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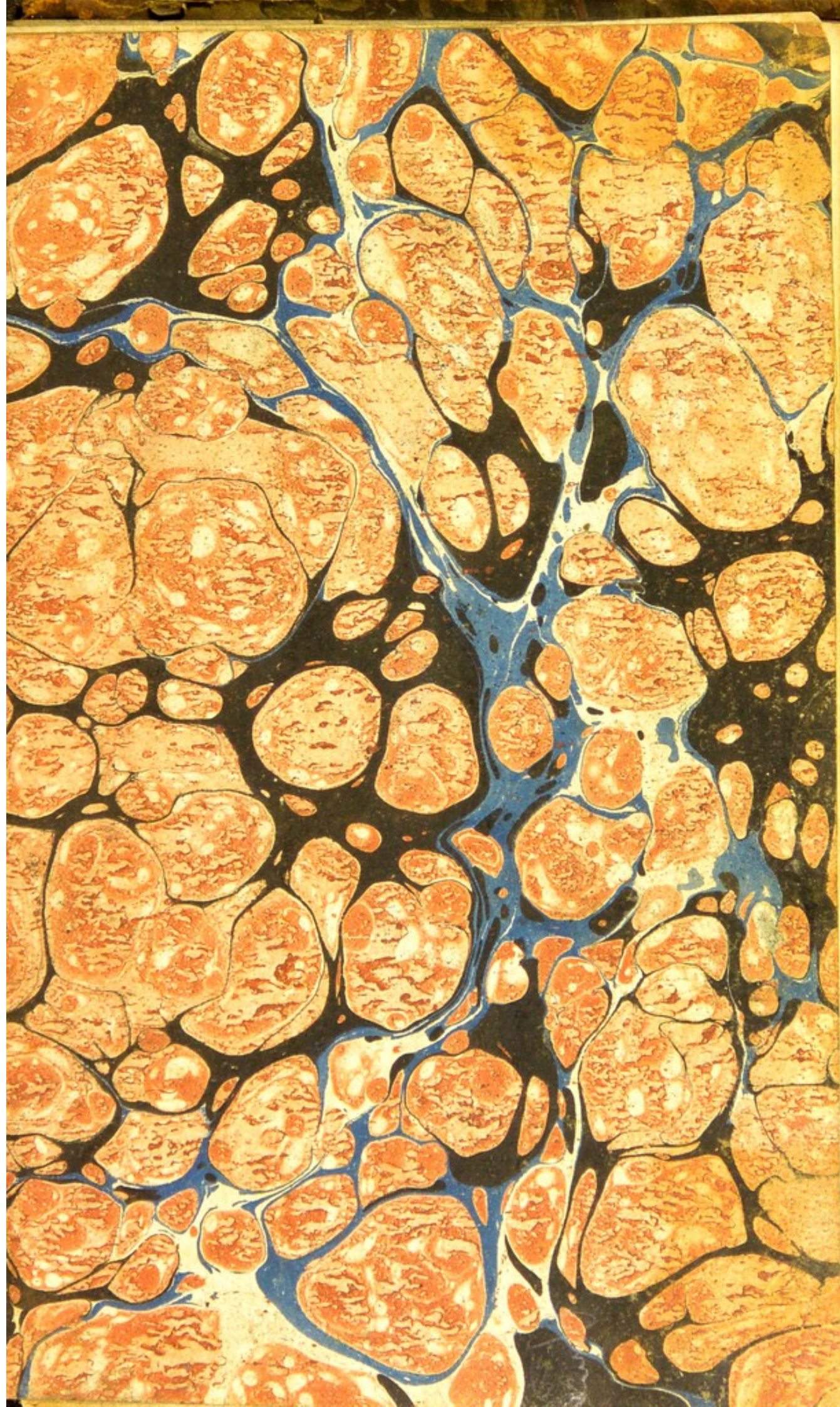


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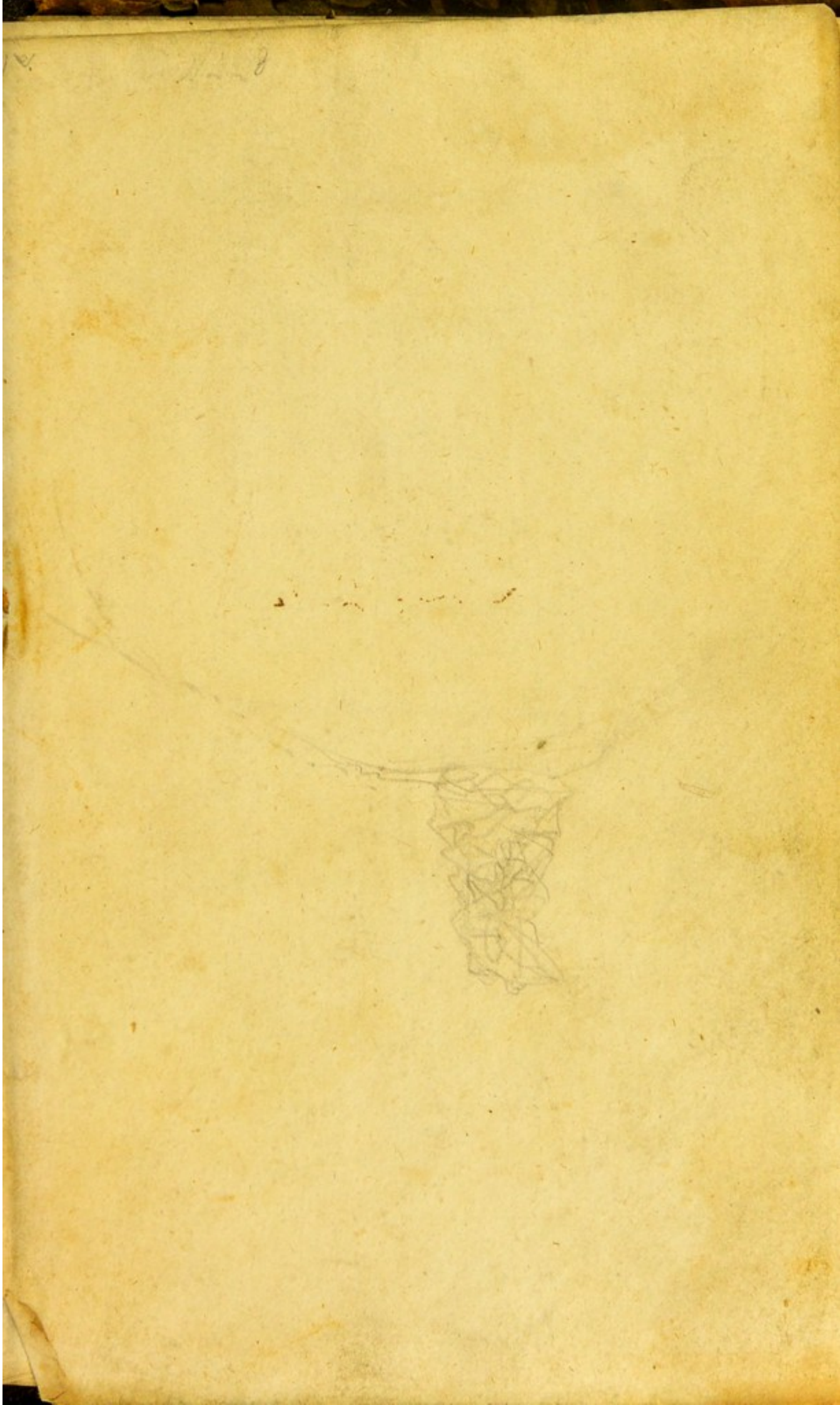


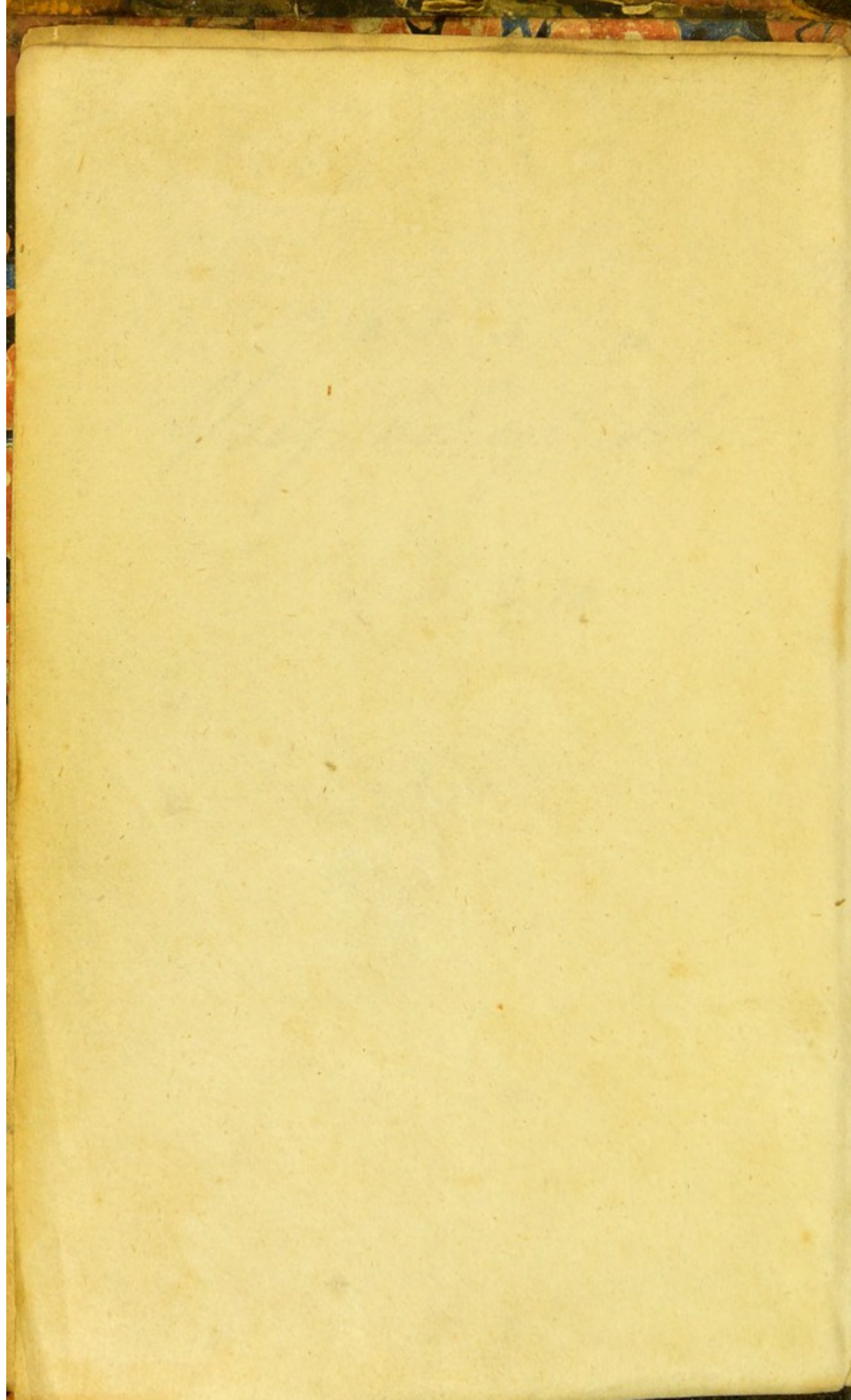
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PRACTICAL OBSERVATIONS
ON
THE TREATMENT
OF
ULCERS ON THE LEGS

FOR THE USE OF
MILITARY SURGEONS

BY GEORGE HENRY, ESQ. F.R.S.

OF THE HONOURABLE SOCIETY OF PHYSICIANS

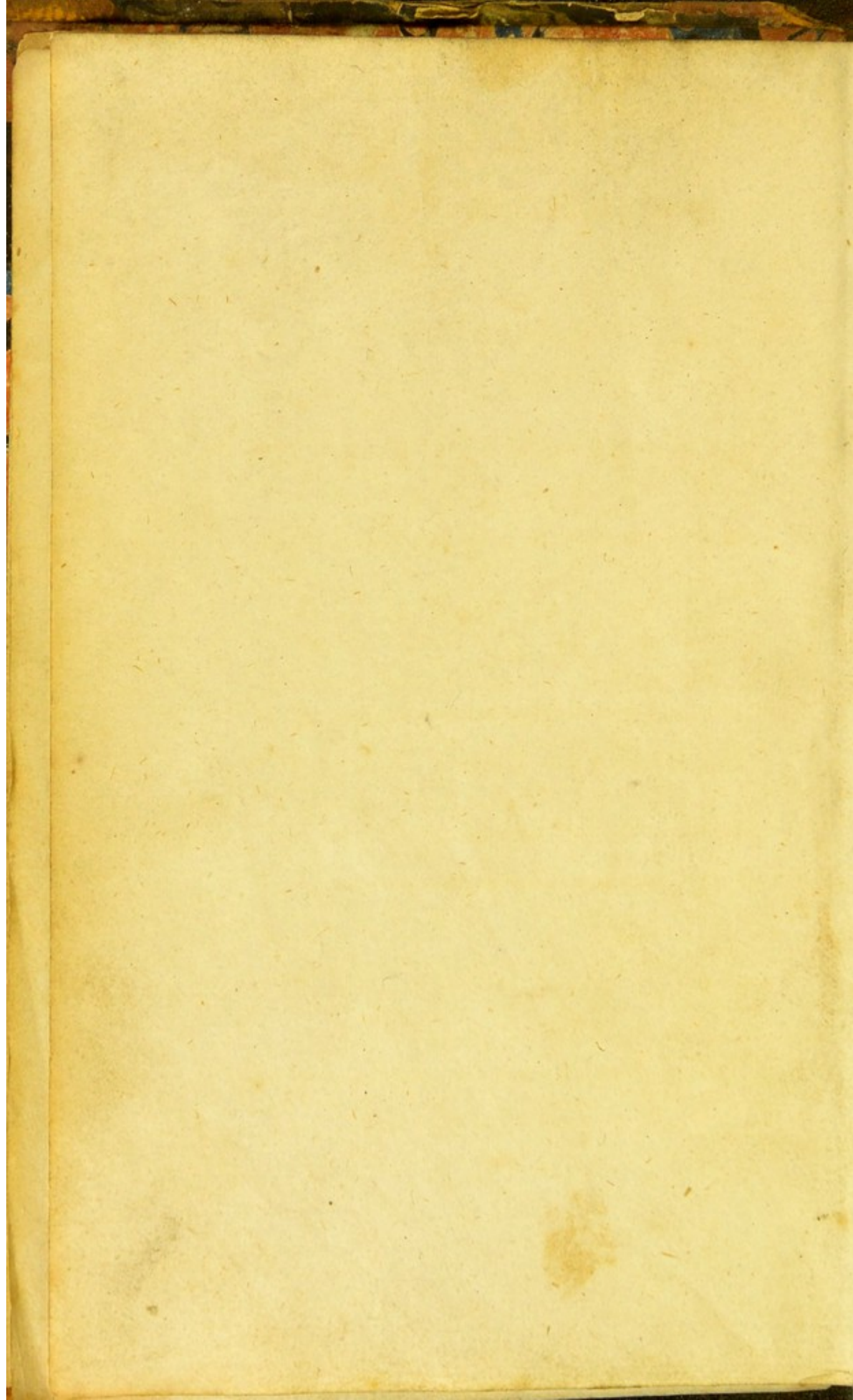
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1784



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OF
ULCERS ON THE LEGS,
CONSIDERED AS A BRANCH OF
MILITARY SURGERY.

BY EVERARD HOME, ESQ. F.R.S.
SURGEON TO THE ARMY AND ST. GEORGE'S
HOSPITAL.

LONDON:
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1797.

TO HIS ROYAL HIGHNESS

FREDERICK,

DUKE OF YORK AND ALBANY,

FIELD MARSHAL AND COMMANDER IN

CHIEF OF HIS MAJESTY'S FORCES.

SIR,

No surgical complaint, incident to the soldier, has deprived his Majesty's service of so many men as that of ulcers on the legs; it is therefore a disease, the effects of

A

which your Royal Highness, in considering the military resources of the country, must always have seen with regret.

From viewing the subject in this light, I have presumed to lay before your Royal Highness the following pages; in which an attempt is made to diminish an evil so destructive to the effective strength of the army. I am encouraged to address them to your Royal Highness, from having experienced, while under your Royal Highness's command upon the Continent, a ready compliance with every arrangement that was suggested for the relief of the soldier,

accompanied with an earnest solicitude for his welfare.

A great part of my experience on this subject, has been acquired in Military Hospitals, and I now communicate my observations to the Public, from a desire to be of use in this the most common, and necessary branch of Military Surgery.

The present work, I hope, will not be considered as unworthy of your Royal Highness's protection, the honourable sanction of whose name, will at least show, that whatever may be its imperfections, the subject of it has attracted the notice of your Royal Highness, and there-

fore deserves to engage the study
and attention of every military
surgeon.

I have the honour to be,

with the greatest respect,

SIR,

your Royal Highness's devoted

and most obedient

humble servant,

EVERARD HOME.

May 6, 1797.

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INTRODUCTION.

WHEN we consider the number of recruits who are rejected, and the number of well disciplined men who are discharged from the army on account of ulcers on the legs, it must appear to be one of the most important duties of every military surgeon, to pay particular attention to a complaint, which renders so many men unfit to perform the duties of soldiers.

It has been unpropitious to the improvement of the treatment of ulcers on the legs, that they have been universally admitted to be the most unmanageable cases which become the objects of surgery; that they are cases in which the most eminent surgeons are too often known to fail in performing a cure; and, therefore, bring no imputation of want of

skill upon those practitioners who happen to prove unsuccessful.

This has led the younger part of the profession in the army to be too diffident, in this respect, of their own abilities; to despair of success where so many have failed, and to follow a beaten track, in which so little advance has been effected, that ulcers on the leg are not unjustly considered as the opprobrium of surgery.

Ulcers on the leg, when regiments are employed on service, are too frequently concealed, and consequently neglected, till they have increased to a considerable size; and this, in many instances, happens from a desire in the soldier to avoid his duty, or to procure his discharge. In this way, too many men have been finally lost to the army. Whenever this kind of imposition succeeds, it is productive of much greater mischief than the loss of the individual to the service, by inducing other men, when dissatisfied, to make

similar attempts, which otherwise would not have been suggested to their minds. It is therefore adviseable, whenever there is the smallest suspicion that any men have hurt their legs from such motives, to keep them in the regiment, even when rendered unfit for duty.

If the idea that this disease is incurable, prevails in a regiment, the soldiers will be very ready to take advantage of such an opinion; and the surgeon who admits of it, will not be induced to give cases of that kind the degree of attention which is necessary to perform a cure, or to detect those men who are artfully counter-acting his endeavours.

As the difficulty in effecting a cure, applies only to those ulcers which have increased to a considerable size, or have been long in a bad state; there should be a regulation in all regiments, that the smallest ulcers on the legs are to be immediately reported to the surgeon;

the non-commissioned officers of every company should be required to enforce this regulation ; and all men so reported, should remain under the direction of the surgeon till perfectly recovered.

A regulation of this kind would be the means of saving many good men to the service, and preventing many others from deserting it ; as ulcers on the leg, in their early stages, admit of being healed even by surgeons whose attention has not been particularly directed to that subject.

There is, in many regiments, an unwillingness in the commanding officers of companies to have their men put into the regimental hospital for slight complaints ; and those men who are not removed from their barracks, are so little under the controul of the surgeon, that he does not feel them intrusted to his charge ; and they are, therefore, of course neglected both by themselves and the surgeon. This is perfectly well known to

be true ; and in many slight cases of disease may be productive of no material harm ; but since it is generally allowed, that ulcers on the leg are so little in the power of the surgeon when they arrive at a bad state, the commanding officers of regiments should put it into orders, that every man affected with such a complaint, must be placed immediately under the sole management of the surgeon ; that the evil may be encountered in time, and the patients recovered.

Men who have been cured, and return to their duty, should be made to wear a bandage and compress for some time, as a support to the newly formed parts, and a defence against accidental violence. A piece of thin tea lead may be used with advantage for this purpose.

If ulcers on the leg, when neglected, are found in this country, to spread and become a very serious disease, it happens

in a still greater degree in the West Indies, where the slightest previous hurt upon the leg, or a small ulcer, will, from the effects of fatigue in that climate, in a very short time, become an ulcer of the worst description, and render the patient entirely unfit for service. Too much attention, therefore, cannot be paid to the conduct of the soldier in hot countries, to prevent ulcers; and when they occur, to put the men as soon as possible under the direction of the surgeon.

At St. Lucia, during the last war, I had several conversations upon this subject with Dr. Young, physician to the army; who had been formerly a regimental surgeon, and had served in the Windward Islands in the year 1765, and the three following years. In that period he had made some remarks, which led him to conclude, that tall men are less able to bear the climate of the West Indies, and

are more liable to ulcers on the legs than others. As his observations are curious, I shall lay them before the reader.

Dr. Young observed, that in the 32d regiment, there were 145 tall men, and 276 short ones. That in the course of four years 22 were discharged from those of the first description, and only 23 from the second, on account of ulcers on the legs. The ulcers were of such a nature as to be deemed incurable in that climate. Some of the patients were obliged to undergo amputation, to give them a chance for their lives; others lost so many of the muscles and tendons as rendered them, everafter, unfit for service. The principal cause why tall men are more subject to ulcers on the legs than short men, Dr. Young conceived to be the length of the column of blood in their veins; which, by its pressure, renders the legs less able to recover when hurt by any violence. He observed, at the same time, that tall men

are less able to support the heat of the climate ; and by losing their general health, are rendered more liable to have ulcers on the legs. From these remarks Dr. Young concludes, that many lives might be saved, by omitting to send any grenadier companies to the West Indies.

After having made these observations on the 32d regiment, Dr. Young went upon the expedition against Martinique, and the Havanna; and was surprised to find that ulcers on the leg, in another regiment, were less frequent, although the mode of life, diet, and all general circumstances were the same, and the fatigue considerably greater. This he was led in some measure to attribute to the circumstance of the men wearing half boots of cloth, which defended the legs from many slight accidents occasioned by marching through uncleared paths, by kicks, or the bites of mosquitoes. They also kept the legs dry; and gave a support

to the veins, which woollen cloth gaiters, from their elasticity, will do in a greater degree than those made of leather or linen.

The mode in which ulcers on the legs are treated in regimental, and other military hospitals, I have had many opportunities of seeing, while I was employed in that service; and have lately made inquiries from those who are at present surgeons of regiments, and find it to be still the same. They are commonly all treated upon one general plan. If the ulcers are in a foul state, they are poulticed; when they become clean, they are dressed. The same kind of poultice is used to all foul ulcers, and the same kind of dressing is used to all those which put on a more favourable appearance. If a new mode of treatment for ulcers is at any time published by a surgeon whose character is respectable, this is tried. The result, in general, is, that in some cases it is found to answer; in many others it fails; and,

upon the whole, usually falls short of the expectations that had been raised. It is therefore very soon thrown aside; and the old plan, though allowed by every surgeon individually to be bad, is resumed.

Such must, of course, continue to be the case, while the disease remains uninvestigated; and the different species of ulcers, and their varieties arising from natural peculiarities, are not understood. Since, without such knowledge, all trials of different applications become so many random experiments, which, by their too frequent failure, will discourage the practitioner from prosecuting so fruitless an inquiry. With a view to enlarge our knowledge, and to establish some general principles, that may guide us in the treatment of ulcers on the legs, I have endeavoured to arrange them under different heads, and have pointed out those distinguishing characters of each species, which will make one mode of treatment

more likely to produce a cure than others of a different kind ; giving an account of those local applications of which I have had experience, and their particular effects.

By these means I hope that I shall, in some measure, clear the way for those who may be led hereafter to take up this subject ; and that, an arrangement having been made, under which the observations and detached facts noticed by individuals may be collected in a small compass, the treatment of ulcers on the legs may in process of time be very much improved ; and many cases of that kind cured, which at present are considered as beyond the reach of surgery.

A plan of this kind will, I hope, be favourably received by the surgeons of the army, who have so many cases of this kind intrusted to their care. It will shew them the extent of the enquiry, and that very little has hitherto been done. It will

point out also, how much it is in the power of every individual to add to the stock of our knowledge, and thereby advance his own credit and the public benefit.

ON
ULCERS, &c.

CHAPTER I.

GENERAL OBSERVATIONS ON ULCERS ON
THE LEGS.

THE treatment of ulcers on the legs is by no means confined to the practice of military hospitals; the disease is too frequently met with in all large cities, and wherever a number of labouring men are employed. But in no situation is their treatment, as a general practice, an object of so much importance as in the army; where the disease not only brings distress upon the individuals, but deprives the public service of a greater number of men than the country, in time of war, is able to afford.

The frequency of this disease, with which all our public hospitals are crowded, gives the surgeons belonging to these institutions ample opportunities of seeing such ulcers in all their different states; of considering their nature, of comparing the effects of different modes of treatment, and of ascertaining, by experimental inquiry, what are the speediest and most effectual means of effecting a cure.

