the average was 120 to 140 till the end of the first week. On the third day the patient developed an attack of bronchitis, and the sputum was found to contain pneumococci. This subsided after a week, and the patient made a rapid recovery.

The first case is representative of the badly infected class; the second was a complicated case, but not infected. The third case is typical of an uncomplicated Caesarean section for osteomalacia.

CASE III.

A., aged 24. Symptoms of osteomalacia. Marked contraction of pelvis. Admitted May 3rd, 1916. Operation May 23rd. Evening temperature 99.4°. This was maintained next day. On the third day the temperature was normal. On the fourth day it rose to 100.4° in the evening, with a pulse of 144; this subsided after a soap-and-water enema.

In this case, after admission, a dirty tampon was found in the vagina, so antiseptic douches were given daily before operation.

If the eclampsia case is excluded, it will be seen that the mortality in 21 cases was approximately 9½ per cent.

The general conclusion is that careful technique gives such good results, even in complicated cases of Caesarean section, that this operation may be regarded as definitely superior to that introduced by Porro. Craniotomy should be reserved for those cases in which the child is dead.

GONORRHOEA TREATED BY ELECTROLYSIS: A NEW ELECTROLYTE.

SOME NOTES UPON CAUSES OF FAILURE WITH
THE METHOD.

BY

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In June, 1915, I published in the *BRITISH MEDICAL JOURNAL* a description of a new method of treating acute gonorrhoea, and subsequently other articles dealing with other states of the disease.

At present I wish to describe a new solution which I have used with improved results, and to give the reasons for its composition. Having tested it by experiments in the laboratory it has been on clinical trial since September, 1916, and I now use it instead of the sodium iodide and iodine mixture previously described.

During electrolysis of a sodium salt—for example, sodium iodide—the iodine is liberated at the positive and sodium at the negative electrode, and in urethral treatment this latter is the mucous membrane. Further, the amount of this alkali formed increases with the strength and time of the current's flow. This alkali formation is an undesirable feature, since the normal reaction of the urethra is never alkaline. Hitherto the free iodine in the mixture was used to neutralize this alkalinity, although one could not use it strong enough to fully neutralize the sodium set free. I have therefore tested a mixture of sodium chloride and monochloroacetic acid and found only a transient and slight alkalinity during electrolysis of a mixture of these substances with a current not exceeding 3 milliamperes. Monochloroacetic acid being a substance of high electrical resistance, it remains as a free acid available to neutralize the sodium of the saline as it appears at the negative electrode.

The strength I use is sodium chloride 1 per cent. and monochloroacetic acid half per cent. It will be noticed that such a fluid is substantially a slightly acid physiological salt solution. This fluid was tested by emulsifying cultures of staphylococci with it, and passing a current through half of the suspension, the other half being unelectrolyzed. Cultivations on agar were then made from each half, and showed a decidedly lethal effect in the electrolyzed, but scarcely any germicidal effect in the control (staphylococci in the mixture at room temperature for half an hour). I have found in both acute and chronic gonorrhoea that this fluid is well tolerated in stronger concentrations than the above, but the results were not quite so good, possibly because they do not so nearly approximate to the tonic strength of normal saline. With this fluid I find that acute cases seldom need more than twelve electric treatments, of which not more than six are given consecutively; during the second week I give three more, and two or three more during the third week. The

technique is almost the same as already described: the stylet within the catheter is made the positive and the pad the negative electrode, and the current flows at a strength of two or three milliamperes for half an hour. With this fluid, however, I make no reversal of the current, as the composition of the fluid is designed to avoid the necessity for reversal. Although short of perfection as yet, in the rapidity of curing acute gonorrhoea the results obtained in the last six months have been more uniformly successful than before in this method of treatment.

Causes of Failure.

Besides describing the above, however, I feel compelled to deal with some of the causes of failure which have come to my notice in the last year, there being no reason why others should obtain results inferior to mine if—and it is a very important proviso—they will strictly follow out the method, doing neither more nor less than directed.

I can best illustrate these causes of failure by detailing the main faults which dominated the so-called trial of the method at a London venereal hospital. It must be clearly understood that I only go into this matter that others may profit by realizing the mistakes and confusion to which these cases were submitted.

Although the work done was considerable and conscientious, the results were disappointing to the operator and staff, and probably to the patients.

