III. THE DRESSING OF WOUNDS.

The Treatment of Wounds—The Open Treatment—Anhydrous Dressings—Raw Cotton Dressings—Water Dressings—Alcoholic Dressings—Earth Dressings—Antiseptic Dressings (Carbolic Acid, Boracic Acid, Carbolated Camphor, Chloral, Sulphites and Hyposulphites, Sulphurous Acid, Lead Lotions, Terebene, Permanganate of Potash Carbolated Earth and Bran, etc.)—Résumé.

THE TREATMENT OF WOUNDS.

The aim of the surgeon, when called upon to treat an open wound, is to bring about the repair of the tissues in the manner most conducive to the future welfare of the patient. Experience has not yet positively decided whether this can best be done by securing union by the "first intention," or by the slower process of granulation. The French surgeons, headed by the eminent Barron LARREY, believe that the latter more certainly avoids dangerous complications and sequelæ, and leaves the cicatrix, when healed, less painful and less liable to annoy the patient. To some extent, the English surgeons acknowledge this. Professor HUMPHREY has long advocated the encouragement of suppuration in wounds for the removal of cancer. He even retards the healing process by the insertion of issues, etc., believing that this tends to delay and prevent the return of the disease. Generally, however, both English and American surgeons pride themselves on the rapidity with which the wound heals; and their dressings are aimed to bring about union by the first intention, without, perhaps, sufficiently reflecting on the current and future dangers such success involves. Most of the dressings which will be mentioned in this chapter, therefore, have been devised with a view of inducing early healing. They are very various, and illustrate the wide differences of opinion among their originators.

THE OPEN TREATMENT OF WOUNDS.

This simplest of all methods of treating amputations and other wounds has been reported very favorably upon from the hospitals of Berne, Königsberg, New York city and elsewhere, and by such surgeons as Dr. F. PEYRE PORCHER, of Charleston, S. C., VINCENZ VON KERN, EDWARD SCHWARZ, Professor BILLROTH, etc.

DR. BUROW, OF KÖNIGSBURG.

This writer gives, in brief, the following as the essentials of the system he follows: In a case of amputation of the breast, he carefully checks the bleeding by the use of silk ligatures, which he cuts off short. The wound is then left absolutely open, being protected from dust and flies by simple oiled cloth. No sutures or plasters are used. When the first oiled cloth is loosened by suppuration, a second is applied, dressed with a simple ointment. When granulations spring up luxuriantly, the cloth is wet with a solution of acetate of alumina. This is the whole treatment. After amputation of the limbs, he first ligates the larger vessels before loosening the Esmarch's tube, completing the ligations after removing it. The wound is then left open for half an hour, with the double object of guarding against secondary hemorrhage and of allowing the surface of the wound to ooze with a serous fluid. Then he puts in three sutures, securing them with a loop, and not a knot, so as to allow for swelling of the tissues. Two or three strips of plaster are placed between the sutures, and the lower angle of the wound is left wide open for the free escape of discharges. Then, by position of the limb and careful watching, it is made sure that the secretions can escape freely. He insists on the greatest cleanliness on all hands, and never uses sponges a second time.

PROFESSOR F. PEYRE PORCHER, M. D., OF SOUTH CAROLINA.

In a case of circular amputation of the upper third of the thigh, Dr. PORCHER describes the dressing he employed as follows: A bit of soft linen cloth, fifteen to twenty inches in length, was torn into strips an inch wide; these were dipped into a basin of cold water, and being applied, one after the other, to the under surface of the limb, they were brought over and down tightly, so as to overlap the stump

six or eight inches on each side, thus bringing the lips of the wound into close co-aptation.

The strips being wet, they adhere tightly to the skin and take the place of adhesive plaster, to which, in many respects, they are infinitely superior. To make sure that they will accomplish this purpose perfectly, and be retained in position, a few turns of a roller bandage, also wetted, may be passed around the stump, and over the free ends of the strips. Cold water is afterwards applied to this dressing, either intermittingly or constantly, by hand or by irrigation, that the strips may be kept wet and the rising temperature abated. A single narrow strip of diachylon plaster may take the place of one of the strips, to give greater security, if there is any apprehension on this score, or at a later period, when it becomes needless to continue the application of cold water.