To this inquiry I was led at a very early period, both by the precept and example of the late Mr. Hunter, whose active mind was always aiming at the improvement of his profession; and the public situations in which I have been placed during the last 18 years, both at home and abroad, have afforded me opportunities of making a great variety of observations.

Ulcers on the legs have naturally attracted the attention of surgeons in all

ages, and many very valuable works have been written on the treatment of them. On a careful examination of these productions, it will be found that this branch of surgery has been progressively improving, along with anatomy, and the knowledge of the animal œconomy; we must therefore conceive it, as they certainly are, to be still capable of further improvement. These ulcers are to be regarded as a distinct consideration from those which occur in the other parts of the body; since they vary among themselves in a much greater degree. This I consider as arising from the following causes.

The legs, by their situation, are more remote from the source of the circulation than the other parts of the body, and are therefore less perfectly supplied with pure blood. In many, and those the most usual positions of these limbs, the blood, in its return to the heart, is obliged to ascend

against its own gravity, which retards its progress ; and thus the smaller vessels are kept in a state of too great distension and resistance from the pressure of this column of blood.

From these circumstances it must appear, that the legs even in health are weaker in their vital powers than the rest of the body ; and when, from previous accident or disease, new parts are to be formed, the actions in the smaller arteries, by which this should be effected, are impeded by the languid state of the circulation in the veins of the limb, whenever the body is put into an erect posture. If, on the other hand, to obviate this disadvantage, the body be kept for any length of time in a recumbent position, this is found so injurious to the general health, as in that way to interfere with the production of healthy granulations.

This deficiency of vital powers in the legs, when compared with the rest of the

body, occasions them to be more readily affected by every thing that weakens or disturbs the constitution ; and in a diseased state, the symptoms will of course be influenced by the natural or acquired peculiarities, as well as by the actual state of the constitution, as to strength or weakness.

It is this influence, which the state of the general system has upon ulcers on the legs, that gives to them a variety of dispositions, and makes many different modes of treatment necessary for their cure.

As no two constitutions are exactly similar, so it happens, that an ulcer on the leg has not in any two persons exactly the same character ; for whatever general resemblance one may have to another, there will be found also some peculiarities by which they may be distinguished. It is therefore not sufficient for the cure of such ulcers, that the surgeon should be

acquainted with the general treatment; a knowledge of these distinguishing peculiarities, and their probable causes, is also necessary to enable him to treat with success the cases of those individuals who may be entrusted to his care.

From these observations it must appear obvious, that there is no probability that any one medicine can ever be discovered, which, whether internally administered, or locally applied, shall have powers adapted to the cure of all ulcers on the legs; and I believe, the idea that such a medicine may exist, has retarded, very considerably, the advancement of our knowledge in the treatment of ulcers, by inducing surgeons to make use of the same applications to ulcers very different in their kinds.

As no general medicine therefore can be applicable to all ulcers, our study should be to ascertain the real powers of those medicines we already possess, and

to discriminate the different kinds of ulcers to which they are respectively adapted.

While the doctrine of the humours was in general repute, internal medicines were supposed to be capable of removing almost every disease, and, among the rest, ulcers on the legs ; but practice did not confirm this theory ; and external applications were of necessity employed, before the cure could in many cases be effected.

When, from the advancement of our knowledge of the animal œconomy, it was ascertained that every part of the body has actions going on within itself for its own increase, for repairing the waste naturally taking place, and restoring parts that have been destroyed ; and that these actions in the different parts can be influenced by stimuli, locally applied, both more immediately and more efficaciously than through the medium of the constitution, local applications to ulcers were

naturally preferred to internal medicine ; and experience has sanctioned this preference.

The number of external applications recommended for the cure of ulcers on the legs, is very great ; many of these have, by their effects, established a reputation beyond all dispute, and are in very general use. Others are of a more doubtful character, their healing powers resting upon hypothetical reasoning, as being dryers, and causing parts to skin over ; effects which do take place under their use, but do so equally soon under the use of other medicines, which are known to have no such powers.

It has been a question, whether all ulcers on the legs ought to be healed, even when we have the power of doing it. If this question is examined only so far as respects the origin of the ulcer, it is very readily answered ; for if the ulcer is a breach in the solids in consequence of an

accident, there can be no doubt that the breach should be repaired, and the parts reinstated as soon as possible ; and if the ulcer arises from disease, there can be as little doubt that the disease should be cured. But this question has been considered in another point of view ; it has been supposed that an ulcer once formed, has a power of drawing off, from the general system, impurities which do not find a ready passage by the natural outlets of the body ; and therefore, although the body went on very well before such an ulcer was formed, when once this new channel is opened, and the impurities of the blood have taken that course, if it be suddenly stopped, they may not readily go off with the natural excretions ; and by being confined, may do a great deal of harm.

This theory is very plausible, and while the doctrine of the humours was generally believed, must have been un-

answerable. But if the formation of pus be an action of the parts in which the ulcer has been produced, for their own recovery; if it be independent of the general system, otherwise than as it occasions a greater supply of blood than usual, to be sent to that part from which the pus is to form, then this theory must fall to the ground.

From these observations it appears, that the different kinds of ulcers on the legs may be safely healed, there being no chance of any thing being thrown back, upon the general system, or retained there, in consequence of their cure.

There are circumstances, however, in which it would be improper to heal an ulcer on the leg; but these are totally independent of the theory I have endeavoured to refute.

If a patient of a gouty habit has an ulcer on the leg, which is evidently affected by the gout, having regular attacks of

pain returning at stated periods, and those attacks similar to what the same person had experienced from gout in other parts; under such circumstances, any attempt to heal the ulcer is improper; for if it should be attended with success, the gout may fall upon some more important part.

There are many constitutional irritations, equally unintelligible with the gout, which occasionally fall upon the weakest or most irritable parts of the body. If it is found that an ulcer upon the leg breaks out whenever the constitution is disturbed, and if, when that happens, no other part is affected, it would be imprudent to heal that ulcer. Many people are affected in the spring by headaches, ulcers on the throat, pains in the chest, eruptions on the skin; which ever is the weakest or most irritable part in the individual who is liable to such attacks; if any such person should have an ulcer on the leg, and the constitutional affection, whatever it may be, should

fall upon the leg, now rendered more susceptible of such attack than any other part of the body, it would be imprudent to interfere or attempt to heal that ulcer.

That the periodical attacks I have just stated, with which every one must be perfectly acquainted, are constitutional affections falling upon particular parts, and not really a disease in the parts themselves, I shall illustrate by the following instance; and, were it necessary, could give a great many others.

A gentleman, who for many years was subject every spring to violent attacks upon his chest, had a disease which took place in the bladder, of a very distressing kind. As soon as that viscus became the weakest and most irritable part of the body, he lost entirely the periodical returns of the complaint in the chest; they fell upon the bladder; so that, independent of the constant symptoms peculiar to the complaint, he had regular attacks, at intervals

of some months, of the most violent irritation in that viscus.

When any ulcer has existed on the leg for a great many years, it becomes an habitual disease difficultly removed, and when it has been healed breaks out again ; the parts readily falling back into a state to which they had been long accustomed. There is, however, no reason why the ulcer, under these circumstances, should not be removed, unless the patient be very infirm or old.

At a late period of life it is imprudent to make the smallest change in the œconomy of the body, even in those respects which may appear to its advantage ; for the smallest disturbance sometimes proves fatal.

If, in a weak state of body, a copious evacuation by stool has been immediately followed by death ; if the drawing off the water by the catheter, when it has been too long retained, has had a similar con-

sequence in the course of a few hours; both of which events I have witnessed, it shews that the actions of the vital organs cannot go on, under such circumstances, if the smallest violence be committed upon any part of the machine, even where it is not attended with any loss to the general system; for in both the cases which I have mentioned, the contents that were evacuated must have been some time separated from the system, and deposited in their proper reservoirs.

The removal of any habitual irritation, in such a state of body, may be productive of harm. A person long accustomed to drink a dram in the morning, on leaving it off has lost his health; the irritation of an ulcer may have an effect upon the general system, of which it will be dangerous to deprive it. The healing of an ulcer on the leg, as it prevents so much blood from being carried to that part, for the formation of pus, may, when the machine

is falling into decay, increase the quantity carried to the vessels of the brain, and produce apoplexy, by causing some of them to be ruptured.

There is a curious effect of approaching death, which has been sometimes improperly attributed to the treatment of the surgeon. An ulcer of twenty years standing, sometimes heals up of itself in the course of a few days, and the patient dies some hours after, or at least in a very short time. This circumstance, of the healing of the ulcer, appears to be an effect of that change which the general system frequently undergoes previous to its dissolution, and corresponds with the sensation of unusual health, often experienced immediately before a severe illness, and also immediately before death.

GENERAL DISTRIBUTION OF ULCERS INTO
THEIR SPECIES.

To render the medicines we employ as generally useful as possible, it appears a very desirable object to distinguish the various ulcers on the legs, occurring in practice, into different kinds, as far as we are enabled so to do upon general principles ; and then to state the particular remedies which more properly belong to each of these classes.

If a plan of this kind can be carried into effect, which is the object of the following observations, a surgeon, as soon as the nature of an ulcer shall be ascertained, will very much have circumscribed his subsequent labours ; since he will only have to discover, by trials, which of the medicines found most applicable to that species of ulcer, will best agree with the particular case under consideration.

A knowledge of all the medicines fit-

ted for each species of ulcer, will also be attended with another advantage; for it will be found, as I shall hereafter more fully explain, that the same application, however it may agree at first, will if used beyond a certain time, lose its good effects, and therefore will require to be changed for some other of similar powers.

From all the consideration that I have been able to bestow upon the subject, which certainly has been very extensive, I am led to believe, that ulcers on the legs differ from one another according to the following circumstances: local peculiarities, constitutional peculiarities, peculiar dispositions of the parts or of the constitution, and diseased dispositions of the parts or of the constitution. I have therefore divided them into six different species, each of which requires a very distinct and different mode of treatment.

1. Ulcers in parts whose actions are healthy.

2. Ulcers in parts whose actions are too violent for their powers to sustain.

3. Ulcers where either the parts or constitution have an acquired irritability.

4. Ulcers where either the parts or constitution have an acquired indolence.

5. Ulcers in parts which have acquired some specific action, either from a diseased state of the parts, or of the constitution.

6. Ulcers where the parts are prevented from healing by a varicose state of the superficial veins of the limb.

I shall take up each of these six species of ulcers separately ; and in stating the different medicines suited to each species, shall consider them, where it can be done, as applied in four different forms ; for the same form of medicine does not always answer in different cases of the same species of ulcer, to which the virtues of that medicine may be generally applicable. In

one case the medicine shall agree best in the state of vapour ; in another, in a fluid state ; in another, in the form of ointment ; and in others again, in the form of powder.

CHAPTER II.

OF ULCERS IN PARTS WHOSE ACTIONS ARE
HEALTHY.

WHEN an accident happens to the leg of a person in perfect health, by which a portion of the skin and muscles is deadened, or only simply divided, if they are not united by the first intention, an ulcer is the consequence. Such an ulcer requires no medicated applications for its cure, the parts having sufficient powers within themselves to restore the lost muscles, cellular membrane, and skin, by means of inflammation, suppuration, granulation, and cicatrization; these being the means instituted by nature for the restoration of parts.

In this species of ulcer the matter or pus is white, thick, readily separates from

the surface of the ulcer, and when diluted and examined in a microscope, is found to be made up of small globules swimming in a transparent fluid. The granulations are small, florid, and pointed at the top; as soon as they have risen to the level of the surrounding skin, those next the old skin become smooth, and are covered with a thin, semi-transparent film, which afterwards becomes opake, and forms cuticle.

All that is required in the treatment of such an ulcer, is to keep the parts clean, and prevent their actions from being interrupted in the course of the cure; this is, in general, best done by applying dry lint to the surface of the ulcer, to absorb the matter, and a pledget of any ointment over the whole, to prevent evaporation of the matter, that the dressings may be readily, and at proper intervals, removed.

This mode of treatment, were it not for the peculiarities of the constitutions of

different patients would apply equally to all ulcers of this species; but these peculiarities are so various as to require particular consideration.

Although healthy ulcers require no medicated application to be made to them in any case, it is necessary that the dressing should be of a kind that does not disagree with the granulations, or surrounding skin, since if it does so, in the slightest degree, the progress of the cure will be retarded.

By some patients a roller applied moderately tight, to secure the dressings, will be found so uneasy to the parts, as to make the ulcer lose its healthy appearance, which will be resumed on leaving off the bandage. Several cases of this kind have fallen under my care.

In some instances the application of ointment will disagree even with the neighbouring skin. In some, the ulcer will not skin over while the surface is kept

moistened by its own pus, and confined from the air; but if exposed, and allowed to scab, it will heal.

That the modes of treatment which most commonly answer, and consequently are in general use, prove hurtful in particular cases, must be referred to the constitution, which has its influence over every component part of the body. They are entirely unconnected with disease; for as soon as the offending application is removed, the ulcer continues its progress towards a cure. These peculiarities are deserving of particular notice, since they are equally liable to occur in the other species of ulcers, which we are about to consider, as in these of the healthy kind; and if not sufficiently attended to, may be mistaken for the effects of disease, and may lead to very improper modes of treatment.

As in the management of ulcers of this species the great object is a knowledge of

the peculiarities of the constitution, if there are any, an inquiry should be instituted into the effects of different applications to the same person upon former occasions; whether oily or watery substances agreed best with the skin; whether exposure to the air disposed former ulcers to form scabs, or the reverse; and if scabs were formed, whether the parts underneath skinned over or not. From such questions a surgeon will in general procure material information, and frequently be led at once to the most judicious mode of practice; while, on the contrary, a want of attention to these circumstances may be the cause of protracting the cure for a considerable time. I cannot better illustrate the truth of this observation, than by mentioning the following circumstance. A boy at school, by some accident, had several small ulcers on his leg, on which account he was immediately sent home. As he was the son of a

nobleman of high rank, every attention was paid to them, all kinds of dressings were tried, but without the desired effect. Under these circumstances it was proposed (as there was nothing in the appearance of the ulcers to account for their backwardness in healing,) to leave off all dressings, and make him wear a pair of loose trowsers, night and day, to prevent any thing from adhering to their surface: under this mode of treatment they readily healed.

Applications considered, with reference to this species of Ulcer.

1. In the form of vapour.

Nothing should be applied in this form, although it is sometimes done by way of fomentation. The effect, however, is pernicious, since the granulations are thereby rendered looser in their texture, and less disposed to form skin.

2. In a fluid form, or moist state.

Poultices are not less improper than fomentations. Alcohol diluted in different proportions is found, in many instances, to dispose the granulations, when upon a level with the neighbouring skin, to form a scab. When that object is desirable this method will answer the purpose.

3. In the form of ointment.

Ointments are seldom of any other use than to prevent evaporation, and are not usually in contact with the granulations; for this purpose the simplest forms appear to be the best, as that made of equal parts of white wax and olive oil; the ceratum epuloticum is supposed, from the lapis calaminaris which it contains, to assist or hasten the formation of new skin. Of this property I cannot speak from my own experience.

The great objection to the common simple ointments,—as cerate, and others of that kind, is, that they sometimes dis-

agree with the skin when recently made, and in the most perfect state; but when allowed to become rancid, which they do by being long kept, they always irritate to a very considerable degree, and aggravate the symptoms they were meant to relieve.

As the army surgeons are supplied with ointments only once a year, or once in two years, and these ointments, from being made in very large quantities, are more liable to suffer in the making, by the heat employed rendering the oil emp²⁵tr³⁴⁶ematic; it would be a much better plan to give an allowance of white wax and olive oil to each regimental surgeon, who could make them into ointment in small quantities, as he had occasion, so as always to have it in a recent state.

In the West Indies, during the last war, ointments were supplied very liberally; but in that country the heat rendered them so rancid, that they became

very stimulating applications, and only adapted to ulcers of an indolent nature.

4. In form of powder, or in a dry state.

If it be thought advisable to form a scab upon the surface of the ulcer, this may be soon effected by applying a small quantity of any inert substance in form of powder; but, as dry lint will answer the purpose, I should for many reasons prefer it.

When either of these means are employed, nothing should be allowed to come in contact with the powder or lint applied to the ulcer. This is best prevented by putting a small bolster of linen on each side of the ulcer, and over these a bandage, so that the bandage may form a kind of bridge over it, and be kept at some distance, while it defends the surface from any accidental violence.

Dry lint is the common dressing in use, and, as a general practice, is the best. When the ulcer does not form a

sufficient quantity of pus completely to moisten the lint in twenty-four hours, the dressings should only be changed every other day, as the removal of the lint when it adheres, even slightly, disturbs the formation of new skin, and makes the granulations afterwards less disposed to form it.

A bandage applied tolerably tight, where there is no peculiarity in the constitution to forbid its use, gives a firm support to the muscles and skin, which are frequently loose and flabby from the want of the natural healthy movements of the limb. It is also a defence to the newly formed parts.

CHAPTER III.

OF ULCERS IN PARTS WHOSE ACTIONS ARE
TOO VIOLENT FOR THEIR POWERS TO
SUSTAIN.

ULCERS of this kind differ from those in healthy parts; the granulations are larger in size, rounded upon their external surface, less compact in their texture, and semi-transparent. When they arrive at the surface of the body, they do not readily form skin, and frequently continue to rise still higher, and then entirely lose the disposition to form new skin.

Ulcers may from the beginning exhibit these appearances of want of strength in the newly formed parts; or they may at first go on for a few days in every respect like those in healthy parts, but become unable to do so beyond that period,

and the granulations then show signs of weakness. For granulations of the most healthy kind, if they are not skinned over in a certain time, appear to lose their original strength, and fall into a weak state.

Ulcers on the legs have been already stated to be influenced, in a very considerable degree, by the natural peculiarities of the constitution; they are found to be still more so by any thing that affects, in the slightest manner, the patient's general health. The appearance of the granulations undergoes a change upon the least diminution of constitutional strength; and if that be restored, the granulations return to their former state; so that an ulcer of a healthy kind becomes in general a very accurate index of the strength or weakness of the constitution.

The influence produced upon ulcers by any diminution of the constitutional

strength is the greater, the further the seat of the ulcer is removed from the source of the circulation. If a person in a weak state has two ulcers on the same leg, one near the knee, the other near the ankle, as he recovers his strength the two ulcers will assume a more favourable appearance; but the effect will not be equal in both; that nearest the knee will show the first signs of amendment, and will go on healing faster than the other. This may by many be considered as accidental, but the instances of it which occur, I think are sufficiently numerous to prove that it arises from some general principle.

Whatever disturbs the constitution seems to produce a temporary imperfection in the actions of the animal oecconomy; for while the body is in that state, the progress of healing in an ulcer appears to be at a stand. We see this effect produced occasionally by anxiety of mind. A small ulcer, which the patient is

led to suspect may be venereal, will sometimes remain without making the smallest progress towards a cure, during fourteen days, in consequence of a state of anxiety brought on by this suspicion : but the moment the mind is at ease, the ulcer will begin to heal, and get well in a few days.

These effects upon ulcers, produced by the state of the constitution, are greater in weak and delicate people, than in the strong and robust. They seem to take place in the greatest degree in those constitutions which, from the effects of particular modes of life, and the influence of different climates, are very susceptible of impressions. The following observation offers a confirmation of this opinion. In the year 1778, after the naval action between the English and French, the wounded seamen belonging to Admiral Keppel's fleet, were all carried into the Naval Hospital at Plymouth; among them were several hundred pa-

tients with ulcers, from accidents on board of ship, and most of them on the legs. Whenever there was any violent and sudden change in the weather, from a dry to a moist state, which is very often the case in October and November, on that part of the coast, it had an immediate effect upon the appearance of all the ulcers in the hospital; giving them universally an unhealthy appearance. Instead of pus, the granulations threw out an exsudation of coagulating lymph, which lay upon the surface of the ulcers, looking exactly like melted tallow; and when the weather changed again, and became dry, they put on a more healthy appearance.

For the cure of this species of ulcer it is necessary to pay attention to the constitution; such medicines as strengthen are to be employed, as bark and steel; and whatever is found to affect the constitution unfavourably, is to be avoided as

much as possible. By these means the local treatment will be materially assisted. In this languid state it is common to give wine and cordial medicines; but the treatment of any set of men should be adapted to their modes of life; and with soldiers, and indeed the whole class of working people, porter is of much more service than wine; it does not heat so much, and they in general like it much better. In the present war the hospitals under Sir John Macnamara Hayes were liberally supplied with porter, and the men recovered their health very fast under its use.

The first object, with respect to the ulcers themselves, is to prevent the granulations from rising higher than the edge of the surrounding skin, since it is a fact well established, that when they are higher than that level, they are not disposed to form skin. This is not sufficiently attended to in common practice; but another mode

is adopted, which is erroneously supposed to produce the same effect. Escharotic medicines are used to eat down the granulations, whenever they are found to be too high, and in this way they are reduced nearly to the proper level. There can be no doubt, that if, by any means, the granulations could be prevented from rising beyond the surface, it would save a great deal of pain to the patient, and be attended with other advantages; and this may be done, as I shall endeavour to explain, by making use of dressings adapted for that purpose.

It becomes a question how far escharotics should be employed, even when the granulations, by inattention, have been allowed to become luxuriant; since the very act of destroying the upper part of the granulations seems to increase the growth of the part that remains, so that the disposition for luxuriance in the new flesh is not corrected, but rather increased,

and there is a constant necessity for making use of the same harsh means of keeping them within bounds, till they shall be disposed to form skin ; a process which would have taken place much sooner under another mode of treatment. If, on the other hand, such medicines are used as have a stimulating power, which is proportioned to the strength of the granulations, the superficial luxuriant parts, to which they are immediately applied, will be absorbed, and those underneath will be checked in their growth. Instead, therefore of touching the surface of such ulcers with the lunar caustic, blue vitriol, red precipitate, or any other of the escharotics in use, the same medicines compounded with other substances, which will diminish their activity, and render them only strong stimulants, may be used with advantage.

To illustrate the difference between the effects of escharotics and of stimulants, in

keeping down granulations, I shall mention what happens in the case of warts ; which are only a luxuriance of growth from the cutis, and, like granulations, and all other newly-formed parts, are weaker in their living principle than original parts.

If warts are touched by escharotics, it is found that their growth is rather increased than stopped by such treatment ; and they cannot be removed by these means unless the caustic acts beyond the basis of the wart, and destroys a part of the skin underneath. But if a stimulating application, such as the powder of savin mixed with *ærugo æris*, is employed, it excites a degree of action in the wart itself, whose vital powers are weak, and, in consequence of the degree of action thus produced, being greater than the parts are able to sustain, the absorbents take them back into the circulation, and the wart is wholly removed ; but if the

same application is made to the common skin, it produces no effect at all.

As the great object in the healing of an ulcer is to have the new flesh, by which it is filled up, as strong in its living powers as possible, that it may not afterwards break out again; every thing that can conduce to that end is deserving of attention. It is reasonable to conclude that, in the growth of animal substance, as of vegetables, where there is a rapid increase, the parts growing are weaker than where it is slow; and if the granulations which are already growing beyond their strength, have this rapidity increased by partial removals, they must in reality be rendered weaker than they were before. If this reasoning be just, which I am led to believe it is (since the observations on which it is founded are taken from practice) the treatment of granulations ought to be regarded in a point of view that has hitherto been little

considered. Their growthought to be kept back in an early stage of their formation, by such resistance as they are just able to overcome; which will at the same time retard their increase, and allow them to acquire strength by their own actions; for new-formed parts in a living body are strengthened in proportion to the action they are obliged to exert. This, however, is confined within certain limits, for if the actions are increased beyond their real strength, the absorbents remove them altogether, and an attempt is made to produce a new growth of granulations, strong enough to support the excited actions in the parts. This they are sometimes unable to accomplish, and the ulcer remains nearly stationary, till this too stimulating application is removed.

It is upon this principle that the pressure made by tight bandaging is found so useful in this kind of ulcer; and it is from the same cause that those ulcers

which heal while the patient is walking and using exercise, are less liable to break out again, than those which are healed under the circumstances of rest and perfect quietness.

I have dwelt the longer upon the necessity of attending to the strengthening of granulations at their first formation, from finding that after they are once formed they do not appear capable of becoming stronger, in the same degree; but give way under the slightest increase of motion in the parts, even after they have been allowed what might be considered a sufficient time to acquire strength, and the ulcer itself has been completely healed. We have daily proofs of this weakness of granulations, in all the stages of their growth, in our public hospitals. When a patient is first received with an ulcer in a very disturbed state, from improper treatment, without any distinct appearance of granulations, under the ap-

plication of a poultice, the surface will frequently become clean, and granulations will rise up in every part: these will increase, and appear to be strong and healthy (when superficially examined) while the patient remains in bed; but as soon as he gets a little better, and walks about, the ulcer spreads; the motion of the limb being greater than the granulations can support, on which account they are absorbed, and taken back into the constitution. If the patient be kept in bed, the ulcer will heal, and he may leave the hospital perfectly well; but as soon as he returns to his usual exercise the granulations, too weak to support themselves, give way, and the ulcer breaks out again, and becomes nearly of the same size as at first.

