds from various instruments, such as needles, nails, hooks, bayonets, saws, &c. and in the bites of animals, in inflamed leech-bites, in the stings of insects, &c.

The dreadful effects of punctures from needles, scratches from bones, of wounds received in dissection, and of other similar injuries, are often totally prevented by these modes of treatment. I have for the last seven years had frequent opportunities of trying them in these cases, and have the most perfect confidence in their success.

In considerable punctured wounds, where an adherent eschar cannot be formed, the nitrate of silver may be applied to the lips of the wound, and over the surrounding skin for several inches, so as not to induce vesication, and the edges of the wound may be brought together by sticking-plaster, as in healing by the first intention. This mode of proceeding prevents the excess of inflam-

mation and consequent suppuration, and the wounds have healed nearly as by the first intention.

The advantage of these modes of treating punctured wounds will however be best explained and established by a selection of cases, to which I can add such particular remarks, as may be suggested by peculiarities in the cases themselves.

### I. *Of Simple Punctured Wounds.*

*Case 14.*—A. B. received a severe punctured wound by a hook, of the size of a crow-quill, which pierced into the flesh, between the thumb and fore-finger, on the outside of the hand. Scarcely a drop of blood followed, but there was immediately severe pain and tumefaction. The nitrate of silver was applied without loss of time within the orifice, and around the edge of the wound, and the eschar was left to dry. The smarting pain induced by this remedy was severe for a time but gradually subsided.

On the ensuing day, the eschar was found to be adherent, and there was little pain ; but there was more swelling than usual after the prompt application of the nitrate of silver, owing probably to the mobility of the part.

On the third day, the swelling remained as before, and there was little sense of heat.

On the fourth day, the swelling and heat had subsided, and the eschar remained adherent.

On the succeeding day the eschar had been removed by washing the hand, and the puncture was unhealed but free from pain and irritation. The nitrate of silver was reapplied.

From this time the eschar remained adherent, and at length gradually separated, leaving the parts perfectly healed. It is quite certain that under any other mode of treatment, this severe puncture would have greatly inflamed, and have proved very painful and troublesome, and it is not improbable that suppuration and much suffering would have ensued. All this is effectually and almost certainly prevented if the nitrate of silver be applied promptly, as in the present case. When time has been lost the case is very different, as will appear hereafter ;

but even in these cases the nitrate of silver proves an invaluable application.

I have since found that, in rather severe punctures the eschar has a conical form, and generally separates before the wound is quite healed; but when it has so separated a subsequent slight application of the nitrate of silver is sufficient.

*Case 15.* — Mrs. Middleton, aged forty, wounded her wrist, on the ulnar side, by the hook of a door post; there was a considerable flow of blood at first, but this ceased suddenly, and the arm immediately became affected with great pain and swelling. The nitrate of silver was applied half an hour after the accident.

On the following day, the eschar was observed to be adherent, and the patient reported that she had suffered scarcely any pain after the smarting of the applicaion had ceased. There was a slight swelling round the puncture, but that of the arm had totally subsided. The nitrate of silver was applied over and beyond the swelling. On the third day all tumefaction had subsided, and there was no remaining complaint whatever.

I hoped that this case would have required no further attention or remedy. But my patient accidentally rubbed off the eschar about a week after its formation, and so exposed the subjacent wound unhealed. She, however, suffered no pain or inconvenience from it, and it was again shielded by means of a fresh eschar, which remained adherent until removed by the healing process.

This puncture was so severe, that the arm was in a state of ecchymosis for the space of six or eight inches upwards, and I doubt not that, without the nitrate of silver, there would have been severe and long continued suffering and perhaps painful suppurations.

*Case 16.*—Sarah Gin, aged twenty-four, had suffered from a bad state of the general health for two years, when she trod upon a nail fastened on a piece of board, lying on the floor, which pierced the shoe and stocking, and entered into the middle part of the ball of the great toe. On pulling the nail from the wound several drops of blood followed. The foot was put into warm water. In two hours the pain became violent, and she passed a sleepless night.



On the following morning, I saw her for the first time, and found the opposite part of the joint affected with inflammation and swelling, which extended to the instep. I applied the nitrate of silver over the inflamed and swollen surface and to the puncture, prescribed a dose of opening medicine, and exposed the part to the air, defending it with a fracture cradle.

On the following morning my patient reported that she had passed a good night, and that the opening medicine had operated. There was no increase of swelling or inflammation. There was a little vesication from the nitrate of silver, and the cuticle was a little discoloured.

On the following day, the eschar was adherent over every part, and continued so till it separated, leaving the puncture well.

I was much interested indeed with the progress of this case, for it was similar to Parr's hereafter mentioned, in which a different course became necessary, owing to the neglect of the nitrate of silver early in the case.

*II. Of Punctured Wounds with Inflammation.*

*Case 17.*—A servant maid, aged twenty-four, applied to me with a swelling of the middle finger, and of the back part and palm of the right hand, attended by such pain as to prevent her from sleeping in the night. She thought this affection had arisen from a puncture by a pin, or needle, in washing. On examination, I perceived a small wound at the middle of the finger, at the first joint, and on removing the skin by the lancet, a little pus escaped, and left a very small cavity. I applied the nitrate of silver within this cavity, and over and beyond the inflamed parts of the finger and hand, previously moistened with water, and I left them exposed to dry. I prescribed an emetic and purgative medicine, and desired that the hand might be supported in a sling.

On the following day my patient stated that her hand was perfectly easy, and had been free from pain, from the time the sense of heat, occasioned by the application, had subsided; she had passed a good night; the inflammation

of the hand was completely checked in its progress; the swelling remained as before.

On the next day, the patient made no complaint; the swelling had become soft, and puffy to the touch. In a few days more, the cuticle began to peel off, and in one point, where it was thick, there was a slight degree of tenderness. From this time there was no further trouble or complaint.

*Case 18.*—Another servant, aged twenty, slightly wounded the fore part of the index finger, at the first joint, by a bone of a hare, in dressing it. The wound healed in a day or two, and no notice was taken of it. A few days afterwards the finger became swelled and painful, and affected with diffused inflammation of an erysipelatous character, extending to the back of the hand, and there it was bordered by a ring of a more vivid colour. I applied the nitrate of silver nearly all over the finger, and upon the back of the hand, upon and beyond the inflamed border.

On the following day the swelling remained as before, and the patient complained of heat of the parts to which the application had been

made, and a small part of the finger which had not been touched was very painful. I applied the nitrate of silver to this point.

On the succeeding day, the swelling had become puffy, and the whole finger and hand were free from pain. A few days afterwards, the hand was quite well. No medicine was given, nor was the patient prevented from pursuing her usual avocations.

This case was the more interesting because I had had two similar ones a short time before, which had been occasioned by wounds received in cutting dogs' meat, and which, under the ordinary treatment, had been several weeks in getting well.

*Case 19.*—A female servant punctured the end of the finger, by a pin. There succeeded much pain and swelling, and it appeared that the nail would separate, and the cuticle all round the finger was raised by the effusion of fluid. This fluid was evacuated and a poultice applied.

On the third day, the cuticle was removed, and the exposed surface was found to be ulcerated in several spots. The nitrate of

silver was passed slightly over the excoriated surface, which was then left exposed to dry.

On the succeeding day, the eschar was adherent, and the pain had almost subsided. On the next day the eschar still remained adherent, and as there was neither pain nor soreness, the patient used her finger.

The eschar was at length removed by the healing process, and was separated together with the nail, and the case was unattended by any further inconvenience or trouble, either to the patient or myself.

It is scarcely necessary to contrast the advantage of this mode of treatment with that usually adopted. It is at once more speedy and secure, and less burdensome to such patients as are obliged to continue domestic avocations.

### III. *Of Neglected Punctured Wounds.*

In many cases in which it is impossible to adopt either the mode of treatment proposed for the simple, or inflamed punctured wounds,

it is of great utility to apply the nitrate of silver first, and then a cold poultice, made without any oleaginous substance. This plan is particularly useful in cases of neglected punctured wounds, in such as are attended by pain, swelling, and ulceration, and in cases of recently opened abscesses. By these applications, the pain and swelling are much subdued and a free issue is secured for the secreted fluid.

It is generally necessary to repeat the application of the nitrate of silver, every second or third day, or occasionally, as the inflammation and swelling of the part may require; and the cold poultice may be renewed every eight hours, and may be kept moist with cold water.

*Case 20.*—William Chantry, aged fifty, received a stab in the wrist with a hay-fork, and applied a poultice.

There were on the next day great pain and swelling; the wounded orifice was very small. I applied the nitrate of silver within the puncture, and directed a cold poultice to be worn over it: the arm was kept in a sling.

On the succeeding day the swelling and

pain were diminished, and a little lymph flowed from the wound. I again applied the nitrate of silver, and I continued the poultice.

Two days afterwards the swelling and pain were nearly gone. The poultice alone was continued, the nitrate of silver not being requisite from the entire subsidence of the inflammation.

The patient came to me again in four days more, quite free from pain and swelling. The poultice was discontinued, and the nitrate of silver was then applied, in order to form an adherent eschar.

*Case 21.*—Mr. Cocking's son, aged twelve, received a stab in the palm of the hand, from a penknife, three days ago, which has been followed by much swelling and pain, the punctured orifice being nearly closed. I applied the nitrate of silver within the puncture, and directed a cold poultice to be laid over the whole hand.

On the following day, I found that the poultice had not been applied; there were more pain and swelling; an eschar was formed over the puncture, which I removed and thus

gave issue to a considerable quantity of pus. I again enjoined the application of a cold poultice, kept constantly moist and cold with water.

On the succeeding day, the inflammation had greatly subsided. I repeated the application of the nitrate of silver, and poultice. On the fourth day the inflammation had nearly disappeared, and on the fifth entirely.

In such cases the nitrate of silver unites the advantages of at once opening the puncture and of subduing the inflammation, thus preventing the formation of deep-seated abscesses.

*Case 22.*—A little boy, aged twelve, received a stab by a penknife, on the fore part of the thigh. In a few days there were great pain and swelling; the orifice nearly closed, and he had fever, with head-ache. I applied the nitrate of silver deeply in the wound, and directed a poultice and a cold lotion to be kept upon the inflamed parts, and, suspecting fascial inflammation, I took away ten ounces of blood, and administered purging medicine.

On the next day the inflammation had



greatly subsided. The poultice and lotion were continued.

On the third day there was some inflammation round the puncture, which appeared to be closing. I repeated the application of the nitrate of silver within the orifice of the wound.

On the fourth day the swelling was subsiding and there was no pain.

The poultice and lotion were continued from this time. There was no occasion for any further remedy; the little patient speedily recovered.

*Case 23.*—Mr. Parr, aged thirty, of delicate habit, trod upon a needle, which pierced the ball of the great toe. A free crucial incision was made, but the needle could not be found. A poultice was applied to the wound, and over the poultice a cold lotion.

In the course of a week, part of the needle came away. Mr. Parr did not rest as he was enjoined to do, and in consequence, severe inflammation came on, and in two days a fluctuation was perceived over the joint opposite to the puncture.

A free incision was made, and some pus was evacuated.

On the succeeding day, the inflammation was somewhat abated, but on the next day it had again become exasperated, and the openings made for the evacuation of matter were somewhat closed by the swelling. I now introduced the nitrate of silver very freely into the opening, and reapplied a cold poultice and lotion.

On the following day I found that my patient had slept well for the first time since the developement of inflammation, and had suffered far less, after the smarting pain from the application of the nitrate of silver had subsided, than before; the punctured orifices were open, and the skin which was extremely tense the day before, was become soft and flexible.

From this time I found nothing necessary but to repeat the application of the nitrate of silver about every third day, to subdue inflammation, and to keep the wounds open, which it always effected. The joint remained stiff, from which we may infer the violence

of the inflammation ; and the constitution of my patient was such that we cannot doubt that the remedy prevented many serious events usually consequent upon such punctures, under the ordinary treatment.

It is highly worthy of remark too, that the good effects of the application of the nitrate of silver, in this case, were too immediate and distinct to be mistaken.

*Case 24.*— ———, aged twenty-one, machine-maker, whilst fighting, in a state of intoxication, received a deep stab with a file, on the inside of the wrist in the direction of the transverse ligament. For two days the pain, inflammation, and swelling, gradually increased. On examination, I found the orifice nearly closed by the swelling, and there appeared much constitutional irritation. I passed the nitrate of silver deep within the orifice, and on the edges of the wound, and directed a number of leeches to be applied to the surrounding swelling, and afterwards a warm white bread poultice, until the leeches should have done bleeding, and I prescribed an emetic and purgative.

In eight hours after the application of the leeches, I passed the nitrate of silver over the leech marks, and indeed over the whole of the swelled and inflamed surface; and I then directed a cold poultice to be put over the eschar.

The next day the parts were free from pain, and the swelling had much subsided.

The day after, I applied the nitrate of silver, to the orifice, but not deeply, and continued the cold poultice.

By three other applications of the nitrate of silver, made every second day, followed by the neutral ointment instead of poultice, this patient got quite well.

*Case 25.*—This case illustrates the mode of treatment by the nitrate of silver, of some of those terrible effects of punctured wounds; which have been neglected in the beginning.

B. Unwin, aged forty, washerwoman, applied to me on July 10, 1820, with severe inflammation and ulceration of the middle finger, arising from a puncture by a pin or needle, some time before. There was much painful tumefaction, and the integuments had burst

along nearly half the length of the finger, on the ulnar side, and over the middle joint, on the radial side. The probe did not, however, pass to the bone, or into the joint. I applied the nitrate of silver deeply in every part, and over the whole surface, and enveloped the finger in a cold poultice covered with cold water.

On the eleventh, she reported that she had slept well for the first time for a whole fortnight. There was scarcely any pain, but she complained of soreness; the swelling had greatly subsided. The nitrate of silver was again applied, and the poultice and lotion continued.

On the twelfth there were still swelling and pain; there was considerable bleeding from the wound, so that I did not apply the caustic well.

On the thirteenth the swelling and pain were nearly gone. I repeated the application of the nitrate of silver, which induced bleeding from a fungous growth.

On the fourteenth the swelling had nearly subsided, and the cuticle was separated all

over the finger. The nitrate of silver was applied extensively over the wound, and abraded parts. It induced little bleeding, or pain.

On the fifteenth the fungus was nearly removed; the wounds presented an appearance of slough, over their surface. The nitrate of silver was applied to the fungus, which still remained.

