acute disease to be almost complete. An occasional opiate to relieve pain, a little wine to help a failing heart, a laxative to relieve constipation, will be useful adjuvants, if judiciously employed; but I do not think they will be anything more.

THE PREVENTION OF BLOOD-POISONING.

By S. MESSENGER BRADLEY, F.R.C.S.,
Surgeon to the Manchester Royal Infirmary.

MR. SAVORY's eloquent address shows that admirable results are attainable by the simplest forms of dressing, when directed by judgment and care, and is an argument that other methods than that of Lister merit the term of antisepticity. It is also valuable in impressing upon us the importance of the patient's general condition, as well as the state of his wound; and therein, to some extent, points the moral of the parable of the sower, in which the soil determines the character of crops: in some cases the seed, falling upon stony ground, it withers away; in others, falling by the way side, the birds of the air devour it; in others, falling upon a suitable soil, it brings forth (septicæmic) fruit a hundred fold. Doubtless the soil is a factor as important as the seed, and in much that Mr. Savory says there is unquestionable force and truth; but, is he wise in resting contented with such a weak barrier between soil and seed as that afforded by the granulation membrane? I cannot think so.

A chain which holds a mad dog may prevent him from biting; but chains are apt to snap, and his room is preferable to his company. While agreeing with Mr. Savory that antisepticity in surgery is obtainable without recourse to Listerism—as indeed I have long maintained—and while congratulating Mr. Savory and his colleagues on the admirable statistics which he quotes, I cannot agree that the employment of germicides is nought; that drainage-tubes are an abomination; and that the perfection of security, as well as simplicity, are to be sought in water-dressings and bread-poultices.

I will refer to one or two points in the nature of first principles in antisepticity.

First, as to the theory. Antiseptic surgery was inspired by a belief in the germ-theory, which maintains that putrefaction is caused by the presence of organisms (bacteria); their action probably being to pull down the higher and more unstable quaternary compounds, and reduce them to the simpler and more stable binary products. In this process, oxygen is absorbed and free ammonia evolved, and the nature of the change is further evidenced by a characteristic odour: hence it comes to pass that we have a triple test of the existence of putrefaction; firstly, the smell, and the nose is a very subtle chemist in this matter; secondly, the existence of organisms, revealed by the microscope; and, thirdly, the presence of free ammonia, demonstrated by Nessler's test.

The truth of the whole theory essentially depends upon the continued non-putrefaction of highly putrescible fluids, when once the germs present have been destroyed and access of fresh germs prevented. It does not at all signify whether or not the air is excluded; so long as it is filtered free from germs the fluids thus protected never putrefy.

In the second place, let us see what antisepticity in surgery aims at. Naturally, as Lister urges, not merely at preventing the access of these mischief-making organisms, but at destroying the germs of those already present. Consider the phenomenon of a putrid egg; how has putrefaction taken place in this instance? Manifestly by the development of the pre-existent germs, and not by the admission of germs from without; for, while "stony limits cannot hold *air* out" any more than *love*, it is not the air which works these changes, as proved over and over again; and even if germ-laden gases could penetrate the egg-shell, it is certain that bacteria would not pass through the membrana putaminis. In this instance as elsewhere death may take place, but without putrefaction. Boil the egg, and so destroy existing germs; and then, although it necessarily dies, it does not putrefy. It is true that chemical changes are involved in death, of a nature not unlike those taking place in putrefaction, but they are not identical, and therefore this is not to the point. Professor Lister seeks to secure the double object by the employment of the antiseptic spray and his well-known dressings, and certainly has conferred the greatest boon upon the surgical profession in all his work in this direction. Amongst other facts elicited during the progress of this work, it has been abundantly proved that there are no more prolific sources of infection than water and such articles as poultices; yet these are the very agents on which Mr. Savory so much relies. How, then, can we reconcile Mr. Savory's treatment with scientific surgery? True his statistics show admirable results; but are there not still better results forthcoming from the master Lister and his followers? I pause for a reply.