As this is one of the most common species of ulcer to which soldiers are liable, it is of the utmost importance that military surgeons should be made

acquainted with the cause why many of them are so liable to break out again; that they may avoid this consequence, and by their mode of treatment enable their patients to return to their duty as soon as possible after the ulcers shall be healed.

Ulcers on the leg may be, in the first instance, of the truly healthy kind, but from their size the parts towards the centre may be so long kept from skinning, that the granulations may become weak, and when they have risen to the surface may remain stationary, without shewing any disposition to form skin. When this is the case they generally, after a day or two, acquire a fresh growth, and become luxuriant.

In the treatment of such ulcers it is therefore proper to attend to this circumstance, and whenever it is seen that the granulations, though come to the proper height, do not form a thin semitransparent pellicle upon their surface, they

are to be considered as weak parts, and treated accordingly. The simplest and best mode, where the constitution has no peculiarity which forbids it, is pressure; this may be made by a piece of thin lead over the dressings, and will be assisted by a tight bandage on the limb, which by compressing the parts, makes the circulation through the veins less tardy, than when the parts are left to themselves.

*Applications considered with reference to
this species of Ulcer.*

It is questionable whether we have any power of strengthening parts by local applications; but it is equally questionable whether the constitution can really be made stronger by the use of internal medicine; since absolute strength can only be conveyed to the body by means of nutriment, which is not contained in the substances used in medicine.

It is, however, by no means improper, in the practice of physic, to call those medicines strengtheners which, by their action on the internal membrane of the stomach, increase the secretion of the gastric juice, so as to convert a greater proportion of the aliment into chyle; or by their action on the absorbents, stimulate them to take up a greater quantity of the chyle, and convey it into the circulation: or which, by regulating the actions of the different parts of the system, diminish the general expenditure of the nourishment of the body: since all medicines which act in these different ways, do indirectly contribute to render the body stronger than it was before.

The same observations apply, with equal propriety, to the applications made to ulcers in weakened parts. Whatever prevents the granulations from exhausting themselves by luxuriant growth, or stimulates them to draw more abundant

supplies from the arteries, does, in effect, render them stronger.

1. In the form of vapour.

The fomentations in common use to many other species of ulcer, are improper in those whose actions are too violent for their powers to sustain, since the application of heat increases the actions of parts, gives them a greater tendency to become luxuriant, and renders them still weaker than they were before. Fomentations sometimes give pain when applied to parts in a very weak state; this happens when the action excited by their warmth exceeds what the parts can readily perform; and whenever this symptom occurs, they should be left off.

Spirits of wine and decoction of poppies, in equal proportions, may be substituted with advantage for the common fomentations, but must not be applied hot. They often soothe the sensations of the parts, and lessen their actions.

Where the granulations appear to be disposed to run into mortification, this application is sometimes the means of preventing it.

2. In a watery form, or moist state.

Poultices are not adapted to this species of ulcer, for the reasons already stated.

The argentum nitratum in weak solution in water, the strength proportioned to the state of the ulcer, is one of the best applications in a watery form.

3. In the form of powder.

There are several medicines used in the form of powder to this species of ulcer; of these the most common are bark, and the lapis calaminaris: the bark is supposed to have a power of strengthening the granulations, and the lapis calaminaris of disposing them to form skin. I have very frequently had recourse to both of them, but cannot, from any experience of my own, speak in their favour; never

having seen the effects that are attributed to them sufficiently obvious to merit the character they have acquired. Powdered chalk and plaster of Paris have been brought into notice, as disposing ulcers to form skin; but such a power appears to be improperly attributed to them.

Powdered carbon has been used with success, but its effects are more conspicuous in ulcers attended with irritability, than those attended with weakness.

Powdered rhubarb is an application which I have used to different species of ulcers, and ventured some years ago to recommend it to the notice of the public.* It appears more particularly applicable to this species, having a power over the luxuriant growth of granulations, rendering them small and compact, and disposing them to form skin;

* See Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, Vol. I.

but if they have been permitted to rise considerably above the proper level, it is not powerful enough to lower them.

The rhubarb is apt to form a crust upon the edges of the ulcer, which should be occasionally removed, to prevent the matter from being confined under it. This should be done with care, to avoid hurting the new skin which begins from the edges, and to the formation of which this crust seems to be favourable.

If the rhubarb alone is too stimulating, which is sometimes the case, adding one-fourth part of the powder of crude opium, makes it a milder application.

It is to be understood, that when any of the powders above-mentioned are used, a small piece of lint, nearly the size of the ulcer, is to be laid over the powder, and the whole covered by a pledget of simple ointment.

4. In the form of ointment.

Unctuous applications appear to dis-

agree more frequently with ulcers of this kind than any others; and in many instances where they have been long used, the omission of them will be followed, almost immediately, by a more favourable appearance. This I have seen so often, as to have no doubt of the fact, and even where the powdered lapis calaminaris has been supposed to be beneficial, I have been inclined to suspect that it is in no other way than by defending the surface of the granulations from the ointment, which before the powder was used, had been more or less in contact with them.

Although ointments are often improper, it cannot be asserted that they are always so, it will therefore be right to try them in those cases where a cure is not obtained by means of the other applications.

The ointment which seems most applicable to cases of this kind, is the un-

guentum hydrargyri nitrati, mixed with hogs' lard, in the proportion of one to five.

Common cerate, with a small proportion of the hydrargyrum nitratum rubrum is also a useful application. Both these preparations give a check to the luxuriant granulations, and are best adapted for reducing them when they have risen to too great a height.

After having enumerated the various medicines which I have used with success in different cases of this species of ulcer, it may be necessary to mention the order in which they stand in practice; beginning with those most generally useful.

The rhubarb seems to agree with the greatest number of patients, and is therefore the application to which I am inclined to give the first trial. Its effects are not

to be decided upon for two or three days, as almost every application appears to be of service for that length of time; but if the ulcer goes on favourably for a week the medicine is certainly to be continued: if on the other hand, after the third day the ulcer appears to be stationary, it is then to be left off.

The *argentum nitratum* dissolved in water, and diluted till the solution, when applied to the tip of the tongue, feels slightly pungent, is the medicine I adopt when the *rhubarb* does not answer; and if this also disagrees, or does not produce any amendment in the ulcer, I then make use of the *unguentum hydrargyri nitrati*; and if still no progress is made towards a cure, I have recourse to the *ceratum epuloticum*, or any other common ointment, with the *hydrargyrum nitratum rubrum*, in the proportion of half a dram to an ounce.

Which ever of these applications is used the ulcer should only be dressed once in the twenty-four hours, unless the quantity of discharge should prove so great as to require it to be done more frequently.

CHAPTER IV.

OF ULCERS WHERE EITHER THE PARTS,
OR THE CONSTITUTION, HAVE AN AC-
QUIRED IRRITABILITY.

WHEN an ulcer takes place on the leg of a person of an healthy constitution, it can only be prevented from healing, under proper treatment, by the weakness of the parts ; but when the general system is not perfectly in that state, whether from some natural peculiarity, or some accidental disturbance, this will operate as a cause to prevent such an ulcer from getting well, and to make its appearance vary from that of the healthy ulcer. These changes when they occur are generally to be considered as under the influence of the constitution. If the constitution at the time be disposed

to irritability, indolence, or constitutional disease, the ulcer acquires a correspondent disposition.

It would be natural to suppose these three dispositions so widely different from one another, that an ulcer attended with irritability, one attended with indolence, and one attended by some specific diseased action, must be very readily distinguished by their external appearance. This, however, is by no means true ; for although in strongly marked cases there is no difficulty in judging of the nature of the ulcer from the state of the granulations, this mode of discriminating is not, in the greater number of instances, at all to be relied on.

The disposition of an ulcer, like the disposition of a constitution, is only to be exactly ascertained by determining the actions which arise from the different impressions made upon it. From a want of attention to this mode of considering the

subject, ulcers have been commonly supposed to be of the same kind, where the external appearances were nearly alike ; which has retarded the progress of our knowledge on the treatment of ulcers, by preventing a more judicious application of the medicines in use ; while, by employing them improperly, their character has been materially injured.

In considering ulcers attended by irritability, I propose not only to treat of those which evidently are so in their appearance ; but to include all ulcers, whatever their appearance may be, which locally or constitutionally partake so much of irritability as to require sedative applications for their cure. This will be found to comprehend a much greater number of ulcers than could at first view be imagined.

There are appearances which at once show the ulcer to be of an irritable kind, and these, when they are present, ren-

der all further investigation unnecessary. The following are the principal marks of irritability :

The margin of the surrounding skin being jagged, and terminating in an edge which is sharp and undermined. The bottom of the ulcer made up of concavities, of different sizes. No distinct appearance of granulations, but a whitish spongy substance, covered with a thin, ichorous discharge. Every thing that touches the surface gives pain, and very commonly makes it bleed.

When these marks are not present, which very often happens, we are frequently led to a knowledge of the disposition of the ulcer by the previous history of the case, and the effects of different medicines that have been used : but where there is no such history to be obtained, and the appearance leaves us in doubt, I think it prudent always at first to take up the treatment under the idea that the

ulcer is irritable ; as it is an error, where we are wrong, of the least consequence, and where right, we have a considerable advantage, in having gained exactly the whole time of the experiment.

When an ulcer takes place immediately over the projecting part of the fibula, which forms the outer ankle, it commonly puts on the appearance of an irritable ulcer. This seems to arise from the nature of that part of the limb on which it is situated, independently of any constitutional or local disposition for irritability. It is probable that the periosteum, which at this part lies immediately under the skin, becomes the seat of the ulcer, which renders it very difficult to heal, and gives it this particular appearance. I was led for some years to suspect that, in all such instances, the bone was injured, from having found that to be the case in several very tedious ulcers in this part ; but I have since seen many recover, although very slowly,

without the bone being exposed: and therefore conclude, that the difficulty attending the cure, which is almost always found, does not necessarily depend upon the state of the bone.

I am further strengthened in this opinion by having seen, on several occasions, ulcers situated upon the ligament of the patella, and on the periosteum of the anterior surface of the tibia with a similar appearance, and equally tedious in the cure.

The great object to be kept in view with regard to the management of ulcers, is that of ascertaining with accuracy their true nature. Too much attention cannot be paid to this investigation. When it is completed, if the ulcer is ascertained to be of the irritable species, little difficulty will remain. All that is wanted will be to find out what particular sedative application may be best suited to the case under our care, and the form in which it can be used to the greatest advantage.

The variety which occurs among constitutions has been already noticed, and we find that its influence produces a similar variety in the dispositions of ulcers. It will therefore be necessary to have a number of different medicines, which may be used in different forms, and of different degrees of strength, so as to adapt them to the peculiarities of particular cases, even of the same species of ulcer. It is this circumstance which gives the surgeon who has the most extensive knowledge of the effects of different external applications, a material advantage; since having greater resources within himself, he will be able to vary his medicines, and will ultimately succeed, where another, whose practice had been limited to a few applications, would have failed of success. The young surgeon should therefore spare no pains in storing his mind with as extensive a stock as possible of this kind of knowledge.

There is a very curious fact respecting the treatment of ulcers, which makes this extensive experience of the medicines which are applicable to them, still more necessary : it is, that very few cases will continue to heal, more than for a certain time, under the same treatment ; the effect which any one application produced at first, being lost by habit, so that it becomes necessary to change it for some other. This change of treatment, after a certain continuance, is so necessary, that even where the transition is made from a medicine with considerable powers, to one which, had it been originally applied, would have had little or no effect, it will be productive of an evident advantage. This, however, will be of short continuance ; but if the change is made to a medicine of equal, or nearly equal powers, the benefit will be more permanent.

This fact corresponds with what is

stated to happen in the practice of medicine, in many diseases of the system, both with respect to internal medicines, and external circumstances. A change of air is often found to be necessary, not from a worse to a better, but because the patient has continued too long in the same air, so that it is simply a change that is wanted; and benefit would be derived from it, even if it were made from a purer air to one of less salubrious qualities.

*Applications considered with reference to
this Species of Ulcer.*

I shall now state the different applications suited to this species of ulcer: leaving it to the judgment of the practitioner to select such as may be adapted to the peculiarities of the cases which are entrusted to his care.

1. In form of vapour.

Medicines in this form are more immediately applicable to irritable ulcers,

than to any others, since warmth very generally allays irritation, and soothes the sensations of the patient.

The vapour of common water, from its degree of heat, is very soothing to many ulcers in an irritable state ; it is, however, very seldom used by itself, but united with other substances which either have, or are supposed to have, some sedative quality.

The vapour of spirits mixed with that of water, adds to its powers of allaying irritation.

Opium is used with advantage, as a fomentation in different forms : such as the tincture of opium sprinkled on flannels wrung out of hot water ; the extract of opium dissolved in hot water ; or a decoction of poppy-heads, heated and applied by means of flannels.

Chamomile flowers infused in hot water ; the tops of wormwood boiled so as to form a decoction ; and the fresh or

dried leaves of hemlock boiled into strong decoctions, are also used as fomentations. The extract of hemlock, and extract of opium dissolved in hot water, make a very useful liquor for fomenting, where there is much irritability.

The great disadvantage attending the use of fomentations is the short time they can be conveniently applied at any one time; but their beneficial effects in many instances remain for hours after they have been used.

There are cases of irritable ulcers which are rendered more painful by the application of any thing warm. In such ulcers there is generally a discoloration upon the limb, of a mottled, purplish appearance, for some way from the ulcer; the lower part of the leg is also unusually cold. When that is the case, fomentations ought not to be used. I believe it will be found, in those instances, that there is a tendency to mortification, the parts be-

ing extremely weak, as well as irritable, and scarcely able to support themselves in their present state, so that the action excited by the warmth, hurries on the ulceration of the weakest parts, or produces mortification, both of which processes are attended with pain.

2. In a moist state.

The most simple application in this form is the common poultice, which may be made with bread and water, with a little sweet oil, or hogs' lard, or bread and milk. Water is often preferred, as the milk very soon becomes offensive to the smell. There does, however, as far as the evidence of patients can be relied on, appear to be some soothing property in milk, since the parts are easier in many instances under a poultice of that kind, than one made either with water or decoction of poppies. Linseed meal has some advantages over bread in forming a poultice; it does not require oil, which

is found often to disagree with an ulcer, it has a degree of tenacity, and can therefore be kept more immediately on the part, and it is more readily removed. It is also sooner made, all that is necessary being the pouring boiling water on the meal, after which the poultice is immediately fit for application.

The extract of lead dissolved in water has been much recommended as an application in form of poultice; and in many cases it answers very well; but in a great variety of instances it does not agree with the parts; and when long applied, it has been known to bring on the lead cholic. It should therefore be used with caution.

Decoction of poppy-heads makes a very useful poultice; but this also disagrees in some instances, but less frequently with irritable ulcers, than the preparations of lead.

Carrots grated, and beaten into a pulp form a substance which in its consistence

makes a very good poultice, and, from the properties of the carrot, is well adapted to irritable ulcers ; many of them healing more readily under its use than by any other mode of treatment. It is curious to observe what slight circumstances make a material difference in the effects of a medicine upon an ulcer. In a particular instance of an irritable ulcer, which had been under the care of several different surgeons, and to which a variety of applications had been made, every thing that I tried disagreed with it, except the carrot poultice ; even this, however, did not give it the least disposition to heal. Another person was consulted, who proposed that the carrots should be boiled and beaten into a pulp, before they were applied, and the ulcer was healed by a continuance of that application.

As the greatest objection to poultices, in most cases of this kind, is their weight, it becomes an object of attention, where-

ever it can be done, to let the limb rest upon the poultice, and not the poultice upon the limb ; when this cannot be managed, and the weight of its application gives pain and uneasiness, so as more than to counterbalance its beneficial effects, it will be better to change it for some lighter application.

Where poultices agree, it is a matter of some consequence to determine how long their use should be continued. This will depend principally on the appearance of the granulations ; if they are small, and the ulcer is rapidly diminishing in size, no change should be made till the cure is completed ; but if the granulations are become large and looser in texture, I should be inclined to leave off the poultice, even where the ulcer was evidently contracting.

It is proper to mention that many irritable ulcers will begin to heal before they put on a healthy appearance ; and after they have skinned over to a considerable

extent, the remaining ulcer shall still have a foul appearance; while this is the case, the poultice should, I believe, always be continued.

Where poultices cannot be used, in consequence of their weight being more than the parts can bear, one of the following solutions may be applied upon lint: decoction of poppies; tincture of opium; decoction of cicuta; aqua lithargyri acetati composita; solution of argentum nitratum, in a diluted state. The best mode of using these medicines would probably be keeping the parts constantly moist, by renewing the application as often as it became dry; but as this would be attended with a great deal of trouble, it cannot be pursued as a general practice; and a pledget of white ointment over the dressing, prevents the lint from drying and sticking to the surface of the ulcer.

3. In a dry form.
For ulcers of this species there are few medicines in form of powder that are

sufficiently mild in their properties to admit of being employed,

The carbon has been lately introduced into practice, and by some practitioners highly extolled. From what experience I have had of it, I think it an useful medicine, in many cases of irritable ulcers; having found it to agree where other more common applications have failed. It has this disadvantage, that its colour prevents the surface of the ulcer from being distinctly seen at each dressing; and any attempt to wipe it clean gives pain, and irritates the granulations.

The extract of opium, in the form of powder, mixed with the carbon, in equal proportions, or with any other powder, as the linseed flour, is an useful application. It is a circumstance deserving of observation, that in some cases the opium is absorbed in sufficient quantity to affect the system, and produce sleepiness. When this happens, it is difficult to determine whether the benefit arises from the imme-

diate action produced on the ulcer, or the effect the opium has upon the system.

Opium, externally applied, sometimes gives pain, and when that happens, it generally aggravates the other symptoms.

4. In an unctuous form.

This form of application is not well adapted to the generality of irritable ulcers, for the following reasons. The oil or lard, which composes a part of the preparation, is generally rendered more or less rancid, as I have already noticed, by the process of forming the ointment, which is commonly by means of heat. It also happens that the skin of persons whose habits are irritable, and who are therefore most liable to ulcers of an irritable nature, frequently will not bear the application of common ointment. Under such circumstances very few unctuous dressings can be used.

In some cases of irritable ulcers cream, where it can be procured, is often a very

soothing application; the cases in which it answers best are where the parts cannot bear warmth, the pain being increased by it; there is a coldness in the cream, which in such instances considerably mitigates the painful sensations.

As a substitute for cream the following ointment is used with advantage: hogs' lard purified by frequently washing it in spring water, and then made into an ointment, with a small portion of white wax and rose water.

The unguentum cerussæ acetatæ agrees in some particular cases, but in many others it appears to do harm; the same caution is therefore necessary here as when the solutions of lead are employed.

These are the only ointments that I can venture to recommend in ulcers which belong to this class.

5. Bandages.

In this species of ulcer no benefit will be derived from compression. The surface

of the ulcer is, in general, unable to bear any pressure without being rendered more painful, and whatever gives pain proves, in these cases, injurious. The bandage employed should only be sufficiently tight to retain the dressings in their place; nor should it even be more so, upon the other parts of the leg.

In this species of ulcer it is very difficult to give any particular directions respecting those medicines that are to be tried in preference to others.

Poultices are the safest to begin with, and when it shall be thought right to change the application, the surgeon will have acquired a degree of knowledge of the disposition of the ulcer, and the peculiarities of the constitution, which will guide him in his future choice.

If the degree of irritability be very great, he will adopt those medicines which are the mildest in their nature, softest in

their form, and can be used with the least pressure arising from their weight. Among these cream, or the ointment substituted for it, are probably the best applications.

If the irritability is not great, but the parts little disposed to heal, the weak solutions of the *argentum nitratum* is one of the best medicines.

CHAPTER V.

OF ULCERS ATTENDED WITH INDOLENCE.

THE appearance of ulcers attended with indolence is the very reverse of that which was described in those of the irritable kind. The edges of the surrounding skin are thick, prominent, smooth, and rounded. The granulations are smooth and glossy on the surface. The pus is imperfectly formed ; it consists of pus and coagulating lymph mixed. The lymph is made up of flakes, and is with difficulty separated from the surface of the granulations ; so that when the ulcer is wiped clean, the coagulating lymph adheres in several places, giving a white appearance to these parts of the ulcer. The bottom of the ulcer is commonly

all of the same level, or nearly so. The general aspect gives the idea of a portion of the skin and parts underneath having been for some time removed, and the exposed surface not having commenced any new action to fill up the cavity.

These appearances are only met with in the truly indolent ulcers, in which the symptoms are the most strongly marked: in others of this species the appearances so much resemble those of irritable ulcers, as only to be distinguished from them by the circumstance of mild and soothing applications being either of no service, or even aggravating the symptoms, which is frequently the case.

It may on the first view appear strange that the irritable and indolent ulcers, which are so very opposite in their nature, should ever have the slightest resemblance; but when it is considered that ulcers change their appearances very readily, according to variations in the

state of the constitution, or any accidental circumstance which may have affected the parts, it will be readily comprehended. An indolent ulcer, after any violent exertion of the limb, will have more or less of an irritable look. If the patient is exposed to cold, and kept without wholesome food, similar changes will be produced. Under any temporary constitutional indisposition the ulcer will spread, and be for a time in an irritable state.

It is this species of ulcer which deprives the army of the service of so many men, and which has, with too much truth, been considered as the opprobrium of surgery. In the army, when ulcers from common accidents are not attended to, the patients continue to do their duty in the regiment, use violent exercise, and are guilty of every kind of irregularity: under these circumstances, the ulcers soon degenerate into the indolent kind,

and when arrived at this state they are considered as incurable.

Many of these ulcers heal in a very short time after the men are discharged; and the patients are afterwards met with in newly raised corps, in which they had re-enlisted. This is a fact within every military man's knowledge, and is a sufficient proof that the ulcers for which soldiers are invalided are by no means all of them incurable; nor are the men rendered unfit to do the duties of soldiers. If some of them are cured after having arrived at the worst state, and after having remained (which they must have done) for some time in that condition, what might not have been effected had they been earlier put upon the right mode of treatment?

To this species also belong the greater number of those ulcers that are received into the London hospitals, more especially in men; many of which are cured

although they have perhaps continued for several years.

Length of continuance alone appears sufficient to give an indolent disposition to an ulcer. It is therefore immaterial whether in its origin it was healthy, only attended with weakness, or even irritable; if not cured within a certain time, it becomes indolent. This is not, however, always true with regard to the irritable kind, many of which remain so, whatever length of time the complaint may have continued.

An indolent ulcer may be imagined, from its name, and the general length of its continuance, to remain nearly stationary, making little or no progress towards a cure; but this is not the case, so great a degree of indolence being rarely met with. Such an ulcer is generally forming granulations, but they are unable to support themselves beyond a very short period; it appears, therefore, to proceed

towards amendment, although very slowly, so long as the granulations stand their ground; and then, all at once, when they are absorbed, the ulcer spreads nearly to its original size, twenty-four hours undoing all that had been formed in so many days, or even weeks. This is a change which takes place so constantly, and under such different circumstances, that it cannot be attributed to any external cause, but must be supposed to arise from the granulations which are formed in that indolent state of parts, being unfit to answer the purpose for which they were intended, and therefore giving way. It is, however, brought on and increased by occasional causes;—as changes in the weather, anxiety of mind, or too great fatigue.

It is a curious fact that there should be the same want of powers in the granulations formed in indolent ulcers, as in those attended with weakness: although the circumstances seem to be so very different;

in both, the granulations are unhealthy ; in the one, indeed, they are luxuriant, while in the other they are deficient. Every deviation from the healthy action, whether it be too great action in weakened parts, or too little action in indolent parts, equally renders them incapable of forming granulations strong enough to support themselves under the necessary actions of the parts to which they belong. Those formed in the indolent ulcer are much weaker in their living powers than the others ; for they are absorbed without any evident cause, their powers of life being exhausted, and no longer able to support them.

That in the present species of ulcer, this unhealthiness in the granulations is the effect of indolence is rendered highly probable ; since in some instances it exists in a greater degree when the patient is perfectly quiet, and lies in an horizontal position, than when he is more actively

employed ; the common motions of the limb rousing up the actions of the parts, and making them approach more nearly to those of health. A bandage moderately tight, as it gives a support to the muscles, and by compressing the superficial veins, renders the circulation of the blood in them less languid, seems also materially to assist the cure ; and admits of the limb being used, without so readily feeling uneasiness from fatigue.

Many cases have occurred which by this mode of treatment were cured, after others of a milder kind had failed. So successful has this practice been, that we may even find it recommended in all cases of old ulcers.

This probably carries the system too far ; there is, however, sufficient evidence to prove that rest is less necessary in cases of indolent ulcers, than in many others. The good effects of this plan may partly arise from counteracting those of

confinement and a sedentary life, which are, to some constitutions, so extremely hurtful, as to prevent an ulcer from healing while the patient continues under these circumstances. This is very often found to be the case in hospitals, particularly with patients who have lived much in the country, and whose employment has been in the fields; as gardeners, and husbandmen. Soldiers are taken from very various modes of life, but many of them must be of this description.