On the seventeenth the wound was much smaller, and the slough was separating. The nitrate of silver, and cataplasm were applied as before.—A similar report was made on the succeeding day.

On the twentieth the slough was separating. The nitrate of silver and cataplasm were applied.—A similar report was made on the twenty-second.

On the twenty-fourth, the slough having separated, the integuments over it were found to be flabby and loose.—The nitrate of silver was applied to them.

By a continuation of this plan the wound gradually contracted, and at length, when there was no further use for the cataplasm,

the eschar became adherent, and the ulcer healed underneath. It appeared highly probable to me, that under any ordinary treatment, the finger in this case, would have been lost.

#### IV. *Of Large Punctured Wounds.*

*Case 26.*— ——— aged fifty, in returning home in the dark, in a state of intoxication, fell on one of the spikes of the iron pallsades at his door. It pierced between the os hyoides and the chin, to the depth of nearly an inch. The wound bled a little, and was very painful when I saw him some hours after the accident. The aperture was rather large and gaping, and, as there was no possible chance of healing it by eschar, I applied the nitrate of silver on the surrounding skin, to the extent of several inches, and to the edges of the wound. I then brought the edges of the orifice together, by means of straps of adhesive plaster, and afterwards applied a compress and bandage. I prescribed a purgative.

In six days, during which interval there had

succeeded no inflammation, or swelling, and scarcely any pain, I removed these dressings. The wound was much closed, and a serous discharge flowed from it. I applied the nitrate of silver again on the exposed surface of the wound, then a little lint, with the neutral ointment, then sticking plaster, and lastly a compress.

In three days more, the wound was nearly healed; there was rather more fulness round the puncture, but no inflammation. The nitrate of silver, lint, and ointment were again applied.

At the next visit of this patient, three days afterwards, the wound was well.

In this case the application of the nitrate of silver, prevented the inflammation of the surrounding integuments, and the wound healed without the unpleasant effects, frequently consequent upon large punctured wounds.

#### V. *Of Wounds received in Dissection.*

It is not in my power to give any cases in illustration of the treatment of severe accidents



resulting from these wounds; for since I began the free use of the nitrate of silver, all the terrible effects of such wounds have been invariably prevented. I may here mention, that in the years 1813, and 1819, respectively, I was myself exposed to great danger from puncture, during the examination of dead bodies. Since the latter period, I have repeatedly been exposed to the effects of such inoculations, but in every instance the danger has been completely averted by the prompt and free application of the nitrate of silver.

I give the following case in order to point out the mode of treatment I would now recommend:—

About eight o'clock in the morning I received a puncture in the examination of a puerperal case; I merely washed the part. About four o'clock my attention was called to a sharp pain in the punctured part, on examining which there appeared a little elevation of the skin. In three or four hours more, there was more swelling round the puncture, and at this point there was a small tumour, about half the size of a large shot-corn. I experienced a little

headache, to which I was quite unaccustomed. I applied a spirituous embrocation, and went to bed. In the night I had an increase of pain, and became feverish and restless, with increase of headache; the thumb and hand were becoming much more swelled, and the absorbents up the arm, inflamed. I took an emetic, and afterwards a dose of calomel, followed by a saline purgative and an enema; and I applied the embrocation constantly to the hand and arm. Afterwards I began to take two grains of the submurias hydrargyri, every three or four hours.

About four o'clock on the following day, I experienced excessive pain in the punctured part. I therefore particularly requested, that I might have a free incision made into it, though I knew no suppuration could have taken place. This was done by the lancet. The incision gave considerable relief to the part, and for a short time the pain of the head was better; a large cataplasm was applied. In the course of the evening I experienced a slight chilliness, with violent fits of vomiting, which continued for about half an hour; this was

succeeded by great heat, and afterwards by profuse perspiration, at which time I became much easier, until it was followed, in the course of about another half hour, with another fit of chilliness, and vomiting, which was again succeeded by a hot fit and perspiration. The vomiting, hot fit, and perspiration, were repeated at intervals for twelve hours, the second being attended with very violent knocking pain in the head. The hand was now become twice its natural size, and the arm was considerably swelled as high as the elbow, with some enlargement of the axillary glands. The tonsil on that side of the throat was also a little enlarged and painful.

My medical attendant recommended the loss of blood ; twenty ounces were therefore immediately abstracted with decided relief of every symptom. The calomel had begun to affect the gums ; the saline purgative was continued. I had no return of the vomiting, but was in every respect better.

It is my opinion, from what I have since experienced, that this severe and painful illness would have been entirely prevented by the free

application of the nitrate of silver, and that it would have been the only local remedy necessary.

In the second state of the puncture, where a small tumor is raised, I would remove this tumor by the lancet, before applying the nitrate of silver, to form an adherent eschar, and I would adopt the precaution of applying it on the surrounding skin, and beyond the swelling.

At a later period still, I am of opinion, that, when the hand had become much swollen and tense, and the inflammation had spread up the arm, the external application of the nitrate of silver, on the whole inflamed and swelled surface, would have subdued and checked the inflammation, and that the constitutional affection would have ceased.

## VI. *Of the Bites of Animals.*

*Case 28.*—James Joynes, aged twelve, was bitten by an ass, on each side of the middle finger. The wounds were severe, and almost

immediately followed by swelling and great pain. The nitrate of silver was well applied within half an hour of the accident.

On the succeeding day, the eschar was found to be quite adherent, and the pain and swelling had subsided. The eschar separated in about twelve days, leaving the wounds healed.

*Case 29.*—Mr. Worth's daughter, aged six, was thrown down by a dog, and bitten severely on the face and forehead in three places; one of the wounds in the cheek was deep, and the parts were much bruised. The nitrate of silver was well applied in half an hour after the accident, to each of the wounds, and the eschar was covered with goldbeater's skin.

On the next day the eschars were adherent. There was some swelling from the severity of the bruise, but the child made little complaint.

On the third day, the swelling remained as before, but the eschar was adherent. On the fourth the swelling had nearly disappeared.

The eschar separated in nine days from the infliction of the wound, leaving the parts healed and free from scar.

*Case 30.*—Mrs. G. was bitten by a little dog on the forefinger, about a fortnight before I saw her. There was then a very irritable, inflamed, fungus sore. I removed the fungus by a pair of scissors, and applied the nitrate of silver, to form an eschar.

On the succeeding day, I found that the patient had applied a little lint before the eschar was dry, which had prevented it from remaining adherent. I reapplied the nitrate of silver, and desired that the eschar might be exposed to dry.

The eschar remained adherent, the inflammation subsided, and the case gave no further trouble.

*Case 31.*—A servant maid was severely bitten by a dog in four places on the fore arm, three days before I saw her; adhesive plaster had been applied. There was a wound across the arm two inches in length, and three fourths of an inch in breadth, attended by dull pain, and swelling of the arm. I applied the nitrate of silver to form an eschar, covering it with goldbeater's skin.

On the following day the eschar remained

adherent round the edges, and had a puffy feel in the centre. I pierced it, and a little bloody fluid exuded; I touched the orifice thus made with the nitrate of silver. The swelling remained as before with a degree of soreness.

On the next day the swelling had subsided. The eschar had the same character as before; a little fluid was again evacuated, and the nitrate of silver was reapplied to the orifice.

This mode of treatment was pursued for nine successive days, when the eschar remained adherent in every part.

The patient continued her usual avocation all along. Under any other mode of treatment, I think it certain that she would have been compelled to rest for a number of days. Adherent eschars were formed on the other three bites which were less severe, from the first application.

VII. *On Inflamed Leech-bites.*

In some cases where the common mode of pressure by sponge and adhesive plaster cannot be used to stop the bleeding of leech-bites, it may be effectually stopped by the firm application of the point of a stick of nitrate of silver within the little orifice, continued for a short time.

It is worthy of observation too, that the application of the nitrate of silver to leech-bites as soon as they have done bleeding, will cause an adherent eschar, and prevent that irritation and erythematous swelling to which some patients are subject.

Where there is great inflammation several days after the application of leeches, it is quickly subdued by the external application of the nitrate of silver. Small irritable sores, after the application of leeches, are readily cured by eschar.

I have had some cases where the little ulceration from leeches has been excavated around the edges. In these cases I have



had recourse to the nitrate of silver, and the cold poultice.

*Case 32.*—Mr. Beardsley had applied a leech on the calf of the leg. Several days afterwards the part inflamed, and was red, hard, and swelled, to the extent of several inches in circumference, and down the leg. I applied the nitrate of silver slightly over the inflamed parts, previously moistened with water, and prescribed a purging pill and draught.

On the following day the inflammation was quite checked, and the pain and swelling gone. The eschar had a brown colour over its surface. On the succeeding day he was still better, and made no complaint. The eschar was black.

*Case 33.*—Mr. B—, had an irritable small ulcer on the leg, surrounded by considerable inflammation, arising from a leech-bite. I applied the nitrate of silver upon the ulcer and lightly over and beyond the inflamed part. On the following day a little fluid had formed under the eschar, but the surrounding inflammation had subsided. On the succeeding day the eschar was adherent, and all inflammation and soreness were gone.

A very irritable ulcer, sometimes forms after the application of leeches. I knew one lady who was confined during five weeks, with several ulcers on her foot, from such a cause. I have no doubt that the application of the nitrate of silver would have prevented all the inconvenience and suffering which she experienced ; this observation is confirmed by the following case.

*Case 34.*—An old man applied leeches to the instep for inflammation occasioned by a bruise. Several very irritable ulcers were produced, with some swelling. I applied the nitrate of silver, to form an eschar over each of them.

On the following day the eschars were adherent, the swelling had subsided, and he had slept well for the first time during several nights.

## CHAPTER IV.

## OF THE TREATMENT OF BRUISED WOUNDS.

It has been already observed, page 12, that the nitrate of silver is an invaluable remedy in cases of bruised wounds of the shin. In these, as in all other cases, the value of this remedy is greatly enhanced by an early application. In bruises of the shin, I have not had a single instance in which I was not enabled to effect a cure by the adherent eschar, if the application of the nitrate of silver were made early, unless the skin had been in an unhealthy and discoloured state from previous ulcerations, or in old persons, in whom the skin along the shin was tender from exposure to the fire, or in whom there was considerable œdema. The

difficulty of forming an adherent eschar is always increased by delay; but in bruises along the shin there is an additional reason for this increased difficulty, arising out of the tendency, observed in them, to the formation of slough.

In this place I have indeed to make an observation of particular interest, both in a pathological and curative point of view; it is, that the formation of this slough has always been prevented by an early application of the nitrate of silver, in the cases which have hitherto fallen under my care. This fact may probably admit of explanation in the following manner:—the bruise partially destroys the organization of the part, and the subsequent inflammation completing what the injury had thus partially effected, a loss of vitality takes place, and the slough is formed. The early application of the nitrate of silver has already been shown to have the remarkable effect of preventing the inflammation consequent upon certain wounds, and, in this manner, in the case under consideration, the part recovers from the injury done to its organization, and

its vitality is preserved, one of the causes of the slough being removed.

Whether this mode of explaining the fact be correct or not, the fact itself is extremely important; for the formation of a slough, which the early application of the nitrate of silver can alone prevent, renders it more difficult to effect the formation of an adherent eschar, and renders double the time necessary to accomplish it. When the patient applies too late after the accident to prevent this formation of a slough, and the slough itself is superficial, I have removed it with a pair of dissecting forceps and scissors; and as the suppurative stage had not come on, the wounded surface has frequently nearly healed by the adherent eschar, the fluid being only required to be evacuated twice or thrice.

In the severer cases of bruise, attended by inflammation and swelling, in which the suppurative stage had not commenced, the nitrate of silver must be applied on the bruised, swelled, and inflamed parts, so as to induce an adherent eschar, which is to be exposed to dry.

In those cases where a recent bruised wound is too considerable to heal by eschar, the nitrate of silver should first be applied on the surrounding skin, for several inches, so as not to induce vesication, and over the wound, which cannot be covered by the skin: the skin is then to be brought as nearly into apposition as may be by means of common adhesive plaster, without any intervening dressing. The plaster will not irritate the skin, or wound, for they are protected by the eschar. By this method the wound will frequently be nearly healed by the first intention.

### I. *Simple Bruised Wounds.*

*Case 35.*—The first case of bruise which I shall detail was not severe, but will serve to illustrate the mode of treatment by the adherent eschar.

Mr. Symons, aged sixty, slipped off a chair and bruised the shin; the skin was removed to the extent of an inch in length in one part, and of an inch in length and breadth in another.

He applied a common poultice. During the night he had much pain, and on the following morning there was severe inflammation round the wounds. I applied the nitrate of silver over both, and covered the eschars with goldbeater's skin, to prevent the contact of the stocking.

On the following day the eschars were found to be perfect. The pain had entirely ceased. There was a little vesication round one of the wounds. I simply evacuated the fluid of the vesication, and left the part exposed to dry.

On the third day, there was no pain or inflammation, and the eschar remained adherent.

From this time no remedy was required. The eschar separated, leaving the surface healed, in about a month from the occurrence of the accident. The patient suffered no inconvenience, nor was he confined from his labours a single day.

*Case 36.*—The following case was far more severe, but the mode of treatment was no less efficacious.

Mr. Granger, aged thirty-six, received a severe bruise, by a quantity of stones

which had been piled up, falling upon the outside of the leg. He was extricated from this situation with much difficulty. Besides the bruise, the skin was removed from the outside of the leg to the extent of ten or twelve inches in length, and in some parts to that of an inch and a half in breadth; and in the fore part of the ankle a deep furrow was made by the rough edge of one of the stones. I applied the nitrate of silver about half an hour after the accident, over the whole surface of the wounds, and protected the eschar by the gold-beater's skin. The patient was directed to keep the leg cool and exposed to the air. He took no medicine.

On the succeeding day the leg was a little swelled, but the patient did not complain of any acute pain, but only of a sense of stiffness. An adherent and perfect eschar was found to be formed over the whole extent of the wound. There was no fever.

On the third day, the swelling had abated. No further remedy was applied. The patient was still enjoined rest.



On the fourth day, the swelling was nearly gone. The eschar remained adherent. The patient walked about.

From this time the patient pursued his avocation of a stone-mason; no further remedy was required, no inconvenience experienced, and the eschar separated in about a month.

I think it totally impossible to have cured this wound, by any other remedy, in less than a month, during which period the patient must have suffered much from pain and fever, and have been quite confined to the bed or sofa.