My belief is, and long has been, that Lister's principles are invulner-

able, and his practice excellent; but that the latter is unnecessarily complicated. I have argued that, scientifically the same results—by which I mean equally certain results—are to be obtained without the spray and without the employment of patent dressings; but I certainly should not look for these results if I used water-dressings and bread-poultices. To satisfactorily solve the question, some other things than even such statistics as Savory advanced are necessary; and among them are the presence or absence of putrefaction, as proved by the triple test I have mentioned, and the temperature of the patient given from day to day after the operation. I hope these points will be answered by Mr. Lister. In the meantime, I should like to be allowed to allude to three cases where I have employed with success similar dressings to those described in my paper, on Antiseptic Surgery, in the BRITISH MEDICAL JOURNAL for February 23rd, 1878.

The first is that of the organisation of a large blood-clot, which formed sequentially to removal of a loose cartilage from the knee-joint, and a report of which appeared in the JOURNAL, November 30th, 1878. The second is the case of a lad in whom I excised the entire spine of the scapula and head of the humerus, removing, at the same time, much granulation tissue. In this case, repair took place without rise of temperature and without putrefaction—the absence of the latter being rigorously tested by the means referred to above. The third is the case of a youth in whom I removed the os calcis, with similar results to those in the second case.

I mention these instances because they are pre-eminently the class of cases in which putrefaction is prone to occur; and, therefore, as tending to show that any treatment which averts such a catastrophe merits the term antiseptic.

Mr. Savory makes a bold, straightforward attempt to prove the same of his method. It remains to be seen whether he has established his position.

BLOOD-POISONING AND ANTISEPTICS.

By WILLIAM THOMSON, F.R.C.S.,
Surgeon to the Richmond Hospital, Dublin.

I WAS one of the many who listened with deep attention and delight to the oration of Mr. Savory at Cork. The subject was skilfully chosen; and, although the orator's words were, as I thought then and think now, only the declaration of a section which clings to old habits and methods that are gradually being swept away, I could not but admire his address as eloquent and brilliant. But when I have said that Mr. Savory left unused no aid of the advocate's art to assail the position held by so many British surgeons, and to defend his own, I have said all that I can say in favour of it; for the result, I fear, will be to establish many in their hostility to antiseptics in the ordinary sense, and to turn back the timid who are on the threshold of conversion to more modern surgical ideas.

I am not about to enter into an elaborate criticism of that remarkable address; but there are some points in it which deserve observation. Mr. Savory is a believer in the germ-theory. He admits that there are such things as "agents of putrefaction" commonly called germs, which abound in the air, and notably in animal decomposing fluids. It is against the noxious influence of these that antiseptic surgery is directed. It is quite beside the question whether fluids potent for the gravest mischief may be produced within the body, "far away from any direct communication with the air". An abscess slowly forming in some remote region of the body is an entirely different thing from an amputation wound suddenly inflicted, or an incision into a knee-joint, or into the peritoneum. Lister's method is intended to prevent the access of these germs to freshly exposed wounded surfaces. It would be an excellent thing if we could also influence those distant collections of pestilential fluid; but, not being able to do so, is there any logical ground upon which we ought not, therefore, to limit the chances of blood-poisoning as much as possible by using an antiseptic spray? It is quite true that under the crudest system of dressing wounds we may see good results, and that a poisonous fluid may be in contact with a raw surface without producing bad effects. But now and then we see a case in which the "terrible transmission" to the blood takes place, and the patient is probably lost. Under what condition does this occur? Mr. Savory answers: "First of all, this mischief is least likely to happen in healthy wounds during the process of repair; and when it does occur, it is either in a wound unhealthy in character or flagging in action, or in one so recent, or in which the process of repair has been so delayed, that little or no new and healthy tissue has been produced on the surface. In other words, when the newly formed tissue is healthy and entire, it is tolerably impregnable, and whatever interferes with its integrity gives the opportunity for mischief. I say the mischief is less

likely to happen in proportion as the wound is healthy and repair is rapid; but exceptions to this we know occur; and it is reasonable to suppose, in some cases at least it has been almost demonstrated, if in some obscure corner reparative action have not failed, that from violence or accidental disturbance or other cause, the continuity of the new structure has been broken or its integrity somehow impaired, and so the poison has passed in."