In indolent ulcers it must appear from what has been said, that there is a backwardness in forming granulations; and, in those granulations that are formed, a want of sufficient health or strength to form a complete cure. The first of these effects of indolence is the only one which has been generally attended to in practice; the surgeon being satisfied if he could in any way heal up the ulcer. This is a very imperfect mode, since we

find that when it is healed by only increasing the growth of the granulations, without altering their disposition, the parts will very soon give way again.

The object of our treatment should be not simply to produce a cure, but to render that cure as permanent as possible. This is only to be done by changing the disposition of the granulations, and rendering them strong enough to stand their ground, after the ulcer is completely filled up. It is in this view that I shall now consider the modes of treatment.

That the granulations which are formed in ulcers of this species differ very much, in respect to their health and strength, according to the applications which are used during their growth, I think is sufficiently evinced from daily experience. It may, however, be very readily demonstrated by the following easy experiment. Let an ulcer of six months standing, which has acquired an

indolent disposition, have a poultice of bread and milk applied to it for a week ; and at the end of that period examine the granulations ; they will commonly have in part filled up the ulcer, but they will also commonly be large, loose, and glossy in their appearance. If the poultice is now left off, and some stimulating medicine, which agrees with the ulcer, is used for another week, the granulations, when again examined, will in general be found to have undergone a considerable change, appearing smaller, more compact, redder, and without gloss. Where this is the case, it is natural to suppose that the ulcer healed under the last mentioned application will be less liable to break out than under the former ; the materials by which it is filled up being of a more healthy kind. The truth of this opinion is not confined to reasoning, but is confirmed by experience. My own observations upon this subject may pos-

sibly be thought less impartial than those made by any other person ; I therefore prefer giving the results which a gentleman, who had extensive opportunities of seeing ulcers treated in these different ways, was led to draw from the facts that came within his notice. He stated at a medium, that the number of ulcers healed under the use of stimulating medicines, which did not break out again in a short time after getting well, compared with similar cases under a milder treatment, were as four to one; and his remarks were communicated to me, some time after they were made, by a gentleman who consulted me as a patient. After having stated these observations made by another surgeon, I must add, that my experience leads to similar conclusions.

Having so decidedly given a preference to the use of stimulating medicines in those varieties of indolent ulcers which

admit of being healed by different modes of treatment, it will be unnecessary to add, that there is a very small proportion of them that come under that description; the greater number not being sufficiently within the influence of mild dressings to admit even of a temporary cure.

I shall now enumerate the medicines which I have found best adapted to promote the cure of indolent ulcers, under the different circumstances in which they occur in practice.

*Of Applications considered with reference
to this species of Ulcer.*

1. In the form of vapour.

Medicines in this form are very commonly employed in cases of indolent ulcers; but from the observations which have now been made, it must appear that they are not such as can promote the cure with advantage, nor should they ever be applied with that view. Recourse is

only to be had to them when the ulcer, in consequence of some accidental cause, has put on a foul appearance, and may be said to be in a state of temporary irritation. As this is unconnected with the original disposition of the ulcer, and it is more properly during that period an irritable ulcer than an indolent one, it is to be treated as such till the parts return to their indolent state.

I have found that soldiers who have had ulcers of some standing, that were in an indolent state, could bear the usual daily exercise, while in fixed situations, without being made worse by it; but if the men at any time have been obliged to march for several days together, or have been employed on any duty of fatigue, the ulcers have put on a very irritable appearance, so as to give the idea of being irritable ulcers of the worst kind. It is therefore necessary, in forming an opinion upon such cases, to inquire into

the conduct of the men for some days previous to the examination.

The patients who are received into our London hospitals, from having used too much exercise, and from excesses of different kinds, have in general their ulcers in this irritated state, requiring the use of fomentations and poultices for some time, before the treatment necessary for the cure of the ulcer can be adopted.

The fomentations in use are the decoctions of different herbs, which are supposed, from their properties, to cleanse the ulcer, and give it a better appearance; and it is highly probable that they deserve this character; but the warmth which is conveyed to the ulcer is, I believe, the most material circumstance in the application. The decoctions of chamomile, southernwood, wormwood, and of laurel leaves, are considered as best adapted to this state of such ulcers. When the ulcer is spreading, and very

painful, decoction of poppies alone, or mixed with equal proportion of proof spirits, is often of service. The fomentations are commonly applied by means of flannels, for about ten minutes or a quarter of an hour each time the poultice is changed, which is generally twice in the twenty-four hours.

2. In a watery form, or in a moist state.

Poultices are used with the same view as the fomentations, and they may be considered as different parts of the same mode of treatment. The fomentations are the occasional, the poultice the continued application. Poultices for this purpose are made of the same liquors as are used for fomentations; but, for the substance of the poultice I should recommend oatmeal to be used, instead of bread.

As both the fomentations and poultices are only intended to bring the ulcer into

a proper state to admit of being cured; they are rather preparatory steps than any part of the regular treatment of such ulcers. In their common state there is no occasion to have recourse to these applications.

In the treatment of indolent ulcers it is very natural to suppose that all medicines, whether stimulating or otherwise, will have a material advantage when used in a watery form, since they will mix with the matter, be more intimately applied to the surface of the ulcer, and remain in contact with it for a longer time; this is, however, only true with respect to the milder applications; for to those that are very stimulating, no such continuance of contact is necessary, and were it accomplished, would probably prove hurtful, since the stimulating effects might exceed what the parts can bear.

As ulcers of this species require stimu-

lating medicines, there is therefore no reason for preferring watery to unctuous applications, further than as they may happen to agree better with particular cases.

When stimulating applications are used to indolent ulcers, it is always to be understood that the medicine is only intended to stimulate the parts to action ; but the actions are to be performed by the parts themselves, which, when once stimulated, will proceed to act in consequence of that stimulus, for a considerable time after the immediate effect of the local application has ceased. The stimulating medicine is therefore only to be repeated as often as is found necessary, to prevent the parts from falling back into their indolent state.

It is in this way only that the effects of stimulating medicines can be explained ; such as that of a single drop of tincture of opium dropped, once in twenty-four hours,

upon the cornea and tunica conjunctiva of the eye, which will remove an inflammation of the eye, when the tincture is scarcely allowed to remain more than a second of time in contact with the parts; as the tears immediately wash it off.

The application of sea water to a swelled hand for ten minutes, once in twenty-four hours, will frequently excite the actions of the absorbents, which will then probably continue to act, so that the swelling in a few days will be completely removed.

In these instances the exact time the medicine is applied can be determined with precision, and is very short; and were it longer it would, by being too violent, do harm. In other instances stimulating medicines act upon the same principle, and are in general not much longer in immediate contact with the surface of the ulcer.

There are indolent ulcers which occur

in patients of debilitated constitutions, that put on a sphacelated appearance, (even after they have made some progress towards a cure) without any apparent cause, and in this way spread to a very large size. This unpleasant change must be the consequence of weakness in the newly formed parts, and some indisposition of the general system. The varieties of this kind that will be necessarily met with in different patients must be very great; and among them there will be some which, were they classed according to their appearances, would be generally allowed to belong to the species of irritable ulcers: but as they do not recover under soothing applications, we cannot, according to the principles we have laid down, separate them from the species of indolent ulcers, of which they appear to be an uncommon variety. They occur in seamen, and land troops which have been long at sea, and when met with in

that class of men have been called scorbutic ulcers. They are not, however, in any way, necessarily connected with the sea scurvy, being but too frequently met with on shore, in patients who have never been affected by that disease.

I have seen them in the West Indies, in soldiers who had lost their health from the effects of climate; they are not uncommonly met with in the London hospitals, in men whose general health has been impaired by spirituous liquors; and I therefore consider them as not belonging to any specific disease, but as common to men whose constitutions are greatly debilitated, whether by salt provisions, the effect of warm climates, or the use of ardent spirits.

In such ulcers a new mode of treatment has been very strongly recommended by Dr. Harris, Physician to the Navy; who found that the gastric juice of ruminating animals, used as an external application,

made the ulcer, when in a sphacelated state, throw off the sloughs, and put on a milder appearance ; and by a continuance of the same medicine the cure was completed. This he afterwards tried in many instances, and was in general successful.

I was naturally led, from so favourable an account, to make use of the gastric juice in ulcers of this description. It gave a good deal of pain on each application, which lasted for nearly half an hour ; but the ulcer in two days put on a better appearance, and all the sloughs were thrown off. From the pain it occasioned, I am led to consider it as a stimulating application.

In one case of a patient in St. George's hospital, the gastric juice brought an ulcer of this kind into a favourable state, after which it appeared to be stationary ; but whenever the gastric juice was changed for any other dressing, the ulcer spread ; and when it was again used resumed its

favourable appearance: this happened three different times, the gastric juice must therefore, in this particular instance, appear to have been the only dressing that agreed with it.

The gastric juice, as procured from bullocks or sheep, must certainly be in a very diluted state; as the liquor found in the true or last stomach, which is the only one that contains it, is in the quantity of two or three pints in the ox, and two or three ounces in the sheep. This practice appears particularly adapted to these ulcers when they occur in seamen; and Dr. Harris considers it as equally successful in the truly scorbutic ulcer. Of this, however, I have had no opportunity of making trials. If this be really the case, it is fortunate that seamen are usually placed for cure in situations where the gastric juice can be very easily procured; as the animals killed for victualling the navy, in the vicinity of the naval hospitals, afford an ample supply for daily use.

In the West Indies, where too many cases occur among the soldiers, bearing a resemblance to those relieved by the application of the gastric juice, the fresh root of the cassada grated into a pulp is employed with evident advantage.* This juice is a poison taken into the stomach, it must therefore be considered as a stimulating application. In this state of ulcer, lime juice has also been used with great advantage. Solutions of vitriol and alum have been recommended; but I cannot speak, from my own experience, at all in their favour.

When an indolent ulcer has none of the peculiarities which have been mentioned, the stimulating applications in a watery form that appear the best adapted for promoting a cure, are the following.

The solution of argenti nitratum, or lunar caustic, is a very useful medicine as a local application, and one of

* The cassada is the *Satropba Manihot* of Linnæus.

the best in general use. It stimulates the granulations, and makes them put on a more healthy appearance, it agrees with indolent ulcers in a greater number of patients than many other medicines. It has a material advantage in being capable of having its strength increased to any degree that can be required, so as always to adapt it to the actual state of the ulcer. This is the more necessary, since indolent ulcers, when they have been accustomed to any application, which they are, in general, very soon, they no longer receive much benefit from its use.

It is a curious circumstance, that an ulcer which at first is unable to bear this solution of more than a certain strength, without pain, and without the granulations themselves being absorbed, will usually, from the continuance of the same application for ten days or a fortnight only, be able to bear it of a double strength, with-

out either of these effects being produced ; and that this increased strength will now be necessary to give the same degree of stimulus, which had before been produced by the weaker solution. This may be considered as a proof that the granulations are become much stronger than they were before.

Tincture of myrrh, either pure or diluted, whichever is found best adapted to the state of the ulcer, is, in many instances, a good application ; it rouses up the actions of the parts, and gives the granulations a better appearance. But, where the ulcer is very indolent, it soon loses its effects, as I have already mentioned to be the case with many other medicines.

The good effects of the tincture of myrrh have been sufficiently established by general practice, to give it a place among the medicines in use for indolent ulcers on the legs ; but as the opinions of

practitioners may differ respecting the extent of its powers, I shall mention the following proof, taken from a wound of a different kind, as it appears to be a strong evidence in its favour.

A gentleman was cut for the stone, and the wound, some time after the operation, became sloughy; it was so indolent as not to throw off the sloughs, and from the urine passing over it, the edge of the divided skin was covered with a crust of calculous matter, so that there was not the smallest disposition to heal. Several medicines were externally applied, to alter the state of the wound, without effect; but tincture of myrrh not only answered that purpose, but under its use the parts were entirely healed.

The tincture of myrrh having considerable powers as an external application, I have been induced, in a variety of instances, to give it internally, at the same time that it was externally applied, with

a view to ascertain its local effects through the medium of the constitution ; but cannot say that I have ever seen any benefit produced in this way.

Decoction of the walnut-tree leaves, and of the soft covering of the walnut have been strongly recommended by a surgeon of eminence in Vienna, who states that its powers in disposing foul ulcers to heal are beyond those of many other medicines.* I have used it in a number of cases of indolent ulcers, and can, from experience, give evidence in its favour.

The diluted vitriolic acid has been employed in particular cases, and has been recommended as a medicine proper for such ulcers ; it has not, however, been sufficiently successful to bring it into general

* *Dissertatio de utilitate decocti corticum nucum Juglandium siccatorum in tractandis ulceribus*, Authore D. Joanni Hunezowsky. *Acta Academ. Medic. Chirurg. Vindoboniensis*. Tom. prim. 1788.

use. From my own knowledge I am unable to speak of it, never having seen it used, but have lately heard it well spoken of by an army surgeon, for whose opinion I have a high respect.

The expressed juice of the pod of different species of pepper, in a recent state, has been used as an ingredient in the applications to ulcers of an indolent kind, both in the East and West Indies. What the real powers of the peppers are, when externally applied in this way, I have had no opportunities of ascertaining, nor can it be procured in this country for trials to be made with it.

The peppers, given internally, have a power of disposing indolent ulcers to heal, by exciting a degree of action in the parts beyond what is natural to them. It is in this way that Ward's paste disposes slight cases of fistulæ in ano to heal; and makes the wound, after the operation, put on a more healthy appear-

ance. The peppers have been known to make a fistula in perinæo close up. This practice may very reasonably be extended to indolent ulcers on the legs; but I have not yet had any experience of its internal use in such cases, and therefore mention it only as deserving of trial.

After having mentioned the medicines in common use to indolent ulcers, I shall add one which has not, I believe, been hitherto laid before the public.

The nitrous acid, diluted to such a degree as will fit it for an external application, I have found, by experience, to be a very useful medicine. The proportions must be varied according to circumstances; but a scruple to eight ounces of water will in general answer. The best mode of ascertaining the proper degree of strength for this solution is by applying it to the tongue, and when it stimulates without being acrid, it is of a proper strength to begin with.

In bringing forward any new medicine it is not sufficient to mention its effects; it is also proper to state the reasons that led to its adoption, so that the grounds upon which it was taken up may be fairly understood.

In considering the different applications to indolent ulcers which are in common use, I was a good deal pleased at remarking that three of them, on which my experience had led me to place the greatest dependance, had the nitrous acid as one of their component parts; the other part being either mercury or silver. This is the case with the unguentum hydrargyrum nitratum, the argentum nitratum, and the hydrargyrum nitratum rubrum. This circumstance caught my attention, and induced me to believe that as these three chemical preparations are applied in a very diluted form, they must be in part decomposed, and in the argentum nitratum some of the metal separated in form of a

powder, before the application is actually made to the ulcer. If this is the case, the detached acid will mix with the water, so that the efficient part of this medicine, locally employed, must be the nitrous acid.

Upon these grounds I was led to try the effects of that acid on ulcers of different kinds. With those that were irritable it evidently disagreed. In those that were attended with weakness, in some instances, and in a very diluted state, it produced an amendment; in others, it retarded their progress. But in many of the indolent ulcers it promoted, in a very uncommon manner, the progress of the cure.

The apparent effect of the nitrous acid as an external application, is different from that of most other medicines of a stimulating nature; it diminishes the quantity of matter or pus, and instead of giving a healthy, florid appearance to the surface of the ulcer, there is a soft ash-coloured coagulated mucus, which partially covers the granulations: near the

circumference this mucus is more compact and harder; it there forms a complete crust, and firmly adheres to the surface. If the bottom of the ulcer is nearly on the same plane, the greater part of it has this mucus spread over it, with small interstices, through which the granulations are seen. If the ulcer is hollow in the middle, and gradually rises at the edges, the crust is met with on the circumference, while the mucous appearance is seen near the edges, and in the centre is common pus, till it has attained the level of the other parts. There is a succession of these crusts formed upon the margin of the ulcer, one under the other; these crusts bear a greater resemblance to laminæ of common cuticle than any thing else that I recollect; the parts underneath evidently rising higher and higher, till they come nearly to the level of the common skin. When that is the case, the crusts are longer in sepa-

rating by four or five days, and on their removal a very perfect cuticle appears underneath; much more so than is usually met with in an ulcer cicatrized by means of other dressings.

The diluted nitrous acid gives a good deal of pain on its first application, this lasts for about half an hour, and then goes off; the pain is afterwards less severe.

In one case of a very indolent ulcer the nitrous acid was applied, in the proportion of two drams to ten ounces of water; it gave little pain, and the parts began to put on a more healthy appearance; but after having done so, their sensibility was so much increased, that a solution one third of the former strength gave pain, and was rather stronger than the parts could now bear.

The progress in the healing of an ulcer to which the diluted nitrous acid is applied, differs so much from what we commonly

meet with, the process of skinning is so much more rapid, and the new skin so much more completely formed, that it was natural to suppose that the medicine produces some very considerable change in the granulations, by which these things are effected. Any change of this kind I have been unable to ascertain; the only visible effect is the coagulation of the pus as it is secreted, which coagulum forms an external application to the granulations, and puts them in circumstances more favourable for filling up parts, and forming new skin. This coagulated matter is thrown off by the pus next secreted, which is also coagulated in the same way, forming another lamina immediately in contact with the granulations. The manner in which the granulations increase, is hidden by this covering, but from their rising higher and higher, it is evident that the parts are very active in forming them.

Pus coagulated by the diluted nitrous acid forms a nidus for the granulations, which appears from the instances in which it has been tried a better application to them than the pus itself, or many other medicines of a different kind. In a few weeks an ulcer of many years standing has skinned over, to the extent of several square inches; and the new skin, a few days after being formed, has very nearly resembled that of the surrounding parts. The skin, in various instances, has formed before the ulcer had been filled up completely, so that the margin of the new skin was a good deal lower than the surrounding old skin; but some weeks after being skinned over, this difference of level gradually disappeared.

If the solution is too strong, it forms a strong crust over the whole surface of the ulcer, giving it the appearance of being covered by a piece of dry parchment. This should be avoided, as the dried

crust remains for several days, after which it is separated, and the progress of the cure is impeded while that process is taking place; so that by such treatment an ulcer might be kept nearly stationary for months. If this medicine is injudiciously applied, it will be found to produce that effect.

A certain degree of indolence in the ulcer seems necessary, to admit this process to go on; for in some cases the nitrous acid irritates, and makes the ulcer spread; and even in ulcers with which it agrees, and which heal very fast under its use, if a state of irritation is brought on, it is necessary to leave it off, as the ulcer will then spread by a continuance of the application.

In stating that the only visible effect of the nitrous acid is that of coagulating the pus, I by no means infer that no other effect is actually produced. On the contrary, I am disposed to believe

that it acts upon the granulations as a stimulating medicine, too violent for several species of ulcers, but adapted peculiarly to such as are indolent, and that the coagulation of the pus is a chemical effect which answers a secondary but a very salutary purpose.

I have allowed several patients with ulcers, which had the nitrous acid applied to them, to walk about and use exercise while under that treatment, and have not found the progress of the cure retarded, although no bandage that could in any way support the limb, was applied to it. This, which I believe will be found to be generally true, is a circumstance very strongly in favour of this application.

The effect of nitrous vapour, in destroying the offensive smell generated in confined apartments, containing a number of sick people, and its power of preventing contagion from spreading, are

very valuable discoveries, made by my friend Dr. Carmichael Smyth; and I have a satisfaction in being thus able to state, that in a fluid form also, the nitrous acid is a medicine, which is applicable to many cases of surgery, in which it has not hitherto been usually employed.

3. In form of powder.

The only medicine which seems to be adapted to this species of ulcer, in form of powder, is the hydrargyrum nitratum rubrum, all the others being either too mild, or more conveniently used in an unctuous form. From the violence of its action, it is fitted for ulcers of the most indolent kind; but even to them, it should only be occasionally applied, unless it is rendered less active, by being intimately mixed in different proportions with some inert powder.

4. In an unctuous form.

Unctuous applications appear to be better adapted to this species of ulcer,

than to any other, and they have some advantages over medicines in different forms, since the necessary action is no sooner produced, and the pus, in consequence of it, secreted, than the stimulating application itself is removed by the pus from the surface of the ulcer; and it afterwards serves as an external covering, by which the pus is confined in immediate contact with the granulations, till the next dressing. The oil becoming rancid, which is so material an objection to this form of medicine in other species of ulcer, is of no consequence in this; as the medicines combined with it are always more stimulating in their nature than the oil, even in its rancid state.

In the treatment of ulcers, a great stress has been laid upon the bad effects of exposing the surface to the external air, as if atmospherical air contained something that irritated and excited inflammation. In the investigation of this

opinion, sufficient proofs have been established, that air has no such property; since when the abdomen of an animal is filled with it, no inflammation takes place. If the cellular membrane of the body is loaded with it, these parts do not afterwards inflame. Nor do ulcers in the throat, that must be constantly exposed to the air, heal less kindly than those in other parts of a similar structure.

It does not appear that the exposure to air is in itself peculiarly hurtful; but, from every observation I have been able to make, an ulcer does not heal so kindly if the parts are disturbed during that process, which they must be when much exposed. The natural, easy state, is that of having the granulations covered by their own matter; which is only to be removed occasionally, when means are used to stimulate the granulations, to secrete such pus as is best fitted to cover the granulations during their increase.

According to this statement, frequent dressings, to indolent ulcers, are not only unnecessary, but when the medicines are stimulating, will do harm. To apply a dressing once in twenty-four hours is commonly sufficient ; nor should it be done more frequently, except when the quantity of pus is too great, which, in this species of ulcer, seldom happens.

The unguentum hydrargyri nitrati mixed with the adeps suilla, in different proportions, according to the state of the ulcer, is one of the best applications to this species of ulcer, in an unctuous form, with which I am acquainted. The most common proportion is one part of the ointment to three of the lard. It is, however, almost always necessary, after using it for some time to the same ulcer, to increase its strength.

There is, very commonly, to indolent ulcers, a thickened edge, like a welt, all round; and the skin to some distance from

this edge is of a darkish red colour, arising from an imperfect or languid inflammation, extending along the skin of the neighbouring parts. Such appearances are very readily removed by the unguentum hydrargyri nitrati and the surface of the ulcer, which too often has an ill formed pus, mixed with blood and coagulating lymph laid over it, under this treatment will form healthy granulations.

I have compared the effects of this medicine, with those of many others that are used in the form of ointment, and think it has more influence over granulations, in making them become small and healthy, than any of the rest ; and, what I consider as a natural consequence of such a property, the ulcer healed by it is less liable to break out again. It has a material advantage also, in admitting of being made gradually stronger, so that the same degree of stimulating effect can be kept up by increasing its strength, as

the ulcer from habit becomes less affected by it.

These are its beneficial effects where it agrees; but there are ulcers of the same kind in particular patients, in which it does not answer at all, and must therefore be discontinued as soon as that can be ascertained.

The unguentum resinæ flavæ, and the unguentum elemi, are in very general use for ulcers of this species; they have sometimes the balsam of turpentine, or the balsam copaibæ added to them, and they are frequently applied hot to increase their stimulating effects, and adapt them to particular cases. These are very useful applications, and their effects are too well known to require that I should dwell upon them in this place.

My own observations lead me to remark, that in general the resins and turpentine do not seem to have equal powers with the acids and metallic salts, in giving

to the granulations a healthy appearance ; nor do they, I believe, give them the same disposition to stand their ground when formed.

This observation may not have been made by other surgeons, in the same way that I have now stated it, but the effect must have been noticed by those who have published in favour of the *hydrargyrum nitratum rubrum*, mixed with these ointments, as a means of rendering the cure more permanent. When these ointments are used, I should recommend the same addition, in the proportion of a dram to an ounce ; but to be made a little stronger or weaker, according to circumstances.

Camphor mixed with the *unguentum album*, or any other ointment, may be applied in some varieties of this species of ulcer, but not so generally as the other medicines that have been mentioned : those cases where there is a degree of

indolent thickening are most likely to be benefited by it.

After having enumerated the different medicines which may be used with advantage in indolent ulcers, it seems necessary to state again expressly that these medicines, in many cases, very soon lose their effect; and that in such instances the great art consists in changing the application as soon as this circumstance is discovered. In regulating such changes two things are always to be kept in view; the one, what had been the original state of the ulcer; the other, what its present appearance; by which attention it will often be found that one ulcer, in the progress of the cure, may require to be treated in several different ways before it can be made to heal. This is so material a circumstance in ulcers of several years standing, that it cannot be too particularly noticed. There is another thing to be adverted to, that although the ulcer

may be in its nature indolent, it is liable to temporary changes whenever the constitution is occasionally affected, and while under that influence is to be treated accordingly. If a patient who has an indolent ulcer, which is going on very well under any stimulating medicine, is attacked by indisposition, the ulcer will no longer bear the former treatment, but requires a milder application; and this milder remedy must be continued till the general system shall have recovered itself, and then the ulcer will again bear more active medicines.