There are several great advantages ensuing from this procedure; the wound is kept perfectly clean and cool, the inflammation is subdued by the cold water, the purulent discharges escape freely between the edges of the strips, they are easily removed, there is absolutely no disturbance during warm weather from flies. An occasional application of a weak solution of spirit, carbolic acid, or Labarraque's fluid, may be made to the wounds at the daily dressing, to disinfect and stimulate when these objects are desirable; and finally we avoid all trouble which follows the removal of diachylon plaster.

PROF. JAMES R. WOOD, NEW YORK.

No one in this country has given closer attention to the treatment of amputations by the open method, nor with better result, than this surgeon to Bellevue Hospital. The details of his plan are as follows: After a limb has been amputated, the flaps are not even approximated, but left entirely open. A pillow of oakum is placed under the stump, which is allowed to rest upon this support until the wound is nearly healed. A small piece of gauze is placed over the contour of the stump, and a cradle is placed over the limb, so that the clothes may not come in contact with the painful extremity. This is all the dressing that is employed; no sutures are used except in the lateral skin-flap method, as will be described. No adhesive plaster is employed, no oil-silk is placed over the stump, no bandage is applied, no dry charpie is stuffed into the wound, no fenestrated compresses are

placed between the flaps; in other words, the stump is left entirely alone, just as the surgeon made it in his amputation. The wound is thus allowed to drain freely, and the stump is gently washed at frequent intervals by means of an Esmarch's wound-douche. The water in this irrigator is impregnated with crystals of carbolic acid, and, after this ablution, balsam of Peru (which makes a fine stimulating application) is poured over the granulating surface. The discharge which falls from the wound is removed every few hours in order to secure perfect cleanliness; and it is a fact worthy of observation that this discharge will not decompose when exposed to the open air, but that it requires a warm temperature, such as exists in the stump itself, in order to develop putrefaction. The pus, thus coming away from a nidus of putrefaction which would otherwise be formed, falls upon a piece of sheet-lint where the temperature is cooler, and thus does no harm. The stump is then washed at frequent intervals until suppuration has nearly subsided in the wound, and then the flaps are gradually approximated by means of strips of adhesive plaster. Too much importance cannot be attached to this method of operating by the lateral skin-flaps. It affords the best facility for free drainage, and makes the most serviceable stump. It is important to dissect the flaps very long, when they are subjected to the open treatment, as shrinking often follows exposure to atmospheric influences. During the entire healing of the wound the greatest possible care is exercised in reference to the use of the instruments necessary to perform the dressing of the stump. No sponges are ever used in the wards. Each patient has his own bottle of balsam of Peru, and every instrument used in the dressing of one stump is thoroughly washed in carbolic-acid water before it is employed in the dressing of another. So far as has been practicable, a different set of scissors, dressing-forceps, and other instruments employed in the manipulation of a dressing, are used, so that each patient has his own instruments, and in this way absolute cleanliness is secured. Each dresser invariably washes his hands in carbolic-acid water after dressing one case before undertaking another, and any one who is dressing unhealthy wounds in the pavilion, or making autopsies, is not allowed to even assist in the daily dressing of healthy wounds. To some this red tape may seem absurd; and it is certainly true that one must be thoroughly convinced of the necessity of these measures before he can be induced conscientiously to observe them. The advantages claimed are:

1. That suppurative fever is very much diminished, and in some cases almost entirely obviated, by this method of dressing.

2. That the tendency to the formation of abscesses is very much lessened.

3. That the predisposition to erysipelatous inflammation is diminished.

Wounds thus freely exposed to the air, when kept for some time in one position, and so placed that the discharges easily escape, are said to succeed as well as wounds treated by the other methods; and this opinion is supported by statistics advanced by surgeons who have given the plan an extensive trial. The explanation offered of its success is that part of the secretions form a crust upon the surface of the wound, the rest flows away, and the wound remains odorless. The crust is dry, and consequently unfavorable for the development of spores that may fall upon it; and when it comes off, it discloses a healthy, granulating, perhaps partly cicatrized surface, which cannot be easily injured by contact with ferments. This is the "healing under a scab" of the English authors. BILLROTH says the method was first introduced in 1856, by VEZIN, and that he himself adopted it in 1860, and has since employed it, with the best results, in amputations, resections, and after the removal of many tumors. Its chief advantage is that it protects against the dangerous primary phlegmonous inflammations, by allowing free escape of all the secretions; but it does not protect against erysipelas and hospital gangrene, and is useless when inflammation has once set in. If the wound is irregular, and permits the accumulation of pus and secretions, there is danger of inoculation by micrococci.