It is also quite certain, I think, that there would have been an extensive slough from the severity of the bruise. This was doubtless prevented by the application of the nitrate of silver.

*Case 37.*—J. Jennings, bricklayer, aged twenty-six, fell through the roof of a house, and bruised and lacerated his shin rather severely, to the extent of an inch and a half in one part, and in a less degree in several others. I applied the nitrate of silver to the wounds

immediately. On the following day the eschar was found to be adherent, and there was neither pain nor swelling.

The eschars separated in nine days, leaving the wounds healed.

It is remarkable that the eschar remains a greater or less time over the wound, according to the severity and exigency of the case. This case being less severe than the former, one of the eschars remained upon the wound, during a much shorter period of time.

*Case 38.*—An old man, aged sixty, received a bruise upon the occiput, from a fall; the skin was lacerated and removed to the extent of half a crown. I applied the nitrate of silver soon after the accident. On the next day an adherent eschar was formed.

There was neither pain nor swelling. The eschar remained adherent, and separated in about a fortnight, leaving the wound healed.

*Case 39.*—Mrs. C. aged forty, was detained on a journey by a bruised wound on the knee, received a fortnight before, which was healing very slowly under the usual mode of treatment. The inflammation was subsiding, but the sore

was extremely irritable and painful, and she was prevented from moving from the degree of inflammation still present. I applied the nitrate of silver very slightly over the sore. I left the eschar to dry, but was doubtful whether it would be adherent or not.

On the succeeding day I found that the eschar did remain adherent, that the inflammation was diminished, and that the pain had entirely subsided after that induced by the nitrate of silver had ceased.

On the next day, the lameness was gone, and there was no sort of inconvenience from the wound. My patient continued her journey on the following day, so that I do not know when the eschar separated.

*Case 40.*—Robert Hill, aged sixteen, received a blow from a bone, which was thrown at him, upon the outer condyle of the humerus. He complained of extreme pain, and there were much redness and swelling. I applied the nitrate of silver over the part, and directed it to be exposed to the air.

On the succeeding day, I found that the eschar was quite adherent, and that the pain,

redness, and swelling, had much subsided, although there was some stiffness of the elbow.

On the third day, there was still further amendment. From this time no remedy or attention was required.

*Case 41.*—It frequently occurs to surgeons to receive slight wounds upon the hands, which prove very troublesome. The following case is of this kind.

Mr. L. C., had an irritable and inflamed sore on the ulnar side of the third finger, occasioned by a bruise a fortnight ago. Many applications had been made during the fortnight, but the sore had no disposition to heal. I applied the nitrate of silver to form an adherent eschar.

From this time the pain and inflammation subsided. The eschar remained firm and adherent, and in six days separated, leaving the wound healed.

II. *Inflamed Bruised Wounds.*

*Case 42.*—Mr. W. Lee, aged forty, had his hand crushed between a wall and a waggon-wheel. He applied a poultice. In a few hours the back of the hand swelled very much, and he passed the night without sleep. On the next day I saw him. The back of the hand was much swollen, and very tense; there were two wounds, each of the size of a sixpence. I applied the nitrate of silver all over the bruised and inflamed surfaces, and directed them to be exposed to the air. He took a dose of the submurias hydrargyri that night, and a purging draught on the following morning.

On the following day, I learnt that Mr. Lee had passed a better night. The eschar was adherent throughout, there was no vesication; the swelling remained much the same.

On the fourth day from the application of the nitrate of silver, the swelling was gone, and there was scarcely any pain.

From this time no further attention was

required; but I cautioned him not to use his hand too soon.

*Case 43.*—Mrs. Willoughby, aged fifty-one, received a blow on the arm, which caused a wound, and broke the radius; the wound did not, however, communicate with the broken bone. The part was inflamed, but the arm itself was not swollen. I saw her immediately after the accident, and applied the nitrate of silver on the whole of the fore arm, and over the wound; I put the arm upon a splint and sling, and prescribed a dose of the submurias hydrargyri, and a dose of purgative medicine.

On the following day she complained of little or no pain, and had very little smarting from the application of the nitrate of silver; and there was less swelling than usual in such cases. The eschar was adherent over the wound; there was slight vesication on the arm. The next day she expressed herself as surprised that she had had so little heat or pain.

Two or three days afterwards the eschar was adherent all over the arm, and nothing was

necessary but to keep it in the splint till the bone should be united.

I have no doubt that a similar treatment may be adopted with advantage in compound fractures. An adherent eschar may be formed upon the wound; and by applying the nitrate of silver on the surrounding skin, which may be done with safety to any extent, the inflammation will be materially lessened. I have not yet had an opportunity of adopting this mode of treatment where the larger bones have been broken, but I can feel very little doubt that the trial will be successful. No evaporating lotion, or other means which I have ever yet seen employed, has the same power of preventing and subduing external inflammation in such cases as the nitrate of silver.

*Case 44.*—Mr. C—, fell upon his elbow, and caused a slight bruised wound, to which he applied tar and spirits of wine. In three days severe inflammation took place, and spread rapidly over the whole of the arm, from the hand to the axilla. The arm became hot and hard, and swollen to one third more than

its natural size ; the affection had evidently the character of diffused phlegmonous inflammation. He had used a fomentation for some hours. His general health had not suffered.

I applied the nitrate of silver once over the whole inflamed surface and upon the wound, the parts being previously moistened. I directed the eschar to be exposed to the air.

Twenty-four hours afterwards the inflammation was checked ; the swelling indeed remained much the same, but the pain and heat were gone.

On the next day the arm had the puffy feel before described, and there were a few vesications.

In two days more the swelling had spread on the hand where the nitrate of silver had not been applied, although there was now but little swelling on the arm, it was not, however, necessary to apply the nitrate of silver, as there was no redness.

Two days afterwards the swelling was gone, and the eschar was peeling off ; the wound at the elbow was well and required no further attention.



III. *Bruised Wounds with Slough.*

*Case 45.*—Mr. E——, applied to me with a bruise on his shin, about an inch in length and half an inch in breadth, with a slough occupying a great part of it. As there was but little inflammation, and the suppurative process had scarcely commenced, I wished to heal it by eschar; but knowing that it would at least require a fortnight for nature to throw off the slough, and the patient being obliged to go to a distance in a few days, I was led to the expedient of carefully removing the slough with dissecting forceps and scissors. This was readily accomplished, as the slough was not deep. I afterwards applied the nitrate of silver to form an eschar, and defended it with goldbeater's skin.

On the following day my patient went a journey of seventy miles, and I did not see him until the evening of the subsequent day, when I evacuated a very little fluid from underneath the eschar. This I had to repeat twice more, when the eschar proved adherent.

Mr. E—— went his journey and I did not see him again for several weeks; the eschar was then still adherent, but as it was loose I removed it; the surface was healed underneath.

#### IV. *Severe Bruised Wounds.*

*Case 46.*—A servant man had the index finger crushed by a heavy box falling upon it, so that the integuments were laid open to the bone to a considerable extent. He applied a poultice.

The next day I washed the finger, and applied the nitrate of silver lightly over the surface of the wound, but not deeply within the wound, and all over the skin of the first and second joint; I then applied the common adhesive plaster.

I saw him several times during the space of a week, and during that time he complained of very little pain, and there was no swelling or heat; on removing the adhesive plaster there was no matter, and only a slight discharge of lymph from the wound. I again

applied the nitrate of silver, and over it the adhesive plaster, and again every third day. With this treatment this formidable bruise got quite well, without any suppuration or inflammation, and the man used his hand in about ten days from the first application.

*Case 47.*—As two men were carrying a heavy bundle of iron rods, it slipped from the hands of one, and fell on the toe of the other. The blow was so severe, as to cut through a strong shoe, and to shatter the nail of the great toe, and drive it into the surrounding integuments, and to cause a slight fracture of the bone of the first phalanx of the great toe, which was exposed. The case was so severe that I almost resolved to remove the toe; but finding the integuments underneath in so bruised a state, that I could not depend upon them as a covering, I wished to try my new practice, with the nitrate of silver. After removing the portions of loose nail, I applied this remedy over the whole skin of the toe, and on as much of the wound as was exposed after the parts were closed by the hand of an assistant. I then applied the adhesive plaster, so as to

retain the parts together ; and over it two or three folds of linen, moistened with cold water.

The patient complained of some pain for three days, and then became easy. I did not examine the wound for nine days. I then found it in a quiet state, and free from inflammation ; the surface of the sore appeared to be covered with a layer of coagulable lymph. I again applied the nitrate of silver, and over the eschar, first lint, then a plaster of the neutral ointment, and then adhesive plaster.

In other three days the sores were nearly healed, except the part occupied by the nail, which had been removed at my first visit.

I applied the nitrate of silver every third or fourth day, for four times, when the wound was quite well. A new nail was making its appearance about the end of three weeks after the accident.

*Case 48.*—As a warehouse-man was standing upon a floor three yards from the ground, a pile of cheeses fell upon him, and forced him through the door-way into a yard ; his leg came in contact with the edge of a large

weight, which inflicted a wound three inches in length, across the knee, under the patella; he also received a severe shock from the fall, which made him feel much indisposed, and he went to bed. When I saw him, the wound was large and gaping; I removed several loose portions of cellular substance which would have prevented it from healing by the first intention, and I applied a suture in the middle of the wound to bring the edges together. I then applied the nitrate of silver, once, over the whole of the knee, on the irregular edges of the wound, and on the exposed surface of the wound, where the edges of the skin did not meet; and I then applied the adhesive plaster, and kept the part exposed.

On the next day I found that the knee was more swollen, which I thought arose from the severity of the bruise. I removed the ligature, applied the nitrate of silver to the ligature marks, and then the adhesive plaster, and lastly the lotion extensively over the whole knee. I took ten ounces of blood from the arm, and prescribed a saline purgative.

At my next visit, the man made no com-

plaint. I removed the plasters in a week; the surface of the sore had the same appearance as in the former case; there was a layer of coagulable lymph on its surface; there was no inflammation or pain.

I applied the nitrate of silver, every third, or fourth, or fifth day. There was after the first a suppurating surface. The case was well in a little more than three weeks.

## CHAPTER V.

## OF THE TREATMENT OF ULCERS.

From the preceding observations, it would naturally be concluded, that the nitrate of silver would afford a remedy for the treatment of ordinary ulcers. This conclusion is perfectly just: yet the attention, discrimination, and experience required on the part of the surgeon, and the necessary care on that of the patient, render the mode of healing ulcers by *eschar* rather difficult. I have therefore abandoned this mode of practice, except in those cases where the ulcers are small, and free from inflammation, where there is but little discharge, and where the parts are not exposed to much motion or friction.

The plan of treatment which I have more recently adopted in large ulcers, attended with

inflammation, is far more successful, and requires very little care or attention on the part either of the surgeon or patient.

If there be swelling or œdema, I direct the patient to take a dose of opening medicine, to apply a common poultice of bread and water over the ulcer, and to keep in bed for four and twenty hours. The inflamed parts must be washed with soap and water, and wiped dry. They are then to be moistened with water, and a long stick of the nitrate of silver must be passed all over the inflamed and ulcerated surfaces, twice, and rather more freely on the ulcer itself, and on the surrounding skin. Lint must then be put on the ulcer, and the whole of the inflamed and ulcerated parts must be covered with the neutral ointment, spread on linen; a compress of five or six folds of fine linen is then to be applied over the ulcer, and a common roller, not too tight, to keep on the whole. The leg is to be examined on the fourth day, when it will be found that the inflammation is nearly, if not entirely gone, and the ulcer is in a healing state. The nitrate of silver must then be applied, on the whole



of the ulcer, and once lightly over the skin immediately surrounding it, one or two inches in breadth ; the lint and ointment are to be applied as before, and the bandage rather tighter. The case must be treated in this manner, every third or fourth day, until the ulcer be healed. I would recommend wearing a calico roller, for some time afterwards, till the leg has recovered its usual strength. The patient may walk about after the first or second application of the nitrate of silver.

I. *On Healing small Ulcers by the Unadherent Eschar.*

*Case 49.*—Mr. S. had been confined to the bed, or sofa, five weeks, under surgical care, in consequence of a broken shin. The wound was in a healing state when I saw it, but would evidently require several weeks for its cure, if treated according to the common method. There was but little surrounding inflammation ; and in every respect the case was a proper one to be treated by eschar. I

applied the nitrate of silver to the sore, and once very lightly over the surrounding skin; I then covered it with goldbeater's skin, and directed it to be exposed to the air.

On the following day, after making an incision with a lancet in the centre of the eschar, a little fluid was evacuated on pressure. I touched the orifice with the nitrate of silver, and reapplied the goldbeater's skin, as before.

On the two next days, there was rather more fluid evacuated, but on each succeeding day, to the seventh, there was less; the eschar then became adherent.

The eschar separated in about a month, and the sore was well.

*Case 50.*—The following case went on more favourably than some which I have since witnessed, and I should not now recommend the treatment adopted in it, on account of the inflammation.

An old gentleman came to me with an ulcer on the shin, about an inch in length, which was very painful and inflamed. I applied the nitrate of silver to form an eschar, and re-

quested him to call on the following morning. He did not come, however ; but on seeing him on the subsequent day, it was requisite to evacuate a little fluid from beneath the eschar ; this was repeated on the third day, after which period the eschar remained adherent, and the part totally free from pain.

The eschar separated in about three weeks, leaving the ulcer healed.

*Case 51.*—The following case occurred in the person of a lady affected with varicose veins, and far advanced in pregnancy. Its speedy cure by the nitrate of silver, was therefore the more remarkable, and saved her much trouble and suffering.

Mrs. C——, aged forty, had two small irritable and inflamed ulcers, under the inner angle. I applied the nitrate of silver to form eschars.

It was requisite to evacuate a little fluid from under the eschars for three successive days. They then remained adherent.

About the usual time the eschar separated, leaving a small point of the size of a pin's

head, unhealed ; this point I touched with the nitrate of silver. The case required no further attention.

The narration of this case leads me to caution my readers always to examine the parts carefully, after the separation of eschars ; and, if there be the slightest ulcer remaining, to reapply the nitrate of silver.

*Case 52.*—The peculiarity of the present case arose from neglect in evacuating the fluid effused under the eschar, the day succeeding its formation ; the consequence of which was, that the edges of the eschar became raised all round, without however, being entirely detached.

Mr. Draper, aged fifty, had a small irritable ulcer of the size of a horse-bean, upon the shin, of a month's duration, with surrounding inflammation to the extent of several inches. I applied the nitrate of silver, to form an eschar, and protected it with goldbeater's skin.