5. Of bandages.

The great advantages derived in this species of ulcer from an uniform steady compression of the limb, is now universally acknowledged, and some mode or other of producing this effect is, I believe, adopted by every practitioner. Many surgeons consider a tight bandage as the only thing necessary, and adduce a number of

instances in favour of this opinion; from such partial evidence, however, we are not justified in drawing conclusions upon a subject so extensive, particularly as the individual cases vary more, according to the constitutional peculiarities, than any thing immediately connected with the ulcer.

Where tight bandaging is employed at the same time that other means are made use of, the beneficial effects which take place cannot be exclusively attributed to either mode of treatment; it is therefore proper to remark, that in all the cases brought forward as evidence in favour of the different applications that have been here considered, no species of bandaging was used but what was necessary to keep the dressings applied to the ulcer.

The most effectual mode of compressing the limb, and giving the parts an uniform and steady support, is by means of the laced stocking: this has been long in

general use; it was strongly recommended by Wiseman in the last century; and we must attribute to his recommendation the adoption of it in this country, as a common application.

A roller of calico or flannel applied to the whole leg, from the toes upwards, is a very good substitute for the laced stocking, and answers very well when neatly applied. Linen does not make so good a bandage for this purpose, as it does not yield to the motions of the limb, and is with difficulty retained upon it, being apt to slip down, from the smoothness of its surface.

Bandages applied partially to the ulcer, without including the whole limb, do not answer unless the ulcer is near the ankle, from the difficulty of retaining them upon the part. A very ingenious mode has been devised of overcoming this difficulty, by applying slips of adhesive plaster, spread upon linen, over that part of

the limb where the ulcer is, and for some way above and below it; these strips of plaster are to lap over one another, and each strip is to be applied from behind, so that the two ends may be crossed over the ulcer, by which means the edges of the skin are, at the same time, drawn as much as possible together. This mode of compression appears very judicious, and the cases adduced are sufficient evidence in its favour.*

No directions can be given which of these applications should be first tried in indolent ulcers, as a great deal must depend on what had been used before, without success; and in all such cases of long standing, many medicines must have been previously employed; the surgeon will therefore be guided by the

* See Descriptive Account of a new method of treating old Ulcers of the Legs, by Thos. Bainton, Surgeon at Bristol.

history of the case, when it can be procured.

The diluted nitrous acid, the solution of the argentum nitratum, and the unguentum hydrargyri nitrati, are the medicines on which I am disposed to place the greatest dependance.

CHAPTER VI.

OF ULCERS ATTENDED WITH SOME SPECIFIC DISEASED ACTION, WHETHER CONSTITUTIONAL OR LOCAL.

ULCERS are met with on the legs of persons who labour under constitutional diseases, and also of persons who have not any universal disease, but are in that state of body which induces parts, when injured, to assume some diseased action. Such ulcers do not properly come under any of the former heads, since they do not heal under any of the medicines which are found to answer in these different species of ulcer; I shall therefore consider them by themselves.

When ulcers of these species are distinctly marked, they neither resemble, exactly, the irritable nor the indolent,

but may be mistaken sometimes for varieties of the one, and sometimes of another; there is, however, commonly an unhealthy appearance of the skin immediately surrounding the ulcer, which gives to the whole a diseased aspect, not seen in common ulcers.

The ulcers which take place in persons whose general systems are contaminated by the venereal disease, come more frequently under the eye of the surgeon than any others attended by a specific diseased action; I therefore mention them as having the character of a diseased ulcer most strongly marked. Any such diseased appearance has been generally considered as a symptom of lues, and ulcers in which it is assumed have been too often referred to that cause. This has been productive of many serious mistakes in practice; for these peculiar appearances arise from the parts being in a diseased state, but are not confined to one

specific action, and take place in many other diseases as well as the lues venerea.

As ulcers which are formed on persons whose constitutions are affected by the lues venerea, in general require nothing but removing the constitutional disease by means of mercury, they cannot properly be said to belong to our present subject, which is more particularly the local treatment of ulcers. There are, however, many ulcers that were originally venereal, which after the virus has been destroyed, assume some new diseased disposition. This may happen in different ways; it may arise from the state in which the parts were left by the original disease, or it may be the effect of a long continued course of mercury, and in many cases a combination of both of them. In this view the venereal disease becomes a source of many diseased ulcers, some of which are met with on the legs.

Ulcers attended by disease occur also in persons of scrofulous habits, in those whose bodies are weakened by a long continued intemperance of different kinds, in those disposed to cancer, and in many instances arise from causes with which, I believe, we are little if at all acquainted. Were I enabled, by any means, to ascertain all the diseases of the system, or of the parts, which produce these unhealthy or ill-conditioned ulcers; could I distinguish them with any degree of accuracy from one another, I would endeavour to consider them in some order connected with their causes or appearances; but this, till our knowledge of ulcers shall be greatly improved, cannot well be done. I shall, therefore, at present not attempt to do more than to state the medicines which may be used with advantage in ulcers of this description: pointing out, under the head of each medicine, such circumstances as may assist the judgment

in determining which are the most proper cases for its use.

In ulcers in general the principal dependance for the cure must rest upon the local applications; as the complaint, although under the influence of the system at large, and varying in its appearance according to the peculiarities of the general system, is still a local complaint; but when they arise from a specific disease, whether it is in the system or in the part, it is natural to suppose, that whatever medicine can relieve the specific disposition, will do it, in many cases, with equal advantage through the medium of the system, as when locally applied; and even where, used internally, it has not the same efficacy, it must, if it acts at all, be generally supposed to assist in the cure.

1. *Of those Ulcers which yield to Mercury.*

It is not meant, as I have already stated, to consider here those ulcers which are immediately connected with the venereal disease, but such only as are produced by other diseases of the general system, or of the parts, which yield to the effects of this medicine.

It was natural, when the beneficial effects of mercury in the venereal disease were first discovered, to suppose that every complaint which yielded to mercury must be venereal. It was, however, to be expected that observations accurately made would soon ascertain that this active medicine is capable of producing salutary effects in many other diseases. Yet a long time elapsed before this was generally allowed.

Even now, when it is universally ad-

mitted that mercury, employed through the medium of the system, is the most efficacious medicine in inflammations of the liver, and in diseases of many of the other viscera, surgeons very unwillingly give it credit for the cure of ulcers that are not venereal; but are inclined to suppose every ulcer that yields to such treatment arises from that disease.

This is by no means true; for many ulcers unconnected with the venereal disease will heal under a mercurial course, or yield to mercurial applications, which had received no benefit from other medicines. In some cases, the ulcer has remained stationary during the use of the mercury, but as soon as it was left off, has put on a more kindly appearance; the mercurial course having produced so great a change in the constitution, as to destroy the disposition which had kept the ulcer from healing.

Such ulcers are, in general, in their

appearance allied to the indolent kind, but have some diseased disposition peculiar to themselves. Mercurial frictions are in these cases to be preferred, as it is a material object to impair the constitution as little as possible, by leaving the stomach undisturbed, and in a state to take nourishment.

There are ulcers on the instep and foot with a very thickened edge, and a diseased state of the surrounding skin, approaching in their appearance to what is called Elephantiasis. These I have several times met with in servants of opulent families, where they had led an indolent life, and fed upon a luxurious diet. In cases of this kind fumigation with the hydrargyrus sulphuratus ruber has healed the ulcers, and resolved, in a great degree, the swelling of the surrounding parts.

The mercurial ointment, either made by calomel and hogs-lard, or the unguentum hydrargyri mitius, mixed with

camphor, answers, in some cases, better than any other application.

Camphor in general renders the mercury more active than when employed alone; and I have frequently known the mouth affected by an application of this kind to a small surface, when the mercurial ointment, applied to a much larger extent, has produced no such effect.

The hydrargyrus muriatus diluted with water (to which a small portion of spirit has been added) in the proportion of a grain to an ounce, is a very useful application to many ulcers with a diseased aspect, more particularly those that are superficial, with a thickened edge, and appear to be principally confined to the skin.

2. *Of Ulcers which yield to the use of different preparations of the Conium Maculatum.*

The inspissated juice of the conium maculatum internally employed is by some practitioners supposed to be entirely inert; while by others it is believed to have considerable powers over many diseases. From these opinions, so diametrically opposite, and both taken from actual observation, it would seem that its effects are very precarious. I confess myself to be by no means warm in its favour, for though I have seen it sometimes of service in local complaints, it has so often failed, that I have never been able to place much reliance upon it as an internal medicine, in diseases connected with surgery.

As an external application I have found the conium maculatum a much more certain medicine; and I do not hesitate to

delcare myself convinced, that there are cases of diseased ulcers on the legs which are cured by it more readily than by other means.

The ulcers which are most generally benefited by it, from their appearance would be classed with the irritable ; but there is in the surrounding parts a degree of thickening, which I am induced to attribute to some specific diseased action. These ulcers are met with in the neighbourhood of the ankle joint, and the joint itself is enlarged. I have also seen them upon the ligaments of the joint of the knee, but less frequently. From their situation and the enlargement of the joint, they may be suspected to be scrofulous ; but from their sensibility they must be considered as an uncommon variety, if they really belong to that disease. In such diseased ulcers the conium maculatum takes off the pain, reduces the swelling of the joint, and seems

to counteract the diseased disposition, whatever may be its nature.

In many ulcers that are truly scrofulous, the external applications of the conium maculatum are productive of the greatest advantage, particularly in those attended with irritability.

The conium maculatum admits of being employed in three different forms, but only two of them are in general use.

The decoction is used as a fomentation, which is a very advantageous form, in those cases which are attended with pain; since the warmth assists in soothing and alleviating the symptoms.

It is used in the form of poultice, which has an advantage, as it admits of being much longer continued to the ulcer. The decoction of which the poultice is made should be much stronger than is commonly directed. Eight bundles, or four handfuls, of the dried herb, and a greater quantity of fresh leaves in proportion,

should be boiled in a quart of water to a pint. I have not unfrequently seen the poultice used without the smallest benefit; but when the strength of the decoction was increased, the ulcer shewed evident signs of amendment. Where the weight of the poultice proves oppressive to the limb, the decoction may be applied upon lint to the ulcer.

The inspissated juice of the conium maculatum admits readily of being formed into an ointment; but although I have made several trials of it, I can say nothing in its favour as an external application.

3. *Of Ulcers which yield to the application of Salt Water.*

Salt water is an exceedingly good application in many scrofulous ulcers, some of them being more readily cured by it than by other applications. The form of poultice is most commonly employed ; but in many cases of ulcers on the legs, I have found keeping the part immersed in tepid salt water, for fifteen minutes, twice a day, preferable to any other mode. I have seen several small ulcers cured under this treatment in a fortnight, which had resisted the effects of internal medicines, and many different external applications for six months ; nor did the ulcers return afterwards in the course of several years. I have used the same mode with large ulcers, and frequently with success. In scrofulous ulcers on the legs and feet the salt water poultice sometimes brings out

pimples on the skin, so that the application cannot be continued. When this is the case, adding equal parts of decoction of poppies takes off this unpleasant effect; and after the skin has been for some time accustomed to the salt water in a diluted state, it will very well bear the salt water by itself.

In such cases the foot or leg, at the times the poultice is to be changed, will receive benefit by being immersed for ten minutes in tepid salt water.

In some superficial ulcers, attended with a thickening of the skin, that have been in that state for months, the application of tepid salt water has produced a cure.

When there is an unusual coldness in the limb, without any tendency to mortification, the tepid salt water may be used with great advantage; it brings a glow upon the skin, and rouses up the actions of the parts, so as to give an ulcer

which had for some time been in an inactive state, a disposition to heal. These cases occur in tall thin men who are unhealthy, and advanced in life. They are also met with in young women who are very weak and unhealthy; the whole system in such cases is apparently defective, not having sufficient energy to do more than carry on the functions of life, and being therefore unable to support the effects of disease.

Where the leg has a tendency to become anasarca, the application of tepid salt water is sometimes found entirely to remove that disposition.

4. *Of Ulcers which yield to the use of the
Argentum Nitratum.*

There is a species of ulcer which does not appear to go deeper than the cutis, but spreads in all directions, producing ulceration on the surface of the skin, and frequently extends in depth through its whole thickness, or nearly so. This diseased disposition, whatever it is, does not remain in the parts which have ulcerated, but only on the edge of the skin where the ulcer is increasing, for the surface first affected heals while the parts beyond are in a state of ulceration.

This description applies nearly with equal success to the ulcers produced by three separate diseases, to all of which the soldier is peculiarly liable. One is a leprous eruption, most commonly met with among the impressed men brought from Ireland. Another is the consequence of

buboes, which from their long continuance after the venereal virus has been destroyed, dispose the skin to take on this disease. The third is a disease of warm climates, commonly called the ringworm. All of these, as far as my experience enables me to form an opinion, yield more readily to the solution of argenti nitratum applied to them in different proportions, than to any other local treatment.

The disease met with among the Irish recruits is evidently of the leprous kind, as it is communicated by infection; and, in those instances that have come under my care, was received by lying in bed with persons affected by it. Under these circumstances, a vulgar prejudice of its only affecting parts similar to those that had the disease, is very readily explained, for such similar parts in bed are the most likely to come in contact with each other.

It affects in general the breast, back,

and legs; it shows itself by a swelling like a large boil, with a pale red margin, extending for some way all round; a reddish black scale forms on the top, the boil becomes extremely painful, and itches; the scales fall off, exposing a foul ulcer, which discharges a foetid limpid fluid, and excoriates the surrounding skin, producing ulceration wherever it comes in contact: in this way it spreads over the greater part of the limb, and in some instances over a considerable portion of the body; the parts first affected healing, while the disease is extending itself to those beyond.

These ulcers remain open sometimes three, four, or even six months, and then heal up, leaving a cicatrix similar to that which remains after the small-pox; those cicatrices often break out again in the spring, in the same way that the disease first began, by forming a boil which becomes an ulcer, and spreads as

it did before. In the very hot weather the pain and quantity of discharge are the greatest; so that in the month of June the disease is the most virulent, and in the autumn subsides.

The symptoms are aggravated by the use of spirituous liquors, by feeding on salt provisions, and catching cold; under any of these circumstances the ulcers are more inflamed, and the pain more violent.

A number of cases of this kind came under my care in the year 1778, at the Naval Hospital at Plymouth, being brought from Ireland, among the men impressed for the use of the navy. Mild applications did not answer; more stimulating medicines gave relief, and I am led to consider the solution of the *argentum nitratum* as the best adapted to this disease.

The disease in the skin produced by the effects of very irritable buboes, in

constitutions broken down by mercury, is very similar in its progress to that which I have described; it is, however, more violent, the ulceration going deeper into the skin, which makes it more painful; it spreads in some cases down the greater part of the thigh, and upwards almost round the body. The new skin which forms is readily disposed to ulceration, and the parts break out again very commonly in the spring. The discharge is of a thin acrid kind, and as it excoriates the surrounding skin, I have little doubt but that it would affect the skin of another person.

I have seen several cases of this kind, and have been led to try a variety of applications; none of them agreed with the skin but the solution of the *argentum nitratum*; all preparations of mercury did harm; no unctuous application answered, and I was always obliged to return to the *argentum nitratum*; which, by steadily

persevering in its use, nearly effected a complete cure, even in the worst of them, after a continuance of the disease for nine months, previous to its being applied.

The ring-worm is considered as a disease of warm climates; and in the stage where an ulcer is formed, it certainly is confined to hot countries; it is, however, met with in a less degree in the warm season in England. It is supposed to be infectious, and always to be caught in that way; that it is so generally, I believe there can be no doubt, but it also arises very commonly without any infection: this, however, probably happens where the skin is very readily affected by the disease. That infection is not necessary for the production of the ring-worm, I shall mention two instances where it arose spontaneously.

In the summer 1779, while at Plymouth, I was consulted by an officer in the 75th regiment, at the desire of

Mr. Venour, who was then surgeon to it, for a complaint on the skin of the upper part of the thigh, which appeared to be an uncommon disease, and did not yield to any applications that were made to it. I felt myself equally at a loss in what view to consider it; mercury was used in different forms, but without any good effect, and in the autumn it very gradually went off.

About a year after seeing this case I went to the West Indies, and as soon as the ship had got within the tropics, found myself more oppressed and irritated by the heat than most of the Europeans on board, and to my astonishment found that I had a similar complaint to that under which the officer had laboured at Plymouth. From the extreme pain and itching it produced, I was led to apply cold water frequently to the part, and keep it very cool; under which treatment I found that it went off, but not for

several weeks. Upon my arrival in the West Indies I found that the disease was the ring-worm, so common in that country, which it was impossible that I could have received by infection, more than the officer in the 75th regiment at Plymouth.

The ring-worm begins by an efflorescence on the skin, a little raised above the natural level, which spreads from a centre, when the disease increases in violence the margin of the circle is raised into a welt, and the surface contained within it appears scurfy; the welt becomes covered with a scab which falls off, exposing an ulcerated ring, commonly not more than a quarter of an inch broad; the ulceration spreads outwardly, and heals towards the centre, so that in general the breadth of the ulceration is nearly the same, although the circle is becoming larger and larger. It seldom becomes of any depth, being entirely confined to the cutis; but in the

worst cases it appears to extend through its whole thickness. In this stage it must be classed among the diseased ulcers, and among those of a very distressing kind, as the painful symptoms are exceedingly violent. The discharge is not pus, but a thin watery fluid, of a very acrid nature, which, by its virulent properties, most probably extends the disease along the skin.

In the East Indies the application in use to it, in this stage, is vinegar, saturated with borax. The natives employ the juice of some plants which is sold as a secret medicine; it is made by an Hindoo doctor at Vizagapatam, and sold at the different presidencies in India. This medicine is of a very acrid nature, giving the patient excruciating pain, but removes the disease in a very short time.

The solution of the *argentum nitratum* answers in the milder cases, and I have little doubt of its being equally successful in those that are more severe.

5. *Of Ulcers which yield to the Use of Arsenic.*

Arsenic has been applied externally, in cases of cancer, by a number of empirics, as a caustic ; but from the violence of its effects, regular practitioners have in general been afraid to employ it in cases of surgery. It is, however, a medicine that may be used with safety, both internally, and externally, in many diseased ulcers, with the greatest advantage.

Those ulcers in which I have been led to employ it, are named, from the virulence of their disposition, *noli me tangere* ; and are very nearly allied to cancer ; differing from it in not contaminating the neighbouring parts by absorption, but only spreading by immediate contact.

Ulcers of this kind differ exceedingly from one another in their degree of viru-

lence ; but they are all so far of the same nature that arsenic in general agrees with them, and puts a stop to their progress, while they are aggravated by milder dressings.

I have been in the habit, for many years, of using arsenic externally to such ulcers, and its effects encouraged me to continue to do so: but I confess that I was afraid to employ it internally with this view, lest the quantity necessary to be of any service might prove hurtful to the coats of the stomach. I was, however, induced to try it a year ago in St. George's hospital, in the following case, in which nothing could be well applied to the part itself.

A woman, 65 years of age, came into St. George's hospital on the 15th of June, 1796, with an ulcer on the side of the tongue, of three months continuance. It was foul, and spreading backwards to the root of the tongue, was extremely pain-

ful, and the ulcer had an offensive smell. It was out of the reach of external application. Finding no advantage from the use of the extract of the *conium maculatum*, which was given in large doses, I thought it right to try the solution of white arsenic in boiling water. She took at bed time five drops for a dose: this made her very sick; next night three drops were given, which did not disturb the stomach; this dose was continued for four successive nights, and as the stomach was very quiet, the number of drops was again increased to five, which were now found to agree very well. The ulcer was evidently better, and at the end of three weeks, from the time the arsenic had been used, was much diminished in size. The dose was increased to six drops, and, in a fortnight more, the ulcer was completely healed. The arsenic in this case could not act locally, as the ulcer was not situated upon a part of

the tongue to which it could apply itself in the act of swallowing; and if it had, the time of application must have been too short to produce much effect.

The success attending this case induced me to try the internal use of arsenic for an ulcer upon the side of the nose of a young woman, which had much the appearance of the *noli me tangere*. Nothing was externally applied; the whole treatment consisting in the internal use of arsenic; and in the course of a few weeks the nose was nearly healed.

These not being cases of ulcers on the legs, may be considered as foreign to the present subject; but they are here introduced with a view to justify the internal use of arsenic in those ulcers on the leg, which receive benefit from its external application; since they show, in the most unequivocal manner, that such practice is in itself not only safe, but capable of being attended with great advantage.

To ulcers of an untoward appearance on the legs, I have used the arsenic, both internally and externally, with success.

The cases to which this treatment is peculiarly applicable are those of the fungated ulcer. They are met with in the calf of the leg, and on the sole of the foot, shooting out a fungus from the surface, which is entirely different from common granulations: the new formed substance is radiated in its structure, the bottom of the ulcer being the central point, and the external surface (which is always increasing), the circumference. This fungus is very tender in its substance, and bleeds if the slightest violence is committed to it. This disease in its origin sometimes appears like a scrofulous affection of the metatarsal bones of the foot; but the enlargement of the parts exceeds what commonly is met with in scrofula, ulceration takes place upon the skin, and a fungus shoots out, showing, for the first

time, the nature of the disease. Whether such cases are originally scrofulous, and afterwards assume this new diseased disposition, it will be very difficult to determine, but their remaining for a year before the fungus shows itself, renders it highly probable. The same disease takes place in the testicle.

There appear to be two kinds of this disease, one which is poisonous, and capable of contaminating the lymphatic glands in the course of absorption; the other not. I know no mode by which these two species can be distinguished in their earlier stages; and the first kind is, I much fear, not to be removed by this, or any other application, at present known; it is therefore only in the second kind that the arsenic is capable of effecting a cure. This medicine should, however, be used in all cases not ascertained to be poisonous.

The solution of arsenic, which I have always used, is made by boiling white

arsenic in water for several hours in a sand heat, and taking this saturated solution for use. When given internally the dose is from three drops to ten; when externally applied, a dram is diluted with lb. ij of water; and this solution is gradually made stronger, till it is of double strength. This solution is either applied on lint, or made into a poultice,

CHAPTER VII.

OF ULCERS ATTENDED WITH A VARICOSE
STATE OF THE VEINS OF THE LIMB.

ULCERS occur in many patients, but I believe more frequently in tall people, on the inside of the leg, just above the ankle. They have their origin from some accidental cause, and when once they take place are difficult of cure, and almost always break out again.

This ulcer resembles in its appearance those of the indolent species, rather of a mild kind; but if the state of the limb is examined, it will be found that the branches of the superficial veins which form the vena saphena, are many of them preternaturally enlarged, and the vena saphena itself is extremely large. It is this enlargement in the veins which prevents

the ulcer from being healed. I have therefore considered this kind apart from other ulcers.

This species of ulcer is seldom very deep; when it spreads, it is generally along the surface; its shape is commonly oval, the ends of the oval pointing vertically. The edges of the surrounding skin are commonly neither thick nor irregular, but are imperceptibly lost in the ulcer. The pain which it gives is seldom from the surface, for pressure does not increase it; but there is an aching uneasy sensation in that part of the leg. This pain is deeper seated than the surface of the ulcer, and very often extends up the leg in the direction of the veins; and is increased to a very great degree if the limb is long kept in an erect posture.

The ulcer commonly increasing in the course of the veins, encourages an opinion that inflammation and ulceration in ulcers in general run along the internal surfaces

of the smaller veins, which open upon the ulcerated part, and that this is the common cause of their increase. There does not appear any other obvious reason why the ulceration should extend upwards, contrary to what happens in ulcers on the leg in general, especially as it will be found, in the course of these observations, that there is, at that time, no disease whatever in the part itself.

That ulcers do, in some instances, spread in the course of the veins, may be illustrated in the liver, where the veins coming from the ulcer have been found to have their orifices perfectly open; the adhesive inflammation not having united their sides together, and the internal surface for some way appearing inflamed.

The enlargement of the veins of the leg, particularly the superficial veins in middle aged and old people, happens so frequently, that no one who has attended to the subject can be ignorant of it. When

once this disposition in the veins has begun, it generally goes on increasing, and the limbs become less able than usual to bear violent exercise, or to sustain the body long in the erect posture. This is so often met with where there are no ulcers on the leg, that it must be considered as a diseased relaxation of the coats of the veins, of which the immediate cause is, I believe, at present unknown.

Although ulcers on the legs, therefore, cannot be said to produce this enlargement of the veins; yet when once an ulcer takes place in such a limb, it seems, by making it weaker, to increase that disposition, or at least to render the progress of the complaint more rapid.

An ulcer, in whatever way produced, upon a limb in this state of enlarged veins, is more difficult to heal than otherwise it would have been; is more liable to break out again after it has cicatrized, and too

often cannot for many years be made to heal at all.

This species of ulcer is very common in the army. I have very often seen it in non-commissioned officers, and am led to believe that grenadiers are, from being taller, more liable to it than the men in the battalion, or light infantry companies. It is an ulcer which external applications rarely can remove; and many men, on this account, are either invalided, or from a consideration of their former services, or of some particular good qualities, are placed in situations unconnected with the effective strength of their regiments. The disease in the veins which prevents those ulcers from healing is, I believe, frequently brought on by the fatigues and changes of climate to which soldiers are subject, and by which their general health is sometimes greatly impaired.