THE ANHYDROUS DRESSING OF WOUNDS.

MR. SAMPSON GAMGEE, SURGEON TO THE QUEEN'S HOSPITAL, BIRMINGHAM.

This surgeon (*The Lancet*, Dec. 23d, 1876,) advocates *dry* and *rare* dressings in the treatment of all wounds, whether the injured parts be soft or hard, skin, bones or muscles, or all combined. Drenching wounds with water during an operation, and washing them with it afterwards, are mistakes. Water favors decomposition, which is the enemy of healing action. After an operation wound, the cut surface is first thoroughly dried with a soft sponge; the edges are then accurately approximated, and kept so with a few strips of lint soaked in Richardson's styptic colloid, (see Index,) or else with numerous points of silver suture; if the surface is large, it is dressed with a layer of fine cotton wool, such as is used by jewelers, and over this, fine picked oakum; a well-adapted bandage exerts gentle and firm compression on the parts. This dressing should not be touched for several days—four to six—and then the use of water should be scrupulously avoided. To remove the styptic colloid, a mixture of alcohol and ether may be employed, or equal parts of absolute alcohol and distilled water, warmed to a little above the heat of the body. CHASSAIGNAC'S drainage tubes are invaluable to convey the products of suppuration from the wound.

MR. ROBERT HAMILTON, M. R. C. S.

The anhydrous dressing of wounds has also been strongly insisted upon by Mr. ROBERT HAMILTON, M. R. C. S., of Liverpool. (*Lancet*, May, 1877.) He regards the use of water, either in washing the wound or as a lotion, as a prolific source of germs, and therefore carefully to be avoided. Even when mixed with carbolic acid, as in Mr. LISTER'S applications, it may still act in this way. He prefers to cleanse the wound with *alcohol*, and to apply some such dressing as dry lint, or lint saturated with oil, or carbolated oil, or compound tincture of benzoin, placing upon this a little oakum and a light bandage. Instead of using as a spray a solution of carbolic acid, as does Mr. LISTER, he prefers a mixture of one part of compound tincture of benzoin to four parts of methylated spirits. Or, he dusts the surface of a burn, for example, with a dry powder, as equal parts of

starch and oxide of zinc. He has found either of these methods leads to better results than when water, either by washing the surface or applying it as a dressing, has been used. It must not, however, be understood that he advocates the leaving of wounds uncleansed from dried, loose scabs or decomposing pus. On the contrary, the skin round a wound should be kept scrupulously clean. There are other methods of carrying out the anhydrous dressing of wounds, such as the use, in the first instance of collodion, to close the wound, or of clotted blood, with dry lint superimposed, or of picked oakum or tenax. Under any of these a wound of moderate size often heals by first intention.

RAW COTTON DRESSING.

DR. ALPHONSE GUÉRIN, OF PARIS.

The adoption by this surgeon of raw cotton as a dressing for wounds was a result of the demonstrations of PASTEUR, that putrefactive fermentation is due to the presence and growth of vegetable organisms, which float in the air and thus gain admittance to fresh wounds; and as the experiments of Professor TYNDALL show that these minute bodies become entangled in the meshes of cotton wool, it occurred to M. GUÉRIN, who was at that time attached to the Hôpital St. Louis, as a possible source of advantage. It was during the siege of Paris, when nearly every amputation was followed by fatal pyemia. He forthwith tried the cotton as a dressing on several patients, binding it upon their wounds in liberal quantity, and keeping it accurately applied by firm compression with bandages. To his surprise and delight, he found that the chill, by which the advent of the fatal complication is always heralded, did not occur, and his patients went on to get well. Encouraged by this experiment, he repeated it with equal success; those dressed with raw cotton were found to do well, while others in the same ward died of the prevailing endemic. The result was so remarkable that surgeons from other hospitals came to St. Louis to witness the rare sight of patients recovering after amputation, and themselves adopted this mode of dressing wounds. Shortly, the use of raw cotton was systematized as a surgical dressing, and it has since been very generally employed.

