

owing to the presence of abundance of carbonic acid far pleasanter than the Elisen well at Kreuznach. Pymont has also a pleasant acidulous spring. This bath is, therefore, very rich in what it has to offer to its patients. All the effects of the best chalybeates and of the best salt waters can be obtained here, which is obviously a matter of much convenience when members of the same family need various modes of treatment. The place is on a much larger scale and not shut in like Schwalbach, which in hot weather is very oppressive.

Pymont is largely visited from the north of Europe, but very few English resort to it, as they did in former days. This is a mistake. All the affections of women are treated here at least as well as at Schwalbach, and there are no better waters for anæmic and various nervous conditions. Although there has been long a gambling-table here, Pymont is, as Hofrath Lynker remarked to me, "kein luxus bad"; yet those who come here may have sufficiency of amusement and of relaxation. There is no necessity for particularising the large variety of cases that may profit by Pymont, nor for recounting its sights, including the gas cave. I may mention that the spring last found here was discovered owing to one of the trees of the avenue not thriving, and that most of the drinking-water has a slightly acidulous taste, caused by the immense quantity of carbonic acid constantly issuing from the soil.

To compare some well-known springs, it may be said that, according to the latest analysis of Fresenius, the Trinkquelle of Driburg contains 409, the same of Pymont 429, the Weinbrunnen of Schwalbach 319, while its Stahlbrunnen has 459.

Most of the physicians of Pymont give board and lodging to patients. The lodgings here are excellent; the hotels generally not quite so good as might be wished.

I visited Rehme Oeynhausen on a rainy day, and did not see Dr. Braun. Everything is being done to bring this place into favour with the North of Germany, as a rival to Kreuznach and Nauheim. The buildings are handsome and well arranged. The salt waters, which are well charged with carbonic acid, are chiefly used in baths. The drinking spring is quite secondary; in fact, the want of a good drinking well is a great defect. The trees are growing, the country round is pleasant without being picturesque, and the place appeared to have been crowded this season. Everything is effected here that the intelligent use of salt water can produce.

Although near the railway, I had not time to visit two quiet little sulphur-baths in high favour with the Hanoverians, Eilsen and Nenndorf. I heard the arrangements of the last very much praised. Rehburg, in a wooded, sheltered valley, with shady walks and a mild climate, is popular for its earthy wells and pine extract baths, but above all for its whey cure.

## THE ACTION AND USE OF ANTISEPTICS IN SURGICAL PRACTICE.

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THAT antiseptics are of much value in surgical practice there can be little doubt; but that the theory of their action advanced by Mr. Lister and his followers is the true one admits of much doubt; and, as many surgeons who adopt the practice ignore the theory, I propose to consider whether a simpler and more satisfactory explanation cannot be given, based on chemical and clinical experience.

The chemical properties of carbolic acid have been so carefully investigated by Mr. Crookes, Dr. Sansom, and others, and are so well known to the profession, that it is unnecessary to detail the experiments on which my observations are based. It is sufficient to state that this substance has a very powerful affinity for albumen, but a very slight affinity for other bodies. Thus, if carbolic acid be added to a decomposing animal fluid, it will combine with the protein substances and arrest their further decomposition, but will not act upon—in other words, destroy—the gaseous and liquid products of decomposition already existing in the fluid. This is not equally true of other antiseptics (as the chlorides of zinc, mercury, alum, sodium, &c.), many of

which have more extensive chemical relations, and not only retard decomposition, but destroy its various noxious products.

Carbolic acid, in common with many hydrocarbons and metallic salts, possesses the property of precipitating albumen from its solutions; but it would appear that this power of coagulation does not explain its antiseptic action, for albumen coagulated by heat, though it resists decomposition much longer than fluid albumen, does not so effectually do so as when precipitated by an antiseptic. Whether the precipitate is a true chemical compound or a mechanical mixture of the substances I am not able to say; but it has been urged in favour of the latter view that, when albumen which has been precipitated by carbolic acid is exposed to the air, the acid separates in the form of vapour, unchanged in its chemical properties. Little importance, however, need be attached to this fact, as the elements of many true chemical compounds separate spontaneously on exposure to the air. When very dilute solutions of carbolic acid and albumen are mixed together, the precipitate is either very scanty or appears to consist of the acid alone; but this arises from the relative proportions of the two substances, and it is quite immaterial whether we say the acid precipitates the albumen or the albumen the acid. This is a matter of little importance in actual practice, as the albumen is always in a concentrated form.

Time is an important element in the healing of wounds, and any agent which will simply coagulate the secretions, and so retard their decomposition for a few days, will be as useful an antiseptic as the more pronounced ones to which I have just referred.

