early "tissue shock" as rendering the patient less liable to pain; others said that if the wound was recent and "clean," the pain was greater than if the wound was a couple of days old and in a sloughy condition. The general opinion seemed to be that when sloughs began to separate and granulations to appear salt or glycerine dressings were apt to be painful, and that this was an indication to reduce the strength of solutions, or to change to some other kind of dressing.

The use of salt dressings had not provoked a larger use of such remedies as aspirin or morphine to relieve pain. It was pointed out that it is especially important to cut nerves short in amputation stumps when hypertonic saline dressings are to be applied to the raw surface. The suggestion was made that sulphates (magnesium or sodium) instead of ordinary salt might be used. (They have apparently a good effect in reducing pain, but have not been tried extensively. The necessity for their use is not great, and less is now heard about pain.)

6. Some used baths only for two hours at a time—two to four or more applications in twenty-four hours. Some gave only one bath a day; others used baths continuously for as long as forty-eight to seventy-two hours, or even longer, with good results, and without complaint from the patient, except on account of the irksomeness. One disadvantage of these methods is that they are "more troublesome to the patient and to everybody else." The general rule seemed to be to use baths and irrigation during the day and soaks or irrigation by night. They were discontinued when the sloughs had separated.

7. Any recommendations elicited in replies to this question have already been incorporated in the paper. Colonel C. B. Lawson pointed out that "warming the dressing, as with a hot-water bottle, greatly increases the lymph flow." Several surgeons drew attention to the fact that the salt tablets are "opaque to x rays, the density being midway between that of bone and metal."

8. The majority of replies stated that hydrogen peroxide was used very occasionally. Practically all used it only for its mechanical effects, especially in loosening dressings. [It is used less than ever now.)

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REFERENCES.

[1] BRITISH MEDICAL JOURNAL, October 9th, 1915, p. 525. [2] Colonel Sir A. E. Wright, BRITISH MEDICAL JOURNAL, October 16th, 1915. [3] BRITISH MEDICAL JOURNAL, August 28th, 1915, p. 317. [4] BRITISH MEDICAL JOURNAL, August 22nd, 1914, p. 349. [5] *Lancet*, May 8th, 1915, p. 996. [6] BRITISH MEDICAL JOURNAL, October 16th, 1915, p. 564. [7] BRITISH MEDICAL JOURNAL, October 16th, 1915.

SENSITIZED SHIGA AND FLEXNER VACCINES IN THE TREATMENT OF CHRONIC BACILLARY DYSENTERY.

BY

SIR LEONARD ROGERS, C.I.E., M.D., F.R.C.P., I.M.S.,

PROFESSOR OF PATHOLOGY, CALCUTTA.

AT the present time chronic bacillary dysentery is the most difficult and unsatisfactory of the more common bowel diseases in warm climates to treat, causing much misery and invaliding, while in the native population, among whom neglected cases are commonly met with in civil hospitals, the mortality is very high.

The introduction of dysentery vaccines some years ago, especially by Forster of Lahore, was an important advance, and a number of good results have been recorded from its use, chiefly in Indian gaols, although it failed in some of them. Unfortunately its use is not without serious drawbacks. In one case in Calcutta fatal gangrene of the bowel closely followed the repetition of the same dose which had previously been given without ill effect, while I have several times seen serious recrudescences of the disease produced by vaccines prepared in Forster's own laboratory, leaving the patients worse than before its use. Moreover, R. T. Rodgers[1] reports from the Raipur Gaol, Central Provinces, two cases treated with Forster's vaccine in which a severe negative phase, characterized by an increase in the symptoms lasting three to six days, followed its use, and ended fatally on the fourth and fifth days respectively. In one of these perforation of the large bowel with acute inflammation and congestion throughout was found *post mortem*. These unfortunate results are clearly due to the great amount of intracellular toxins in dead Shiga bacilli, for it is well known that an injection of the dead organisms into rabbits produces necrosis of the mucous membrane of the large intestine, with all the pathological changes associated with acute bacillary dysentery, showing that these toxins have a selective action on the large bowel mucosa.

The foregoing considerations led me a year ago to apply Bedeska's principles to the preparation of a sensitized dysentery vaccine, in the hope of being able to prevent severe and dangerous reactions, and at the same time retain the beneficial action of the remedy. During the past year my opportunities for testing the sensitized vaccines I have prepared have been almost entirely limited to patients seen in consulting practice, still the severe reactions have been so entirely absent and the results sufficiently favourable to make it advisable to place them on record, especially now that many cases of dysentery are being reported from the Eastern theatres of war, which are likely to be partly at least bacillary in nature. I had hoped by this time to have been able to report the results of a carefully controlled test of my sensitized dysentery vaccines in the Assam gaols, which is being carried out, thanks to the kindness of Colonel H. E. Banatvala, I.M.S., but during the recent rainy season the dysentery cases were unusually few, so sufficient data are not yet available. In a few Indian patients treated by me in the isolation ward of the Medical College Hospital the results have also been favourable, but they remained such a short time under observation that it would not be safe to draw any conclusions from them.

