

The external wound was trifling, but it was evident that a great shock had been given to the foot and leg. Four days afterwards the limb was in a state of mortification as high as the knee, and the mortification seemed to be extending to the thigh. I amputated the thigh as high up as I could, near to the great trochanter. We dissected the limb very carefully. The large arteries, and also the large veins, were quite pervious. There was, in fact, no injury whatever to the arterial trunks; but the cellular membrane, the muscles, and, in short, all the structures, seemed to be more or less disorganized. There were spots of ecchymosis in the large nerves; the periosteum was universally detached from the fibula, and very nearly so from the tibia. How does the periosteum adhere to the bones? By the small vessels. It is evident, then, that the shock of the accident must have occasioned a great injury to the small vessels connecting the periosteum to the tibia and fibula, and the probability is, that the same kind of injury inflicted on all the capillary vessels of the limb laid the foundation for the mortification. I do not see how the occurrence of mortification in cases like this can otherwise be explained.

It has been a sort of *dictum* of the schools of surgery, that you should not amputate while mortification is going on; and certainly, when there is mortification from ossified arteries (as I shall hereafter explain), or where there is mortification from inflammation, you ought to wait for the mortification being stopped, and for the formation of a distinct line of separation, before you proceed to an operation. But it must have been palpable to every body who took the pains to consider the subject, that this rule would not apply to all cases of mortification. For example, a man has a strangulated hernia; when you open the sac you find the omentum strangulated, a part of it dead, and the mortification still extending. You would not hesitate in a case like this to cut off the dead and dying omentum. If piles were undergoing the process of mortification from being strangulated by the sphincter muscle, you would not hesitate to cut them off. You may conceive many other cases, in which the cause of mortification is local, and to which the general rule which I have just mentioned does not apply. Baron Larrey has the credit of having pointed out more distinctly than had been done before, that where there is mortification from local injury, you may venture to amputate, though the mortification is still spreading. But I apprehend that the operation must be had recourse to at once, and that the case admits of no delay. If, in consequence of local injury to a limb, mortification has begun, but has not yet produced any severe shock on the system, there you may amputate. But where the mortification has been going on for some days, so that the system has begun to be influenced by it, the pulse getting weak, perhaps intermitting, and with great prostration of strength, in such a case you must venture to amputate. Under such circumstances it is probable that the system is not in a state to bear the additional shock of the operation. However, I believe that cases enough may be adduced to prove that Baron Larrey's rule of not waiting to amputate till the mortification has stopped, is applicable in a great number of instances

where the disease arises from local injury. It is good in theory, and there is now sufficient experience to enable us to say that it is good in practice also.

LECTURE VI.

ON MORTIFICATION. (Continued.)

DESTRUCTION OF PARTS BY CAUSTICS.

PARTS may be destroyed by the application of various substances, which exercise a chemical action on the materials of which their organization is composed. We call these substances *caustics*, and sometimes *escharotics*. This is a subject of especial interest in practical surgery; and in considering it I shall not confine myself to the *modus operandi* of caustics, but I shall extend my observations to the modes of using them, and explain some of the principal occasions on which you may, in the treatment of diseases, have recourse to them with advantage. I have no scruples in doing this, as I am not restricted by the rules of a systematic course of lectures, and need have no object in view, except that of making these discourses as useful to you as possible.

I have said that caustics act chemically, destroying in this manner the organization of the parts to which they are applied. If there be any exception to this general rule, it is in the case of *arsenic*, in the operation of which there seems to be something peculiar. I make this observation, because it has appeared to me, that while other caustics have a manifest action on the dead body, it is not so with arsenic. I very much suspect that arsenic acts merely on the fluids, while ordinary caustics act on the fluids and solids also. However, I offer this to you as a conjecture, and as a matter deserving of further inquiry, and not as a well-established fact. All other caustics which I have made the subject of experiment produce a distinct alteration in the condition of the dead body, though different in appearance from what they produce on the living, in which they operate on the fluids as well as on the solids, and in which the blood moving in the small vessels conveys their influence beyond the surface to which they are actually applied.