It was not until several months after this so-called trial was made that the operator requested me to account for the differences between his results and those I describe and usually obtain. Accordingly I devoted about an hour and a half to a survey of about twenty charts and case records which had been carefully compiled, and, instead of any mystery, the causes of failure were as clear as the daylight. The worst mistakes were as follows:

1. All but about one-quarter of the cases had received from twelve to twenty-two consecutive treatments instead of the six or seven specifically directed.

2. About four-fifths of the cases had been submitted to irrigations or injections besides electrolysis.

3. In only four or five cases had electrolysis been the only treatment, and even in these various compounds of mercury and silver solutions had been used instead of the fluid I described.

4. In defiance of the instruction, this operator did not lubricate the catheter, and passed it after some manoeuvre of previously filling the urethra with water. The treatment was found painful—nor, I think, need one be surprised.

So these things had been done to about twenty patients with acute gonorrhoea, and treatment by electrolysis had been judged accordingly and a commentary made in the medical press. The only interesting item I noticed in the series was the operator's selection of four or five of his best results, and in each of these electrolysis had been the only local treatment, though even in these a variety of metallic compounds had been substituted for the solution directed to be used.

It is, of course, easy for other workers to avoid the mistakes recorded above, but in justice to the method and its value in gonorrhoea I think such misuse of any serious work should not occur.

Principles of the Electrolytic Method.

As there is still some misapprehension as to the principles of the method, I hope a brief repetition of its essential aims may be excused.

There are two remedial agencies which Nature brings into action in each case of gonorrhoea.

The first is the production of gonococcal antibodies which are essential for the phagocytosis or arrest of the organisms by the leucocytes. As, however, in the acute stage of the disease we can do little to increase these by vaccines or the like, we can only take care to prevent their waste by any unnecessary lavage or other dilution by excessive fluid intake through which the supply of these valuable substances to the affected parts may be hindered.

The second natural agency, however, is that of phagocytosis or the arrest of the gonococci by the leucocytes, both of which are voided from the body in the form of the discharge, and it is here that we can certainly assist Nature. If we can facilitate the voidance of the gonococci

—whether dead or alive—we are giving important assistance to the patient, provided it can be done without irritation of the delicate and inflamed membrane, and also without conveying the infection into deeper and uninvaded parts. The most important gonococci are those multiplying in and inflaming the mucous glands and follicles and their ducts, and these can only be voided after they have become conveyed into the main urethral channel, whence they flow out in the discharge or are swept out in the escaping urine. I believe that gonococci while in the gland recesses are not accessible by any fluid led into the urethra.

If, however, we can provide an agency which actuates the secretory flow from within these spaces towards and into the main channel, we shall produce an evacuation of these gonococcal dépôts, and in a series of such operations we shall subdue the disease. Such, of course, is the sequence of events effected in the method of electrolysis. The numbers of pus plugs, so to speak, visibly projecting from the catheter perforations at the end of half an hour of electrolysis may amount to 1 drachm in volume after settling in a measure glass. Microscopically, their composition can be seen to be of gonococci in large numbers with as many leucocytes involved in a matrix of mucus. It is significant, also, that this quantity of morbid material has been obtained after a urinary voidance (a natural lavage of the urethra), and it was not obtainable by that agency. It is also noteworthy that as the spontaneous discharge diminishes from day to day the material obtained in this way is correspondingly reduced. Naturally, the final event constituting recovery in any case is the phagocytosis of the last gonococcus, and this occurrence can be recognized by no human eye. Before this, however, all spontaneous discharge will have ceased and the microscope is now invaluable for scrutiny of the threads in the urine. These threads—which soon become mere wisps of mucus—are made into Gram-stained films and searched for gonococci; and if more than one test of the all-night urine shows their absence, there will almost certainly be no relapse. Apart from care in the conduct of the method, some experience is required to know when to stop the local treatment; but judgement improves with practice in this particular. Everyone likes to find his prognosis verified, but the proof of the cure is only obtainable by the evidence of no relapse nor conveyance of the disease for months or years afterwards.

I believe that in electrolysis we have the most elaborate and the most rapid, but the least painful, of any local treatment for this disease. It is also remarkable that in nearly two hundred cases I have only met one case of arthritis arising during electrolysis. The special interest in that case was the incision of an abscess before I began the treatment. This immunity from arthritis is a matter I cannot explain at present, but it is, I believe, important. Stricture of course does not occur, as there is no ulceration induced in the urethra. If cases are treated early it is rare for the infection to reach the deep urethra, and the process gives us a decisive control over the disease which is maintained up to recovery.