What Hahnemann has done for the medical, Dr. Humphry has done for the surgical branch of the profession. By recommending that surgical operations should be treated without surgical dressings of any kind, he has given us an opportunity of studying their clinical history, and of comparing the relative merits of the various kinds of dressings employed by different surgeons. Dr. Humphry's practice was extensively and successfully tried by the late Mr. Keyworth, of York, at the York County Hospital, when I was house-surgeon to the institution, and I had ample opportunities of watching the progress of many operations throughout their course. I will give a summary of my observations in order more distinctly to explain the action of antiseptic dressings.

However carefully an operation may be performed, the instruments necessarily produce a certain amount of bruising and suspension of vitality or even death of the soft parts. The bloodvessels are blocked with coagula, lymph and blood are effused on the surface of the wound, and serum oozes from it for some hours after the operation is completed. Under favourable circumstances the bruised tissues recover their vitality, the serum and blood, if they have not escaped, become absorbed, the lymph becomes organised, and the wound heals. But if the wound is large, and this kind of union does not take place (and antiseptics have not been applied), at the expiration of from two to three days the injured structures and effused fluids begin to decompose. The first step in this downward progress is one of oxidation. The fluids, which when first effused were alkaline, become acid by absorbing oxygen from the air, and, when free from the vital action of the surrounding parts, new chemical combinations rapidly follow. Numerous nitrogen and hydrogen compounds are given off in the gaseous form, while the solid and fluid debris consists of fatty acids, leucin, tyrosin, lactic acid, sulphide of ammonium, and other salts. Some of these substances are poisonous (especially the sulphides), and irritate the surface of the wound, causing inflammation and unhealthy suppuration, or are absorbed into the system, and give rise to fever, erysipelas, and pyæmia. Concurrently with these chemical changes various vital organisms appear, which are probably adventitious, but according to Mr. Lister are the cause of the chemical decompositions. Finally, if by judicious surgical treatment the various poisonous products are removed, granulations form, and the wound heals by cicatrisation.

Thus a wound which does not heal by first intention passes through three stages—(1) the fresh wound, (2) the stage of decomposition, and (3) that of granulation and cicatrisation.

When simple dressings are employed—water dressings, ointments, bandages, &c.—the decomposition of the secre-

tions commences earlier, the suppuration is more profuse, and the healing more protracted. This is due no doubt to the increased heat and moisture produced by the dressings. Meat is preserved for a much longer time when exposed to a current of air than when kept in a close, stagnant, damp atmosphere. Wounds heal most speedily in a dry atmosphere, as Dr. Richardson has shown was the case in Egypt.

There are numerous reasons why wounds fail to heal by first intention—as the great extent of the wound, the bruising and destruction of the soft parts, the amount of effused blood and serum between the surfaces, and the rapidity with which the latter and the injured tissues undergo decomposition. When antiseptics are applied to a fresh wound they combine with, or coagulate, the albuminous secretions and tissues, and fix them like a mordant, so to speak, till the vessels have time to recover their tone, and either produce absorption or organise them into living tissues. Thus antiseptics are of the greatest value, for, by postponing the second stage—namely, that of decomposition—for three or four days they give more time for the wound to heal, and any substance which will coagulate albumen will be as efficacious as carbolic acid for this purpose. The employment of heat and of various alcoholic preparations (tincture of benzoin, tincture of aloes, &c.) by veterinary surgeons; of nitrate of silver, sulphate of copper, &c., by surgeons; and the chloride of zinc by Mr. De Morgan, is to be explained in this manner, and not by the destructive action on organic germs which they possess.

If a wound has failed to heal after the employment of antiseptics, and the putrefactive stage is fairly established, we have not only chemical but pathological processes to deal with, and much more than antiseptic treatment is required. It is not enough to suspend the decomposition going on in the wound, but we must also disinfect it of its poisons; and for this purpose carbolic acid is useless, for it exerts no power over the products of putrefaction, and is itself a poisonous and irritating application. For simple disinfection of a wound nothing is so admirable as Condyl's fluid, but its action is so temporary that it requires constant renewal. Solutions of chloride of zinc answer the double purpose of an antiseptic and disinfectant, and are not so irritating or poisonous as carbolic acid. But the treatment of a wound in this stage will necessarily depend more on the skill and judgment of the surgeon than on the virtues of any one application.

For a granulating wound antiseptics (as such) are not only unnecessary but injurious. If the secretions decompose, the products will not be absorbed, and they can be washed away by water and Condyl's fluid, and other local applications can only be beneficial as they influence the health of the granulations. Mr. Lister has shown that carbolic acid acts injuriously on young epithelium, and yet many of his disciples continue to apply it to wounds in every stage of their progress, and so retard the healing process.