A great variety of chemical agents may be employed as caustics. It would be an endless task for me to describe all of those with which I am myself acquainted; and if I were to do so, a multitude of others would be left unnoticed, of which I have no experience. I shall only speak of those which we are in the common habit of employing, and the right use of which will, if I am not mistaken, enable you to accomplish all that can be accomplished in this way.

There is some difference in the action of different caustics: some

act slowly, others rapidly; some produce much pain, others comparatively little pain: the pain caused by some is very severe for a short time, by others less severe, but of longer duration: some destroy a part to a much greater extent than others: the slough made by one kind of caustic will separate much sooner than that made by another. The period occupied by the separation of the slough seems to depend on the quantity of surrounding inflammation. If the inflammation of the margin be considerable, the slough is soon thrown off; whereas, if it be trifling, it may remain attached for a long time. If the caustic be applied merely to granulations, the slough separates much sooner than if it be applied to the skin or to other parts of original structure.

There is no class of cases in which you will have such frequent occasion to apply caustic, as those of exuberant granulations, such as are commonly called *proud flesh*. In some cases in which there is little disposition to form new skin, the granulations rising above the level of the skin in the neighbourhood, it is important that they should be destroyed. On these occasions we commonly use the nitrate of silver, and it is quite a sufficient caustic for this purpose. You rub the part with it pretty freely, and the next day the exuberant granulations have disappeared, partly by sloughing, and partly by absorption. There are, however, occasions on which you will find a great irregular mass of unhealthy granulations beyond what the nitrate of silver will easily destroy. Such granulations as those to which I now allude are frequently generated over an old carious surface of bone, and you will then find that the ointment which I am going to mention makes an excellent caustic application for them. It is a very old prescription, but not the worse on that account. The ointment consists of verdigris, sulphate of copper, nitric oxide of mercury, of each two drachms, oxymuriate of mercury one drachm, with as much hog's lard as is necessary to blend them together. This may be spread on lint, and one or two applications will be sufficient to destroy a very large mass of fungous granulations.

One mode of making an issue is by means of caustic, and for this purpose we generally employ caustic potash (potassa fusa), or strong nitric acid. The former may be rubbed on the part until it has penetrated through the skin, and that is enough. If you continue rubbing it afterwards it goes deeper than is necessary, and generally gives rise to considerable bleeding. This caustic continues to spread after you have ceased to apply it, and you must make an allowance for this when you use it, otherwise you make too large a slough. The concentrated nitric acid spreads a little after it has been applied, but not so much as the caustic potash. The nitric acid is applied by means of lint on the end of a probe dipped in the acid, and rubbed for several minutes on the surface. I have seen issues made by the nitrate of silver made into an ointment and laid upon the part. It makes a slough of the skin, and as far as the mere issue is concerned, will do very well; but it is very slow in its action, and causes ten times the pain produced by other caustics.

When an issue is open you want to keep it so, while, perhaps, it has a tendency to heal; and there are other occasions on which

something is required to prevent sores or the orifice of a sinus from healing. A man may have a small abscess by the side of the anus. If the orifice heals, the matter collects within, and a large abscess is formed, which should be prevented if possible. In these cases the best thing that can be done is to touch the margin of the issue, or the orifice of the sinus, now and then with the caustic potash. It makes a slough which takes some time to come away, and the application of it once in ten days or a fortnight will answer that purpose. I have seen the nitrate of silver frequently used with the same intention; but in fact it promotes cicatrization, and heals the sore or the sinus, instead of keeping it open.