The officers in the army, from the same circumstances, are more liable to this complaint than any other description of men in the higher orders of society. In them, where no accidental cause has produced an ulcer, it is not noticed; and when ulcers have been formed, they may, by great attention, be healed, so as only to break out occasionally; which, when it happens, is supposed to arise from the impaired state of their bodily health, being seldom referred to the real cause.

This species of ulcer, although difficult to heal, has not been considered the opprobrium of surgery, because in general the ulcer is not very large, nor is its appearance such as to alarm the mind of either the patient or the medical attendant. But, from its not getting well under the use of different medicines, it has been productive of considerable embarrassment to the mind of the surgeon, and has taken from him the necessary confidence in the

treatment of other ulcers, more within the influence of external applications, so as materially to retard the improvement of this branch of surgery.

This, I am very ready to confess, happened to myself, and many were the mortifications I met with in my attempts to heal such ulcers, before I discovered the peculiarity which renders them a distinct species; nor was it unnatural that I should draw conclusions very unfavourable to the healing powers of the medicines which had been used without effect (even when applied to other ulcers), while I was ignorant of the circumstances by which they had been counteracted here.

Cases of this kind show, in the clearest point of view, that we are not to give up the use of medicines, although in some cases they have not answered, since the want of success most probably arises not from any inefficacy in the medicine, but from our misapplication of it.

It is this species of ulcer which, from its great backwardness to heal, has given the idea of its being a natural drain from the constitution, which it was improper to dry up; and the strong argument advanced in favour of this opinion has been, that whenever it was healed, it broke out again, and the patient was full as easy while the ulcer was open, as when it was closed, if not more. This may at first appear extraordinary, but can be readily explained; since the pain, in such cases, arises more from the distended state of the veins, than from the ulcer, and the patient will naturally be led to use more exercise when the ulcer is healed, which will keep the veins in a more uneasy state.

This is the species of ulcer in which tight bandaging to the leg is particularly applicable, and rolling the whole limb from the toes to the knee, is found to be attended with the greatest advantage. It is to be understood that the tight ban-

daging is not immediately applicable to the ulcer itself, as it will appear that it is immaterial in what way the management of the ulcer is conducted; and it is probable that the success of tight bandaging in ulcers attended with varicose veins, has led to the use of compression in other species of ulcers, wherein it has proved hurtful; not being suited to the state of the limb, which often is unable to bear any thing tight upon it.

Soldiers who have the slightest disposition to a varicose state of the veins, whether there is an ulcer on the leg or not, should have their gaiters so made as to answer the purpose of a tight bandage, which may be readily done by having them very accurately fitted to the leg; for this purpose those made of woollen cloth will answer best, as its elasticity allows it to yield to the motion of the muscles, and always preserves an uniform compression.

A laced stocking is a most useful application, and if it could be worn without inconvenience, probably no other mode of treatment would be necessary; but it too often happens that the patient is unable to bear the necessary degree of general compression for any length of time, and therefore, after using it for some weeks, is obliged to leave it off.

Having found, in some cases of ulcers under these circumstances, that no local treatment whatever would produce a cure, and that the ulcer healed under the simplest applications when the laced stocking was used; my attention was very naturally directed from the consideration of the ulcer itself, to that of the veins of the leg.

The case which most particularly impressed my mind with this idea, was the following.

A. B. a workman employed by Mr. Ramsden the optician, had an ulcer on

the leg, for which he was admitted into one of the Royal Hospitals in London; he remained there for several months, but the ulcer baffled the skill of the surgeon to whose care the patient was entrusted, and he left the hospital nearly in the same state in which he entered it. As the man was a valuable workman, Mr. Ramsden was very solicitous about his recovery, and begged I would give him my advice. The man happened to have been standing for some time before I examined his leg, which gave me an opportunity of perceiving the veins to be extremely varicose, and preternaturally enlarged; I therefore advised the use of the laced stocking, as a support to the veins; to this he immediately had recourse, and very soon got well, the ulcer being dressed with the most simple ointment.

This case, with many others, led naturally to the adoption of the laced stocking, not as a general practice in all old

ulcers on the leg, but in all those where the veins of the limb were enlarged ; it also prepossessed me in favour of tight bandaging in cases of ulcers on the leg.

I found, however, on putting it to the test, that there are many people whose legs can neither bear the laced stocking nor a tight bandage of any kind, and that instead of deriving advantage from such applications, the ulcer, in these subjects, becomes worse ; or if it gets better, the limb becomes so uneasy that the patients are obliged to leave off the bandage.

As an instance of the first kind, I shall mention the following case. A gentleman consulted me for a small ulcer on his leg, which he had in vain attempted to heal by the common applications. I applied to the ulcer an ointment composed of one part of the unguentum hydrargyri nitrati mixed with three parts of hog's lard. As a part of the treatment, I rolled the leg as tight as the patient could bear. He had

no sleep all night, and the ulcer looked worse next day. This I did not attribute to any part of the treatment, and therefore continued it. The ulcer became still worse : he now told me the tight bandage gave pain, that 15 years before he had an ulcer on the same leg, that Mr. Moffat the surgeon had bound it up in the same way, and that the effect was the same. I therefore left off all bandage, and in a few days the ulcer got quite well. Since that time I have met with several instances of the same kind ; and indeed there are many people who, in health, cannot bear compression on the leg.

From these examples I found that no rule of practice could be laid down for all cases ; the peculiarities of constitution being such as to require being considered apart. As, however, those who cannot bear tight bandaging at all are but few, I was rather led to look upon them as exceptions, and uncommon cases, than as

depreciating the general treatment; but I have since had the mortification to find that even in those cases where the veins are enlarged, the limb too often can not bear compression for any length of time.

As the tight bandage and laced stocking, the only modes of compressing the veins recommended to us, and sanctioned by general practice, in many instances cannot be adopted, and in others are attended with great inconveniences, and consequently are seldom uniformly complied with, I was led to consider in what other way the same effect could be produced.

The remarks which I have made upon tight bandaging must, I am convinced, be familiar to every one who has considered this subject with any degree of attention. They have not been stated under the idea of conveying any new information; on the contrary, they are rather meant as a justification of my peculiarity

in not being satisfied with that practice. They show, at the same time, that I had not passed it over, but had given it a fair trial ; and from a careful investigation of its effects, had been led to give it up, and to endeavour to find out a substitute, which might be free from its disadvantages.

In considering the mode by which the varicose veins prevent an ulcer from healing, it appeared to be most readily accounted for in the following manner. That in consequence of the size of the vena saphena, and its numberless convolutions, the return of the blood from the smaller branches is so impeded, as to retard the circulation in the smaller arteries, and to interfere with their action in forming healthy granulations. This observation is, in some measure, confirmed by the following circumstance. In cases of ulcers attended with weakness, on the lower part of the leg, the granulations, while the patient

lies in an horizontal position, appear florid and healthy; but if he is made to stand up, and continues in that posture only for a few minutes, they become of a deep dark red colour, and frequently bleed. This change can only arise from the increased resistance which the blood encounters in its return through the veins of the limb, when the body is erect.

An enlargement of the veins produces also another effect. The coats of the vessels and the valves become thickened, which renders the valves less pliant, they do not occupy the whole area, and therefore are no longer of any use; and from this defect the whole length of the column of blood in the vena saphena is, in the erect position, pressing upon the contents of the smaller veins, so as to dilate them still more and more, and to keep the limb always in a weak state.

Under these circumstances, it appeared to be an object of no small importance to

take off a part of the pressure of this column of blood, which will probably allow the parts lower down to be in a more easy state, and better able to recover themselves; it may also prevent the veins from being still more dilated, and so far stop the progress of the disease in these vessels.

The only mode of doing this that suggested itself, was that of making an artificial valve, by passing a ligature round the vena saphena, as it passes over the knee joint, and obliterating the vein at that part. The reason for applying the ligature upon this particular portion of the vein is, that just at that part the branches from the different parts of the leg unite and form a common trunk, and as it is the preternatural enlargement of some, or all these branches, which constitutes the principal part of the disease, the most effectual mode of taking off the weight of the column of blood contained

in the common trunk will be by obliterating it, as near as possible to the termination of those branches into it.

The practice of taking up veins is not new; it was in use by the older surgeons in cases of varicose veins, and in one case was practised by Mr. Hunter. In that particular case several branches were separately taken up, which increased the pain of the operation, and made it more tedious; but I understood afterwards that the man was much benefited by it. In the instance, quoted from Mr. Hunter, this mode of treatment was adopted with the view of alleviating the disease in the smaller veins, without any reference to the cure of ulcers on the leg: and in the practice of the older surgeons, if the dilated branches only were taken up, it could not succeed. Its failure was probably the cause of its falling into disuse.*

* "The cure of these ulcers with varix is either real or palliative. The real or perfect cure proposed by the ancients, I have delivered in the chapter of a simple varix:

The present intention, as well as the mode of effecting it, is somewhat different. The principal object is the healing of the ulcers ; and this will be found of no small consideration, when it is known that ulcers of this description, although not so painful and troublesome as ulcers in common, are attended with an uneasy sensation in the course of these dilated veins, which disables the patient from bearing

it is by making an incision in the skin, and taking up the vein, and tying it, &c.* But this way hath not been admitted (to my knowledge) amongst us ; nor have I often seen that a varicose ulcer could be cured by cutting off the branch leading to the ulcer, there being commonly more veins concerned in it." *Wiseman's Chirurgical Treatises, octavo. Vol. I. page 325.*

* The following is the passage referred to in the preceding quotation :—

“ In simple varix, according to the ancient practice, you are to proceed by section, dividing the skin and separating the teguments ; and having raised the varicose vein, you are to pass a ligature above and another beneath it, making a delegation of them ; then slit the vein, cast out the gross blood, and afterwards digest and heal it as is after said in an aneurisma.” Vol. I. page 108.

fatigue, this uneasiness being much increased by standing long, or walking. That these symptoms are peculiar to ulcers in this state of the limb is evident, for within a few hours after the vena saphena has been taken up the symptoms disappear, and the patient is led to take notice of the distress it before gave him, and to express his sense of the suddenness of its removal.

Another object is to prevent an increase of the dilatation of the veins of the limb; which, when nothing is done to prevent it, are constantly growing larger; and after they are arrived at a certain size, become very painful on the smallest exertion, or continuing long in an erect posture, even where there is no ulcer.

The mode of practice, which I am going to explain, I have followed for five years; and during that period have had opportunities of seeing its effects in twelve different instances. All the cases, except

the first, were under my care in St. George's hospital, and many of the patients submitted to this mode of treatment, from seeing the good effects of it upon others.

As every thing connected with the operative part of surgery carries along with it a certain degree of dread to the mind of the patient, any mode of treatment, however tedious and even uncertain, is preferred by many to an operation; although the sufferings, when justly estimated, are too often ten times greater in obtaining a cure without such operation than with it. Under this prejudice, the operations of surgery must continue while they are considered abstractedly; but when the diseases for the relief of which they are performed are taken into the account, and the pain and distress of the one is balanced against the other, the prejudice will be removed; and what, upon a superficial view, was considered as cruel,

will be found to be humane. The surgeon therefore, who discovers an operation by which a distressing disease is removed, should be viewed in the same light as any other benevolent man, who prevents or removes the sufferings of a number of his fellow creatures.

The operation of taking up the vena saphena is extremely simple, may be performed in a very short time, and is attended with less pain, if we may judge from the account of those on whom it has been performed, than it would be natural to expect. My attention has been directed in every case in which I have performed it, to render it as little painful as possible, and the mode which appears to me the least so, is the following.

As the veins are only turgid in the erect posture, the operation must be performed while the patient is standing; and if placed on a table, upon which there is a chair, the back of the chair will serve him to

rest upon, and he will have the knee joint at a very convenient height for the surgeon. The leg to be operated upon, must stand with the inner ankle facing the light, which will expose very advantageously the enlarged vena saphena, passing over the side of the knee joint. While the patient is in this posture, if a fold of the skin which is very loose at this part, is pinched up transversely, and kept in that position by the finger and thumb of the surgeon on one side, and of an assistant on the other; this fold may be divided by a pointed scalpel pushed through it with the back of the knife towards the limb, to prevent the vein being wounded; much in the same way that the skin is divided in making an issue. This will expose the vein sufficiently, but there is commonly a thin membranous fascia, confining it in its situation; and when that is met with, the vein had better be laterally disengaged by the point of the knife. This

is most expeditiously done by laying hold of the fascia with a pair of dissecting forceps, and dividing it ; for it is difficult to cut upon parts which give little resistance, and there is a risk of wounding the vein. After this, a silver crooked needle, with the point rounded off, will readily force its way through the cellular membrane connected with the vein, without any danger of wounding it, and carry a ligature round it. This part, or indeed what may be considered the whole of the operation, being finished, the patient had better be put to bed, so as to allow the vein to be in its easiest state before the ligature is tied, and then a knot is to be made upon the vein ; this gives some pain, but it is by no means severe. The edges of the wound in the skin are now to be brought together by sticking plaster, except where the ligatures pass out, and a compress and bandage applied, so as to keep up a moderate degree of pressure upon the vein,

both above and below the part included in the ligature. The inflammation, in general, is very trifling; it does, however, in particular cases, extend for some way in the course of the veins under the skin; but even where this has happened in the greatest extent, it has been attended with no bad consequences. The ligature comes away about the ninth or not later than the twelfth day, after which the parts commonly heal up.

As it answers no good purpose for the ligature to remain so long, and only protracts the cure, I have been in the habit of removing it on the fifth day, which saves the patient five or six days of confinement. The mode of removing the ligature is very simple; the vein is so little below the skin, that the knot is readily brought into view, and the ring of the ligature, which at the time of the operation was filled up by the vein, is now become loose, its contents having been

considerably diminished by absorption, so that the point of a pair of scissars can be readily passed through it, by which it may with ease be divided, and the whole of the ligature brought away.

Cases occur in which there is a smaller vein running parallel to the vena saphena. This, when the vena saphena has been taken up, afterwards becomes enlarged, and continues the disease; when that is the case, this vein also must be taken up. These circumstances ought to be attended to in the first examination of the disease, as sometimes the two veins are so close together, that they may both be included in the same ligature.

This enlargement of the vena saphena is sometimes combined with an enlargement of the branches of the vena saphena minor, that passes up behind, between the two hamstrings; when this is the case, the disease is in an uncommon degree of violence, and in such instances would

be less likely to be attended with success unless both venal trunks were taken up.

In two or three cases, I have met with an enlargement of the branches of the vena saphena minor, without the vena saphena itself being at all affected; the principal convolutions of the enlarged veins were on the calf of the leg, and on the outside of the foot, just below the outer ankle. In these instances there was no ulcer, and therefore no very forcible reason could be urged to induce the patients to undergo an operation, nor was I inclined absolutely to propose one, but recommended the use of a laced stocking; and in case that should not answer, explained to them, that they had it in their power afterwards to have recourse to taking up the venal trunk.

The enlargement of the vena saphena minor, I mention rather as an uncommon occurrence, than as a case requiring surgical treatment; that when it is met

with, it may be distinguished from the enlargement of the vena saphena, the subject under consideration.

I have seen one case where there was an ulcer, and only the venal branches of the vena saphena minor enlarged; the ulcer was situated more posteriorly than it is usually met with, and the branches upon the calf of the leg were in an extremely varicose state, forming large projections, the trunk itself was very large, while the vena saphena was nearly of its natural size. The patient was a young woman of a very delicate constitution, but in good health; she was twenty-five years of age, and suffered so much pain in the ulcer, and, proceeding from that part, in the course of the enlarged venal branches, as to be unable to walk or stand for any length of time, unless the limb was supported by bandage.

As instances occur, in which, though the immediate branches of the vena sa-

phena are affected, the disease extends no farther ; and as the same thing happens, though rarely, to the branches of the vena saphena minor ; and in other cases, the disease is found to take place in both, it becomes necessary to explain in what manner complicated cases may be distinguished.

The branches of the veins, passing up from the foot to form these two venal trunks, anastomose very frequently and freely with each other ; it is therefore impossible to say precisely to which of them the collateral branches belong.

When the vena saphena becomes enlarged, many of the common branches, and some of those belonging to the posterior trunk will consequently be affected ; and *vice versâ*, when the vena saphena minor is enlarged. This, however, is not to be considered as implicating both veins in the disease, for the branches of one of them are only affected in a secondary

way by their connection with the other. Whatever number of the venal branches of the lower part of the limb are enlarged, if this enlargement in those of the upper part of the leg only extends in the course of one of the venal trunks, the disease should be referred to that trunk, whichever it is, as it is evident that the other, from its remaining of the natural size, can have had no part in the disease.

CASES

Of the Vena Saphena included in a Ligature, to promote the Cure of Ulcers on the Leg.

As this operation is, I believe, a new one, so far as it is performed for the purpose of disposing ulcers to heal, the mode which appears to me the most unexceptionable, of laying the facts of which I am in possession before the public, is giving a plain narrative of the several cases that have come under my care ; that they may become documents upon this subject to others, as they have been to myself.

CASE I.

A man, sixty years of age, had for many years gained his livelihood by going on messages, having been rendered unfit for any more laborious employment by a large ulcer on the left leg, just above the inner ankle. The complaint was of twelve years standing; it had been sometimes much better than at others, but had never been well during the whole of that period.

In the year 1792, it became so bad as to confine him entirely. It was at this time I first saw him. Upon examining the limb, the veins were extremely large and varicose, and the trunk of the vena saphena, at the knee, appeared almost the size of the little finger. The size of this vein led me to the idea of taking it up at that part, with a view of relieving the

lower branches from the pressure of the blood, which I believed to be the cause why the parts remained weak, and the ulcer could not be healed. I explained my opinions upon this subject to the patient, and told him, that, if he thought it worth while to try it, I was very ready to do it for him. The man's desire to get well was such as to induce him to embrace the offer of any mode of treatment which afforded the smallest chance of it. The vein was taken up in the way that I have mentioned. He complained of very little pain, no improper degree of inflammation was brought on by the operation, the ligature came away in nine days, and in fourteen the wound was healed.

The ulcer upon the leg was dressed with dry lint; it put on a better appearance on the second day after the operation; on the fourteenth it had diminished in size one half, and in twenty-eight days was completely healed. He was also freed

from a pain in the course of the veins of that leg, to which he had been subject for many years, whenever he used any exercise.

He returned to his business of carrying messages, and called upon me a year after, perfectly well ; his leg having continued sound.

CASE II.

Sarah Stapleton, a cook and housemaid, aged twenty-one years, in January, 1794, was admitted a patient in St. George's hospital on account of an ulcer upon her leg. The ulcer was situated upon the inside of the leg, a little above the inner ankle, had been of several months continuance, and was extremely painful, more particularly so at night, depriving her of rest. The pain was not confined to the ulcer, but seemed to run up in the course of the veins; this was much increased after fatigue, or having been obliged to stand for any length of time, and consequently was greatest at night after the labour of the day, which, from the nature of her situation, was very great.

On examining the limb, the branches of the vena saphena were found to be much

enlarged and varicose. Under these circumstances I proposed making a ligature upon the vena saphena. In performing the operation, which was done in the erect posture, she complained of great pain in the ulcer, from being obliged to stand firmly on that leg; but as soon as the ligature was tied round the vein this pain ceased, and never afterwards returned. In the time of the operation a smaller vein was observed running parallel to the vena saphena, which afforded a reasonable suspicion that the disease might recur: as however this was uncertain, I mentioned the circumstance, and left it to herself to determine whether she would have it taken up at that time, or take the chance of its enlarging, and whenever it did so, have a repetition of the operation. She preferred the last. The ligature came away in ten days, the ulcer on the leg healed up entirely in three weeks, and she was discharged from the hospital perfectly well.

She went again to service, in the capacity of cook, in a small family; and from the nature of her business was much exposed to the fire, and obliged to stand a great deal, which made the veins of that leg swell and increase in size; but the leg continued sound, and she had no return of the pain. Fifteen months after the vena saphena had been tied, a vein in the place where the ulcer had formerly been situated burst, and bled freely; it stopped, however, of itself; the quantity of blood which was lost alarmed her considerably, and made her return to the hospital for advice.

Upon examining the vena saphena, at the part where the ligature had been applied, I found two very large veins; so that there must have been, at the time of the operation, two small branches, one on each side of the vena saphena; one of these only had been observed at the former examination. These two veins were now included in one ligature. This was done

April 17, 1795. Tying the veins gave considerable pain, which did not go entirely off for two days, and then subsided; on the 22d, the ligature was removed, after which the parts were much easier, and in a week the wound healed up.

The ligatures which are applied to secure vessels in all operations, while they remain in the wound, act as extraneous bodies, and keep up a degree of irritation, which although it differs in almost every two patients, is generally considerable; this is known by the relief the patient experiences after their removal. The leg for a time gave the sensation of weakness, and swelled when walked upon for a number of hours; but this gradually went off, and by the beginning of March she left the hospital.

N. B. The swelling of the leg for a few weeks after the operation, is a symptom which occurred in several instances.

CASE III.

A man, sixty years of age, in the year 1794, was admitted into St. George's hospital, on account of an ulcer upon his leg of many years standing. It proved to be one of those attended with large and varicose veins; I therefore explained to him the connection between the two complaints, and proposed to take up the vena saphena, which he readily consented to have done. In this case the vein was strong in its coats, and rolled more loosely in the cellular membrane than I had found it in younger patients. It was readily included in a ligature. The ulcer, immediately after the operation, put on a more kindly appearance: it healed more slowly than in the two former cases. This probably arose from the man's age; but in a month's time it was perfectly well. It

is to be remarked, that no dressings were made use of, in this or any of the other cases, but dry lint and white ointment, unless they are particularly mentioned.

CASE IV.

Richard Pinkley, 34 years old, had complained of a swelling of one of his legs for ten years, during the latter part of which period the veins had gradually enlarged, and an ulcer had broke out a little above the inner ankle, which healed up, but broke out again. This happened several times ; and at last the ulcer became so large and painful as not to admit of being healed, which induced him to become a patient in St. George's hospital. He was admitted under my care, and the operation of taking up the vena saphena was proposed as the only means of making the leg continue sound. To this he readily acceded. The operation was performed on the 10th of April, 1795. The vein was very large, and on the third day a swelling came upon the leg ; on

the sixth the ligature was removed, the inflammation increased and extended itself in the course of the venal branches. It was evidently of the erysipelatous kind; it also spread up the thigh, and the ulcer put on a foul appearance; on the tenth the inflammation began to subside; on the twelfth it was still more diminished, but the swelling remained the same: the ulcer now put on a better appearance. On the eighteenth the inflammation was very much gone off; and by the twenty-eighth day, from the operation, the man was perfectly well.

The erysipelatous inflammation which attacked the leg and thigh is to be considered, in some measure, as accidental, and not connected with this particular operation; it is very frequently met with in all hospitals, and in the spring of the year we find, at St. George's hospital, that a great number of the surgical patients are liable to it, whether their complaints

arise from accident, operation, or ulcers of long standing. It appears to be occasioned by some peculiarity in the state of the air, at that season of the year; and when the erysipelatous inflammation had once begun, the irritation from the ligature would direct it along the course of the vein.

CASE V.

A man, 60 years of age, whose business was that of an out-door porter to a banking house, in June, 1794, came into St. George's hospital with an ulcer upon the inner side of the right leg, of several years standing. This ulcer had been repeatedly healed, but always broke out again ; and, at the time when he came into the hospital, rendered him unfit to bear the fatigue of his business. The veins of the limb were very much enlarged, and consequently extremely varicose. I proposed passing a ligature round the vena saphena, to which he assented. The operation was attended with little pain, and the ligature came away the ninth day after the operation, and on the fourteenth the wound was entirely healed. The hospital now disagreed with his general health ;

this he attributed to the confinement, and the want of his usual exercise, having been accustomed to be much in the open air. He lost his appetite; and the ulcer on the leg spread to a considerable size. Under these circumstances I had him moved into private lodgings. As soon as he left the hospital he began to recover, and in less than six weeks from the time of the operation the ulcer on the leg was entirely healed, and he was discharged cured.

CASE VI.

Anthony Kennedy, a footman, aged thirty-five, in the year 1793, about the month of April, found that the veins of his left leg had become unusually large; they continued to increase in size, and in six months an ulcer broke out just above the inner ankle. This ulcer spread, and in eight weeks was so large and painful that he was obliged to leave his place, and go into the infirmary at Dumfries, where he continued five months; during which time his leg got quite well. He returned to his master, and went with him to Bath, where the ulcer broke out again. The veins of the right leg began to enlarge in the same way, and an ulcer broke out upon the same part of that leg. For these two ulcers he was under the care of several surgeons of eminence in Bath

for five months, without receiving benefit: he then went into the Bath infirmary, and was there six months, and both the ulcers got well; but in two months time they both broke out again, and were more painful than they had ever been before. He was now received into the Bristol infirmary, and continued there six months; the ulcers, however, could not be again healed; and he was told by the surgeons, that their not being able to heal them was of no consequence, as they would break out again; and therefore he could not have a permanent cure. Under these circumstances he came to London, and applied to me for assistance; I advised him to become a patient in St. George's hospital, where he was received on the 5th of February, 1796.