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THE THERAPEUTIC EFFECTS OF COLLOIDAL PREPARATIONS.

BY

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(Preliminary Note.)

THE invitation from the Editor of the *BRITISH MEDICAL JOURNAL* to relate my experience of the therapeutic effects of drugs in the colloidal state is one to which I willingly respond.¹ For more than a year, I have been employing the collosol preparations of the Crookes Laboratories, and have had results which leave me in no doubt as to their superiority—I must say, with every desire to avoid the appearance of exaggeration, their great superiority—to the same drugs in the non-colloidal form. They are results

which make it an obvious duty to suggest that trial on a large scale ought to be given to a form of medication which promises to effect a pharmacological revolution.

In cutaneous affections, as every dermatologist knows, the drawbacks to the use of argentum are the pain which it causes and the discoloration which it leaves behind. With collosol silver these effects are entirely absent; instead of producing irritation, indeed, it has a distinctly soothing effect. It rapidly subdues inflammation and promotes the healing of lesions. I have had remarkable results in enlarged prostate with irritation of the bladder, in pruritus ani and perineal eczema, and in haemorrhoids. It can be used in the form of suppositories while a solution is applied to the irritated skin. In bromidrosis in the axillae and feet it quickly gives relief. It also causes a rapid disappearance of warts. Being non-toxic, it can be given internally in urticaria and other forms of dermatitis which are suggestive of toxæmia. In such cases it is quickly beneficial, as it is also in diarrhoea.

Of collosol iodine, which, like collosol silver, is non-irritating and produces no stain, I have proved the efficacy in certain forms of eczema, and in some of those cases of bad chilblains which have been so numerous this winter. In a severe case of chilblains in the first stage, that of a woman of 37 whose fingers were so swollen that they looked like sausages, under the application of collosol iodine oil rubbed in four or five times a day every trace of the condition disappeared in four days. Equally valuable is this collosol in severe cases of trench feet with ulceration, in which it is also an excellent prophylactic. It is most useful, too, in the many cases of Charcot's bedsores which are so troublesome a complication of spinal injuries in military hospitals. In the earlier inflammatory stages of lupus erythematosus, before atrophy has supervened, it is far more suitable than the ordinary form of the drug because of the absence of irritation. Similarly, it is to be preferred for internal administration in the later stage of syphilis, because the practitioner may dismiss from his mind all fear of evoking symptoms of iodism. Parasitic affections, again, show a striking amenability to this remedy. In a case of dhotie's itch, in which the disease had spread from the groins and invaded the trunk, legs, and arms, under the quite painless application of collosol iodine oil the extensive lesions all cleared up in three weeks; with ordinary remedies the case would undoubtedly have been more protracted, and the treatment would inevitably have put the patient to a good deal of pain.

Among the affections in which collosol sulphur is beneficial are various forms of acne, including acne rosacea, and seborrhoea. For the relief of generalized dermatitis, in acute psoriasis, and in painful fibrositis, whether of connective tissue, of muscle, or of joints, baths medicated with this collosol are, in my experience, at once soothing and quickly curative. In the case of an officer from the front who was crippled with fibrositis and had severe eczema, a daily collosol sulphur bath relieved him of all his symptoms in a week.

These are not the only collosols with which I have had gratifying results, but on this occasion I need not go further into detail. I have said enough, I hope, to show that these preparations, to put the case at its lowest, mark a very considerable advance in therapeutics. They act with singular rapidity, they are free of disadvantages inseparable from the same drugs in the ordinary state, and their extensive use would effect an enormous economy in drug consumption—a not unimportant consideration at a time when there is not enough of many medicinal substances to go round.

REFERENCE.

¹ *BRITISH MEDICAL JOURNAL*, May 5th, 1917, p. 585.

MESSRS. GRAHAM AND LATHAM, LTD., military engineers, 104, Victoria Street, London, S.W., have sent us a sample of the "Swarren crutch seat." It is made of webbing three inches wide, with plated steel clips at each end for fixing to the hand-pieces of standard crutches. When not in use the crutch seat can be folded up and carried in the pocket. It is strongly and simply made, and provides a ready means of rest for wounded soldiers and others who have to walk with crutches. We are informed that the catalogue price of 7s. 6d. is subject to substantial discount to Red Cross and allied organizations.