What, then, is the hope of escape which Mr. Savory puts before us, when he scornfully casts aside the details of the antiseptic method? An utterly unreliable hope—that the wound will remain healthy, or that the delicate layer interposed between the blood and the poisonous pus shall remain intact! Who can foresee the moment when the wound shall become unhealthy, or by what unlucky movement a rent shall be made in the granulation film, and the way made clear for immediate poisoning? Is it not the case, that we only recognise the damage when it is done by the occurrence of a rigor, or the presence of some other marked symptom? On the other hand, the antiseptic plan aims at securing healthy discharges by preventing the septic organisms from touching the part until they are impotent, and thus providing against the risks which Mr. Savory so forcibly points out.

Well, having had such an admission of danger from him, one naturally turns anxiously to see what is his hope of security, and finds it in the declaration that he has achieved "the best results by the simplest means". In the early part of his address, we have him pronouncing "free ablation with clean water adequately used to be amongst the simplest, safest, best of antiseptics". There could be no higher character; and, when the elaborate table of results from operations and the percentages of pyæmic cases follow, one expects to hear that all this has been attained by so simple and safe an agent as cold water. But it is not so; for in St. Bartholomew's Hospital the surgeons "use very freely antiseptics of various kinds. And with cleanliness we attach, for the most part, the highest importance to rest." Mr. Savory gives his own method of dressing a wound. He uses carbolic catgut ligatures, wire sutures, dresses the wound with olive or almond oil, containing one part in about fifty of carbolic acid; adapts cotton-wool or lint to exercise equable pressure; drains the wound by position; dresses it "probably from the first with tepid water, perhaps containing some permanganate of potash in the form of Condy's fluid or other potent antiseptic of the least irritating kind, and, if there is tension, uses a bread-and-water poultice". Now, is this method fittingly "characterised by its simplicity and the entire absence of all novelty", when we get at one bound from cold water to carbolic ligatures, carbolic oil, drainage, and permanganate of potash washings? What is the need of this hybrid antiseptic method, if there be no more virtue in carbolic acid than in cold water? I assume that Mr. Savory is above paying court to carbolic acid simply because it is popular; and I must, therefore, believe that he admits its virtue as a protection against pyæmia.

When I began to study surgery, I made acquaintance with watery and greasy dressings. They were an advance upon much more uncouth applications, and with their use the greatest cleanliness was enjoined. The cases were carefully watched, dressed daily, and all care taken, but I know that blood-poisoning was not uncommon, and that the chances of it were increased by the long and profuse suppuration. Sometimes cases stood out from the others as remarkable in the facility of cure. Amputations of the breast often did well, as they do now, and healed without suppuration. It is one of the points most strongly urged against the Listerian treatment, that these cases do occur. But those who use that argument seem to forget that here, in most instances, the conditions of success are peculiarly favourable. The parts can be kept at almost absolute rest; and it is a recognised principle that when this is secured healing may go on uninterruptedly. Mr. Lister himself observes, in an address given in this hospital last June (*Dublin Journal of Medicine*, August 1879): "Before I saw Pasteur's papers, I used to wonder how the layer of blood or lymph in the wound made in operating for hare-lip did not putrefy. After a plastic operation on the face, I remember observing that, if the lymph was beyond a certain thickness, there was suppuration, but there might be a fair thickness and yet no suppuration. Now, that healing without the formation of pus implied that the lymph did not putrefy; for, if it had done so, the putrefaction would assuredly have involved suppuration. But, if the lymph had been put between two bits of glass or gutta-percha tissue at the same temperature, it would have putrefied. What was the reason of the difference? Somehow there is a peculiarity in living tissue as distinguished from ordinary matter that acts antiseptically, as we may say—prevents the development of septic organism. And it appears from various facts, to which I must not now refer, that such really is the fact—that healthy living tissue has the power of counteracting the development of these minute organisms, on the same sort of principle, probably, as the healthy plant can resist parasitic fungi. If a plant becomes enfeebled by cold, you

