

THE MEDICAL TIMES.

VOLUME I.—NO. 2.]

KINGSTON, (CANADA), SATURDAY, JULY 12, 1873.

[PRICE FIVE CENTS.

SURGERY.

THE ANTISEPTIC SYSTEM AT EDINBURGH.
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Although the vital importance in surgery of the antiseptic system is now very generally recognized, it is difficult for those who have had little experience of the advantages to be derived from the treatment to form a just appreciation of its merits, even though fully convinced of the truth of the great principles upon which it is based. To such, therefore, an account of the comparatively recent improvements in practical details may not be without interest, illustrated by notes of a few cases, showing the character of the results which are now obtained in Mr. Lister's wards at the Royal Infirmary of Edinburgh; and as I have during three months of last session enjoyed unusual opportunities for observing for myself the efficiency of the treatment in his hands, I have asked and obtained his consent to the publication of the following facts, some of which have not hitherto been laid before the profession.

Mr. Lister principally relies at the present time on three antiseptic agents: carbolic acid, boracic acid, and chloride of zinc, each of which is possessed of peculiar properties, which render their employment advisable under different circumstances. The first differs from the other two in being volatile, and is therefore employed by preference in every case in which a cavity exists, into which regurgitation of air is liable to occur, both during and after the changing of the dressing; any such air is deprived of its septic influence by the vapour of carbolic acid which exists between the meshes of the gauze or amongst the drops of the spray; but it would be quite unaltered after passing through a substance containing a non-volatile antiseptic salt, such as boracic acid, the action of the latter being confined to the objects with which it comes into actual contact. The proportion of the ingredients with which the gauze is saturated is as follows: by weight—carbolic acid 1, resin 5, paraffin 7. The resin is employed on account of the tenacity with which it holds the carbolic acid, the paraffin (which gives it up with great readiness) being added to give the mixture a suitable consistence. In making a dressing a sufficiently large piece is folded in eight layers to overlap the wound in all directions, to a greater or less extent, in proportion to the amount of discharge that is anticipated. Between the two outer layers a piece of thin macintosh cloth (stained red for distinction) is interposed, by which the discharge is made to traverse the whole of the seven layers before it becomes exposed to the causes of putrefaction by reaching the surface. Without such an arrangement the continual flow of the fluid would soon exhaust the carbolic acid from the part of the gauze immediately over the wound, and this would then cease to form a barrier to the spread of decomposition inwards.

For use as a lotion, carbolic acid is dissolved in water in the proportion of 1 part to 20 or 1 to 40; the weaker solutions being now abandoned, as they did not appear to be perfectly trustworthy. The 1 to 20 lotion is employed for destroying already existing organisms, as—a. g., in the injection of a recent compound fracture, for purifying the epidermis of a part on which operation is to be performed, or for the cleansing of an ulcer in which putrefaction has been allowed to take place. The solution of 1 in 40 of water is used for the spray, and during the changing of an ordinary dressing, and for most purposes it will be found a lotion of very convenient strength. Before an operation some of the instruments, such as the saw and cutting pliers, are purified by smearing them with a solution of one part of the acid in ten of olive or other sweet oil, and the same is used as a temporary dressing after operations on some putrid cases; but for cleansing knives and most other instruments, for which the oil has no special virtues, either in facilitating their working or in penetrating intricacies of their surface, dipping in 1 to 40 watery solution is quite sufficient. It is of great importance that catheters, &c., should be freed from septic germs before use, as there can be no doubt that in very many cases decomposition of urine has followed the introduction of instruments into the bladder. For this purpose a 1 to 50 of oil is found to be sufficiently powerful, and it does not, as do stronger solutions, prove in the least irritating to the urethra.

The antiseptic qualities of boracic acid were discovered a short time ago in Sweden; but though used for preserving articles of food, it had not proved of any value as a surgical application until its slight solubility in water was ingeniously turned to account by Mr. Lister, for the purpose of storing up a supply of the acid in the so-called boracic lint. As boracic acid is much more soluble in hot than in cold water, the effect of soaking lint in a saturated boiling solution, is a copious deposit of the crystals throughout its substance on cooling and drying; and as these will be but slowly acted upon by the discharges from the wound, which are at or below the temperature of the body, the lint remains for a considerable time efficacious as an antiseptic application. A cold saturated solution of the acid is also employed as a lotion, with the assistance of which a moist dressing may, if required, be made by wetting with it the boracic lint, over which is placed a piece of ordinary oiled silk or gutta-percha tissue. But, as a general rule in cases free from putrefaction it is used as a dry dressing, overlapping a piece of the protective moistened with the lotion, and it is often found very convenient to fix the lint by means of collodion, its edges having been previously frayed out with a pin for the purpose. The special advantage of boracic acid is its extreme blandness; it is in substance al-

most tasteless, and as the crystals themselves are very soft and almost greasy, resembling closely in physical properties those of the crystallizable fats, it acts but very slightly either as a mechanical or chemical irritant; but its non-volatility, for the reasons before mentioned, limits its application to superficial sores, in the treatment of which it will be found invaluable.

Chloride of zinc, though long known as a surgical remedy, owes its reputation largely to its employment by Mr. Campbell de Morgan, of the Middlesex Hospital. It is remarkable as well for the potency of its action as for the duration of its effects; thus, besides being a most efficient corrector of putrefaction, it has the advantage of preserving or pickling the part to which it is applied for about three days. But as, like boracic acid, is non-volatile, and is moreover a powerful caustic to the tissues, its employment is confined in Mr. Lister's practice to a limited number of cases. He makes use of a solution of forty grains to the ounce of water for application to the surface of the wound, after operating on a part where decomposition is already present, or on one which communicates directly with one of the natural cavities of the body (as, for example, after removing piles or cutting a fistula); and in this way, even if putrefaction be not completely eradicated, its noxious products cannot influence the general cavity of the wound during the three days prior to granulation, when the tissues are specially prone to irritation and absorption. For the method of employment in the former class of cases, I may refer to that of J. W—— given below, and to that of W. M' K——, who, besides other injuries, had sustained a severe compound fracture of the ring-finger of the right hand, which was not submitted to Mr. Lister's inspection till several days after the accident, when it was found that the wound had putrefied and was much inflamed, having assumed a sloughy appearance, while the proximal phalanx was necrosed.

Mr. Lister amputated the finger, removing the necrosed phalanx with dressing forceps, and fashioning two lateral flaps from the inflamed tissue. After removing as far as possible the adherent sloughs, the raw surfaces were freely treated with the solution of chloride of zinc, and a piece of lint soaked in carbolized oil (1 to 10) was inserted between the lips of the wound, which were not brought together at all, and the whole hand was loosely enveloped in the antiseptic gauze. The oiled lint was changed by the nurse every three hours during the first day, and afterwards the little and middle fingers were bandaged together and the ordinary gauze dressing applied, the case being from this time treated as though it had been "aseptic" from the first. The wound rapidly assumed a healthy appearance; while the discharge, which had previously been copious and foully offensive, became serous, and rapidly diminished in amount, remaining free