The Lister Institute antidysenteric serum was used for sensitized stock cultures of Shiga and Flexner bacilli in the preparation of the vaccines.

The following are brief notes of a consecutive series of cases treated with my sensitized vaccines during the past year. In order to avoid the danger of conveying an unduly favourable impression I will begin with the failures.

I. *Cases in which the Treatment Failed.*

1. An Indian gentleman came down from Bihar to consult me for chronic amoebic dysentery, which yielded to emetine injections. He returned six months later, when the stools presented the characters of bacillary dysentery, although at first I failed to isolate the organisms. He improved for a time under injections of sensitized Shiga vaccine, but still occasionally passed thick mucus without blood, and I now isolated dysentery bacilli from his stools and wished to try an autogenous vaccine, but by the time it was ready he had passed into other hands, having been told he was suffering from "mucous colitis."

2. An Indian lady brought from the extreme South of India by her husband, who is a medical man. She had suffered from griping pains with the passage of mucus for several years, and had tried all kinds of treatment in various places. I found Flexner bacilli in her stools, and treated her for nearly two months with both sensitized Shiga and Flexner vaccines, with only temporary good effect. She is now having an autogenous Flexner vaccine, but has left Calcutta and I have not heard the result.

In these two cases only temporary benefit was obtained. The maximum doses given did not exceed 100 million, so possibly greater benefit might have resulted if more prolonged treatment with larger doses had been possible.

II. *Cases Much Benefited, but which Relapsed Later.*

3. A young adult European in Government service came to consult me from the Central Provinces for very chronic dysentery of long standing, accompanied by severe griping pain which greatly interfered with his work, and had led him to decide to retire from India if not better soon. I cultivated Flexner bacilli from his stools, and treated him with sensitized Shiga and Flexner vaccines, as I have more than once seen greater benefit follow a Shiga vaccine in cases showing Flexner bacilli in the stools than from a Flexner one—an observation which is easily understood in view of Dopter's work, showing that the bacteriolytic sensitizing substances produced by every one of the different varieties of dysentery bacilli are identical. The injections were continued after he left Calcutta by Major Fleming, I.M.S. After two doses of 50 million and one of 100 million at weekly intervals, he wrote that it had certainly done him a lot of good, as he had had no relapse, but still had a little pain in the left hypochondriac region at times, but his bowels were quite regular. Two months later Major Fleming kindly reported that the patient was

"enormously better, and in fact at times seems to be all right." Soon after Major Fleming was transferred, but on inquiry he recently informed me that he had heard that the patient had another attack of colic and had gone to England. In this case the benefit lasted several months, while particulars of his apparent relapse are not available. Here, again, larger doses and longer treatment would probably have produced more lasting benefit.

4. A European lady was sent down from up-country to consult me for chronic dysentery of four months' duration, with the passage of large quantities of mucus, described by her doctor as "regular sheets of mucous-like sloughs." Finding the disease to be bacillary in nature, I supplied some doses of 50 and 100 million sensitized Shiga vaccine, but the immediate effect of the first doses was reported as being slight. Four months later the patient wrote from England that the injections of vaccine had done her a lot of good, but she was then suffering from a relapse of a much milder form. Her statement was confirmed by her medical man, who asked for some more of the vaccine. This was sent, but there has not been time to hear again regarding her progress.

III. *Cases Greatly Benefited by the Vaccines.*

5. An Indian gentleman from the United Provinces consulted me for dysentery of eighteen months' standing, complicated by fistula, which had been freely opened up into the rectum. Large quantities of mucus were being passed, from which I isolated Flexner's bacillus and made an autogenous vaccine. After one dose of 50 million, which had little effect, a second dose was not taken until after two months, when much benefit resulted. Three more doses of sensitized Flexner vaccine of 50 and 100 million were injected, and two months later the patient reported that except for a little mucus on one day only he had kept quite free from his old trouble, very marked benefit having resulted from the vaccines.

6. A European male, sent to me from the Central Provinces by Lieutenant-Colonel Chapman, I.M.S., with a history of chronic dysentery for eight months. Among other forms of treatment, he had received two courses of emetine (one in Bombay), albargin enemata, which did good for a time, a course of coli vaccines, and a mixed dysentery vaccine from Kasauli, but without any lasting benefit. I cultivated dysentery bacilli from his stools and supplied him with doses of 50 and 100 million sensitized Shiga vaccine, which Major Chapman injected. Two months later the patient wrote that the results were quite satisfactory, the symptoms having been greatly reduced and his general condition improved. He went to Europe on ordinary leave soon after, with a supply of vaccine, to enable the treatment to be continued if necessary, and I have not heard of him since.