There is an occasion on which you will not unfrequently have occasion to apply caustic, and where it is very material, indeed, that it should be done in a careful and scientific manner. I refer to cases in which a person has been bitten by a rabid dog, or a dog supposed to be rabid. It is evident that in either case the treatment must be just the same. On these occasions it is better to excise the part thoroughly and to take out a good deal of the surrounding parts. But it sometimes happens that this cannot be very easily accomplished. A person, for instance, is bitten in the palm of the hand; the dog's tooth penetrates into it, and it would be a very serious thing to cut out tendons, nerves, and every thing else down to the metacarpal bones. Or it may be that you had supposed that you had cut out the part completely, and yet find on examination that the tooth has penetrated further, where you cannot very easily follow it with the knife. On these and similar occasions, you can do nothing better than trust to the application of caustics. Mr. Youatt, the veterinary surgeon, who has had great dealings with rabid dogs, tells me that when he has been bitten he has always applied the nitrate of silver, and he is alive and well now: so that in his case this kind of caustic has answered the intended purpose. But, then, he applies it at the very instant when he is bitten; whereas very few of your patients have the nitrate of silver in their pocket or could apply it if they had. The best caustic, I apprehend, to use on these occasions, is the caustic potash; and for this reason; that it dissolves the parts with which it comes in contact, and that then the dissolved caustic penetrates still further beyond the part to which it has been actually applied. If the tooth penetrate into the cellular membrane, some of the saliva may have gone to the cells beyond; and if you apply the nitrate of silver, or the nitric acid, these will coagulate the fluids and harden the solids, and they will not diffuse themselves, like the caustic potash. A convenient way of applying the latter on these and some other occasions is this—melt some of the caustic potash in a silver or platina spoon, and when melted dip into it the blunt end of a probe, and it will come out with a varnish of the caustic upon it; dip it in again and again, until a button of caustic of sufficient size is formed upon it. By means of a probe thus armed you may carry the caustic into a narrow wound, so that you are sure it will penetrate wherever the dog's tooth has penetrated; and then, from the particular nature

of the caustic (as I have explained), you may be certain that it will penetrate still further, and as far as the saliva can have reached.

Caustics may often be used very advantageously for the purpose of destroying diseased lymphatic glands. A man has chronic inflammation and enlargement of the glands in the groin, forming a considerable tumour. The skin over them ulcerates, forming at last a large ill-conditioned ulcer, which will not heal. What is the reason of this? Because no ulcer will heal unless it has a healthy basis, and here the basis is a mass of diseased glands. These diseased glands may take a long time to recover themselves—not merely months, but one or two years, and as there are plenty of glands to spare, there is no harm in destroying them. You may effect this by the caustic potash, but not very well; you want some kind of caustic which will lie in the substance of the diseased glands and destroy their inner structure as well as their outer surface. The form of caustic I am going to mention was used by the late Mr. Pearson, from whom I had the prescription. It consists of one ounce of crumb of bread, two drachms of oxymuriate of mercury, one drachm of red oxide of lead. These are to be mixed together, kneaded with the fingers, and formed into a sort of paste. The paste should be rolled into little conical troches, and these, if left to dry, become hard like bread seals. These troches may be stuck into the enlarged gland like pins into a pincushion. They produce no effect at first, but in the course of a little time they begin to act, and the patient knows this by the pain produced. This lasts for some hours, and if a sufficient number of the troches be employed, the whole of the gland is at once destroyed. If any portion remains not destroyed it is easy to effect it by repeating the process. I do not know whether the red-lead answers any useful purpose; I suppose not, but I found it in the original prescription, and on all occasions where I find a particular prescription to do just what is wanted, I am unwilling to alter it.

Caustic may be applied to various morbid growths; and I am inclined on the whole, when these can be easily destroyed by caustics, to use them in preference to the knife, and for these reasons:—*First*, the former are on the whole much less formidable to the patient; *secondly*, if I am not very much mistaken, there is less chance of any ill consequences from the application of caustic than from even a small operation with a knife. For example, you very seldom find an attack of erysipelas follow the use of caustic, certainly much less frequently than after the use of the knife. Again; the slightest wound in certain constitutions will be followed by that diffuse inflammation of the cellular membrane, terminating in gangrene, which I noticed in a former lecture. But I do not recollect that I ever saw the same thing to happen after the use of caustic. The cases, however, to which caustics are applicable, are only those in which the morbid growth is of small size, and placed quite superficially. Undoubtedly it would cause too great a shock to the constitution, and too much suffering to the patient, for him to have a morbid growth of very large size destroyed in this manner.