On the following day it appeared from the flatness of the surface, that the eschar was adherent ; the inflammation remained as before.

On the next day the eschar was raised all

round its borders, presenting the appearance of an elevated ring. I made an opening in one point of this ring, by a lancet, and evacuated the fluid ; and I again applied the nitrate of silver all round, in order to give firmness to the edges of the eschar.

On the succeeding day an opening was made in the centre of the eschar, and a little more fluid was evacuated.

This mode of treatment was continued daily for about a week. The inflammation gradually subsided, the eschar becoming adherent and corrugated. In about three weeks, the patient thinking the sore quite well, detached the eschar ; there was still, however, a minute ulcer left, which was touched with nitrate of silver. It required no further attention.

## II. *Of the Cure of Ulcers with Inflammation.*

Before I detail any cases of the mode of healing ulcers, to be described in this place, I must give the formula for the neutral ointment by

which this description of ulcer is defended.—

I prefer,

R Emplastri Plumbi lb. iij.	$\frac{116}{3ij}$	—	$\frac{3ij}{3ij}$	
Olei olivæ lb. ij.	$\frac{3ij}{3ij}$	—	$\frac{3ij}{3ij}$	
Cretæ ppt. $\bar{3}$ xviii.	$\frac{3ij+3ij}{3ij}$	—	$\frac{3ij}{3ij}$	
Aceti Distillati lb. j.	$\frac{3ij}{3ij}$	—	$\frac{3ij}{3ij}$	

*Argentum  
Neutrale*

The acetic acid and chalk must be well mixed in a mortar, and the lead plaster and olive oil previously slowly melted together are to be added. The whole is then to be stirred together until cool.

*Case 53.*—Mr. B—— had a fall and lacerated his shin about five weeks ago. He had used various applications without relief. The wound was about an inch in length, and half an inch in breadth. There was a firm slough occupying a great part of it; the surrounding skin was inflamed several inches in extent; the patient complained of much pain, and was unable to attend to his employment. I prescribed him a pill of hydrargyri submurias, to be taken at bed time, and a purging draught the following morning. I applied the nitrate of silver on the inflamed and ulcerated surfaces, passing it over them twice.

I then applied a piece of lint on the sore, and covered every part of the inflamed surface with the neutral ointment, spread upon linen; and, lastly, I applied a calico roller to keep on the dressings.

In four days I visited my patient again. He said he was much easier, and had been able to walk about. The inflammation was gone, and that part of the sore not covered with the slough had the appearance of healing.

In three days more the slough came away, and I applied the nitrate of silver over the whole sore, and a little on the surrounding skin.

In four days more the ulcer was healing, and free from any irritation or pain.

My patient took a journey after this, and had a little nitrate of silver with him, to apply every third day. In a few days, he sent me word that the sore was quite well, so that it must have healed by one or two more applications.

*Case 54.*—Mr. Pindar, joiner, aged thirty-five, hurt his shin against a cart, seven weeks ago. The wound had been getting gradually

worse since that time. The last application made to it was, a mild ointment, and a poultice. The sore on the shin was of the size of a shilling, or larger, and nearly the whole of the leg was inflamed: there was œdema of the ancle and instep. My patient was obliged to desist from moving about.

I prescribed a dose of opening medicine, a bread and water poultice to be applied over the sore, and rest in bed for twenty-four hours. I then applied the nitrate of silver twice over the ulcer, and the whole inflamed surface. I covered the ulcer with lint, and the whole of the leg with neutral ointment, spread on linen. I put a fracture cradle over his leg.

In four days the inflammation on the superior part of the leg was gone, but the œdema and irritation on the instep was greater than usual after this mode of application. On examination, I found an abscess a little above the ancle, and, on opening it with a lancet, some pus was evacuated. I applied the nitrate of silver on the ulcer, and once lightly over the surrounding skin, for an inch or two, and



likewise within the cavity formed by the abscess : I then applied a cold bread and water poultice to the abscess, and lint and neutral ointment to the sore.

In three days more all inflammation and irritation were gone, and the sores were healing rapidly. My patient had resumed his work. I applied the nitrate of silver, and the lint, with the neutral ointment. By three more applications the sore was perfectly well.

*Case 55.*—Mary White, aged thirty, had a small sore, six months ago, from scratching the leg. Afterwards a violent inflammation came on, spread all over her leg, and produced about twenty ulcers, from the size of a shilling to the size of a pea. These ulcers caused much pain, irritation, and heat, and prevented sleep at night. This patient was daily getting worse. The last application she had used was a saturnine lotion, and a poultice : she had taken saline purgatives.

I desired her to keep her bed for a day and night, and to continue the white bread poultice, and to take a dose of opening medicine. I

then applied the nitrate of silver over the whole inflamed and ulcerated surfaces, lint on the sores, and neutral ointment over the whole: lastly, a compress of linen and a common roller were applied lightly.

In four days the inflammation had nearly subsided. My patient expressed herself as having experienced very sensible relief after the smarting pain occasioned by the nitrate of silver had subsided: she said she had slept at night, and had been nearly free from pain during the day. The sores had a healthy appearance. I retouched them, and the skin directly surrounding each ulcer, with the nitrate of silver. I prescribed a dose of opening medicine to be taken every second morning. The bandage was applied rather more firmly.

In three days more the inflammation was gone, the ulcers were healing very rapidly, and indeed some of the smaller ones were quite healed. By two more applications, the ulcers were quite cured, and this in a fortnight from the first.

I saw my patient twice a week for several

weeks afterwards, to examine the bandage, to apply the nitrate of silver on any tender or slightly inflamed spot, which should make its appearance, a precaution which secures a permanent cure.

*Case 56.*—Mary Williamson, aged sixty-nine, fell down and bruised her shin : this was followed by swelling ; she rubbed the part with the soap liniment which inflamed it much ; she afterwards applied a poultice, but the leg still got much worse for six weeks ; she then went to an infirmary, and [remained under surgical care for eight weeks. The sore was now healed, but the inflammation still remained over the whole of the leg. The patient then placed herself under the treatment of an empirick for three weeks, still uncured she returned home into the country and attempted to work at a cotton factory. This she did with much suffering, and soon became quite unable to this or any avocation. She came to Nottingham, and fell under my care. At this time the whole of the leg was inflamed, and affected with œdema. A large abscess had formed under the maleolus internus, and a smaller one

on the opposite side. There were several ulcers on the shin from the size of a crown piece, to that of a sixpence.

I prescribed a dose of opening medicine, and directed her to keep in bed for twenty-four hours. I washed the leg afterwards with soap and water, opened both the abscesses with the lancet, and applied the nitrate of silver over the whole extent of the inflamed surface, over the ulcers, and within the abscesses ; I then applied a poultice to each of the abscesses, lint upon the ulcers, and the neutral ointment over the whole of the inflamed parts in the manner already described.

In four days, the patient having still kept her bed, all inflammation was gone, and the ulcers and abscesses were in a healing state. I again applied the nitrate of silver to the ulcers and abscesses, and dressed them with lint and the neutral ointment.

In four days more there was very great improvement ; the abscesses nearly well, and the ulcers were healing rapidly.

In other four days, the abscesses were healed, the ulcers healing fast.

By four more applications, the ulcers were all made well.

It was necessary in this case to continue the application of a bandage to the leg twice a week, for several weeks, and to apply the nitrate of silver to parts which became slightly inflamed from time to time.

*Case 57.*—George Knowlson aged twenty-two years had typhus fever about three years ago, followed by considerable inflammation and swelling of the right leg. Shortly afterwards two ulcers made their appearance on the fibular side of the leg, which have continued ever since ; being sometimes larger, and sometimes smaller ; he had used common dressings.

When I first saw him, there were two ulcers nearly of the size of half a crown, and of a dark purple colour, attended with inflammation of the whole leg, and œdema of the foot ; the leg was swollen so as to be one third larger than the other. He had been kept from his occupation of a groom for twelve months.

I directed a poultice of bread and water to be applied over the ulcers ; and prescribed a pill with hydrargyri submurias to be taken at bed

time, and a purging powder of rhubarb and sulphate of potass, on the following morning, and I enjoined him to keep his bed for a day and a night. On the following morning I applied the nitrate of silver over the whole inflamed surface, and lint on the ulcers, and I defended the whole with a plaster of the neutral ointment and a bandage.

On the fifth day the sores had changed their character and appeared healthy ; the inflammation had disappeared, and the limb was less swollen. I applied the nitrate of silver to the ulcer, and lint, the neutral ointment, and a compress of five or six folds of fine linen over the wound, and then the roller, tighter than before.

The nitrate of silver was applied every third day after this period. The ulcers were quite healed in less than three weeks.

The roller was still well applied. My patient was able to attend to his employment, for there was no vestige of ulceration or inflammation, and the swelling was quite gone in a month from the first application. He walked about all along.

## CHAPTER VI.

## ON OLD ULCERS OF THE LEGS.

FORMERLY there was no department of surgery, so tedious to me, as the management of old ulcers of the legs. I rigidly pursued the plan recommended by Baynton, as being that most approved.

This practice proved insufficient in most severe cases. After a number of weeks of daily dressing, and frequent interruptions during that time from fresh attacks of inflammation, and from excoriation from various causes, I had often scarcely succeeded in healing the ulcer, when I had the mortification of seeing my patient return with renewed inflammation of the leg, and the beginning of fresh ulceration. I was therefore naturally led to

try various modes of application of the nitrate of silver in old ulcers. After many experiments, I have adopted the following plan. A patient presents himself, with one or more ulcers of the leg, with a dark, greenish or purplish surface, deep and hardened edges, fœtid smell, attended with inflammation, covering perhaps a great part of the leg, with enlargement of the vena saphœna, sometimes œdema of the foot; having perhaps not experienced a good night for years; the pain, heat, and itching sensation being dreadfully distressing to him; and his health altogether being much impaired. He is obliged perhaps to follow his daily avocation, which is often, in these cases, a laborious one, and thus he may have dragged on a miserable existence for years.

The first thing I direct my patient to do in such a case, is to apply a common white bread and water poultice, to keep in bed for eighteen or twenty-four hours, to allow any swelling of the leg to subside, and to take a dose of opening medicine. The leg is after this to be washed well with soap and water, to free it from any oleaginous substance, or loose



cuticle; it is then to be wiped dry with a towel, the inflamed part is to be moistened with pure water, and the nitrate of silver is to be passed twice over it, and a little beyond it on the healthy skin; and then, more freely, to every part of the ulcer, and particularly the edges and immediately surrounding skin; a piece of lint is to be put over the ulcers, and linen spread thick with the neutral ointment, over the whole inflamed and ulcerated parts; a compress of linen, and a common calico roller are to be applied in the last place, the latter not tight, but just so as to retain the dressings in their place. The patient is obliged to remain a few hours in bed, on account of the pain occasioned by the application of the nitrate of silver; but after this has once subsided, he enjoys more relief than from any former application, and sleeps soundly all night, for the first time perhaps for years. The dressings are to be taken off at the expiration of the fourth day, the inflammation is then found to have nearly subsided, and the ulcer is become more healthy in its appearance. If any of the plasters adhere, they may remain

until the next time of dressing ; the applications to the ulcer itself are readily removed, as there is usually a free discharge of lymph from its surface. This discharge is to be simply removed by a little linen or tow ; the nitrate of silver is again to be applied all over the wound, on its edges and the skin immediately surrounding it ; and if any of the plaster be detached, and there be any inflamed part, slight sore, or excoriation, those parts are to be slightly touched with the nitrate of silver. About the expiration of three more days, the eschar is found to be detaching itself from the surface previously inflamed, and all the inflammation gone. The patient now makes no complaint, is free from pain, sleeps well every night, is able to follow his employment ; there is generally a free serous discharge from the ulcer, free from fœtor. The nitrate of silver is again to be applied over the whole surface of the sore, its edges, and the adjacent skin. This plan has the effect of preventing any inflammation of the surrounding skin, or irritation on the surface of the ulcer itself. It is to be repeated every third or fourth day, till

the ulcer be healed. When the ulcer is near the ankle, deep, of long standing, and with hardened edges, and with enlargement of the vena saphœna, and swelling of the foot, I have added, to the mode of treatment just described, the treatment by strapping recommended by Mr. Baynton, and recently improved by Mr. Scott. The latter gentleman recommends the emplastrum plumbi, which is not so apt to irritate the skin; but where the nitrate of silver is used, the common adhesive plaster may be used without inconvenience. If any excoriation did arise from any cause, a slight application of the nitrate of silver would induce a firm eschar, and prevent any ill effect. I prefer that the adhesive plaster should be spread upon dimity, which is stronger, and gives more support than the calico. It may be well to state that this kind of strapping is prepared by Gale, Baker and Warde, Chemists and Druggists, Bouverie Street, Fleet Street, London.

The following is the plan laid down by Mr. Scott.—Cut the plaster into slips of fifteen inches in length, by two in breadth. The foot

being placed at a right angle with the leg, one of the slips is to be applied from the first bone of the great toe, along the inner edge of the foot, around the posterior part of the os calcis, to the first bone of the little toe. The middle of another slip should then be placed under the bottom of the os calcis, and its ends extended perpendicularly up on each side of the leg. The third slip is to be applied along the foot, parallel to the first, and overlapping one half of it. The fourth is to be placed parallel to the second, partially overlapping it, and extending perpendicularly up the sides of the leg. In this manner the slips of plaster are to be applied alternately along the foot, and up the leg, the one holding, and, as it were, antagonizing the other, in the motions of the foot, until the whole limb is covered, from the toes to the knee : lastly, a calico bandage is to be applied, but not too tightly.

To prevent a recurrence of the inflammation and ulcers, after their cure, the patient must wash his feet and legs with cold water and white soap every morning, and then apply a linen compress on the part formerly ulcerated,

and a calico bandage, moderately tight, from the toes to the knee. This will totally remove the scales, which are so apt to form, and which become, as it were, a hot bed for fresh inflammation, and consequent ulceration. If the least inflammation, or excoriation should at any time make its appearance, it is most effectually remedied by applying the nitrate of silver once over the part, as in external inflammation.

If calico bandages be used, those made of tolerably stiff calico are best; and when they have been washed, they should also be well ironed, otherwise they are harsh, and act too much as a ligature round the leg, causing irregular pressure.