The details of the dressing are as follows: After the operation has been completed, bleeding arrested, and the surface of the wound washed with water, or some weak disinfecting solution, a large bunch of cotton-wool is placed between the lips of the wound, and the whole limb is then enveloped in a layer of cotton eight or ten inches thick, which is then bound down very firmly with roller-bandages, which are tightened on the following day, and then the dressing remains untouched for about three weeks. If the pus makes its way between the limb and the dressing, and appears after a few days at its free margin, additional bunches of cotton are placed over the edge and bound down. Clinical experience shows that patients whose wounds are dressed in this way generally remain free from fever and pain, eat and sleep well, and make good recoveries.

After a circular amputation of the thigh, an assistant steadies the stump, while another pulls apart the edges of the divided integument, and the surgeon proceeds to fill the cavity thus presented to him with small masses of cotton torn from the sheet of wadding, small at first, and applied accurately to every part of the cut surface, then larger masses as it becomes filled, and then layers of the wadding are applied over and around the stump and upon the hip and pelvis, and over all a spica-bandage put on, with great care, and as much compressing force as possible. No air must come in contact with the wound that has not filtered through the thick mass of cotton. Moreover, this cotton must be of good quality, fresh from the manufactory, and it must not have been exposed to the air of the hospital. Under favorable circumstance, he has found it the best plan to leave this dressing in place about two weeks, when the granulating surfaces are usually found ready for approximation for final union; but he never renews a dressing in the foul air of a ward. Tarlatan and collodion straps are preferred to strips of plaster, as more transparent. M. GUÉRIN claims that this method differs from that of "occlusion," because air can pass freely through the cotton, which acts only as a filter, freeing it from all spores and ferments. PASTEUR says that ferments are undoubtedly present in the cotton and in the wound, but that the physical condition of the pus is rendered unfavorable for their multiplication by the absorption of its liquid portions, and he advises exposure of the cotton to a temperature of about 400° Fahr., before application, as an additional precaution. However that may be, the

method has two evident advantages—equable temperature, and complete immobility of the limb.

M. GUÉRIN rarely or never employs his dressing except where the limb can be covered for a considerable distance above the wound or operation. He covers to the middle of the thigh, for example, after CHOPART'S operation. The compression by the bandage, as above described, he lays much stress upon as an essential point in the treatment. Secondary hemorrhage can hardly occur when the bandage is properly applied. In the rare cases of pyemia occurring under this dressing, the rigors take place at longer intervals and are less severe than in other cases.

WATER DRESSINGS.

The employment of simple water, without medication, as a means of cleansing and dressing wounds, may well have been of the earliest date. Some years since it was brought into popular favor again by a systematic treatment of Dr. ADOLPHE AMUSSAT, of Paris, who fully described its various uses and methods of application. The *temperature* of the fluid was the principal point about which surgeons disagreed. That recommended by AMUSSAT as the most preferable was about 60° Fahr., and the method of irrigation was the method which most surgeons found most available.

Later experiences have led several experienced observers, however, to reject cold water in favor of warm, and the method of irrigation in favor of immersion. Others have been guided by the general rule, which is that now laid down in various standard works of surgery, that the sensations of the patient are to be consulted, and that temperature chosen which feels most agreeable to him. (GROSS, ERICHSEN.)

Dr. J. E. GARRETSON, of Philadelphia, has formulated the rule that when the wound is followed by marked reaction with tendency to excessive vascular excitement, cold water is called for. It may be sufficient occasionally to wet the dressing, or it may require such refrigeration as is only to be secured by a constantly changing current. The process of reaction is to be closely watched, and the water withheld, or elevated or depressed in temperature, to correspond with the demand for a greater or less antiphlogistic impression.

In another class of cases, where reaction is incomplete or absent, and where there is a present and increasing asthenia, a water dressing is still to be employed. It should, however, be neither cold nor warm, but about four or six degrees higher than the surrounding atmosphere, and it should be medicated with tincture of myrrh, or, what is better, the compound tincture of capsicum.

Dr. GARRETSON is convinced that the experience of the most judicious surgeons demonstrates beyond a doubt the superiority of water as a surgical dressing above all other applications; but it is by no means an innocent or inert agent, and its employment demands as much judgment and care "as are necessary in the administration of opium." Owing to a neglect of such necessary precautions, water dressing has at times been most severely censured and discountenanced, for its alleged tendency to prevent the healing process and lead to sloughing.