There is a very common kind of morbid growth, in the form of

warts and condylomata, which occur in women about the pudenda, and in men on the glans penis and about the anus. These are very easily destroyed by caustic. The nitrate of silver will destroy warts on the glans penis very well, if they are of limited extent, but not when they are collected in large masses. In such cases as these strong nitric acid may be employed. Rub the warts with it, and repeat the application from time to time till the whole are destroyed. The following application will answer the purpose very well in cases where the warts are not very extensive—a drachm of muriatic acid, added to three drachms of muriatic tincture of iron. This destroys the warts very well, but not very rapidly. The application must be repeated every day for some time, till the warts shrivel, decay and drop off. There is a very common escharotic, and a very useful one for warts, on the glans penis or pudenda, where they do not exist to a great extent—namely, equal parts of powdered savine and verdigris. This being sprinkled on the warts destroys them, partly by making them slough, and partly by promoting their absorption. Another excellent caustic, on this and some other occasions, is this; take half an ounce of strong nitric acid, add to it half a drachm of white oxide of arsenic. It makes a beautiful blue solution, consisting of the nitrate of arsenic dissolved in nitric acid. This may be applied to the warts by means of a probe armed with lint; and it has a double operation. The nitric acid acts immediately, and, when it has done acting, the slough contains a certain quantity of arsenic, which continues to operate afterwards. Having this double action you may suppose that it is a very efficient caustic.

On this occasion, as on many others on which you use nitric acid, without care, you will be in danger of burning the neighbouring textures. A woman who has warts on the pudenda wishes to have them destroyed, but she has no desire that the skin in the neighbourhood should be burned. This, however, will happen, unless you take care to prevent it. If you use nitric acid you should have at hand a solution of the bicarbonate of potash, by applying which you may neutralize the acid as it flows beyond the surface on which it is intended to act, and stop its operation. I may observe here, once for all, that there are many occasions when it is necessary to use similar precautions. Indeed, almost always when you use a caustic, it is prudent to have some counter-agent at hand to stop its action if it goes on a wrong part. Acids may be neutralized by alkalis; caustic potash may be neutralized by vinegar. If you are afraid of nitrate of silver burning the neighbouring parts, its action may be neutralized by common olive oil; a solution of the bicarbonate of potash will decompose chloride of zinc—and so with other caustics.

Caustic may be used with great advantage in many cases for destroying the congenital vascular tumours which we see so frequently in children—*nævi*, as they are sometimes termed.

There are small vascular spots, not exactly congenital, though they occur in early life, which present themselves on the face of children, and which not unfrequently are objects of some anxiety, especially in the higher classes of society, as they form rather ugly red specks

on the face. On examining one of them with a lens you see one large vessel in the centre, and small branches radiating from it. These spots, in most instances, if let alone, will disappear spontaneously. If, however, this does not happen, you may destroy them in the following manner. The principal vessel is near the surface. Touch it through the cuticle for an instant with strong nitric acid, and it will contract and become obliterated. This is best done by means of a pointed piece of glass, which they sell as a sort of toy under the name of a glass pen. It is in truth as bad a pen as possible, but it answers this purpose, and some other purposes in surgery, extremely well. If the acid flows over the cheek, you may neutralize it by a little bicarbonate of potash. But this will not destroy these vascular stars in every instance; and there is another and still a more certain method of proceeding. Puncture the principal vessel from which the others radiate, with a lancet, and then introduce into the puncture, merely for a single instant, a very fine piece, scraped like a pencil, so as to have a sharp point of the caustic potash. Touch it for a moment only; that will be quite sufficient. But even after so slight an application, you will see that the caustic has also burned the margin of the skin, and unless you adopt other measures a trifling mark will be left. For this nothing is required but the application of a small piece of lint soaked in vinegar.

There are some congenital nævi which are altogether cutaneous. There is a very intricate plexus of little vessels filled with scarlet blood in the skin, which, being elevated above the surface of the surrounding skin, assumes an appearance which may be compared to that of a raspberry. If a nævus of this kind be of large size it must be removed by the knife or by a ligature, but if it be small, you may destroy it very well with caustic. You should not employ the caustic potash, for that would produce bleeding, but rather have recourse to nitric acid, which destroys the nævus sufficiently, while at the same time it coagulates the blood in the small vessels, rendering the nævus more solid than it was before. With a bit of stick, or a probe armed with lint, and dipped in the strong nitric acid, paint the surface of the nævus, taking care that you include the whole, but that you do not burn the neighbouring parts. This makes a slough of the surface of the nævus, and destroys it at the same time that it coagulates the blood in the small vessels below, and thus renders them impervious. But, as I stated just now, this method is applicable only where the nævi are of small size.