### I. *Cases of Old Ulcers.*

*Case 58.*—Mrs. Worthington, aged thirty-one, has had swelling and inflammation of the left leg, with enlarged veins, for the last sixteen years, but without ulceration, till about two years ago, when I first saw her. The ulceration had been gradually spreading for the

previous six weeks, and was of the size of half-a-crown, but not deep: the inflammation was very severe, and extended half over the leg, attended with great heat and pain. My patient said she had not had a good night's sleep for a number of weeks, both before and since the ulceration, on account of violent pain and inflammation: she complained of stiffness and pain about the knee, and had not been able for two months to put her heel to the ground. Her health had gradually suffered. She had last applied fomentations and poultices, and taken saline purgatives.

I applied the nitrate of silver over the whole inflamed and ulcerated surface, and defended them with the neutral ointment. The pain of the application was more severe than usual, partly from my not knowing at that time the advantage of twenty-four hours' previous rest in bed in partially allaying the inflammation and swelling.

In five days I found the inflammation gone, and a loose eschar formed over the wound, which I did not disturb. I again covered the whole with the neutral ointment.

In six days more the inflammation was quite gone, and the eschar separated, leaving the ulcer perfectly healed.

This being one of my first trials of this plan of treatment, I was particularly interested with the result. It taught me how very readily a progressive ulcer may be cured, which, under the common mode of treatment, would inevitably have fallen into an old, almost incurable sore; and how complete a control we have, in the commencement, over these cases so unmanageable by any other means.

Two years elapsed, and Mrs. Worthington had no return of the inflammation: but at that period she met with a slight accident, upon the same leg, which induced a wound: this was cured by two applications of the nitrate of silver.

*Case 59.*—Mrs. A—— had been subject to ulcers of the right leg for seventeen years: she had had regular surgical attention for a year or two at a time: but, as is too customary in such cases, the ulcers had always broken out again.

This case had not lately been attended with

much inflammation. Mr. Baynton's plan having been used for two years, only one ulcer remained. This was situated on the outer ancle, and was about the size of sixpence, and not deep: the surrounding skin was very hard, and she complained of an intolerable itching, for which cold water, applied through the medium of the bandage, gave but very temporary relief. She had, for years, had all the symptoms consequent upon such ulcers; she had suffered much from loss of rest, and was totally unable to follow her employment.

I passed the nitrate of silver upon the ulcer, and over the surrounding inflamed skin, and I applied lint and the neutral ointment spread on linen, over the ulcer, and I continued the bandaging according to Mr. Baynton's plan.

In five days, all inflammation and itching were gone, and the ulcer was healing.

In three more dressings, on each third day, the ulcer quite healed.

It is now two years since this case was cured, and the patient has had no return of inflammation, irritation, or ulcer. She has washed her leg with cold water



every morning, and constantly applied calico bandages.

*Case 60.*—Robert Spurr, aged fifty-three, labourer, had a compound fracture of the left leg, above the ankle forty-three years ago; his leg has ever since been subject to severe ulcerations, some of which have continued for three or four years unhealed. He has been in an infirmary, and has had them healed, but the ulceration soon returned. This man applied to me in January, 1827, with a deep ulcer, six inches in circumference, of a dark green colour, emitting an extremely offensive discharge, and having highly inflamed borders, of five or six inches in breadth. This ulcer was attended with severe pain of the leg, which caused him very sleepless nights, and induced much general indisposition, and entirely prevented him from following his employment. The ulcer had got gradually worse, during a fortnight.

I applied the nitrate of silver on the inflamed part, as directed in external inflammation, and on the whole of the ulcer; I put lint on the ulcer, and linen spread with the neutral oint-

ment on the inflamed surface, and over the whole a compress of linen, and a bandage.

This patient dressed the ulcer himself daily, with the neutral ointment. This was quite unnecessary; but it was in the early part of my trials of the nitrate of silver in these cases; it would have been sufficient to have removed the dressings in four or five days.

In five days, the character of the ulcer appeared totally changed; it was of a more healthy appearance and quite free from fœtor. I reapplied the nitrate of silver to the ulcer, and on the parts surrounding the ulcer, as before; but since that time I have found this to be unnecessary; for if any slight inflammation remains, it yields by the application of the nitrate of silver to the ulcer only, repeating it every third or fourth day.

The nitrate of silver was applied every fifth day to the ulcer in this case, and there was a gradual amendment from the first. My patient became nearly free from pain, and slept at night; the nitrate of silver gave him less pain at each succeeding application. He did not follow his employment; he did not how-

ever remain in bed, but walked two miles, to be dressed every fifth day. No strapping was used, and the bandage was not applied tighter than was just necessary to keep on the dressings.

The ulcer was healed in three months. Two months afterwards he called upon me to say that he could attend to his work comfortably; the leg was quite free from ulceration, inflammation, and pain. He afterwards called upon me several times, at more distant intervals, to show me that his leg continued perfectly well.

*Case 61.*—M. Bosworth, aged sixty-nine, has had ulcerated legs for the last thirty-five years, and, during that interval, has had the ulcers healed several times, but for short periods only. The present ulcers on both legs are about twenty in number; two are of the size of a crown piece; the others from the size of sixpence to that of a pea; the veins are in a varicose state, and the legs are extensively inflamed; his sufferings have been very great; his nights, have been entirely restless from excessive heat and pain. He has been scarcely

able to follow his employment, of a framemsmith, for many years, and he has almost always been obliged to sit to his work. I applied the nitrate of silver on the whole ulcerated and inflamed surfaces, after he had rested in bed, with poultices on the ulcers, for twenty-four hours; and I gave him a blue pill and purging powder.

At my next visit he said that he had not suffered more pain from the application of the nitrate of silver, than from some of his former dressings; that, on the following day, he had experienced scarcely any pain, and that he had had better nights than for many years.

I examined the sores on the fourth day, and found them in a healing state; the inflammation was gone, and my patient suffered no pain. The nitrate of silver was reapplied, with the addition of Mr. Scott's mode of bandaging.

This case was dressed every third or fourth day, for ten weeks, when all the ulcers were perfectly healed. During the whole

of this time he followed his employment with more ease than he had done at any former period for thirty years.

I directed the patient to continue to come to me twice a week, for a few weeks, that I might examine the bandages and apply the nitrate of silver to any tender or slightly inflamed spot, if any such should make their appearance.

*Case 62.*—Joseph Dodd, aged sixty-eight years, very tall, and of a spare habit, had had ulcers of the legs for fifty-three years. The last was situated on the inner angle of the left leg. The muscles of the leg appeared to be much wasted, but the ankle and foot were at least as large again as natural, and resembled, in size and scaliness, a foot affected by the elephantiasis. He had endured much pain, and had been constantly obliged to rise in the night, and to walk about his room in order to benumb the pain. The ulcer itself was of about the size of half-a-crown, having dented edges and being rather deep. The whole of the leg and foot were much inflamed.

He had used no remedies of late, but marsh mallows, ointment, and a bandage. His health had not been particularly affected.

I gave him the usual directions to apply a poultice, and remain in his bed for twenty-four hours. I then applied the nitrate of silver over the whole leg, as already described.

I saw my patient again in four days, when he told me that after the pain of the application was gone off, he slept well, and had had no pain to prevent sleep from that time. This account accords with that of every case which I have had of this nature. All the patients sleep well after the first application of the nitrate of silver.

As the inflammation was gone, I next used Mr. Scott's mode of bandaging, over the lint and neutral ointment. I considered this case a very proper one for this mode of bandaging, on account of the great size of the foot and ankle, and I found it to answer admirably; for although the patient was actively engaged from six o'clock in the morning till six in the evening, as a lamp-lighter, the foot became gradually reduced to its natural size. The

ulcer also gradually healed, and he had so little pain and could walk so well as to neglect the dressing of his leg during the latter part of the treatment, for a week together.

When the ulcer was healed I saw him once or twice a week, to see that proper attention was paid to the washing and bandages.

*Case 63.*—Mr. Loundes, aged forty-four, had an ulcer of the inner angle of the left leg, which had not been well healed for eight years. He could assign no cause for it. He had been under the care of a number of surgeons, and some of them for a year or more. He had also been in an infirmary several times, yet the ulcer always returned in a few weeks. The last time he was in the infirmary he was confined to bed for nine weeks, yet the ulcer remained unhealed; during the latter part of this attempt to cure, the surgeon endeavoured to do so by the adherent eschar, but, of course, without success. The position of the foot was much distorted.

I first saw this patient about fourteen months ago, and for some time, I applied the nitrate of silver, defending it with the neutral

ointment. This plan had the effect of removing the pain, and thus of admitting of sleep at night; whereas previously to this application he had not had a good night for years, although he had taken laudanum. He had worked at his trade of a shoemaker very inefficiently for four years of that time, and was totally unable to support his large family. Upon the first application of the nitrate of silver the inflammation and pain subsided.

This mode of treatment was continued for some months; the ulcer healed very gradually and the patient continued free from pain; yet the cure was not so rapid as I wished, I therefore united the application of the nitrate of silver every third day, with that of a little lint upon the wound, and Mr. Baynton's bandages to the leg; by this treatment the ulcers healed perfectly in about four months.

This case has now been well for a number of weeks; the leg is totally free from inflammation, or pain, and the foot is daily recovering its long-lost mobility and use.

This patient followed his employment regularly during the whole of the cure, and



suffered very little pain. His health too, which had failed much during the nine years of continued irritation occasioned by his diseased leg, became very good.

*Case 64.*—Mrs. Johnson, aged fifty-four, had had ulcerated legs for twenty-seven years, originating in an attack of typhus fever. The legs were extremely swelled, inflamed, and painful, for a year before the ulcers made their appearance, and these remained unhealed for three years. They were then healed at an infirmary. Six weeks afterwards, however, they became again ulcerated. This sort of course was repeated year after year. There were, when I first saw this patient, five ulcers on the left leg, one of the size of half a crown on the inner ankle, the rest somewhat smaller.

On the right leg, there was one ulcer of the size of a crown, situated on the inner ankle, and the foot was distorted and the ankle stiff, as in the case of Loundes. Both legs were much inflamed; the skin very hard, the pain very severe, the nights exceedingly distressing. From my patient's own account, she had not

had one good night's sleep for eighteen years, and had often passed many hours sitting up in bed, with one hand grasping the foot, and with the other pressing on the upper part of the leg, thus endeavouring to obtain a little relief. Her health was very much impaired, and she was obliged to give up washing, her only means of support, and which she had long pursued in the sitting posture.

I applied the nitrate of silver, as in the case of Loundes, without any strips of plaster; it had the same effect of totally removing the inflammation and pain, so that my poor patient enjoyed some good night's sleep for the first time of many years. Her health visibly improved.

This case, like that of Loundes, was tedious, but it only required attention every third or fourth day.

At last I had recourse, in addition to the use of the nitrate of silver, to Mr. Scott's mode of bandaging, using the adhesive plaster spread on dimity instead of calico.

After the lapse of four months this patient is perfectly well, with the exception of a small

part of the ulcer situated on the inner ancle of the distorted foot, which depends, as I imagine, on a diseased state of the periostium, and, judging from similar cases, will require rather more time to cure; yet as I have not witnessed an instance of the return of ulceration in such a case, except from accident, and as even in such instances the ulceration was immediately checked by a proper application of the nitrate of silver, I trust this cure will prove more permanent than any former one.

## CHAPTER VII.

## ON BURNS AND SCALDS.

I HAVE found that, by slightly passing the nitrate of silver once over a burnt surface, the pain is increased for a short time, but then totally subsides, vesication appearing to be prevented; the black cuticle peals off in a few days, leaving the part well. In cases in which the cuticle has been removed, the nitrate of silver applied on the surface, induces an adherent eschar, and prevents the consequent ulceration. In cases in which a slough covers the surface, I have removed it with the scissors and forceps, and applied the nitrate of silver, and have cured them by the unadherent eschar.

In one case, in which, after a burn, the part was healed over, and a considerable cicatrix

formed resembling a fungus, and attended with severe pain, the nitrate of silver, applied as in external inflammation, removed all inflammation and pain.

I have not had an opportunity of using the nitrate of silver, in very extensive recent burns, but I can have no doubt of the benefit that would accrue from it. It should, I think, be applied over the whole surface of the burn or scald, once only, but as in external inflammation; then the parts most severely burnt should be covered with lint, and the whole of the burnt surface with the neutral ointment spread on linen, a bandage being applied to retain the dressings in their place. I should expect that the inflammation would be checked, and the consequent vesication, ulceration and sloughing, in a great measure prevented, excepting in those places where the fire had actually destroyed the parts deeply. I should not examine the parts again, before the fourth or fifth day; and if the dressings adhered, I would let them remain during another similar period. The application of the nitrate of silver should be repeated in the same

manner, as it might appear to be required. I think the burn would then be limited in its extent, and would consequently be less dangerous; for the danger is, generally, in proportion to the extent of surface destroyed. The nitrate of silver has certainly the property of removing the irritability of the whole surface to which it is applied, and cannot add much to the pain of the burn itself.

#### I. *Case of Recent Burn.*

*Case 65.*—A servant maid, whilst ironing, burnt the back of her hand for several inches in extent, with a hot iron. Very acute pain and inflammation followed immediately after the accident.

The part was moistened with water, and the nitrate of silver passed once lightly upon it, as in external inflammation. The application caused severe smarting pain in the part for a short time, but this shortly ceased, and there was subsequently no vesication, or any further inflammatory action. The eschar sepa-

rated in a few days, leaving a healed surface underneath.

*Case \*65.*—A lace-mender had the misfortune to set fire to a piece of net, and in endeavouring to extinguish the flame, burnt her hand and arm. Cold lotions were applied during that day, and through the night; on the following morning her friends were alarmed at a violent inflammation, which was spreading rapidly up the arm. When I saw her the hand and arm were much swollen and red, but there was no distinct vesication; the inflammation was passing up the arm, and had an erysipelatous appearance; the patient complained of much heat and pain, and her countenance was very pale; she was weakly and delicate.

I applied the nitrate of silver twice over the whole surface, and gave purgative medicine. This had the desired effect of removing all inflammation; slight vesication was caused by the application, which went away in four days; from that time she made no complaint.

*Case 66.*—A servant maid had some boiling molasses poured upon the back of the hand,

which removed the cuticle over a space of two inches, and caused inflammation diffused over several inches more. The nitrate of silver was passed over the whole surface, once, lightly. An adherent eschar immediately formed over the vesicated surface; and no vesication followed on the inflamed surface. This patient required no further attention.