see fungi developed upon it, but, if it becomes vigorous again, the fungi leave it. The healthy tissue of the plant resists the growth of the fungi. Well, then, the healthy living tissues of a wound—that is to say, if the tissues are perfectly free from irritation and disturbance, and have recovered from the damage done by the wound—these tissues resist the development of the organisms. And not only the healthy tissues, as we ordinarily call them, but the blood-clot seems to have this power. The blood-clot may be regarded as a form of tissue. You may say 'That seems strange; the fibrine is merely a chemical substance that can be formed outside the body by the mixture of two solutions. The red corpuscles soon lose their vitality, and constitute a large mass of the clot. The serum is a mere chemical solution.' But, then, there are the white corpuscles. These we know retain their vitality outside the vessels; and it appears that these white corpuscles in the clot confer upon it the properties of tissue, and that by virtue of them the blood-clot in the healthy condition may remain unputrefied, although the causes of putrefaction are mixed with it. If you do not understand these things, you will not be able to understand various apparently contradictory circumstances in the behaviour of wounds."

These breast-amputations and hare-lip cases, then, prove nothing in opposition. But, take an excision of the knee or an ovariectomy. In the earlier knee cases here, the suppuration went on for months, and everywhere it was one of the most forcible arguments against the operation. It is certainly not so now. On the day before I went to Cork, I saw my colleague Mr. Stokes excise a knee-joint. It was dressed antiseptically. A week afterwards, I saw it dressed, but there was absolutely not a drop of pus. A drainage-tube—which Mr. Savory regards as a seton simply, and mischievous—was removed, but it was not followed by a gush of any fluid, purulent or otherwise. I write this on the seventeenth day after the operation, but there has not been a sign of pus, and the wound is practically healed. After Mr. Lister gave his address at the Richmond Hospital, I was asked by my friend Mr. H. G. Croly to assist him in dressing a case in which he was about to excise the elbow. I did so; and there the wound healed, he assures me, without any suppuration, and the girl left in a few weeks quite well, with a narrow cicatricial line. The same has happened in ovariectomy in my own practice and in that of my colleagues. Now, this is the experience of every surgeon who has adopted the Listerian method strictly. I say strictly, because I have seen a great deal of so-called antiseptic surgery that was, in reality, worthless. A hand-spray used intermittently, or the spray playing on the surgeon's back instead of on the wound, was surely not Listerism, and yet I have heard an operation so performed honestly described as being done under the strictest antiseptic precautions. It is no wonder that results disappointing and deterrent should be obtained from such methods; but they are not antiseptic methods, and I very much fear that many who think they have tried Lister's plan and found it wanting have, in reality, not tried it at all.

I cannot say why Mr. Lister has not published statistics; but it is to be believed that there is a conspiracy among surgeons generally to exaggerate the benefits of his system as they have employed it? I have myself tried the usual plans. I began with plain cold water—pure Varty—and then drifted into carbolic lotion and oil, using them without gauze or protective or mackintosh, but with simple lint; and even applied Mr. Savory's bread poultice when necessary. But I have given all up for the pure antiseptic treatment. Of the results, I can say that I have lost no case by blood-poisoning under the latter method; that I have lost several under the "simple method"; that the wounds heal more rapidly, and that there can be no comparison at all on the score of suppuration. That is the view which all my colleagues, I believe, hold too, and it is one that we have come to not because we have caught at a fashionable novelty—for we were amongst those who held out long—but because we have been compelled by our experience. Has experience taught nothing in St. Bartholomew's Hospital? I am assured that it has. I have heard to-day that the operation of ovariectomy was disastrous there, until Listerism was adopted, and that since then the results have been as uniformly favourable. I should like to see the records of that operation, although Mr. Savory has excluded them from his table.