In favor of *warm water* dressing, as superior to cool or cold, the opinion of Dr. FRANK H. HAMILTON has already been quoted. (Page 20.) On the same side,

PROFESSOR N. B. CROSBY,

of the Bellevue Hospital, New York, says (*New York Medical Journal*, February, 1877,) that its undoubted success is due, first, to the exclusion of air; second, to the soothing effect of warmth and moisture; third, to the fact that the heat favors cell-infiltration; and finally, and perhaps most important of all, the changing of the water from time to time removes all septic matter, and thus prevents absorption of purulent and putrid elements.

An elevated temperature in the water proves a marked advantage when the vitality is low. The rule of lacerated and contused wounds is to slough to a greater or less extent. The separation of the slough is dependent on cell-infiltration or the formation of granulations, and this is retarded by cold and aided by heat, and the more rapidly this is brought about the more rapidly will adhesive inflammation be set up, and insure the immediate safety of the patient by plugging the capillary vessels and closing the lymphatics.

ALCOHOLIC DRESSINGS.

The employment of vinous or alcoholic liquids as surgical dressings dates back to remotest antiquity. One of the warmest living advocates of it is

DR. BORLÉE, PROFESSOR OF CLINICAL SURGERY, UNIVERSITY OF LIÉGE.

This surgeon prefers alcohol, simple or camphorated, to carbolic or salicylic acid, or any other of the vaunted antiseptics. (*Journal des Sciences Medicales de Louvain*, 1876.) The following is his customary method of employing it:

The liquid preferred is simple or camphorated alcohol of the temperature of 68° Fah. Having washed the wound carefully with this, he applies on the edges of the solution of continuity, if they are approximated, or between them, if they are not, tufts of charpie wet with the alcohol. Above these he places a compress and bandage, and then a piece of oiled silk, so as to prevent the evaporation of the alcohol and the dessiccation of the dressing. If the wound is large, the dressing should be renewed several times a day, the alcohol being somewhat diluted.

He considers that the alcohol favors immediate union, prevents excessive inflammatory action, aids in sustaining the vital powers, promotes healthy granulations, and moderates the suppuration.

PROFESSOR H. F. DOLBEAU, OF L'HÔPITAL BEAUJON, PARIS.

The bleeding having been staunched, the raw surface is washed with the strongest commercial alcohol, and then dried with some fine soft linen. The cavity caused by the loss of substance is filled up, and in the case of an amputation, the flaps are covered with feathery tufts of fine charpie saturated with alcohol. The entire dressings are then enclosed in an envelope of impermeable gutta-percha tissue, and retained in position by a few rounds of a bandage. During the day the gutta-percha is temporarily removed, and the underneath dressing moistened with alcohol. Next day, and on each following five or ten days, the entire dressings are renewed. The charpie adherent to the raw surface is carefully moistened with alcohol before removal, to prevent any oozing of blood. At the end of eight or ten days, raw surfaces treated in this way are quite dry, and present a slate-gray color. This dried-up state may be indefinitely prolonged. To accomplish permanent healing it is necessary to induce suppuration in the wound. The idea of DOLBEAU is to maintain the alcoholic dryness (*secheresse alcoholique*) till all risk of traumatic fever is past, and till the patient sleeps and eats naturally, and has so gained strength. He then considers that the time has arrived for promoting suppuration with a view to cicatrization. Glycerine dressings are forthwith used. If the formation of pus is excessive, occasional alcoholic dressings are employed to moderate it. DOLBEAU maintains that by following the method now briefly described, traumatic fever is prevented, and the surgeon is enabled to arrest or diminish the suppuration of wounds at his pleasure.

DR. DAVID BLAIR, OF SCOTLAND.

In the *Glasgow Medical Journal*, Feb., 1870, this writer recommends the use of *whisky* as a surgical application. He washes the wound with the whisky, and then wraps it in rags saturated with the fluid, covering the whole with gutta-percha tissue or oiled silk. As a rule, the first dressing is not disturbed for three or four days, and afterwards every day or every second day. The principal thing to be attended to is to have the bandage kept wet with the whisky, but not *too* wet. He has never seen erysipelas follow in a wound thus treated, and suppuration has always been moderate. In treating *bed-sores*, he finds poultices mixed with whisky and whisky lotions of superior efficacy. In cases of chronic and scrofulous *abscess* he has used it as an injection, and found that it checked the discharge and hastened the cure.