*Case 67.*—A boy, had some boiling water spilt on his foot. I saw him two hours after the accident; the outside of the foot and the heel were scalded severely; there was one large blister several inches in length. I punctured the blister, removed the loose cuticle, and applied the nitrate of silver once lightly over the exposed surface. As it was night he went to bed, keeping his foot uncovered. On the next morning an adherent eschar was found to be formed. He put on his stocking and shoe, and went about, and yet, what is remarkable, the case required no further attention.

*Case 68.*—Miss B., aged twenty, a healthy young woman, applied to me on account of her foot, which had been scalded with boiling



water from the tea-kettle, a month before; she had used lotions and ointments.

The sore occupied a great part of the instep, and there was a superficial slough covering a great part of its surface; it did not appear to have the least disposition to heal. I removed the slough with the scissors and forceps, and then applied the nitrate of silver to form an eschar.

I had to pierce the eschar and allow a little fluid to escape on several successive days; the eschar then became adherent, and my patient was nearly free from pain, and enabled to walk about. The eschar did not separate until the expiration of a month, when the sore was observed to be perfectly healed.

Had this case been attended with much inflammation, I should have applied the nitrate of silver every fourth day, and over the eschar the neutral ointment, as in the following case.

*Case \*68.*—Mr. Garton, aged 69, scalded the fore part of his leg several weeks before I visited him. There were then several ulcers on the shin, one of the size of a half-crown, the

others of a smaller size. The inflammation was severe, and extended over a great part of the fore part of the leg. This appeared to be a proper case for the same treatment as that required for inflamed ulcers arising from other causes. I therefore applied the nitrate of silver on the inflamed parts and ulcers, and defended them with the neutral ointment.

In four days the inflammation was nearly gone, and the ulcers were in a healing state. By four more similar applications the leg was quite well. My patient was not at all confined to his house.

## II. *Erysipelas from a Burn.*

*Case 69.*—Mrs. Bell, aged thirty-four, had the lobe of the right ear burnt about a fortnight ago. She was afterwards exposed to cold and wet for several hours. She became affected with severe shivering, succeeded by fever; the ear was slightly inflamed. I pre-

scribed an emetic, a dose of the submuriæ hydrargyri, and purgative medicine.

On the following morning the ear was much swelled; the inflammation had spread to the face, temple, and upon the scalp on the back part of the head.

I removed the hair from the inflamed scalp and applied the nitrate of silver over the parts affected.

On the evening of the same day there was every appearance of the inflammation having been checked; but on the following day, I found it spreading in every direction, and my patient complained of much chilliness and headache; the pulse was 100. I directed more of the hair to be removed close, with the scissors, as the patient could not bear the razor. I should, however, in all cases recommend that the head be shaved when the scalp begins to be inflamed, that no obstacle may exist to the effectual application of the nitrate of silver. This remedy was in the present case applied to every part affected with the erysipelas.

On the next morning my patient expressed

great satisfaction in regard to the relief she had experienced, soon after the application of the nitrate of silver. She said she had no soreness in any part to which this remedy had been applied.

On each of the two following days I had again to apply the nitrate of silver where the inflammation was still spreading; but on the sixth day from the first application all inflammation had subsided.

The cure was certainly rather retarded from not shaving the head, and from not using the nitrate of silver promptly and extensively on my first visits.

### III. *Hard and Painful Cicatrix after a Burn.*

*Case 70.*—Timothy Coleman, aged thirty-two, whilst in a state of intoxication, burnt his shoulder and arm very extensively. He was under the care of a surgeon, and the sore was healed in ten weeks. There still however, remained an inflamed surface, larger than

the size of the hand, over the deltoid muscle. It had the appearance of fungus cicatrized over; it was attended with so much heat and pain, as to prevent him from sleeping at night, or following his employment in the day, for thirteen weeks, even after it was said to be cured. He had used a number of remedies. His health continued good.

I first saw him on June the 20th, 1827. I applied the nitrate of silver, as in external inflammation, over the whole diseased surface. I directed the part to be exposed to the air for three days, and then to be covered with the neutral ointment.

As my patient resided at a distance in the country, I did not see him again for a fortnight, when he informed me that eight hours after the application of the nitrate of silver, he had more ease than he had experienced since the accident, that he was nearly free from pain, and slept well.

I again applied the nitrate of silver very freely on the whole affected surface, as there still remained several inflamed spots, besides several slight ulcerations caused by the nitrate

of silver. I then covered the part with the neutral ointment.

In another week, I saw my patient again. He said he had suffered more from the last application than from the former one, that it had acted more like a blister, that there had been a very free discharge, and that the eschar had separated sooner.

There appeared however scarcely any irritation, except from a few superficial ulcerations, on which I passed the nitrate of silver very lightly ; I continued the neutral ointment.

A few weeks afterwards this man called on me to say that he was quite well.

This peculiar case is almost incurable by any other means.

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## APPENDIX I.

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IN this short appendix I purpose to give a few cases of a desultory character, which I could not well embody in the work.

### I. *Of the Use of the Nitrate of Silver as a Blister.*

Hitherto I have used the nitrate of silver as a blister very little ; but in those cases in which I have used it, the effects have been very satisfactory. I am persuaded that it will possess a decided superiority over cantharides in many cases ; it causes less irritation, and its effects are much more prompt than those of cantharides ; and it may be used in persons in whom the latter



remedy induces strangury. It induces a very copious discharge, without heat or pain, after the first few hours. The vesicated part heals about the fifth day, without leaving the least ulceration.

I have used this mode of blistering in several cases of incipient strumous swelling of the joints. The following is a case of this nature.

1. *Case of blistering by the nitrate of silver in enlargement of the knee.*

*Case 71.*— — Symons, aged eighteen, was obliged to leave his situation, as an apprentice to a baker, on account of a swelling of the inside of the knee, which had been gradually getting worse for six weeks, and made him walk quite lame. No cause could be assigned for this affection. It was seated on the inner condyle of the os femoris, which was considerably swelled: there was no external redness. I first directed a number of leeches to be applied on the part, and a white bread poultice over the leech-bites, until they should have done bleeding. I afterwards moistened the

part with water, and rubbed the nitrate of silver over it eight or ten times.

In six days there was less swelling of the part, and evident amendment. The blister induced by the nitrate of silver discharged freely for three days, and then healed.

Two other applications, with intervals of six days, quite removed the inflammation, and my patient could walk quite well. He rested for another week, and then returned to his employment.

The following case presents a most decisive instance of the value of the nitrate of silver, as a blister.

2. *Case of blistering by the nitrate of silver in inflammation of the urethra.*

*Case 72.*—Mr. C. aged thirty-five, had been affected several times with virulent gonorrhœa. He was again infected, three or four weeks ago. In four days he had severe chordee. The usual remedies were administered, and leeches were applied along the course of the urethra. The discharge ceased; but the in-

flammation became so severe as to require, in the course of three weeks, the application of a hundred and twenty leeches, and he was twice bled from the arm: he had frequent warm baths, and purgative and anodyne medicines were given, but without any amendment in his complaint.

I was called to this patient, in consequence of a total retention of urine, late at night. I passed the catheter, and gave him sixty drops of laudanum. On the following morning, he informed me that he had passed a very bad night, and was still unable to void urine. On examining the perineum, I found it very hard, swollen, and tense. He complained of a most distressing, aching pain, striking in a direction to the left side of the abdomen. This pain had been so severe, for nearly three weeks, that Mr. C. had been totally deprived of sleep, so that he was almost exhausted; his countenance was exceedingly pallid.

I moistened the perineum, and the whole course of the urethra to the end of the penis, and then applied the nitrate of silver freely, so as to cause immediate vesication. My patient

complained much, even before I left the room. I visited him in eight hours, and learnt from him that he had experienced a severe burning pain for three quarters of an hour, and then a smarting pain for several hours. All pain, however, had then quite left him, and he was perfectly easy; but he had passed no urine.

On the following morning he was still perfectly easy, had passed a good night, and had enjoyed more sleep than he had done for three weeks. There had been a very free discharge of serum from the blistered part. No attempt had been made to pass urine. The catheter was used.

On the following day the blistered part had a moist, soft, doughy feel, and had lost all the character of inflammation; there was still a very free discharge of serum. This discharge continued four days after the application of the nitrate of silver. No further local remedy was required. I gave saline and purgative medicine. The use of the catheter was resumed at times.

About a week after this period a free gonor-

rhœal discharge came on, and continued for some time ; but it gave way to the common remedies.

## II. *Cases of Gun-shot Wounds.*

I have no doubt that the nitrate of silver will be found a valuable remedy in cases of gun-shot wounds. The directions laid down for the treatment of large punctured, bruised, and lacerated wounds, will, I think, be applicable to many cases of this kind.

In gun-shot wounds the nitrate of silver will answer several important purposes : it will prevent inflammation, moderate pain, and keep the orifice of the wound open, for the exit of sloughs, pus, &c. ; it will, in cases in which the parts are much bruised, preserve the integuments from sloughing ; and in large lacerated gun-shot wounds it will often prevent an open state of the wound, by insuring adhesive inflammation.

The three following trifling cases of gun-shot wounds, will illustrate, in part, the views which I have formed upon this subject.

*Case 73.*—A girl was shot in the arm, by a small gun ; a portion of paper wadding was embedded in the outside of the fore arm. I saw the case soon after the accident, and removed the wadding ; the wound did not bleed, but it had a black appearance. I applied the nitrate of silver on the surrounding skin, and to the edges of the wound, and dressed it with adhesive plaster, as if to heal it by the first intention.

I did not remove the plaster till the expiration of nine days. There had been no inflammation or swelling. The patient complained of no pain after the application of the nitrate of silver. The wound had the appearance of a superficial issue with a little slough at its bottom. I applied a little lint on the wound spread with the neutral ointment.

Three days afterwards I examined the wound again, and found it even with the skin ; the slough had been thrown off. I applied the nitrate of silver slightly over the wound, and upon the eschar, the lint and ointment as before.

By two similar applications this wound was

quite cured, just three weeks from the time of the accident.

*Case 74.*—Mr. Loundes' son, aged fourteen, on the fifth of November, loaded heavily a part of a large gun barrel; in discharging it, it burst and wounded two of his fingers; the ring-finger was burst open at the second joint, so as to expose the capsular ligament, and the inside of the joint. I applied the nitrate of silver over the whole of the skin of both fingers, and partly upon the hand. I then brought the edges of the wound together by means of adhesive plaster, and supported the finger by a sort of small splint.

On the second day there was more swelling of the finger than I expected; on that account I took the splint away, and cut through the adhesive plaster on the opposite side, so as to remove any tightness. The finger did not drop, being now supported by the firm eschar around it, and by the adhesive plaster. There was some swelling and inflammation of the hand, to which I applied the nitrate of silver.

On the sixth day from the accident, I removed the adhesive plaster; the lacerated

surfaces had remained nearly in contact, and there was but a small line of wound, and that was free from any irritation. I passed the nitrate of silver over it, and afterwards applied lint and the neutral ointment.

By three other similar dressings, the wound was healed; the finger remained rather bent, and the joint stiff.

In this case the healing property of the nitrate of silver, was very apparent. As the boy had made no complaint of the other finger, which was but slightly wounded, I did not open it till after the expiration of a fortnight, when I found it unhealed; but it required but two applications of the nitrate of silver to effect a cure, so that this severe wound was healed in three weeks.

*Case 75.*—Mr. Leake's son, aged seventeen, was shot by the discharging of a large horse pistol, loaded with small shot, when in his side coat-pocket. On seeing him one hour after the accident, I found that the skin of his side was superficially burnt to the extent of eighteen inches; the small shot had passed along the integuments; but on a careful examination



with the probe, I could discover none under the skin. I passed the nitrate of silver lightly over the whole surface; it caused a smarting pain. I desired my patient to remain in bed and to have the clothes carefully kept from the wound.

Twenty-four hours afterwards an adherent eschar was formed upon the whole surface. He said that the smarting pain continued during two hours after the application of the nitrate of silver, but that he had been quite free from pain since.

Several days afterwards the eschar still remained adherent, except in one point, which required a slight application of the nitrate of silver. From this period the case required no further attention, and the eschars gradually separated, leaving the subjacent parts healed.

### III. *Cases of Neuralgia.*

*Case 76.*—Mr. Gadd, aged fifty, had a severe pain in the hollow of the instep, extending in

a direction behind the malleolus internus. He could assign no cause for it. He had been obliged to rest for a whole week, during which time liniments, lotions, and other remedies had been applied. The pain was evidently becoming worse. There was no appearance of swelling or redness, but the parts were painful on pressure. I applied the nitrate of silver, as in external inflammation, along the course of the pain. It caused a degree of smarting for a few minutes, and afterwards afforded marked relief.

On the next day there was very little pain. I again applied the nitrate of silver. The pain totally subsided, and my patient was able to walk about.

*Case 77.*—Mrs. S——, in the weak state left by an abortion, was seized with an acute pain, extending from the toes to the hip. Fomentations were applied without relief. The pain fixed more particularly about the calf of the leg, being more severe at intervals, and, to use her own words, partaking of the character of cramp. It was much increased by putting her foot to the ground. The parts were free

from inflammation and swelling. I applied the nitrate of silver along the course of the pain.

On the following morning the pain was nearly gone. A second application of the nitrate of silver quite removed it.

*Case 78.*—Mrs. W——, had a pain extending over a great part of the arm. The arm itself was a little swelled, but there was no redness. She could assign no cause for the affection. She was feverish, and felt generally unwell. I prescribed emetic and purgative medicines, and applied the nitrate of silver along the whole course of the pain.

On the following day some vesications were observed to have arisen from the application of the nitrate of silver, but the patient expressed herself as being greatly relieved.

She required no further attention and was well in a few days.

#### IV. *Case of Contracted Rectum.*

*Case 79.*—Mr. S——, aged fifty, applied to me in consequence of nearly a total obstruction

in the lower part of the rectum, which he thought arose from internal piles. On examination I found a stricture about two inches within the anus, so firm and small that the point of the finger could not be passed through it. Mr. S——'s health had been gradually declining for a year; from being corpulent, he had become much emaciated. He had been unable to pass solid fæces for some time, and every effort to do so gave him much pain, and occasioned great irritation. I first introduced the largest urethra bougie; but this induced so much pain and irritation, and afforded so little benefit, that I was led to the expedient of applying a stick of the nitrate of silver within the contraction. This I effected with the common nitrate of silver case, using the index finger of the left hand as a director. The application caused a sense of burning heat in the part, for two hours, with severe tenesmus, and a considerable discharge of mucus. My patient obtained so much relief, however, from the application of the nitrate of silver, that he was enabled to bear the introduction of a small bougie two days afterwards.