When Mr. Savory speaks upon this question of statistics, I must take exception to the mode of comparison which he seeks to establish. He says, "Lister's plan must be tested (it would be an insult to its author to propose less) not by contrast of former with present statistics, but by comparison of its results with the best results which now are obtained otherwise". Now, Mr. Savory's results are of the "obtained otherwise" class, and they are put forward as a challenge. But, surely, this is not comparing present with former modes of dressing. It is comparing Lister's plan with a modification of it, but a modification which is, in certain respects, antiseptic—using that word in the popular sense, and not as Mr. Savory, as a purist in language, uses it. The truth is that

all dressing is now tinged more or less with the Listerian mode; whether it be in increased carefulness, or cleanliness, or washings with antiseptic fluids—they are all based on getting rid of a danger ever lurking about the patient. Even Mr. Savory is the practiser of a method, not Listerian in its details, it is true, but Listerian in its principles. If he would have a true comparison, let him dress his wounds with one of the “best antiseptics”, clean water, side by side by those done under the antiseptic dressings, and a twelve months’ observation will show on which side success will stand.

Mr. Savory is liberal in his admission, when he regards a carbolised spray as “better than a pestilential atmosphere”. I should like to know how he determines when the atmosphere is not pestilential, as regards an open wound. He admits that there are germs in the air so small as to be beyond the powers of the microscope. By what means is it made clear that the atmosphere coming in from London or other streets is pure, though all the sides of a ward be windows or the walls be burrowed with chimneys. Is it quite certain that this special ventilation will sweep away all the exhalations from other patients, and that the eddies caused by opposing currents of air will not carry troops of vigorous poison germs upon the wound at the very time we deem the ward to be purest? May not the very “pestilential atmosphere” of which Mr. Savory speaks, however small in extent, be actually present at the wound surface, with great potency for mischief? If, then, it be impossible to determine this point, if we cannot know at what moment a tear may occur in the granulation tissue and expose the patient to risk, is it not reasonable, even on Mr. Savory’s own showing—nay, are we not bound on every ground—to use a spray which he admits to be “preferable” to such a condition?

Read in this light, Mr. Savory’s address will not do so much harm as might at first appear. It is a testimony to principles which he has adopted, but which he has hesitated to follow in their logical leading. That he must do so, I do not doubt. His address has only strengthened my own convictions. Like hundreds of others, the trammels of my old teaching held me back from trying a method over which I heard much scepticism talked; but I cannot refuse the evidence of my senses, and I have adopted it because it has relieved surgery of much of its terror, and given a sense of safety which, so far as I am aware, no other system affords.

A BRIEF RECORD OF TWO THOUSAND TWO HUNDRED CONSECUTIVE CASES OF MIDWIFERY.

By W. WHALLEY, M.D., etc., Bradford.

In reviewing 2,200 consecutive cases of midwifery taken from my obstetric register, I find that out of that number there were thirty-nine breech-presentations, of which seventeen infants were still-born. Footling cases occurred seventeen times; ten of these infants were still-born. The arm presented twelve times; five of these infants were still-born. The face presented five times; one infant was still-born. The funis associated with either head or breech presentation occurred seven times; one infant being still-born. The funis and arm presented in one case; the infant was still-born. The funis and shoulder presented once; the funis, feet, and head once; the funis and foot once; the shoulder once; the foot and head twice; the hand and face once. There were two complete and three partial placental presentations. The placenta was retained or adherent in twenty-seven cases, requiring the introduction of the hand for its removal. Accidental hæmorrhage occurred in twelve cases. In three instances, the funis was coiled three times round the neck of the child. The long and the short forceps were applied in fifty-one instances; in which seven infants were still-born. Craniotomy was resorted to in eleven cases. Podalic version was performed in about twenty-one cases; and the Cæsarean section in one case.

There were twenty-eight cases of twins, of which eleven infants were still-born. In thirteen cases, the head presented in both children; in seven cases, in the first child the head presented, and in the second the breech; in four cases, the head of the first child and the foot of the second; in one case, the arm of the first child and the head of the second; in another, the breech of the first and the head of the second; in one case, the head of the first child and the hand of the second; and in another, the hand of the first child and the head of the second. In half the number of cases, the second child followed the first at intervals varying from twenty minutes to two hours; in the remainder, the intervals varied from two to six hours. In twelve cases, the children were both males; in seven cases, they were both females; in five cases, male and female; and in four cases, the sexes were not registered.