There are subcutaneous nævi formed by vascular tumors in the texture *under* the skin, and not *in* the skin itself. These put on a different appearance from the cutaneous nævi before mentioned. The blood here is seen not of a scarlet, but of a purple colour, because the skin lies over it. These may be destroyed by caustic when they are of small size; and even when they are of large size, if it be a great object to avoid the scar which must exist after the removal of them by the knife or by ligature. These vascular nævi have sometimes been cured by vaccination. Half a dozen punctures have been made with a lancet armed with vaccine lymph. The

pustules being crowded together in the nævus, a good deal of inflammation has ensued, with some degree of sloughing, and altogether the nævus has been cured. But you cannot depend on this method—at least so I am informed by those who have practised it, for I have not tried it much myself. But you may, on the same principle, very easily cure a nævus of this kind by caustic. For this purpose I have a very narrow lancet, perhaps about the eighth of an inch in width: I introduce it into the middle of the nævus, and move it in different directions, so as to cut to pieces, as it were, its vascular structure. I then have a probe armed by dipping the round end into the nitrate of silver melted in a platina spoon. This is to be introduced into the puncture made by the narrow lancet, and moved about, so that wherever the lancet has divided the blood-vessels, this may penetrate. It causes inflammation and sloughing, at the same time obliterating the vessels beyond the margin of the slough. When the slough is separated, there is a slight discharge of pus for a few days, and if the tumour be of small size you will find that it is cured; but if it be large the application must be repeated. I have used this on several occasions with great advantage, especially when the tumour has been on the face, where it was a great object not to destroy the skin. If you remove one of these tumours either by the knife or by ligature, you must in either case leave a large cicatrix. But by applying the caustic in the way which I have mentioned you save the skin that lies above it. I was last year called to see a little child that had one of these subcutaneous nævi at the end of the nose, which gave it a very ugly appearance. A good part of the alæ of the nose was involved in the tumor, and to have cut it out would have disfigured the child for life. I treated it according to the method which I have just explained. Several operations were required, but they succeeded perfectly; the child is quite cured of the nævus, and I will not say that you see no mark at the end of the nose, but there is so little that, unless your attention were called to it, you would not know that any thing had happened. I have destroyed an extensive nævus covering a very large portion of the face in the same manner, there being very little or no scar afterwards.

There is another class of cases which may be very conveniently treated with caustic, and in general much better than with the knife. I mean those tumours which I have been in the habit of calling half malignant, and which occur on the face chiefly of elderly people. A man has a soft tumour upon the face, covered by a smooth skin, and not exactly a wart. On cutting into it you find it consists of a brown solid substance, not very highly organized. A tumour of this kind may remain on the face unaltered for years, and then when the patient gets old, it may begin to ulcerate. The ulcer spreads slowly but constantly, and if it be left alone it may destroy the whole of the cheek, the bones of the face, and ultimately the patient's life; but it may take some years to run this course. So far these tumours in the face, and these ulcers, are to be considered as malignant. Nevertheless they are not like fungus hæmatodes or cancer, and for this reason: that the disease is entirely local. It does not affect the

lymphatic glands, nor do similar tumours appear in other parts of the body. I have generally been in the habit of destroying these tumours with caustic, and when they are of small size I prefer caustic to the knife, for the reasons I have formerly mentioned. If a patient applies to you with one of these tumours as large as a pea or a horse-bean, not ulcerated, but beginning to increase in size, you may proceed in the following manner. First, make a crucial incision through the substance of the tumour with a lancet. Then, as soon as the hæmorrhage has ceased, apply the caustic potash in the incision. You may destroy the tumour if you please by letting the caustic act on the skin without using a lancet, but its destruction is much more easily accomplished in the manner which I have suggested. One application is generally sufficient; the slough comes away, and the sore heals. Perhaps it will be asked—Is there not this objection to the use of caustic; namely, that some time is necessary for the slough to come away—then a further time for the healing of the wound? and does not all this make the process of cure more tedious than it would be if the knife were used instead? The fact is, that a wound always heals much more readily after the application of caustic than after the use of the knife. Take two cases—if you destroy one tumour of a given size by the knife, and then the other, supposed to be of the same size, by caustic, in spite of the time occupied by the separation of the slough, the sore in the former case will be healed sooner than that in the latter.