At this time there was an ulcer on each leg, which had a foul appearance; the branches of the vena saphena of both legs were very much enlarged, and varicose.

I explained to him that the ulcers were prevented from healing by this enlargement of the veins; and proposed to take up the vena saphena of each leg, assigning the reasons, and describing the advantages which might be expected. He very readily consented to have any thing done which I should think necessary; and on the 9th of February the vena saphena of the left leg was taken up. On the 16th the ligature was removed, the wound had a very healthy appearance, and the ulcer was evidently better. On the 19th the vein of the right leg was treated in the same way, and the ligature was removed on the 23d. He felt very little pain in either limb during the operation, and had none afterwards. The ulcers, to which the only applications were dry lint and simple ointment, made a very rapid progress towards healing. On the 1st of March the wound made in the first operation was healed,

and on the 8th that made by the second had also healed. On the 26th the ulcer on the left leg was skinned over, and that on the right leg nearly so; this last, however, was a fortnight longer before it healed. About the 14th of April he was discharged from the hospital.

CASE VII.

Robert Bradbury, nineteen years of age, a gentleman's servant, was admitted into St. George's hospital June 23d, 1796, with an ulcer upon his left leg. The following is the history of the case. The veins of that leg had been enlarged for many years, but he had felt no great uneasiness from this circumstance, till a year and a half before I saw him; when, in consequence of a kick upon that leg, just above the inner ankle, an ulcer took place, which healed and broke out again. This happened several times, and at every return it put on a worse appearance, and was longer in healing; and, at the time when he came to the hospital, it was not at all disposed to heal.

Under these circumstances I considered the state of the veins as the cause of the

ulcer remaining in an indolent and unhealthy state, and proposed taking up the vena saphena, as a means of producing a permanent cure. On the 26th of June the operation was performed, on the 30th the ligature was removed. On the 4th of July the veins were evidently diminished in size, and the ulcer on the leg was entirely healed. On the 8th the wound made in taking up the vein was so nearly well as to be of no consequence, and he was allowed to leave the hospital and return to his master.

I saw him five months after, and there had been no return of the ulcer.

CASE VIII.

James Peasnell, a footman, twenty-eight years of age, had an ulcer on the inner ankle of the left leg, for twelve weeks, with a varicose state of the branches of the vena saphena of that leg. This he attributes to the cramp, and thinks that the veins began to increase sixteen years ago. This enlargement of the veins had given him no pain, unless they were much pressed, or when he was carrying a heavy burthen. He was admitted into St. George's hospital, under my care, on the 9th of October, 1796, for the purpose of having the vena saphena taken up by ligature, with a view of inducing the ulcer to heal, and relieving the uneasy symptoms produced by the enlarged state of the veins.

He had been a patient in the hospital a month before, but no mode that was adopted succeeded in disposing the ulcer to heal,

which induced him to apply for this mode of procuring relief. On the 10th of October the operation was performed; on the 14th, when the veins were pressed by the finger, they did not give the same pain he had formerly felt, and the ulcer on the ankle had a better appearance. On the seventh day the ligature was removed, and the wound superficially dressed. On the ninth day he had an attack of fever; on the tenth was rather better: but an erysipelatous inflammation came upon the wound, and extended down the leg, in the course of the cellular membrane; but the branches of the vena saphena were not affected by it. On the fifteenth there was an abscess formed in the calf of the leg; he was still very much indisposed in his general health; on the nineteenth a second abscess formed, a little below the other, and the two openings communicated into one, the cellular membrane under the skin having been destroyed.

From this time he became daily worse ; on the thirtieth day he had a cough, loss of appetite, and hectic fever. As I conceived these symptoms to arise from the air of the hospital disagreeing with him, I proposed his being immediately removed into private lodgings, but from several circumstances this was not done till the fortieth day. He was no sooner out of the air of the hospital than he was able to sleep, and recovered his appetite; and in three weeks time his general health was re-established, all the ulcers formed by the different abscesses were healed, and he returned to his master.

CASE IX.

John Baker, a labourer, aged sixty-two, twenty years ago, by an accident, cut one of the branches of the vena saphena with a bill; the wound very soon healed, but the branches of the vein became enlarged and varicose, and have occasionally been painful ever since, when pressed.

In August, 1796, he received a hurt on his inner ankle, which formed an ulcer; he went on for two months making use of different applications, but at the end of that time it became so large and painful that he was induced to apply for relief at St. George's hospital. He was admitted on the 8th of October. Upon its being explained to him that the ulcer was prevented from healing by the enlargement of the veins of the leg, he readily submitted to any operation which would facilitate the cure of the ulcer.

On the 10th the vena saphena was taken up; soon after this operation, the pain which he had felt in the vein when pressed, gradually became less, and the ulcer had diminished in size. The only dressing employed was dry lint. On the seventh day after the operation, the ligature was removed, and the wound looked very well; it continued healing for several days, after which it inflamed and spread, the ulcer on the ankle taking on the same disposition. Under the use of the carrot poultice this inflammation subsided, and the parts again put on a healing appearance. At the end of five weeks the man was discharged, the wound made in taking up the vein being completely healed, and the ulcer on the ankle so very small that he could not be induced to remain longer in the hospital.

In these nine Cases the vena saphena was taken up on account of ulcers on the leg, proving so obstinate under every mode

of treatment which could be devised, that the patients readily submitted to the operation, with a view to have them healed.

In all of them, the ulcers put on a much more healthy appearance, in less than three days after the operation ; and from that time, where no circumstance occurred to prevent it, went on healing like ulcers in healthy parts.

The veins of the limb in all of them became evidently smaller next day, in some of the cases in a very remarkable degree ; and in the course of a week they were in general very much diminished in size.

In those cases that were attended with fever, inflammation, and general loss of health, all these effects were combined in the same case, and so very similar to what occurs in hospitals, from change of mode of life, and a more confined situation than the patient has been accustomed to, that they are partly to be attributed to these circumstances, and might have taken

place if no operation had been performed. It is natural at the same time to suppose, that, in irritable habits, applying a ligature round a large vein may so far affect the general system, as to dispose the body to be more readily affected by such causes.

That I may not appear to have laid too much stress upon the effects which confinement and the air of an hospital have upon the constitution of many individuals, particularly after having undergone an operation, I shall state the following remarks on that subject.

The injury the constitution receives from long confinement in an hospital is sufficiently understood ; but that it can suffer in so short a period, as a week or a fortnight, will not be so readily believed, although instances of this kind are not unfrequently observed in practice. Were these effects confined solely to hospitals, they might be attributed altogether to bad air, much to the discredit of those chari-

table institutions ; but this is by no means the case, as the same thing happens to private patients.

In three different instances of young women, who came out of the country to have operations performed in London, their health began to fall off at the end of the fortnight, and continued to decline till they were carried out into the air ; and from the time of taking the first airing there was so evident an amendment, as to show that air alone was sufficient to bring about a recovery, which very soon took place, by daily going out in a carriage. Their lodgings were in the neighbourhood of Leicester-square, which cannot be considered as a very confined situation. After getting well, their general health did not suffer from remaining some weeks in the same lodgings ; so that London could not be said to disagree with them. In conversations upon this subject with two of these patients, they mentioned

that they never could bear being confined to their room, even for a few days, without suffering from it.

If this ever happens in private practice, it must very frequently occur in all hospitals, even the most airy, both from the construction of the wards, and the situation of the buildings. Gardeners, farmers, and persons of that description, are soonest affected by it; and I have met with many instances of their losing their health in less than a fortnight in St. George's hospital, and getting well in a few days after being more in the air.

CASES

Of Varicose Veins unattended by Ulcers, in which the Branches became smaller, in consequence of the Trunk having been included in a Ligature, and rendered impervious at that Part.

The following Cases, as they are not immediately connected with the subject of this work, which is on the treatment of ulcers, are placed by themselves. They are additional facts respecting the operation of which I have just treated; and if they throw any light upon it, they cannot be considered as improperly introduced in this place.

CASE I.

A. B. thirty-five years of age, a house-painter by trade, came to St. George's hospital, in the year 1794, to have advice for a weakness in his limbs that rendered him unfit to follow his business, which required him to stand a great deal. Upon examining his legs, the veins were extremely large and varicose, equally so on both of them; there was no local disease of any kind, only pain and inability to stand long at a time. He was probably rendered more liable to this disease by the debilitating effects of lead.

From the success I had met with in the cases above related, I thought he might receive material benefit from having the vena saphena taken up, and therefore proposed to him that it should be tried in one leg; and if he found sufficient advantage from

it, he could have it done on the other. To this he readily assented, and the operation was performed. In this case there was a considerable vein close to the vena saphena, which I included in the same ligature; the operation gave little pain, and was not followed by any uneasiness: the ligature came away on the ninth day, but the wound did not heal; he became faint and languid, had tremblings and cold sweats, with loss of appetite. These symptoms came on after being a fortnight in the house, and appeared to arise, in some measure, from the air of the hospital disagreeing with him; that this was partly the cause, was confirmed by their being much relieved by getting him to walk out every day in the air, and by the internal use of Peruvian bark. As soon as he recovered, which was in about a month, I advised him to go into the country, and re-establish his general health, for the confinement in an hospital disa-

greed too much with his constitution to admit of any thing being done at that time to the other leg; and at some future period he might return, if the result of the operation encouraged him to have it performed. I have had no opportunity since that time of seeing him, I can therefore draw no conclusions from this case beyond the immediate effects of the operation, which were favourable, the veins of the limb being rendered much smaller than they were before.

CASE II.

Thomas Gough, aged forty, came to St. George's hospital, and was admitted under my care, on account of a weakness and swelling in the right leg, which prevented him from engaging in any employment of fatigue; there was no ulcer upon the leg, but a constant degree of uneasiness, which was always increased by standing or walking. On examining the leg, the veins were much enlarged and varicose, and, what is unusual, there were two venal trunks passing up the thigh, one the vena saphena, the other a branch of nearly the same size, at some distance from it. I proposed that both of them should be taken up; as, however, they were too much separated to be included in one operation, and too near to admit of both being taken up at

the same time, without the inflammation extending over the intermediate space, it was determined to take them up separately, allowing the inflammation from the first operation to go off before the second was attempted. On July the 22d the vena saphena was taken up: on the 26th the ligature was removed, and the wound had a very favourable appearance; on the 29th the collateral branch was taken up; and on August the 2d the ligature was removed. The leg was less swelled, and entirely free from pain, the veins appeared to be contracted in their size, and on the 5th he went into the country, one of the wounds being entirely healed, and the other nearly so.

CASE III.

John Mathews, aged twenty-six, a gentleman's servant, came into St. George's hospital on the 19th of April, 1797, on account of a varicose state of the veins of the right leg. He perceived, about ten years before, that the veins of the leg were larger than those of the other, and whenever he stood or sat long in the same posture, they swelled and became painful. Three years ago he received a cut upon the inner ankle, which divided a branch of the vena saphena; it bled profusely, and the hemorrhage returned several different times. Two years after that he bruised the same leg against a cart wheel, and hurt it so much as to be confined to his bed for seven weeks with a large ulcer, situated upon the inner side of the leg, a little above the ankle joint; this ulcer

healed under the use of a tight bandage, applied to the whole limb, from the toes to the knee.

The varicose state of the veins was now his only complaint, and it was so troublesome, as to induce him to come into the hospital, for the express purpose of having the trunk of the vena saphena taken up; to relieve the branches situated upon the leg from the pressure of the column of blood, by which their dilatation was continuing to increase.

Upon examining the limb, the dilatation seemed to be confined to those branches which form the vena saphena; but the trunk of this vein was deeper seated than common, it did not lie loose under the skin, but imbedded in the fat and cellular membrane; this was so much the case, that it became necessary to make compression upon the thigh, to render the vein more prominent. After dividing the skin, the vein was not exposed clearly to

view, but was now very distinctly felt. Under these circumstances I applied the fore-finger of the left hand upon the vein, as a guide to the knife, and detached the fat and cellular membrane on one side with the point, so as to make room for the blunt needle to get readily behind the vein : in this way the ligature was passed round it, and tied in the same manner, as has been mentioned in the other cases. The operation was performed on the 22d of April ; on the 25th, which was the third day, upon removing the dressings and sticking plaster, there was an erysipelatous inflammation, extending a little way up the thigh and down the leg, in the course of the veins ; this induced me to cut out the ligature, from the idea that this inflammation was brought on by it. He felt immediately easier ; on the fourth day the inflammation was much abated, and on the fifth it was quite gone off. He now mentioned that the pain he had been

accustomed to feel in the veins of his leg was gone away. On the sixth day the wound was reduced to a small superficial ulcer, which healed up in a few days.

CASE IV.

This is a case of varicose veins of the testicle, considerably relieved by taking up the venal trunk, which passes up from the testicle immediately under the skin of the scrotum, on the outside of the spermatic chord.

George York, aged twenty-eight, a tailor by trade, in the year 1788, while in North America, had a hydrocele, which was cured by means of a seton passed through the sac of the tunica vaginalis, it was three months before he recovered from the effects of the operation. And three months after he got well, the testicles seemed to enlarge, and the scrotum became very uneasy when pressed. He came to England in the year 1795, and applied to several surgeons for relief, the scrotum being at that time so

large, and the testicles so uneasy, that he could not follow his usual occupations. He was directed to live low, and take internal medicines of a cooling and purgative nature; to apply the solution of sal ammoniac to the part, and to keep it suspended. He followed this plan for some weeks; but, receiving no benefit, relinquished it.

His complaints preventing him from pursuing the only mode of life by which he could get a livelihood, which was going to sea as a ship-tailor; he was very desirous of having something done for his recovery. He came to St. George's hospital, and consulted me how far any operation could be performed for his relief, as he was willing to submit to the loss of the testicle, rather than continue in his present state.

Upon examining the parts, the scrotum was found to be unusually thickened, and the veins of the left testicle to be so much

enlarged, as to increase its bulk beyond what is considered as a large hydrocele. The veins were all convoluted, and moved readily on one another, and appeared to be the only cause of this increased size of the testicle. On the testicle of the right side there was an incipient hydrocele, containing about two ounces of water.

In this state of the left testicle little was to be expected from internal medicines, and the removal of it appeared to be a cruel operation. The patient could not be prevailed upon longer to go on with his complaint in its present state. He had before been told that the disease was an enlargement of the veins; and had seen two patients of mine in the hospital who had received considerable benefit in cases of varicose veins of the leg, by having the vena saphena taken up at the knee, and wanted to know if a similar operation could not be performed upon the veins of his testicle. The only answer

I could make to this question was, that I would not propose to him any such operation, having no knowledge of its effects; at the same time I thought so well of it, and believed there was so little danger in it, that if he chose to have it performed, I had no objection to comply with his desire, although I did not feel myself authorized to take it entirely upon myself. I begged he would not at that time come to any resolution, but turn it in his mind before he came to a determination.

He returned to the hospital some days after, and said he was resolved to have the veins taken up; and the operation was performed on the 15th of March, 1796, in the following manner. I endeavoured to find the spermatic chord, and having done so, grasped it between my finger and thumb, and pushed forwards the surrounding veins, so as to make them press against the external skin of the scrotum: while the left hand was thus engaged, I

divided the skin without wounding the veins ; and the moment the incision was made, several convolutions were protruded between the lips of the wound, covered by a strong tendinous fascia, which confined them in their situation ; when that was cut through they projected beyond the aperture ; it was necessary to divide this fascia a little more freely, to get readily behind this vein, which by its convolutions on itself formed a thick plexus. I then passed a needle, the point of which had been rounded off, behind the convoluted vein, and inclosed it in a ligature.

The moment the ligature round the vein was drawn tight a cold sweat came on, and he fainted away ; in a few minutes he recovered, and was tolerably well. For the first three days nothing particular occurred, the wound had no unusual appearance. On the fourth day his tongue became white and dry, his pulse small and low, the beat not exceeding fifty in a mi-

nute: these symptoms coming on unaccompanied with any change of the local appearances, led to the belief that they were not the effects of the operation, but the symptoms of a common fever; and this was strongly corroborated by the circumstance of there being two or three patients in the hospital attacked in a similar way, independent of local injury. On the fifth the parts were very tender and uneasy, and put on a sphacelated appearance, but the fever had abated. Eighth day, the ligature came away, and he was now so free from fever as to take the bark. The abatement of fever and irritation immediately after the coming away of the ligature, is sufficient proof that they were brought on and kept up by the presence of the ligature. Twelfth day, the wound became very irritable, and could not bear the dressing; the parts were therefore fomented every hour. He took thirty drops of æther and tincture of opium, as often as

was found necessary to take off the pain, which was very acute. On the sixteenth the sloughs were entirely separated from the wound, and it put on a healthy appearance; and on the twenty-fourth day it became a superficial ulcer; and by the twenty-sixth was perfectly well. At the time the wound healed, the testicle and its vessels were diminished to one half of the size they had acquired before the operation.

He was kept in the hospital, and had the operation for the radical cure performed for the hydrocele of the tunica vaginalis of the other testicle. This was done by an injection of equal parts of wine and water, and succeeded perfectly. He then left the hospital, having continued there a month after he had got well of the operation for the varicose veins; the parts remained in the same diminished state, not being at all affected by the operation for the hydrocele, although so near them.

On the 30th of November he returned to the hospital, with a view, he said, to have the testicle still more reduced, by having another vein taken up. From this I endeavoured to dissuade him, by pointing out the violence of the former symptoms; but the benefit he had received from the first operation had so strongly impressed him with the belief, that another operation would complete the cure, that all the arguments I could urge in favour of his being satisfied with his present state were in vain. Finding he would be unhappy unless something more was done, and there being no apparent danger in taking up a large vein, which lay very superficially on the anterior part of the spermatic chord, I saw no objection to comply with his wishes, and therefore took him into the hospital for that purpose.

On the 2d of December I took up this vein, while the patient was in an erect posture, exactly in the manner described in

the cases of the vena saphena. As soon as the ligature was passed behind the vein the man fainted, but recovered upon being laid in an horizontal position.

As the immediate symptoms in the last operation had been very severe, with a view to make them less so in the present, I did not immediately tie the vein, but left it till the next day with a loose knot upon it; he had an opiate given him, but had no sleep in the night; he was however tolerably free from pain. Next day the ligature was tied as tight as the parts could bear; this did not produce any pain or distressing symptoms. On the fifth day from the operation the ligature was removed, by dividing the noose with a pair of scissars, and the wound was treated as a superficial ulcer. The general bulk of the testicle was become much smaller, and the parts free from any degree of inflammation. On the thirteenth, on account of some very indecent conduct, he was

discharged from the hospital by order of the Board, the wound being nearly healed.

I have since heard that he imprudently exposed himself in the very severe weather about Christmas, caught a violent cold, which fell upon his bowels, and carried him off.

These four Cases are not only additional facts respecting the operation, but they afford a comparative view of the consequences of taking up veins connected with different parts. Those of the testicle are found to be more irritable in a great degree than those of the leg, both in the immediate symptoms and the sympathetic affections of the constitution. The symptoms are found to vary in different patients, according to the state of the body at the time; and both in the veins of the testicle, and of the limb, the

presence of the ligature aggravates the symptoms very considerably; the parts being much relieved immediately after its removal.

APPENDIX.

APPENDIX

APPENDIX.

THE following Observations on Pus were written, as part of a prize dissertation, and printed at the desire of the Lyceum Medicum Londinense, in the year 1788. They are so intimately connected with the present subject, that I have annexed them to this publication, as they contain part of the data from which many of the observations in the work itself are deduced.

“THE PROPERTIES OF PUS; PARTICULARLY THOSE WHICH DISTINGUISH IT FROM OTHER SUBSTANCES. THE CASES IN WHICH IT IS FORMED. THE TIME ITS FORMATION REQUIRES; AND THE EFFECTS IT HAS UPON THE BODY.”

IN treating of Pus, its properties, and its effects upon the body, as marked out in the thesis, it will not avail much to enter into the opinions of either the ancient or modern authors respecting it; or examine the arguments by which these opinions have been supported, since that would, in some measure, be deviating from the thesis before me, and would lengthen this dissertation much beyond its proper limits, without enlarging, in any degree, our knowledge of the subject. I shall therefore avoid controversy; and endeavour, by experiments and ob-

servations, to investigate the different parts of the subject.

It may not, however, be improper to take notice, that the most generally established opinion of the nature of Pus, was, its being composed of both solids and fluids. It was distinguished by the term, "true, or laudable Pus;" and was supposed to differ materially from a similar discharge called, Mucus. Yet the distinctions between Pus and Mucus have been very ill defined: there was thought to be a difference, in their appearance to the eye; but the principal mark of distinction arose from a breach of surface being believed necessary to the formation of Pus, but not of Mucus; consequently, when there was no breach in the solids, the discharge was only Mucus.

This notion of Pus must have taken its rise from an idea that the solids of the part were broken down into Pus. The physiologists, who formed this theory,

cannot, however, be said to have made their distinctions with great accuracy, since the discharge, in consequence of a blister being applied to the surface of the body, was admitted to be Pus ; although in such cases there is no loss of substance, and therefore the discharge should have been called Mucus.

To ascertain the real difference between Pus and Mucus, has been considered an object meriting the attention of some of our most eminent surgeons, although they have not yet been fortunate enough to discover it. This must have arisen from their adhering to the hypothesis which I have mentioned ; and which not being founded upon the principles of the animal œconomy, can never explain, satisfactorily, any of the operations in the living body.

The appearance of a discharge produced from the secreting surface of an internal canal, or excretory duct, when

when the result of common inflammation, is exactly similar to a discharge, in consequence of inflammation, in any other part of the body. The only respect in which they differ, is, that in the one case there is no breach of surface, and in the other, there most commonly appears to be one. The one is suppuration alone; the other, suppuration attended by ulceration.

In the present inquiry I shall confine myself to the collecting those properties and circumstances which I consider to have been ascertained respecting Pus; and shall endeavour, by investigating others not so well understood, to render the history of it more complete.

Through the whole of my observations, I shall consider Pus as a fluid, whose formation depends upon a process in the animal œconomy, analogous to glandular secretions.

It is difficult to give a definition of any

thing, the properties of which are not well ascertained ; but as it is necessary that I should particularize the substance which I propose to investigate under the term Pus, I shall define it to be a whitish fluid, made up of globules, and a transparent aqueous liquor. Its production depends upon inflammation having previously taken place in some part of the body, either in the common reticular membrane, upon the internal surface of circumscribed cavities, or the surfaces of internal canals, which I shall call excretory ducts.

Inflammation is necessary for the formation of Pus ; and although a fluid, somewhat similar, is produced without any preceding inflammation, such fluid not having all the properties of true Pus, can be readily distinguished from it.

Pus, whether it is formed in the cellular membrane, upon an investing membrane, or on the internal surface of an

excretory duct, has exactly the same appearance, and general properties ; I shall therefore make no distinctions between Pus produced under this or that peculiar circumstance, believing it, when preceded by the same degree of inflammation in a healthy constitution, and when free from any extraneous substances, to be the same fluid ; but as a difference in Pus may arise from a variety of causes, I shall endeavour first to mark those properties which really belong to it in a healthy state of body ; and afterwards mention the variations to which it is liable.

Pus, taken from a healthy ulcer near the source of the circulation, as on the arm or breast, readily separates from the surface of the sore, the granulations underneath being small, pointed, and of a florid red colour, and has the following properties : it is nearly of the consistence of cream ; is of a white colour ;

has a mawkish taste ; and when cold, is inodorous ; but when warm, has a peculiar smell. Examined in the microscope, it is found to consist of two parts, of globules, and a transparent colourless fluid ; the globules are, probably, white, at least they appear to have some degree of opacity : its specific gravity is greater than that of water : it does not readily go into putrefaction : exposed to heat, it evaporates to dryness ; but does not coagulate : it does not unite with water in the heat of the atmosphere, but falls to the bottom ; yet, if kept in a considerable degree of heat, rises, and diffuses through the water, and remains mixed with it, even after having been allowed to cool ; the globules being decomposed.

Pus varies in its appearance, according to the different circumstances which affect the ulcer that forms it, such as the degree of violence of the inflammation ; also its nature, whether healthy or

unhealthy ; and these depend upon the state of health, and strength of the parts yielding Pus. These changes arise more from indolence, and irritability, than from any absolute disease ; many specific diseases, in healthy constitutions, producing no change in the appearance of the matter from their specific quality, but by rendering the ulcer either indolent, or irritable. Thus the matter from a gonorrhœa, from the small-pox pustules, the chicken-pock, and from a healthy ulcer, has the same appearance, and seems to be made up of similar parts, consisting of globules floating in a transparent fluid, like common Pus, the specific properties of each of these poisons being superadded to those of Pus. Matter from a cancer may be considered as an exception ; but a cancerous ulcer is never in a healthy state.