Rupture of the perinæum requiring surgical interference happened in six cases. All were successfully treated with the quilled and interrupted sutures. Spontaneous evolution occurred in three premature cases. Five cases were complicated with convulsions. Deformity of the pelvis was met with in seven cases. Premature labour happened spontaneously twenty-eight times, and was artificially induced five times.

In one patient, seven years had elapsed since her last confinement; in another, eight; in two others, nine; in another, ten; in another, eleven; in another, twelve; in another, fourteen; and in two others, fifteen years.

Among the primiparæ, six patients were aged respectively 32, 34, 36, 37, 39, and 45 years.

Of the total number delivered, seven mothers died.

The abnormalities met with in children were the following. Three possessed supernumerary thumbs; in two of these cases I amputated the redundant thumb, and in the third applied the ligature; all did well. One child had webbed fingers, another hare-lip with cleft palate; the latter I operated upon successfully at the eighth week. One child was born with talipes calcaneus, and was successfully treated by the aid of a boot without division of tendons. There was one case of spina bifida, the tumour being situated in the lumbar region; and, notwithstanding every care was taken to protect it from injury by a properly arranged apparatus, the child only survived a few months, ultimately dying from convulsions. There were twelve or fourteen cases of nævi. Two were cured by vaccination, one with nitric acid; but the ligature was found most successful. One child had malformation of both ears; each pinna or external ear consisted merely of a small flap of loose skin, and there was complete absence of the meatus auditorius externus; the child did not survive many days. In another child, there was an absence of a portion of the abdominal parietes in the umbilical region, the deficiency being supplied by a purple-coloured membranous structure; the child died before the funis separated. Lastly, there was one acephalous child.

The foregoing cases—viz., 2,200—have been attended in private practice, and comprise the whole of my midwifery practice from August 28th, 1860, to January 21st, 1878. It will be observed from the above figures that, of the abnormal presentations, the breech was the most frequent. The management in the greater number of these cases has been to let the breech pass doubled, and not to allow the legs to escape until after the knees were born. In the twelve cases of arm-presentation, podalic version was successfully performed in all, so far as the mother was concerned. Out of the five cases of face-presentation, one infant was still-born, and another died in a few hours after birth, from injury to the larynx during labour. In the cases complicated with prolapsus of the funis, the “postural method” and turning the child and delivering by the feet were found to be the most successful plans of treatment.

The first case of complete placental presentation was met with in a multipara, about six months advanced in pregnancy. She stated that during two months she had lost blood eight or ten times; it had appeared in gushes without any apparent cause, and subsided as unaccountably. In this case, plugging succeeded well for about thirty-six hours, after which the discharge became excessive, and the uterine action strong; the os uteri was found dilating, the placenta was detached from the inner surface of the uterus, and removed; the breech was then readily brought down, and delivery speedily accomplished. The patient made a good and rapid recovery. The second case of complete placental presentation occurred also in a multipara, aged 35, the mother of ten children, pregnancy being advanced almost to the full term. When called to this case, at 3 A.M., I was informed that the patient had been flooding excessively at intervals since the afternoon of the previous day. I found her fainting, cold, gasping for breath, and the uterine action very feeble. The os uteri was dilated to the size of a crown-piece, and possessed that degree of unresisting flabbiness indicative of the most urgent danger. Brandy was administered by the mouth and in the form of enemata combined with infusion of ergot. In an hour and a half, the patient had fairly rallied. Podalic version was decided upon, and was performed without much loss from hæmorrhage, after which the uterus contracted firmly. The child was still-born. Although the patient appeared to bear the operation remarkably well, she sank four hours after delivery. The death of this patient was unquestionably attributable to hæmorrhage carelessly allowed to take place before sending for assistance, the patient having unfortunately being placed under the care of an old, ignorant, and very deaf nurse.

Only one of the cases of partial placental presentation caused trouble or anxiety. This occurred in a primipara at the full term of gestation. I found flooding was and had been going on profusely for some time, the membranes were ruptured, and a portion of the fleshy fibrous placenta was readily recognised. I proceeded at once to plug the