If the tumour be ulcerated, this is favourable rather than otherwise to the use of the caustic, because it saves the trouble of dividing the part with a lancet. When, however, the tumour has been of long standing, and has produced an extensive ulceration, the caustic potash will not well answer the purpose. There will be so much bleeding from the large surface that the caustic will expend its action on the blood, and will produce but little effect on the disease. You may then destroy the tumour with nitric acid, but the best applications, according to my experience, are the chloride of zinc or arsenic. There is, however, one very serious objection to arsenical caustics applied to a large surface; the arsenic is sometimes absorbed, producing severe constitutional symptoms. There was, in former times, a Miss Plunkett, a quack, who pretended to cure cancer, and it was known afterwards that her secret consisted in the application of arsenical caustics. An old medical practitioner, whom I knew in the early part of my professional life, informed me that it had fallen to his lot to see many of Miss Plunkett's patients, and that after the application of her caustics many of them died, from what seemed to be inflammation of the bowels. It is, indeed, notorious that the topical application of caustic to a great extent is very likely to produce the same poisonous effects as arise from an absorption of arsenic from the alimentary canal. The chloride of zinc acts merely locally; it is not absorbed into the constitution, and its use is not attended with any constitutional disturbance, nor productive of the smallest danger. I generally use the chloride of zinc by mixing it with an equal quantity of flour. It deliquesces from the moisture of the atmosphere, or you

may add a little water to make it into a paste, which is to be spread on lint. If you want a deep slough, spread the paste thick; if a thin one, spread it as thin as you please. The depth of the slough depends on the thickness of the paste, and the thicker it is the longer the action of it continues. The application of the chloride gives the patient a good deal of pain, which you must make him endure as well as you can by giving him opium. Some patients suffer much more than others; some will not require any opium at all, others will require it in great abundance; but when the action of the caustic has ceased, there is an end to the pain, and the slough comes away in a few days. If the ulcerated surface be of large size, and the disease of much depth, a second application may be required. When the disease is situated over a bone, I generally like to procure a thin exfoliation of the latter, and the caustic accomplishes this very well, acting on the bone, but not to any great depth. The exfoliation takes place in a few weeks, and when the thin layer of dead bone has come away, healthy granulations are seen beneath. Sometimes, after having destroyed a great part of an ulcerated tumour with chloride of zinc, a small portion of it may be left here and there, to which you may apply the caustic potash, or solution of arsenic in nitric acid. This solution of arsenic, or any other preparation of arsenic, may be applied to a small surface very safely. Observe that what I object to is its application to a very large surface.

Ulcerated tumours, similar to those which occur on the face, are sometimes met with on the scalp, and these too may be destroyed with caustic. You must, however, apply it in these cases with great caution, and for this reason—if you destroy at once a large piece of the pericranium, the destruction of it is likely to produce a separation of the dura mater from inside the bone. A case of this kind which I saw long ago made a great impression on my mind. A surgeon applied the caustic potash to the scalp with a view to make an issue in a man's head, who was labouring under a headache, and nothing else. He made a slough down to the bone, and exposed a piece of the occiput as large as half a crown, or larger. The patient was soon seized with a set of strange symptoms, and died. It was found that the dura mater had become detached from the inside of the bone just opposite the part where the pericranium was destroyed on the outside; and it was clear that the sloughing of the dura mater was the cause of the man's death. I mention this case to show that you must be cautious in the use of caustic when you apply it to the scalp; but you may apply it in that situation, nevertheless, if you proceed in a prudent manner. I had lately a very successful case of one of these half malignant tumours of the scalp, which was much ulcerated, and had been going on for some years. I applied caustic to the different parts in succession, not making a fresh application until the slough made by the former one had come away. By proceeding in this manner the bone was not killed, except a very thin layer on the surface, and the patient was cured.

