chloroform ; the limb is elevated to empty it of blood, and a tourniquet is applied round the limb below the knee. The instruments to be used during the operation have been previously purified by lying for half an hour in a flat porce­lain dish containing carbolic acid (1 to 20). The sponges are lying in a similar carbolic lotion. Towels soaked in the same solution are laid over the table and blankets near the part operated upon. The hands of the operator, as well as those of his assistants, are thoroughly purified by washing them in the same lotion, free use being made of a nail brush for this purpose. The operation is performed under a cloud of carbolized watery vapour (1 in 30) from a steam-spray producer. The visible bleeding points are first ligatured ; the tourniquet is removed ; and then any vessels that have escaped notice are ligatured. The wound is stitched, a drainage-tube made of red rubber being intro­duced at one corner to prevent accumulation of discharge; a strip of protective (oiled silk coated with carbolized dextrin) is washed in carbolic lotion and applied over the wound. A double ply of carbolic gauze@@1 is soaked in the lotion and placed over the protective, overlapping it freely. A dressing consisting of eight layers of dry gauze is placed over all, covering the stump and passing up the leg for about 6 inches. Over that a piece of thin Mackintosh cloth is placed, and the whole arrangement is fixed with a gauze bandage. The Mackintosh cloth prevents the car­bolic acid from escaping and at the same time causes the discharge from the wound to spread through the gauze. The wound itself is protected by the protective from the vapour given off by the carbolic gauze, whilst the sur­rounding parts, being constantly exposed to its activity, are protected from the intrusion of septic contamination ; and these conditions are maintained until sound healing has taken place. Whenever the discharge reaches the edge of the Mackintosh the case requires to be dressed, and a new supply of gauze applied round the stump. The gauze that is used should be freshly made and kept in a tin box to prevent evaporation of the volatile carbolic acid. This precaution is most needful in warm weather. When­ever the wound is exposed the stump is enveloped in a vapour (1 in 30) of carbolic acid by means of the steam- spray producer. At first a syringe was used to keep the surface constantly wet with lotion, then a hand-spray, such as Richardson’s ether-spray producer. More recently a steam-spray producer has been introduced into practice. These dressings are repeated at intervals until the wound is healed, the drainage-tube being gradually shortened and ultimately removed altogether.

In the case of an accidental wound to which the surgeon is called a short time after its occurrence, carbolic lotion (1 to 20) must be injected into the cavity of the wound to destroy any organisms which may have fallen into it. The dressings already described are then applied. In operating on a case in which putrefaction has occurred, every endeavour must be made to destroy the causes of putrefaction which are already present. The substance most frequently used for this purpose is chloride of zinc solution, 40 grains to 1 oz. of water. This powerful anti­septic was extensively used some years ago by Mr De Morgan, Middlesex Hospital, London. When the wound

has been thus purified from its septic condition, the after- treatment must follow strictly the plan already recom­mended for a recent wound to avoid secondary contamina­tion at subsequent dressings.

The object Lister had in view from the beginning of his experiments was to place the open wound in a condition as regards the entrance of organisms as closely analogous as possible to a truly subcutaneous wound, such as a con­tusion or a simple fracture, in which the unbroken skin acts as a protection to the wounded tissues beneath. The introduction of this practice by Lister effected a complete change in operative surgery. Although the principle on which he founded it was at first denied by many, it is now very generally acknowledged to be correct. In Germany more especially his views were speedily accepted. In France and England their adoption was slower. In Scot­land, perhaps in consequence of the fact that many saw him at work and worked under him, acquiring perhaps some little part of his persevering enthusiasm, he soon had many believers. Since about 187*5* surgeons have been trying to improve and simplify the method; chemists have been at pains to supply carbolic acid in a pure form and to discover new antiseptics, the great object being to get a non-irritating substance which shall at the same time be a powerful germicide. Iodoform, eucalyptus, salicylic acid, boracic acid, corrosive sublimate, have been and are being used, and the question as to their relative superiority is not yet settled. Carbolic acid has the disadvantage of irri­tating the tissues. This is partly counterbalanced by its anæsthetic properties. Absorption of the carbolic acid has occasionally taken place, giving rise to symptoms of poison­ing. But this danger has been greatly lessened by the introduction of pure acid. Of the antiseptics named carbolic acid, eucalyptus, and iodoform are volatile ; the rest are non-volatile. At first Lister for some years irrigated a wound with carbolic lotion during the operation, and at the dressings when it was exposed. The introduction of the spray displaced the irrigation method. At the present time the irrigation method is again gaining favour. All these different procedures, however, as regards both the antiseptic used and the best method of its application in oily and watery solutions and in dressings, are entirely subsidiary to the great principle involved—namely, that putrefaction in a wound is an evil which can be prevented, and that, if it is prevented, local irritation, in so far as it is due to putrefaction, is obviated and septicæmia and pyæmia do not occur. Alongside of this great improve­ment the immense advantage of free drainage is now uni­versally acknowledged. Surgeons now understand the dangers which lie on every side, and this knowledge causes them to take greater care in the purification and in securing the greater cleanliness of wounds, and some hold that much of the good result follows from these precautions apart from the principle of the system.

Putrefaction has been clearly shown by Pasteur, Tyndall, and others to be due to the activity of certain lowly forms of organized matter. Scientific men have therefore had their attention more particularly directed to these lower forms of plant life. A careful study has been made of their life history, and several diseased conditions are now known to be due to the deposit and growth of organisms of a specific form in the blood and in the tissues. This is not the place to discuss points still *sub judice* ; but there can be no doubt, *e.g.,* that the *Bacillus anthracis* is the cause of splenic fever and of its local manifestation, malignant pustule, and that erysipelas is due to the presence of a micrococcus. There are many other diseases spoken of as zymotic or fermentative, upon which observers are now at work, and hardly a month passes without the publication of new observations (compare Schizomycetes). It can

@@@1 The gauze dressing consists of thin gauze which has been soaked in a mixture of carbolic acid (1 part), resin (5 parts), and paraffin (7 parts). The object of the paraffin is to prevent the gauze sticking to the skin. The resin retains the carbolic acid and prevents evaporation at the ordinary temperature ; at the temperature of the body, however, a certain quantity of the carbolic acid is constantly being given off, and in this way the part operated on is enveloped in a vapour of carbolic acid. This antiseptic vapour persists as long as there is any carbolic acid in the gauze. A gauze dressing is not reliable for more than a week ; by that time the carbolic acid in the gauze is dissipated and the dressing requires to be renewed.