I persevered in the use of the bougie, and whenever the irritation became great, I applied the nitrate of silver as before. By these means I was enabled, in a short time, to pass my finger through the stricture. I found it to be about two-thirds of an inch in extent. I could discover no ulceration.

I gradually increased the size of the bougie, and, at the expiration of a few months, Mr. S—— could bear to pass the largest rectum bougie: he also gradually recovered his health and flesh.

Mr. S—— has continued the introduction of the largest rectum bougie once or twice a week for the last several years.

In this case it is very evident that the patient's life was saved by the use of the nitrate of silver.

#### V. *Case of Ulceration of the Tongue.*

*Case 80.*—Mr. G—— had a swelling and soreness of the tongue for six weeks. At the expiration of this period, a distinct tumour

formed upon the centre of the tongue, suppurated, and then presented a sloughy ulceration, of the size of sixpence. Borax had been applied, and five grains of the blue pill, with one-third of a grain of opium, had been taken, night and morning, for several weeks, without any amendment.

I applied the nitrate of silver within the cavity of the ulcer, and over its edge, and afterwards a little lint, to confine the action of the remedy.

By eight such applications of the nitrate of silver, repeated every third day, the case got perfectly well.

#### VI. *Case of irritable Ulceration near the Eye.*

*Case 81.*—Mr. Q—— had a very irritable ulcer near the inner canthus of the left eye, on which a poultice had been applied for a fortnight. This ulcer gradually increased to the size of a large horse-bean, became deep, and had a sloughy appearance, with inflamed, irregular, and elevated edges, and it was evidently

spreading fast. I first used a mild ointment and a lotion of zinc, but without any good effect. I then resorted to the use of the nitrate of silver, applying it freely within the wound, and upon its edges and the surrounding skin, and over the eschar, lint and the neutral ointment.

In four days the character of the ulcer was altogether changed. It was free from inflammation, and in a healing state.

Three more applications of the nitrate of silver, with intervals of three days, proved a perfect cure.

#### VII. *On the Fungous Ulcer of the Navel in Infants.*

It sometimes occurs that a little fungous sore exists upon the navel in infants, which is difficult of cure in the ordinary way. I had one case, which had subsisted for two years, and another, which had continued for two months: both were, during those respective periods, a source of great trouble and uneasiness to the mothers of the little patients.

These ulcers are easily cured in the following manner. The fungus is to be completely removed by a pair of scissors, and, when the bleeding has quite ceased, the nitrate of silver is to be applied, and the part is to be defended by the goldbeater's skin, and kept carefully from any moisture.

In one of the cases mentioned above, the eschar was accidentally separated twice, and it was necessary to renew it; but both cases were cured in the space of a few days.

#### VIII. *On the Treatment of Corns.*

The nitrate of silver is an old remedy for corns; but as the plan which I adopt is rather different from that usually employed, I will describe it briefly in this place.

The patient should put the feet in warm water at bed-time for half an hour, to soften the corns: as much of the corn should be then removed, by means of a sharp knife, as can be done without making a wound: the corns and surrounding skin are then to be moistened with



water, and the nitrate of silver is to be rubbed on the corn very freely, and lightly on the skin, so as not to occasion vesication: the part is then to be exposed to dry.

Little advantage would be derived, if nothing more were done, as the black eschar would remain on the corn for some weeks, and during that time the corn would form anew.

About the fourteenth day it will be observed that the cuticle is peeling off around the corn: this is the proper time for putting the feet in warm water again, and for removing the eschar, and as much as possible of the corn underneath, by the knife. At this period there is a distinct mark between the surrounding healthy cuticle and the corn, so that the latter may be removed more effectually than at first. The nitrate of silver is to be again applied as before.

This plan is to be repeated until the corn be perfectly destroyed.

## APPENDIX II.

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For the following valuable communication I am indebted to Dr. Marshall Hall, to whom it was addressed in a letter from Mr. Webster, Surgeon, Dulwich.

My Dear Sir,

I sit down to do an act of justice to Mr. Higginbottom's merits, and my own feelings, in expressing to you the pleasure I have felt in perusing his work on the nitrate of silver.

It is true the profession had some confused and indistinct notions on the benefits occasionally derived from the use of this remedy; but I believe I may with confidence say, that till

the appearance of Mr. Higginbottom's work, none of its members had any very correct ideas even of the proper mode of applying this remedy, far less of the extent to which it might be used in such a variety of cases. The account of the adherent and unadherent eschar is so rational and satisfactory, that I am sure it must carry conviction to every unbiassed mind, and moreover point out the cause of the failure of this excellent remedy, in less experienced hands. In many cases a *solution* of the nitrate of silver has been used, which is not sufficient to produce an eschar. When the stick itself has been applied, the parts have been immediately covered with lint and adhesive plaister, so as to prevent the access of the atmosphere, which however seems necessary in all cases to produce an eschar, and thus the chief benefit has been lost by doing too little or too much. I have often applied the nitrate of silver to wounds with a view of healing them quickly, or of repressing granulations, but not understanding, till I had read Mr. Higginbottom's book, the principle upon which it acted, I

generally *covered* the parts instead of exposing them to the air ; and have in most instances, especially when the wound was of any extent, been disappointed of success, and mortified in finding the secretion of pus increased instead of being lessened in quantity from the surface of the wound : and yet a process has occasionally passed under my eye, that ought to have instructed me in a measure upon this subject. I knew that exposure of an ulcerated healthy surface to the atmosphere, would sometimes greatly quicken the healing process, in fact by forming a scab ; and in some cases, as in wounds about the face, where it has been of importance to prevent any mark, I have pursued this method, but not liking to leave the parts wholly unprotected, I have applied a covering to protect the wound, and yet not prevent altogether the action of the air—I mean the goldbeater's skin.

If I might be allowed to theorize a little, I would say the eschar produced by the nitrate of silver, acts by excluding the atmospheric air from the wound. This may seem paradoxical, as I have stated above, that I consider

the access of atmospheric air necessary to the cure; yet so it is; for it acts by producing a thin scab or crust, and protects the part below so as to allow it to skin over. And so when the nitrate of silver is applied, it forms a thin layer, by uniting with and decomposing the animal matter it comes in contact with; this gradually hardens and becomes black by exposure, and forms an almost impenetrable crust, which effectually shuts out the atmosphere. I suspect this crust may operate also in another way—in curing wounds merely by producing considerable pressure on the part; for if the eschar is closely observed, it is evident that it contracts and corrugates, and finally cracks and peels off. But to leave theory and come to facts, I have tried the caustic in several cases since I have read Mr. Higginbottom's book, and it may be well to notice its effects in other hands.

A boy had an extensive burn of the arm, which healed very slowly in spite of a variety of applications and modes of dressing; the process occupied several months, and I applied the nitrate of silver when the wound was of the

size of a shilling. It formed an eschar and required no further dressing. It would otherwise certainly have required two or three weeks for its complete cicatrization.

Mr. W. a clerk in a public office, accidentally struck his pen-knife about half-way into his thigh, on the outside. He called on me a few hours after, complaining of pain all up the fascia, and saying that he could scarcely move the limb. I applied the nitrate of silver to the wound and round its edges, and covered it with goldbeater's skin. The pain went entirely off in the course of the evening, and it healed without any other application.

A young nobleman was bit by a terrier dog, on the temple; the part sloughed and ulcerated, and though attended with much care by a medical gentleman in the country, it was very difficult to heal. I saw him about a month after the accident, when there was a round superficial ulcer, of the size of a half-crown piece. I dressed it in various ways for some time, without its advancing to cicatrization, though the wound looked very healthy. I then applied the nitrate of silver in the way

recommended by Mr. Higginbottom, covering it with goldbeater's skin. It went on very well and required no dressing; the eschar remained perfect for five days, when he accidentally received a slight blow on the part, which displaced part of the eschar. I reapplied the nitrate of silver, and when the eschar separated, the part was found to be perfectly cicatrized.

Mr. L. has had a stricture of the urethra, for many years, which is occasionally attended with inflammatory symptoms and discharge. In this state I had tried a variety of remedies, with but indifferent success. I now at your suggestion applied the nitrate of silver twice, making the lines broader opposite the stricture. It produced smarting, and in one or two spots slight vesication. For twenty-four hours after, the discharge was considerably increased, and it then lessened to such a degree as to warrant a second application, which was done. About a week afterwards the eschar separated, and with so good effect as to stop the discharge and remove the symptoms. After some time, when the cold weather set in, the symptoms having partially returned, Mr. L. sent for me

and begged I would again apply the nitrate of silver, as he had never found any remedy relieve him so quickly. I accordingly applied it, and with the same beneficial results, the symptoms passing off in three or four days.

I have had no experience of the effects of the nitrate of silver applied externally, in internal inflammations, as of the stomach, bowels, &c. but I shall state as briefly as I can, the beneficial effects of this remedy, in a peculiarly fatal affection of the larynx, which, as far as I know, has been but little, if at all, attended to by medical men. The disease I allude to, has in the six cases I have seen, occurred in children under six years of age, and they have all been of a delicate fibre, and of rather feeble constitution. The complaint has come on as a common ulcerated sore throat, with superficial sloughs in the tonsils. At first the usual remedies have seemed to be successful, but after, perhaps, eight or ten days, the sloughs, which had never disappeared, have spread to the uvula and surrounding parts, attended with redness and rather a glossy appearance. The constitution has sympathized; slight feb-



rile symptoms have come on; a dry ringing short cough has supervened; then dyspnoea and an anxious countenance; the difficulty of respiration has increased, and in two or three days from the setting in of these (what may be called croupy) symptoms the patients have died. The three first cases I saw, proved fatal, notwithstanding the best advice and the anxious attendance of some of the most able physicians and surgeons in London. The two first cases occurred in the same family, and I have reason to believe, though there was no eruption, that the sore throat was produced by the contagion of scarlet fever, as an elder sister had the eruptive disease a few weeks afterwards. The antiphlogistic treatment was fully tried without any effect. In the third case, which was independent of scarlatina, leeches and blisters were used at first; bark quinine, cayenne pepper, &c. were afterwards given without any good effect. The only remedy that gave relief and seemed to act beneficially, was a strong solution of nitrate of silver applied freely to the tonsils and fauces; this gave temporary relief, though applied late in the disease, at the

suggestion of Mr. Wardrop. This was the first case I could examine, and I subjoin the morbid appearances.

I examined the body, forty-six hours after death, in presence of Mr. Upton and my pupil Mr. Glennie. Our attention was chiefly confined to the trachea, which was dissected out with the tongue, the velum pendulum palati, and tonsils attached, and as low down as an inch below the bifurcation of the trachea. Both tonsils were deeply ulcerated, presenting almost a honeycomb appearance; the point of the uvula had disappeared, and an ulcer extended considerably up the velum. The pharynx was not affected nor the upper surface of the epiglottis, but the whole of its under part was involved in one ulcer, which extended upon the rima glottidis downwards about one quarter of an inch, and round on each side for half an inch, so as nearly to meet on the back of the organ. There was also a patch of mucus or lymph on the centre of the thyroid cartilage, which had somewhat the appearance of false membrane, but which was not attached to the parts. There

were scarcely any marks of inflammation sufficient to account for the appearances, and none of the redness usual in affections of the larynx. The trachea was free from disease, perhaps a little more vascular than usual. The bronchia were filled with a muco-purulent fluid as far as the bifurcation of the trachea. The lungs were healthy. The brain was not examined.

The morbid parts are in the possession of James Wardrop, Esq. who, with Professor Bennett, agreed that the disease was decidedly ulceration of the larynx and epiglottis.

It was the relief afforded in this case and some conversation which I had with you on the use of nitrate of silver in erysipelas, &c. which induced me to give the remedy a full trial in the following one:—

July 26, 1828.—Jane Thornback, aged four years, has been complaining for a fortnight of languor, debility, head-ache, and other feverish symptoms. About a week ago she first noticed that her throat was sore. She had difficulty in swallowing or articulating, and the tonsils became enlarged externally.

Yesterday her respiration became affected and there supervened a short dry ringing cough, with an inclination to retch, and an occasional sense of strangling. The present symptoms are, considerable emaciation; pale and sunk anxious countenance; purplish tinge of the lips; respiration increased in frequency, and carried on with difficulty; the inspiration sonorous and rattling, the *alæ nasi* acting rather strongly; the throat is painful, increased on swallowing; the uvula and both tonsils are swelled and covered with sloughs, the margins ulcerated; the surrounding parts of a dark red colour; the pulse 120 and weak; bowels open by aperients.

Being fully alive to the danger of this case, and having no confidence in any of the usual remedies, I thought that the nitrate of silver, applied to the ulcerated part, and externally over the larynx, might afford the child some chance for her life. The skin over the larynx and trachea having been moistened with water, a stick of the nitrate of silver was gently passed over the surface. This, in a short time, formed a superficial eschar, about two inches square.

A solution of 10 gr. of the nitrate, in  $\bar{3}j$  of distilled water, was applied with a hair pencil to the ulcerated parts in the fauces, and again in two hours. A dose of calomel was given, and a mixture of sulphate of magnesia and infusion of roses ordered to be taken till the bowels were well relieved.

At my evening visit I was much gratified to find the symptoms mitigated: the respiration was greatly easier, having altered very considerably about an hour after the application of the nitrate of silver. The countenance was less anxious, and with less of the purple tinge. The solution of the nitrate was again applied, which did not seem to produce pain; but externally the eschar smarted a good deal, several spots having vesicated.

July 27. The child has passed a good night; the bowels have been moved several times; the respiration is perfectly natural; the cough is less frequent; pulse 112: the countenance much improved: still there is considerable pain in the throat, and great difficulty in swallowing: the ulcers look more healthy, and less extended, than yesterday. The nitrate was applied in

substance to the ulcers, and a mixture, with decoction and tincture of bark, and sulphuric acid, prescribed.

July 28. Ulcers in the throat much better; she is in all other respects improving. Bowels confined. I gave two grains of calomel, and five of scammony, and repeated the application of the nitrate of silver both externally and internally.

July 29. The ulcers disappearing, leaving a honeycomb-appearance of the tonsil. The bowels not freely opened.

Cont. Mixt. et Pulv. et Nitras Argenti.