The practical conclusions I draw from a consideration of this subject are the following:—Wounds do better when freely exposed to the air than when dressed with warm, moist dressings—as simple water-dressings, poultices, or ointments. For fresh wounds, antiseptics are of great value; the solutions of the chloride of zinc are to be preferred to those of carbolic acid, as they are fixed, easily applied, and require no dressings; whereas carbolic acid, being volatile, requires a complicated system of dressings, and is, moreover, poisonous, and sometimes produces disagreeable, if not dangerous, constitutional symptoms. For a putrefying wound, the dressings should be disinfectant as well as antiseptic, and the solutions of chloride of zinc are to be preferred as they possess both these properties. For a granulating wound, antiseptic applications are useless and often injurious, and disinfectants are rarely necessary.

I have intentionally avoided entering into the merits or demerits of the germ-theory of putrefaction, as, for practical purposes, it is not of the least importance whether we exclude the organic or the chemical and physical elements of the atmosphere, or render the tissues and secretions invulnerable to their attacks. Carbolic acid, being volatile, does no doubt destroy organic germs floating in the air, but it also renders the albuminous fluids unfit for their development; and as chloride of zinc and other non-volatile substances possess this latter property and not the former

it is reasonable to conclude that the explanation I have given is probably the true one of the action of antiseptics in surgical practice.

The antiseptic system of treating wounds has been associated with the name of Mr. Lister; but the credit of its introduction is due to Mr. De Morgan and Dr. Humphry, and Mr. Lister's complicated practice has retarded rather than advanced its development.

Bolton-row, Mayfair, 1871.

## THE CASE OF ARTHUR O'CONNOR.

By HARRINGTON TUKE, M.D.

In the year 1852 I was requested by a Committee of the House of Commons, at the instance of my late kind friend Jacob Bell, to visit Feargus O'Connor, the Member for Nottingham, then a prisoner in the custody of the Sergeant-at-Arms. I found Mr. Feargus O'Connor was suffering under hopeless organic disease of the brain. He died in 1855, and during nearly all that time was under my care. I thus became well acquainted with his family, and especially with his nephew, Mr. George O'Connor, who, although entirely opposed to his uncle's political views, was most kind and attentive to him during his illness.

On the 7th of March, 1872, Mr. George O'Connor was announced in my consulting-room. Directly or indirectly I had had no communication with him, or any of his family, since his uncle's death. I heard from him for the first time that the prisoner, Arthur, was one of his eight children, and the nearest direct descendant of my old patient. Mr. O'Connor told me that his son had always been delicate; that he was a great favourite with everyone, and remarkable for his gentle and inoffensive disposition. But latterly this had changed; he had become irritable, and subject to gusts of passion, and had complained of pain in the head. The change was so marked that Mr. O'Connor had mentioned to friends his fear that *his son's brain was affected*. This important statement, upon subsequent inquiry, I found to be strictly true. He thought his son's attack upon the Queen entirely the result of deranged brain. It was contrary to the boy's training, to the feelings of his family, and to his own previous conduct. Mr. O'Connor was quite aware of the law bearing upon his son's case: if insane, he would be confined during Her Majesty's pleasure; if not, he was liable to any punishment not more than seven years' imprisonment with hard labour, and two floggings. He entreated me to visit his son and give my opinion as to his mental condition.

On the 12th of March I therefore, with Mr. Gibson, saw the youth in Newgate. I found him of weak and feminine appearance, his head smaller than it should be, and his palate highly arched; the pupils of his eyes were widely dilated, and the eyes themselves had the glistening appearance which is so frequent in disease. He spoke with easy and pleasing address, entering fully into his history. He corroborated his father's account of his health, and, in addition, gave long details as to dyspeptic pains after eating, especially in the jaw-bone, with dizziness and fulness in the head. He had had bone disease, and, after four operations, his great toe had been finally amputated. He had suffered from cough and expectoration of blood. He was always under care, but, he said, the misfortune was that so few medical men could understand his case. He dwelt upon this, and gave details of his symptoms that indicated, in my opinion, a fanciful and hypochondriacal state of mind.

Four years ago he had been knocked down by a Hansom cab, had received a severe scalp wound, the scar of which I examined. He was carried in a state of insensibility to the hospital. I could detect no fracture having taken place, but there had been, of course, concussion of the brain at the most dangerous time—that just before puberty, which in his case was long delayed. Latterly he had suffered much from pain in the head and sleeplessness, such sleep as he had being much disturbed. His next brother and his sister were somnambulists. His pulse was very weak; and