In indolent ulcers, whether the indolence arises from the nature of the con-

stitution, weakness of the parts, or the nature of the inflammation, the Pus is made up of globules, and flaky particles floating in a transparent fluid; and these globules and flakes are in different proportions, according to the degree of indolence: this is particularly observable in scrofulous abscesses, preceded by a small degree of inflammation. That this flaky appearance is no part of true Pus, is well illustrated by observing, that the proportion it bears to the globules is greatest where there is the least inflammation; and in those abscesses that sometimes occur, which have not been preceded by any inflammation at all, the contents are wholly made up of a curdly or flaky substance, of different degrees of consistence, which I do not consider as Pus, from its not having the properties stated in the definition of that fluid.

The constitution and part must be in

health to form good Pus; for very slight changes in the general health are capable of producing an alteration in it, and even of preventing its being formed at all, and substituting in its place coagulating lymph. This happens most readily in ulcers on the lower extremities, owing to the distance of the parts from the source of the circulation, rendering them weaker. And it is curious to observe the influence that distance alone from the heart, has upon the appearance of Pus.

A man had a compound fracture of the right leg, and an ulcer on the ankle of the left; he was in tolerable health, both the ulcers looking well. An attack of fever came on soon after, when the ulcer on the ankle ceased to form good Pus, the matter not separating readily from its surface, while the compound fracture continued to look very well; but in twelve hours more the same change had taken place in the opening of the compound

fracture, which was about six inches higher up the leg than the ulcer.

In irritable ulcers, the discharge is often thin, being principally made up of an aqueous fluid, possessed of an irritating quality, and containing few globules; such ulcers are commonly attended with hemorrhage from the smaller vessels, by which means the discharge is very materially altered in its properties, is rendered acrid, and more ready to run into putrefaction than true Pus. We find, however, in many irritable constitutions, the same appearances that were mentioned to take place in the indolent, the coagulating lymph being thrown out, and adhering firmly to the surface of the ulcer; therefore, the appearance of an ulcer alone will not lead us to a correct judgment of its nature, but will only inform us whether it is healthy or unhealthy.

Although I have taken notice of these different appearances of Pus, from their

being so connected with its history as to deserve attention, I do not consider them as belonging to true Pus; but as arising from a defect in the process, whatever it is, by which Pus is formed.

As Pus has been supposed to have a corroding quality, I made the following experiments to ascertain the truth or fallacy of such an assertion, and found it to be void of foundation, and to have arisen from an inaccuracy which having prevented observers from seeing the distinctions between Pus in a pure state, and when mixed with other substances.

EXPERIMENT II.

I made a comparative trial upon the Pus contained in an abscess, and on Pus, and animal jelly out of the body. The matter and jelly were in equal quantities, and contained in glass vessels kept nearly in the temperature of the human body.

To make the comparative trials as fair as possible, a portion of muscle, weighing exactly one drachm, was immersed in the matter of a compound fracture, in the arm of a living man, and a similar portion into some of the same matter out of the body; also a third portion into fluid calf's foot jelly, in which the animal substance was pure, having neither wine nor vegetables mixed with it. These three portions of muscle were taken out once every twenty-four hours, washed in water, weighed, and returned again. The results were as follows:

In 24 hours—the portion of muscle in the abscess weighed sixty grains, was pulpy and soft, but quite free from putrefaction: that portion immersed in the Pus, weighed forty-six grains, was pulpy, soft, and had a slightly putrid smell: the portion in the jelly weighed thirty-eight grains, was smaller, and firmer in its texture.

In 48 hours—the portion of muscle in

the abscess weighed thirty-eight grains, and had undergone no change: that in the matter weighed thirty-six grains, was softer, and more putrid: that in the jelly thirty-six grains, and smaller.

In 72 hours—the portion of muscle in the abscess weighed twenty-seven grains, was drier, and firmer: that in the matter eighteen grains, and was rendered fibrous and thready: that in the jelly unaltered.

In 96 hours—the portion of muscle in the abscess weighed twenty-five grains: that in the matter was dissolved: that in the jelly weighed thirty-six grains.

In 120 hours—the portion of muscle in the abscess weighed twenty-two grains, not at all putrid: that in the jelly thirty-four grains, not at all putrid.

In 144 hours—the portion of muscle in the abscess weighed twenty-two grains, and was free from putrefaction: that in the jelly thirty-four grains.

The next day the jelly had evaporated

to dryness, which put an end to the comparative experiment. The portion of muscle in the abscess was kept there a few days longer, without undergoing any change or diminution of weight; and was taken out, in consequence of the arm requiring fomentation, which interfered with the experiment.

EXPERIMENT II.

A similar experiment was made upon the matter contained in an abscess recently opened, where the Pus was not pure, but mixed with blood from the cut edges of the external opening, which had not come to suppuration.

A portion of recent muscle, weighing one drachm, was immersed in the abscess; and a similar portion in a small vessel of water, of nearly the temperature of the human body.

In 24 hours—the portion of muscle in

the abscess weighed twenty-four grains, and was very putrid: that in the water forty grains, rendered smaller, but free from putrefaction.

In 48 hours—the portion of muscle in the abscess was wholly dissolved: that in the water weighed thirty-eight grains.

This circumstance alone of Pus, when in a pure state, not readily taking on the putrefactive fermentation, distinguishes it from those fluids which are not perfect substances, but a mixture, which Pus must be reckoned, in these instances, where it has extraneous parts mixed with it; and likewise distinguishes it from the produce of fermentation of animal or vegetable substances, as they run very readily through all the different stages of fermentation, that process being once begun.

The property which characterizes Pus, and distinguishes it from most other substances, is, its being composed of glo-

bules. This appears to me to throw considerable light upon the subject; since the presence of the globules seems to depend upon the Pus being in a perfect state; from which we learn the circumstances necessary for the production of good Pus. Mr. Hunter was, I believe, the first who took notice of this property; and has thereby furnished us with a very accurate distinction between Pus and animal Mucus. For the appearance of what is properly termed Mucus, that is, animal substance dissolved from putrefaction, is flaky, and very different in its appearance from Pus. It is also by this property distinguished from all the chemical combinations of animal substance that I am acquainted with; every one of which appear in the microscope to be made up of flakes.

At the same time that this appearance in the microscope distinguishes Pus from other substances, it shows its great affi-

nity to the other animal secretions, although in many circumstances it differs from them.

It differs from the blood in the colour of the globules; in their not being soluble in water, which those of the blood are; and from the fluid in which they swim being coagulable by a solution of sal ammoniac, which serum is not.

EXPERIMENT III.

A drop of matter, and a drop of blood, were placed upon a piece of glass, at a small distance from each other, and the glass was fixed under the magnifying lens of a microscope: while in this situation, the point of a toothpick was dipped in a saturated solution of sal ammoniac, and applied to each of them. This was repeated two or three times. The drop of matter, instead of appearing more diluted, became viscid and ropy; and upon

being examined through the magnifying glass, the globules appeared perfectly distinct in the coagulum.

The drop of blood had no appearance of coagulation ; on the contrary, it was more diluted.

This experiment was repeated several times, and the results were always similar.

Pus differs from chyle, in its globules being larger ; not coagulating by exposure to the air, nor by heat, which those of chyle do.

The pancreatic juice contains globules ; but they are much smaller than those of Pus.

Milk is composed of globules, nearly of the same size as those of Pus ; but much more numerous. Milk coagulates by runnet ; which Pus does not ; and contains oil and sugar, which are not to be discovered in Pus.

The cases in which Pus is formed, are,

properly speaking, all reducible to one, which is, the state of parts consequent to inflammation. For as far as I yet know, the fluid which I have considered as Pus, in this dissertation, has, in no instance been met with, unless preceded by inflammation; and although, in some cases a fluid has been formed, independent of preceding inflammation, it differs from Pus in many of its properties, as has been already observed.

In inflammation, the smaller blood-vessels become considerably enlarged; and what is curious, this takes place in the greatest degree in the veins; the small vessels are not only enlarged, but become more numerous; which does not proceed entirely from the blood being propelled further than usual in the old vessels, but from new ones being formed; and this takes place in a much shorter time than has been commonly imagined. It is highly probable, that these new

vessels are so constructed, as to make the blood undergo certain changes, by which the fluid, that afterwards constitutes Pus, is formed.

It has been long discovered, that new vessels are generated in extravasated coagula of blood, and exudations of coagulating lymph. The following case ascertains the period in which this effect can be produced, to be within twenty-four hours. And we know that Pus commonly requires a much longer time for its formation under the same circumstances, and in similar parts.

I performed the operation for the strangulated hernia, upon a man, in other respects in health, at seven o'clock in the morning. The hernial sac was laid open, and the gut, which proved to be a portion of the ilium, about six inches in length, was attentively examined previous to its being returned into the cavity of the belly: it had the natural polished

surface, peculiar to an intestine ; and although its vessels were turgid with blood, it did not appear that they were uncommonly numerous. After the operation, the symptoms did not abate so much as might have been expected ; and, during the afternoon, he complained of pain in the lower part of his belly : he had no passage by stool ; and next morning, about seven o'clock, his pulse was scarcely perceptible to the touch ; his skin cold and clammy ; and about twelve at noon he died, having lived twenty-nine hours after the operation.

The body was opened, and the portion of gut which had been strangulated, was found considerably inflamed ; the external surface having lost its natural polish, and having several small portions of exuded coagulating lymph adhering to it. The vessels of the gut were minutely injected, the arteries with a red coloured injection, and the veins with a yellow one.

Upon examination, afterwards, all these adhering portions of coagulating lymph were found to be injected, having a considerable artery going to each of them, and a returning vein which was larger than the artery. It is evident, therefore, that the coagulating lymph was laid upon the external surface of the gut after the operation: and we cannot suppose, that any such process as the forming of new vessels, could have been going on during the last five hours of his life, when the pulse in the wrist was scarcely to be felt, and the powers of life were so much weakened in every respect. We must therefore conclude, that the whole operation of throwing out coagulating lymph, and supplying it with blood vessels after it had become solid, was effected in less than twenty-four hours.

This shows, that inflammation forms a vascular surface previous to the formation of Pus. Is it not, therefore, highly pro-

bable, that the newly formed parts are so organized as to secrete that fluid?

In considering the time required for the formation of Pus, I shall first take notice of the periods which are found, under different circumstances, to intervene between a healthy or natural state of the parts, and the presence of that fluid after the application of some irritating substance to the skin.

In cases of wounds made into muscular parts, where blood vessels are divided, the first process which takes place, is the extravasation of red blood; the second, is the exudation of coagulating lymph, which afterwards becomes vascular; and the third, the formation of matter, which last does not, in common, take place in less than two days: the precise time will, however, vary exceedingly, according to the nature of the constitution, and the state of the parts at the time.

If an irritating substance is applied to

a cuticular surface, upon which it raises a blister, Pus will be formed in about twenty hours, as we find in the following experiment.

EXPERIMENT IV.

I applied a blistering plaster, the size of a half-crown piece, to the pit of the stomach of a healthy young man. In eight hours a blister rose, which was opened, and the contents removed; they were fluid, transparent, and coagulated by heat; had no appearance of globules when examined by the microscope; and in every respect resembled the serum of the blood. The cuticle was not removed; but allowed to collapse; and the fluid, which was formed upon the surface of the cutis, was examined from time to time, by a microscope, to detect, as accurately as possible, the changes which took place. The better to do this, as the quantity in the intervals stated below must be exceedingly small,

a piece of talc, very thin and transparent, was applied to the whole surface, and covered with an adhesive plaster; and the surface of the talc, applied to the skin, was removed and examined by the microscope, applying a fresh piece of talc after every examination, to prevent any mistake which might have arisen from the surface not being quite clean.

The fluid was examined by the microscope, to ascertain its appearance; but as the aqueous part in which the globules of Pus swim, is found, by experiment, to coagulate, by adding to it a saturated solution of sal ammoniac, which is not the case with the serum of the blood, nor the transparent part of milk, I considered this as a property peculiar to Pus; and consequently, that it would be a very good test by which to ascertain the presence of true Pus.

In 8 hours—from the time the blister was applied, the fluid discharged was per-

fectly transparent, and did not coagulate with the solution of sal ammoniac.

In 9 hours—the discharge was less transparent; but free from the appearance of globules.

In 10 hours—the discharge contained globules, which were very small, and few in number.

In 11 hours—the globules were numerous; but still the fluid did not coagulate with the solution of sal ammoniac.

In 12 hours—the appearance much the same as before.

In 14 hours—the globules a little larger; and the fluid appeared to be thickened by a solution of sal ammoniac.

In 16 hours—the globules seemed to form themselves into masses; but were transparent.

In 20 hours—the globules were double the size of those first observed at ten hours, and gave the appearance of true Pus in a diluted state; the fluid was co-

agulated by a solution of sal ammoniac; the globules, at the same time, remaining perfectly distinct; so that I should consider this as true Pus.

In 22 hours—no change appeared to have taken place.

In 32 hours—the fluid was considerably thicker in consistence, the number of globules being very much increased: but in no other respect, that I could observe, did it differ from that formed twenty hours after the application of the blister.

As the results of microscopical experiments have been found exceedingly fallacious, a prejudice has very naturally arisen against all experiments of this kind, upon the secretions of the human body, from a supposition that they are not to be depended upon. But it is right that we should discriminate, and not condemn the use of the microscope altogether, because, from ignorance of its principles, it has been misapplied; since

these very deceptions have been the means of our acquiring a more accurate knowledge of the use and application of that instrument.

The errors, in the use of the microscope, have arisen from increasing the magnifying powers of the glasses too much, and not taking in all the circumstances relating to the refraction of the rays of light; making no allowance for the aberration. An attention to the aberration alone will explain the different appearances under which the red globules of the blood have been represented. Some have found them perfect spheres; which will always be the case when the glasses are perfectly adjusted, and the object placed at the true focal distance. Others have found them annular, from the object being at the focal distance of the rays transmitted near the circumference of the magnifying glass, which are refracted in a greater de-

gree, and consequently shorter than the central rays. Others again have viewed them as flattened bodies of a circular figure, bright in the centre, and becoming darker towards the edges; which appearance arises from the object being at the focal distance of the central rays of the magnifying glass, which will be less refracted than those near the circumference. Although such are the errors which arise when microscopical researches are pushed beyond certain bounds; yet that the red part of the blood is made up of globules, is a discovery for which we are indebted to the microscope; and which seems to be as well ascertained as any discovery in anatomy or physiology. The appearances of Pus, mentioned in this paper, are equally distinct, when examined on the field of a microscope, as the globules of the blood; they are visible with a small degree of magnifying power; and are the same to the eyes of different persons.

The time required to form Pus, on a secreting surface, appears, from the following experiment, to be five hours.

EXPERIMENT V.

A common bougie, four inches long, was introduced into the urethra of a healthy young man. The surface of the bougie was not oiled, which made the irritation more violent, and prevented there being any ambiguity in the appearance of the fluid collected upon it.

In $\frac{1}{2}$ an hour—the bougie was withdrawn, and the fluid on its surface, examined by the microscope, was found to contain globules that were very small, and few in number, resembling those found under the cuticle in the blister at ten hours. The bougie was again introduced.

In 1 hour—the fluid had the same appearance.

In 1 hour and $\frac{1}{2}$ —the globules larger and more numerous.

In 3 hours—the globules more numerous.

In 4 hours—the globules larger; but the fluid did not coagulate with the solution of sal ammoniac.

In 5 hours—the globules large and numerous: the fluid coagulated with the solution of sal ammoniac. I therefore considered it as true Pus.

To prosecute this inquiry still further, I endeavoured to ascertain the changes this fluid undergoes from the time of its leaving the extremities of the vessels which form it, till it becomes that thick fluid we find upon suppurating surfaces, called Pus.

In this investigation it is necessary to attend to the following circumstances: that a suppurating surface, upon exposure, does not form Pus, but a watery fluid, similar to what is thrown out in

consequence of the irritation of cantharides, which, from its coagulating by heat, is most probably serum ; and that pressure, from a hard substance, acts as an irritator, and produces a similar effect to exposure. These circumstances rendered ineffectual several trials which I made, to collect the matter from a healthy ulcer, on pieces of glass.

After several unsuccessful trials, in different ways, to collect the fluid in the various states of its formation, I used small pieces of very fine lamellæ of talc ; which, although hard substances, were, from their extreme thinness, very light ; and, having a smooth polished surface, gave less irritation than any other substance that I could devise. One circumstance which renders them fit for these experiments, is, that the fluid being in very small quantity, and from that circumstance drying almost immediately, there is no time for removing it from the

surface upon which it is collected, to another, for examination.

The experiments were made upon a healthy granulating ulcer, on the upper surface of the prepuce of a healthy young man, about two inches square, forming good Pus.

EXPERIMENT VI.

I exposed the surface of the ulcer; wiped it dry, and applied a piece of talc upon one part of it, leaving the rest exposed. The surface of the talc was almost immediately covered with a thin fluid. This, in about three minutes was removed and examined by the microscope: it appeared to be transparent; and although examined for some time, did not change in any respect from the appearance it at first exhibited.

This experiment proves that, the fluid,

formed during exposure, is not Pus at the time of its formation.

EXPERIMENT VII.

I wiped the ulcer, and applied four very small pieces of talc upon different parts of it; immediately afterwards covering the whole with a plaster of common cerate, spread upon lint, to prevent the evaporation of the fluid.

In 5 minutes—I removed one of the pieces of talc, and examined the fluid on its surface; which appeared like a thin transparent jelly, divided into masses; but in which no globules could be distinguished.

In 10 minutes—another piece was examined, and the appearance was like the former. But, at the bottom, a number of small globules could be readily discerned.

In 15 minutes—a third piece was exa-

mined, and the whole mass appeared to be made up of small globules; but these were almost transparent, and seemed to become more distinct and opaque while looking at them.

In 20 minutes—I examined the fourth piece, and the globules were found more numerous and opaque, like those of common Pus.

From this experiment we find that Pus, at its formation, does not contain globules; but is a transparent fluid, of a consistence, in some sort, resembling jelly; and that the globules are formed while it lies upon the surface; requiring, in some instances, fifteen minutes for that purpose.

To see how far the formation of the globules depended upon the fluid remaining in contact with the granulations, I made the following comparative experiment.

EXPERIMENT VIII.

The ulcer being exposed and wiped dry, I applied, to different parts of its surface, two pieces of talc, and covered the whole as in experiment VII. In five minutes, I removed one piece, and found the transparent fluid, mentioned above; but no globules. I then covered the surface of the talc, on which the fluid lay, with another piece of talc, to prevent the fluid coming in contact with the granulations, and applied it again to the ulcer. In twenty-five minutes more, I examined it by the microscope; as also the fluid upon the other piece of talc, which had remained thirty minutes, and found, in both of them, the globules distinct and very numerous; but most so upon the portion of talc in contact with the ulcer.

This proves that, after the fluid is once separated from the vessels, the formation

of globules is a change taking place within itself; independent of the granulations which secrete it.

EXPERIMENT IX.

I applied a piece of talc, as before, and covered the whole ulcer for two minutes; I then removed the piece of talc, and examined its surface by the microscope: at first, no globules appeared. The examination was continued five minutes; in which time the globules became exceedingly distinct to my own eye, and to the eye of another person well versed in microscopical experiments.

This experiment I repeated several times; but the quantity of fluid was in general so small, that it evaporated to dryness before the change into globules took place.

From this last experiment, it is not only evident that the formation of globules

in matter is a change that takes place in the fluid after it is secreted; but it further proves, that the globules are formed in a much shorter time when the fluid is exposed, than when kept from the air. And, I think, we are led, from the whole of these experiments, to conclude that the time required for the formation of Pus, in the state we commonly find it upon a healthy ulcer, varies according to circumstances, and is from five minutes to twenty.

In treating of the effects which matter produces on the body, I shall consider it as essential to the formation of granulations in wounds which are kept from healing by the first intention or adhesions, and to the filling up of cavities which are exposed. But what the particular effects are, by which Pus either gives rise to, or assists the process of forming granulations, I must confess myself to be entirely ignorant. Nor am I acquainted with any effect which it produces on the parts that

formed it, or upon the constitution, believing that all the effects which are attributed to matter, do not arise from any property in the matter, as Pus; but are in consequence of some extraneous substance being mixed with it; or, some morbid affection of the parts which form it. And this observation is equally true, whether we consider its local or constitutional effects.

Although Pus frequently produces considerable local irritation upon the neighbouring parts, it never affects the surface which formed it: this arises from the parts themselves not being susceptible of irritation from their own matter; which may be illustrated by several of the secretions, and morbid poisons.

Absorption of matter has long been considered as the cause of many diseases; but this opinion seems to be done away by the late advancements in physiological knowledge: and indeed the effect is not

sufficiently general to arise from such a cause ; since instances of matter being absorbed, occur daily, where no ill consequences whatever are produced in the constitution.

Among the diseases which have been considered as consequent to absorption, the principal are, a general wasting of the body, hectic fever, and diseases of the lungs.

That such complaints do frequently occur in patients who have a considerable discharge of matter from large abscesses, or ulcers, is a fact that every one will admit ; but if the length of time the local complaint has continued, and the injuries which the constitution has sustained from it, be likewise taken into the account, with all the other attending circumstances at the time the consequent disease is produced, it will appear that we cannot, with justice, attribute its origin to the absorption, which has been equally present

through the whole time ; but must refer it to the debilitating effects of a long continued discharge, or a constant irritation, preying upon the constitution, and in the end becoming the cause of constitutional diseases.

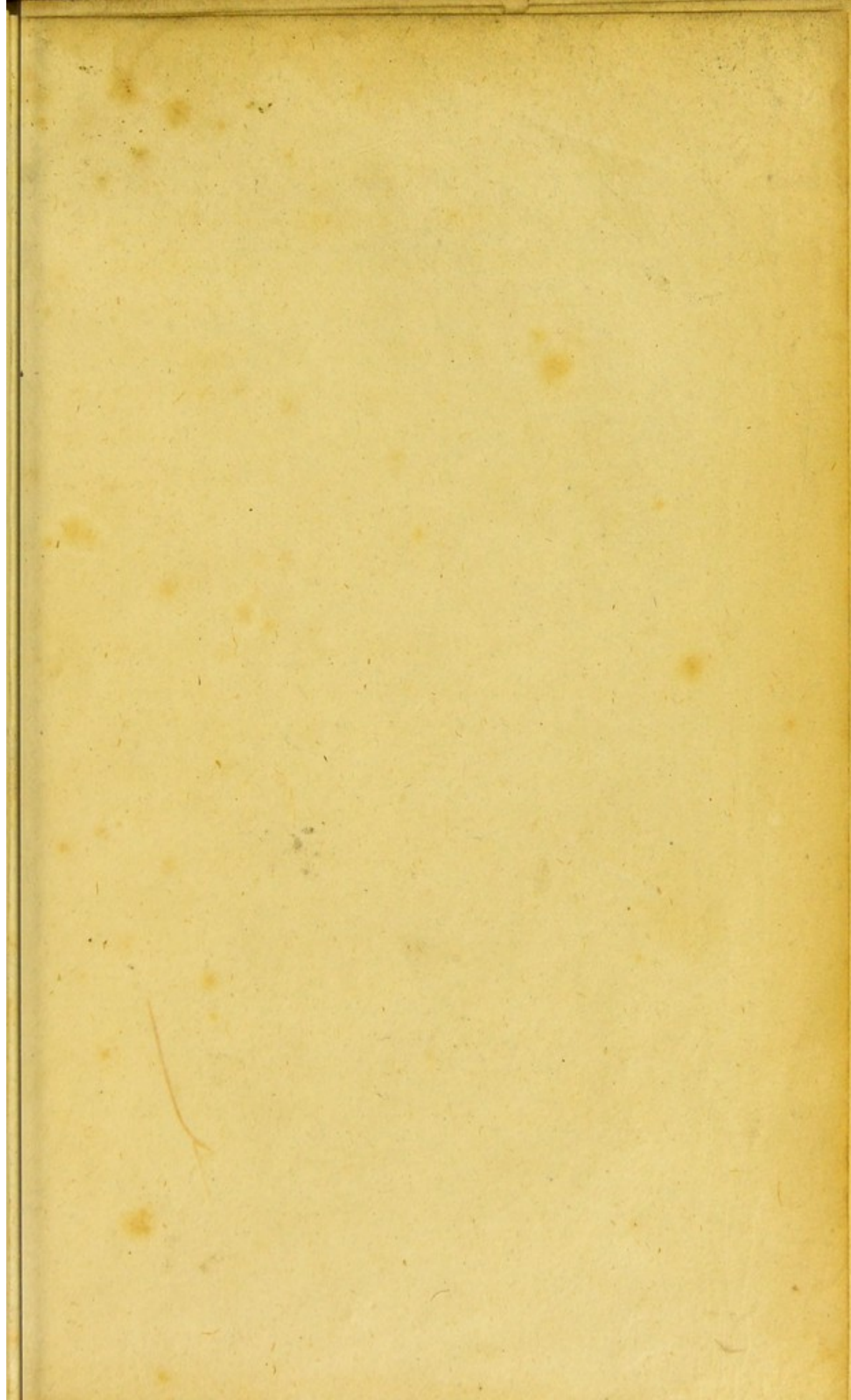
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