Dr. HORVARTH has had an opportunity of testing the value of alcoholic application to burns on his own person, as well as upon others, and not only was all pain instantly allayed directly the part was immersed in cold alcohol, but it was found that the wound very speedily began to assume a more healthy appearance, the surrounding redness rapidly fading.

spect the wound on the day after its infliction, whether it be accidental or the result of operation, and change the dressing only in case the discharge is liable to extend beyond the edge of the folded gauze; during the subsequent progress of the case, leave the gauze undisturbed for periods varying from two days to a week, according to the diminution of the effusion. In re-dressing continue the spray uninterruptedly on the part; while the bandage is being cut or removed, the patient, or an assistant, keeps his hand over the site of the wound, to prevent the dressing from rising *en masse*, and pumping in septic air; in raising the folded gauze, take care that the spray passes into the angle between it and the skin; remove the drainage tubes, cleanse them in the carbolic acid solution, and before re-introducing them cut off such portions as the granulations in the wound render necessary to bring the external extremity flush with the surface of the skin; lay aside the gauze which is soaked, but use the mackintosh again, after cleansing it with carbolic acid solution.

A very important part of Mr. LISTER'S treatment is the provision he makes to secure a free escape from the wound or abscess cavity of all secretions. This he effects by the introduction of india-rubber drainage tubes of sufficient calibre, and provided with a sufficient number of lateral perforations to secure a ready escape of all fluids. Mr. LISTER has pointed out that under his system it is especially necessary to make this provision; for, when applied to fresh-cut surfaces, the carbolic acid, by its stimulating properties, excites an abundant secretion, which if retained within the wound cavity would be a serious source of danger; while in the treatment of abscesses the use of the drainage tubes is insisted on, to avoid tension of the abscess walls by accumulation of pus—tension being, according to Mr. LISTER'S view, a most potent source of continued suppuration and constitutional irritation.

Mr. LISTER states that the spontaneous cure of caries under antiseptic treatment is a striking feature of the system, but in order that it may occur he considers it to be essential that the diseased part should be kept absolutely at rest—a condition that is difficult to secure in the treatment of some joints, but can readily be complied with in the case of spinal caries. Lumbar and psoas abscesses, which generally do badly after evacuation, are, according to Mr. LISTER, most hopeful subjects of treatment, provided that unremitting care be exercised to

maintain the antiseptic precautions till the sinuses are completely cicatrized.

In carrying out his antiseptic method in the treatment of wounds and abscesses, Mr. LISTER'S chief aims are: first, to exclude all germs of putrefaction; and secondly, to provide a free escape for all secretions. The first object is attained by cleansing from putrefactive germs the part to be operated on, the instruments and sponges employed, and the hands of those that use the instruments; by creating a germless atmosphere during the necessary exposure of the part; and by disinfecting all discharges coming from the part, lest putrefaction should occur in these, and from these spread to the wound itself.

The formulæ for the various antiseptic preparations of this eminent teacher are as follows:

Carbolized Oil:

54. ℞. Acidi carbolici crystalisati, ℥j.
Olei lini, f.℥iv.
Dissolve.

Carbolized Putty:

55. ℞. Olei carbolati (above), f.℥iij.
Cretæ preparatæ, q. s.
To make a firm paste.

Antiseptic Lac Plaster:

56. ℞. Shellac, ℥iij.
Acidi carbolici crystalisati, ℥j.
Heat the lac, with one-third the acid, over a slow fire; when completely melted add the remainder, mix, strain and spread.

Antiseptic Gauze:

57. ℞. Paraffini, ℥xvj.
Resinæ, ℥iv.
Acidi carbolici crystalisati, ℥j.
Melt together. Muslin gauze is dipped in the melted mass, and well wrung or pressed while hot.

Antiseptic Adhesive Plaster:

58. ℞. Acidi carbolici crystalisati, ℥j.
Aquæ bullientis, f.℥viij. M.
Dip ordinary strapping in this, and let it dry.

59. ℞. Acidi boracici,
Ceræ albæ, āā ℥j.
Paraffini,
Olei amygdalæ dulcis, āā ℥ij.