July 30. Has passed a restless night, and this morning has fresh symptoms of fever, with headache, but no difficulty of breathing, or increase in the affection of the throat. Bowels do not act freely. I ordered a powder with calomel and jalap, and a mixture with sulphate of magnesia.

July 31. The symptoms of fever have disappeared; the throat is quite well; but marks of the ulcers remain. She is in all respects convalescent.

The next case of this disease which I saw, occurred recently, in a little girl, two years and a half old, who was recovering from scarlet fever. She seemed to be convalescent; when, about the tenth day, she became drooping and depressed, and had an accession of febrile symptoms. Ulcers were then observed in the tonsils, of an ash-grey colour, and deep-seated. A dry, short, ringing cough came on, followed by difficult respiration; the pulse 130, and weak; the face pale and anxious. The symptoms were more severe, and continued longer than in the last case. The ulcers were touched with the nitrate of silver, and a strong solution of it was directed to be applied, with a hair pencil, three times a day. This remedy was also applied slightly over the trachea and larynx, and from ear to ear. In a few hours the skin was black, and over the larynx and trachea it was vesicated. Calomel and scammony were given as a purge every morning, and a grain of sulphate of quinine every four hours. Under this treatment the symptoms gave way, the respiration gradually improved, and in two days the child was free from danger.

The sixth case unfortunately proved fatal, though the same plan was adopted. There were some peculiarities in the case.

I was called up in the night to see Mary Thornback, aged two years, the sister of case 4. She had been seized with a convulsion without apparent cause. The last molares had not appeared, which induced me to scarify the gums, though there was no swelling. As scarlet fever prevailed, it was suspected, and I examined the throat. There were slight ulcerations on the tonsils, the respiration was not at all affected. Leeches were applied to the head and calomel given.

The convulsions returned next day, when I opened the jugular vein, with relief: they came on again in the night, when the jugular vein bled rather freely from the struggling, the plaster having been rubbed off. No eruption or other symptoms of scarlet fever appeared. I slightly touched the little sloughs on the tonsils with the lunar caustic, and they got well. The child seemed fast recovering, when about the eighth or ninth day after the first convulsion, she became restless and languid, and did



not play about the room as usual. Next day a dry short cough came on, and the respiration was slightly affected. On examining the throat the tonsils were again covered with several superficial ulcers. I immediately applied the nitrate of silver to the sloughs, and externally, as in the last case, and gave aperients and quinine. Blackness only of the skin was produced, which made me reapply the nitrate next day, which caused vesication. The respiration became much worse, the countenance very anxious, the pulse 140, and weak; there was great difficulty in applying either the stick or a solution of the nitrate of silver to the ulcers, from the resistance of the child. The symptoms increased in severity, and the child died in two days.

*Inspection.*

On examining the parts after death, the uvula and tonsils were deeply ulcerated. The larynx and trachea exhibited marks of inflammation, though not of a decisive character. There was none of the bright redness of mucous membranes which is often seen after in-

wards, a weak solution of acetate of lead, with opium, and prescribed a dose of calomel with an aperient draught, which he was desired to repeat in two days. On the fourth day the symptoms continuing unabated, and the erections having increased in frequency, I applied a stick of the nitrate of silver *once* very gently along the under surface of the penis, in the course of the urethra. Next day I found vesications had been produced soon after the application of the nitrate. The patient expressed to me the relief the remedy had given him by almost entirely removing the scalding heat and erections, and what is worthy of remark (as being analagous to the effect of the nitrate on abcesses,) the discharge was changed from a thick purulent matter to a thin gleety consistence. The cure was soon perfected without another application of the caustic.

I understand that Mr. Higginbottom has thought of using the nitrate of silver as an Epispastic. Having observed the vesicating properties of this remedy, when applied merely to produce blackness of the skin, I was induced to apply it as a blister, and from the numerous

trials I have given it with this view, I have no doubt that were it generally applied by the profession it would soon supersede the use of cantharides ; of warm water, as proposed by some ; and of the heated metallic plates of Sir Anthony Carlisle.

The advantages of the nitrate of silver over cantharides, the usual epispastic, are fivefold.

1. It acts much more *quickly*, requiring generally only from one to three or four hours.

2. It produces very much *less pain* in its action, independently of lessening the *duration* of that pain.

3. It causes scarcely any constitutional irritation, even in children.

4. It does not affect the bladder, nor bring on strangury.

5. It heals much sooner.

The mode of application is simply to wet or rather *moisten* the space to be blistered, with water, and then to rub a stick of the nitrate three or four times over the part, according as the cuticle is thin or otherwise. Once or twice is sufficient to blister the skin of children, or where the cuticle is thin and

tense inflammation. The under surface of the epiglottis presented rather a sloughy appearance, but whether this was ulceration or a thin layer of lymph I could not determine, as I did not wish to disturb the parts before sending them for the inspection of a friend more conversant with morbid parts than myself. A thin layer of lymph lined the trachea in front, but it did not form a tube as in croup. Mucopurulent fluid filled the bronchil tubes. There was no œdema of the glottis.

Though this case proved fatal, yet I should, if another instance of this intractable complaint presented itself, pursue the same remedies, as in three cases *two recovered*, which in my experience of the three previous ones, I think I might fairly say, under the ordinary treatment, would also have proved fatal.

I have thus slightly noticed these instances of this malignant disease, at your request, for the purpose of shewing the effects of the nitrate of silver in them ; but I intend detailing them more at length, and drawing the attention of the profession to the complaint, as none of the eminent gentlemen who saw the three

first cases had known any thing of the kind occur in their practice, nor have any of my friends to whom I have mentioned the subject. I have seen Bretonneau's account of a somewhat similar disease, but it is sufficiently distinct from the affection I have hastily described.

Believe me to remain,

With much esteem,

Your's very faithfully,

GEORGE WEBSTER.

*Dulwich, Jan. 8, 1829.*

*To Dr. Marshall Hall.*

P.S.—Since writing the above, the following case has occurred to me :

Mr. W—— contracted a gonorrhœa, which shewed itself with rather severe symptoms, and he applied to me two days after. The scalding and heat on making water, and at other times, were very troublesome, he had frequent erections and the discharge was copious and purulent.

I directed him to use warm water freely, externally, to inject at first warm milk, after-

the fæces were of a pale colour, and deficient in quality; there was a craving appetite which was soon satisfied.

In this state of things, the wrist joint of one arm, and the thumb of that hand became enlarged and painful. There were no other external marks of inflammation. During a considerable time my father attended her; but he became wearied with the unsuccessful use of the usual remedies, and took her to Sir A. Cooper, who ordered the decoctum sarsaparillæ compositum, in large quantities, and then the liquor hydrargyri oxymuriatis, but without advantage. Our patient was then advised to consult Mr. Abernethy, who prescribed the Plummer's pill, with the senna purgative mixture; this somewhat relieved her general health. The enlargement of the wrist however increased, and the elbow began to swell and to be extremely painful; her nights were miserable, and she again consulted some other professional man, who induced ptyalism; under this discipline the constitution broke down.

During the last winter I was called to see

this patient. The discharge of blood from the bowels had returned; her body was emaciated from continued want of rest; the thickening of the joint had extended, and the occiput was affected with a painful node. The bowels had become extremely irritable. I gave her five grains of the *hydrargyri cum critâ*, and of the *pulvis ipecacuanhæ compositus* at night, and the *infusum rhei* and the *infusum cascariillæ*, with the *liquor potassæ* three times a day, and at your suggestion I applied the nitrate of silver. At first I applied it too freely, blistering the parts; this I did not find at all to improve its effects. Half an hour after the application of this remedy the part was less painful, and so sensible was my patient of the comfort afforded her, that, when I visited her, I found her fingers blackened by using it wherever and whenever pain came on. By this means the pains and swellings have disappeared. I have since given her the sulphate of quinine to restore her strength.

It is necessary to observe, that during the last two years, my patient has menstruated irregularly and sparingly. She has never had

loose. In a few minutes the part begins to smart a little, which generally does not last long, and in the course of from two to four or five hours the blister insensibly rises. The serum is to be discharged and the part dressed, as in a common blister, but as it heals sooner, any application to keep up a discharge, must be applied at the first dressing, and for this purpose the cuticle must be entirely removed when the serum is discharged.

It may perhaps be objected by some to this new mode of blistering, that there is a dread of the nitrate of silver producing a deep eschar—but this is not the case, the cutis vera is not affected in this way, at least when the nitrate is only applied to the cuticle, nor do I believe that nitrate of silver ever produced a *deep eschar* under any circumstance, however freely applied.

Whether the nitrate of silver produces any specific or peculiar effect on internal extensive inflammations I am not prepared to state, but I believe that it is capable of producing all the beneficial effects of the common blistering plaster, without its troublesome ones.

*Dulwich, Feb. 5, 1829.*



I am also indebted to Dr. Hall for the following interesting communication from Mr. Brown, surgeon, Camberwell.

*Camberwell, April 24, 1828.*

MY DEAR SIR,

I transmit the following cases to you, with much pleasure, and consider myself greatly indebted to you for the communication of a remedy so eminently and promptly serviceable, in cases where the usual remedies had been employed without any good effect.

The first case was that of a female of exceedingly delicate constitution, who had, previous to the birth of the first child, seven years ago, been what is usually called tolerable, but who, after that time, wasted in flesh, and became subject to leucorrhæal discharges, with great general debility. She was from time to time relieved by visits to the coast, and by the employment of mineral tonics. Within the last two years she became attacked with considerable hemorrhage from the bowels, attended with violent pain in the head, and great pain and sinking at the scrobiculis cordis ;

any sores or enlargement about the pudenda, nor has her husband, whom I have known many years, ever had in his life any venereal affection, except a slight gonorrhæal attack, some years ago.

The second case occurred in a carpenter, who was, with his companion, carrying up an ascent, a small flight of stairs, for the purpose of fixing them. He supported the under part of the weight on the palm of the hands. His companion tripped and threw the whole pressure of the stairs upon him. He felt something snap or give way in the fore arm. No swelling or redness followed, and but little tenderness. He went home to dine, and on his return to work, he found that he could not use the plane or saw, or in fact, do anything with the fore arm. He applied to some one who ordered leeches and a fomentation, and afterwards a cold lotion. Still he found no relief. The pain began at the inner condyle of the humerus, and extended obliquely over to the middle of the fore arm, evidently depending upon fascial laceration. I applied the nitrate of silver in the direction of the pain. On the

next day he could use some force with but little pain, and in two more applications was made quite well.

I remain,

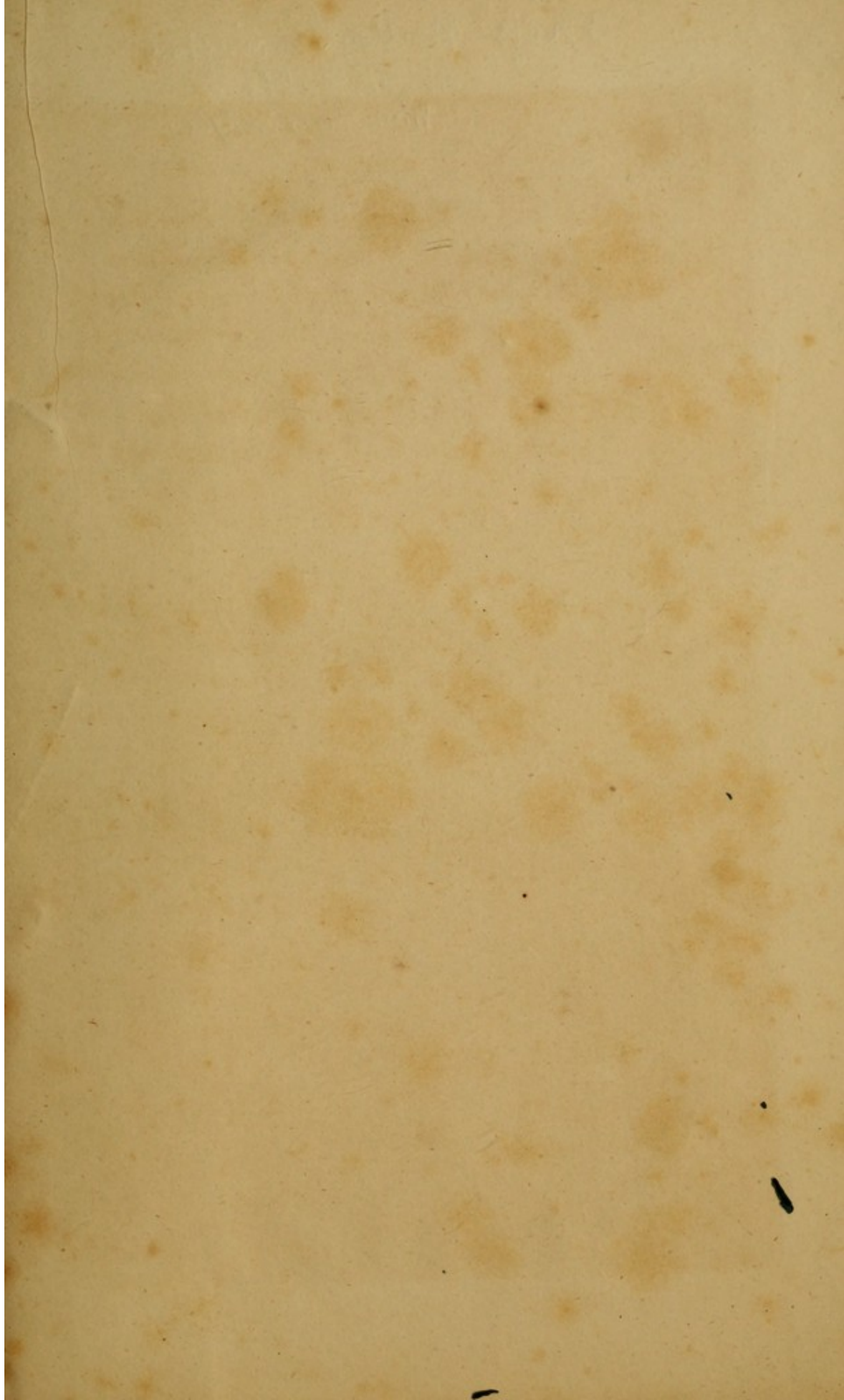
Dear Sir,

Your's very faithfully,

TOBIAS BROWNE.

*To Dr. Marshall Hall.*

THE END.



Miss - Willey Farrington  
Wett Bedham  
Wm Fairbanks -