You may, with proper precaution, apply caustics to parts situated internally, even to the inside of the mouth, and to the inside of the

female urethra. In that disease which we call *epulis*, a red tumour that looks like the gum, and which becomes connected with it, (though I believe that it really has its origin in one of the alveoli,) you may use caustics with great advantage. It is in vain to destroy the outer part of such a tumour, that is, the part connected with the gum, unless you also destroy the inner part where it originates in the alveolar process also; and from the surgeon not being aware of this circumstance I have in several instances known repeated operations with the knife, as well as the application of hot iron and caustics, fail. The caustic which I find in general to be most convenient in these particular cases, is the caustic potash. You must fix it at a right angle to the end of a pair of dressing forceps, and secure it well by tying thread round it. The caustic should be scraped small enough to enter the alveolus, the teeth having been previously removed. Having thus destroyed the disease where it originated, you may apply the caustic to that portion which is outside, and connected with the gum. But you will say that it will burn the tongue or the cheek; and so it will, if you are not careful. You must let your assistant hold open the cheek, and while you apply the caustic he must have at hand a brush dipped in vinegar, which he is to apply whenever the caustic spreads beyond where it ought to be applied. I do not recommend this kind of treatment in the case of a large *epulis*, in which it will probably be necessary to take out a portion of the jaw; but it is perfectly applicable to many cases in the early stage of the disease. With a somewhat similar precaution you may apply caustic to destroy the vascular excrescence, to which I have before referred, of the female urethra—a disease first described by Sir Charles Clarke, and of which you will find some account also in my lectures on Diseases of the Urinary Organs. For these cases you should be provided with a silver tube or shield, closed at one end and open on one side. Introduce this into the female urethra, so that the vascular fungus may project into the open side of the tube, and there apply the caustic. Here also you must trust to your assistant dabbing the neighbouring parts with some liquid which will act as an antidote to the caustic; a solution of bicarbonate of potash, if you use the nitric acid, or vinegar if you use the caustic potash. In general, in these cases, it is better before you use the caustic to remove as much of the excrescence as you can with a pair of scissors.

I have spoken of the application of caustics to some cases of what I have called half malignant disease; but occasionally they may be employed in cases of true malignant disease; such as scirrhus and fungus hæmatodes. If one of these tumours is of large size, it is better to use the knife; in fact you cannot remove it otherwise. But there are instances of smaller tumours in which you may use caustic with great advantage. I will give you an example. A lady consulted me concerning a scirrhus tumour of the breast. The tumour was very small, but there was a scirrhus gland in the axilla, and where there is one scirrhus gland you may be nearly certain that there are several others, though you cannot perceive them through the skin. I did not therefore recommend an operation. She came to town a year

afterwards; the tumour had ulcerated, and there was severe and indeed almost intolerable pain. I applied to the ulcerated surface of the tumour a paste of flower with the chloride of zinc. The tumour was apparently destroyed, and the sore cicatrized. She continued well for a considerable time. Another tumour then showed itself in the neighbourhood of the cicatrix, which was also attended with excessive pain, and that was destroyed in the same manner, as was a third tumour that appeared afterwards. By this treatment her life was prolonged a full year and a half; and during this time she was in a state not of misery, but of comparative comfort, being generally free from pain. She died at last of effusion of fluid into the chest.

A lady, whom I attended last winter, had a fungous growth over the head of the tibia. It had all the appearance of malignant disease, was of considerable size, and was partly ulcerated. There had been a tumour there before, and her country surgeon had removed it, but the disease had returned. I removed it a second time with the knife, and, as far as I could see, I removed not only the diseased structure, but the parts beyond to a considerable extent. The wound appeared quite healthy, and went on healing favourably. Just, however, as it was healed, and when the patient had fixed the day for going out of town, there appeared on the margin of the wound, where there had been nothing before, a tubercle, which seemed to be precisely similar to what the other tumor had been in its origin. I destroyed this tubercle with caustic, and the sore thus made healed. A second and a third appeared, which were also destroyed in the same manner. No others have since shown themselves, and I cannot but entertain some hopes that the disease is really eradicated.

I must not recommend you to use the chloride of zinc without giving you this caution respecting it. Never apply it except where there is an ulcerated surface. If you apply it to the skin, you must first put on a blister to remove the cutis, as otherwise it will scarcely act at all. But even when the cuticle is removed, it will not act for the first twenty-four hours; and it will then begin to produce intolerable pain, which will continue for four or five days. When the tumour is covered with skin, you must use the caustic potash, or nitric acid, first; and when the superficial slough has come away, if the further use of caustic is indicated, the chloride of zinc may be had recourse to.