Melt the wax and paraffin, stir in a warm mortar till the mass thickens, then cool, and reduce in a cold mortar to a soft ointment. Apply on fine rags to exposed ulcerous surfaces.

60. ℞. Plumbi oxidi, ℥iv.
Acidi carbolici, ℥vj.
Olei olivæ, f.℥iv.
Ceræ, ℥j. M.

This plaster is to be prepared without water, and spread upon a thin cloth. To be applied as a dressing for wounds which need disinfection.

Professor LISTER employs *boracic acid* in two forms—*boracic lint*, a dressing material, almost non-stimulating, for wounds where the crystals of the antiseptic in the lint are only dissolved gradually by the discharges of the wound; and a *lotion* of boracic acid, (three to five per cent.,) partly for washing and partly as a spray. The antiseptic power is less than that of carbolic acid, and stimulates the tissues less, but, being non-volatile, it is not so evanescent. LISTER, therefore, prefers this substance for superficial wounds, such as those of plastic operations, in the treatment of ulcers, and, lastly, for the purpose of the healing of loose portions of skin on granulating surfaces.

In the case last mentioned the method is the following: After the sore is brought into an aseptic condition, it is carefully washed with boracic acid solution, then the pieces of skin to be transplanted are placed upon the surface of the granulations, under protection of the boracic spray. Without fixing specially the small portions of skin, a piece of protective is laid over the wound, after it has been dipped into boracic acid solution; upon this, a layer or two of boracic lint similarly treated; the whole fixed with a gauze bandage. As the discharge is scanty, the dressing may be left unchanged two, three or four days.

In regard to *chloride of zinc*, Professor LISTER employs a solution—forty grains to the ounce of water—and with the following indications.

1. For wounds which have been for a longer or shorter time exposed to the influence of atmospheric air, and in which a superficial putrefaction of the tissues has occurred, in order to be able, after the destruction of the products of putrefaction and the infected particles of the tissues, to regard the wounds as asceptic. To this class belong superficial surfaces of ulcers, with sloughing of granulations and stinking discharges.

2. Also for recent wounds, before putting on the first dressing, when the wound contains some focus of putrefaction, such as sinuses communicating with a joint subjected to excision. In such a case, the sinuses are also injected with the solution, in the hope of correcting the putrefaction of their contents, though the attainment of this is always uncertain.

3. He employs the *chloride of zinc* for recent wounds in the neighborhood of the different cavities of the body, and where the continual bathing of the wound with the putrid secretion of the cavity would render infection of the former possible.

Benzoated or *salicylated gauze* or *wadding* may be prepared by adding 3 to 4 parts of castor oil to the solution, for every 10 parts of benzoic acid; 100 grammes of benzoic acid and 40 grammes of castor oil (or 20 grammes each of castor oil and resin,) are dissolved in 2.36 liters (2360 cc.) of alcohol, the gauze soaked in the liquid and then dried. This gauze contains a 10 per cent. solution of benzoic acid. The salicylated gauze is prepared in the same manner.

Mr. E. W. EILAN writes to the *Maryland Medical Journal*, February, 1879, that Lister's bandages may be made thus:

60 *a*. ℞. Boiled linseed oil, ℥iv.
Yellow wax, ℥ij.
Rosin, ℥iv.
Spts. turpentine, ℥viij.
Calvert's carb. acid, No. 2, ʒj.

Melt the oil, wax and rosin together over a water-bath, and add the turpentine and carbolic acid. Then take a piece of tarlatan sixteen yards long by two yards wide, and immerse it in this menstruum, while still fluid. Then pass it through an ordinary clothes-wringer. Pass it through the wringer three or four times, or until no more of the mass can be squeezed through, then fold it and wrap it in oiled silk or carbolized paper, and preserve it in a tin box carefully excluded from the air, to prevent the evaporation of the carbolic acid.

The process above described will yield a material which is soft, pliable, and does not become sticky when brought in contact with the body.

Salicylic acid tampons, as employed in the German army, consist of pieces of soft gauze of about 13 or 16 square centimeters, which are loosely tied around 1 or 2 grammes of cotton, so as to be readily formed into any desired shape by pressure. One kilo of these tampons is impregnated with a solution of 110 grammes of salicylic acid and 40 grammes of castor oil or glycerine, in 3½ or 4 liters of 95 per cent. alcohol. They are afterwards dried in a well-ventilated room,