7. An Indian male, seen in consultation with Dr. S. C. Mallik. He had been suffering from chronic dysentery for about eighteen months, and was in an extremely emaciated and enfeebled condition, being unable to sit up in bed without help. All kinds of remedies had been tried without avail. I injected 50 million sensitized Shiga vaccine, and repeated the dose after a week, as the first injection had produced a marked improvement in the bowel condition. The dysentery now finally ceased, but a third dose was given later as a precautionary measure. He remained in a very weak condition for over a month with great nervous prostration, but eventually made a good recovery. I have no doubt that the vaccine treatment saved his life.

8. An Indian female, seen in consultation with Dr. Tarak Nath Sur, to whom I am indebted for reports on the progress of the case. She had been suffering from chronic dysentery for several months, was reported to be passing about forty small stools a day, with mucus and a little blood, evidently due to ulceration in the lower part of the large gut. No amoebae were present in the stools, while the microscopical characters were those of bacillary dysentery, although I did not succeed in isolating the dysentery bacillus. Emetine and numerous other forms of treatment had been tried without avail. Sensitized Shiga vaccine in doses of 50 and 100 million were injected weekly, and rapid improvement resulted. A slight relapse occurred several months later, but quickly yielded to the same line of treatment, the good effect having been very remarkable in this case.

9. A European male had been treated with emetine and salines for an attack of dysentery, but was still passing much mucus, which was increasing in amount. His stools presented the characters of chronic bacillary dysentery, and I injected him with one 50 million and four 100 million doses of sensitized Shiga vaccine at weekly intervals, with the result that the trouble completely disappeared. This was not a severe case, but the patient was greatly worried over his condition.

10. A European male, who had been attacked with dysentery eleven months previously, and had received twenty-three injections of emetine without any marked effect. After a change of climate he gradually got better, and six months after the attack commenced was practically well. A month later, with the onset of the rainy season, the trouble returned and continued for three months, emetine, Dover's powders, etc., failing to do any good; so it was decided to send him home. At this stage I was called in consultation, and examined a stool microscopically, which presented the characters of chronic bacillary dysentery, and showed no amoebae. I arranged for him to have one 50 and two 100 million doses of sensitized Shiga vaccine. He greatly improved after the first dose, and after the second he remained free from all symptoms for several weeks. He then passed a little mucus on one day only, and received an injection of 200 million of the same vaccine, after which he had no more trouble up to the time he went on his ordinary leave a few weeks later. He himself described the effects of the injections as being marvellous. It is, however, too early to say if the effect will be lasting.

11. An Indian male, who had suffered from occasional attacks of griping pain in the region of the hepatic flexure and descending colon for several years, while during the last six months the trouble had been present almost daily, the pain waking him up in the early morning hours, and mucus being passed on rising. He had been injected with emetine without benefit. There was tenderness over the descending colon, which felt thickened. The microscopical characters of the mucus were those of bacillary dysentery, and I isolated dysentery bacilli, which proved later to be Shiga's bacillus. Mixed sensitized Shiga and Flexner bacilli were injected in increasing doses up to 125 million. In the night following the first dose there was no disturbance and no mucus was passed in the morning, and two weeks later, when I last heard, he still remained free from all symptoms. All his stools were seen by his Indian medical attendant, and a number of them by me, so there is no doubt about the facts. This case is too recent to judge if the effects will be lasting, but the immediate result of the vaccine was most remarkable.

CONCLUSIONS.

In none of the above cases was anything beyond a moderate degree of reaction at the seat of the injection of the vaccine observed, while there was never any increase in the bowel symptoms or other toxic signs for a single day. The sensitization of the vaccines appears therefore to have fulfilled the expectation which led me to prepare them. Considering that the majority of the patients were sent from various parts of India to consult me after the failure of prolonged treatment of different kinds, and that the doses used were always small—probably much less than might be used with advantage in cases which resist the treatment—I think the results recorded in this paper may be considered as affording good grounds for hoping that, with further experience, this line of treatment will prove to be an important advance in dealing with intractable cases of chronic bacillary dysentery. Sensitized vaccines also appear worthy of cautious trial in quite small doses, but with shorter intervals, even in the more acute stages of the disease.

REFERENCE.

[1] *Indian Medical Gazette*, November 19th, 1913, p. 434.

THE General Council of the Seine and the prefect of police of the department have placed a bust of the late Dr. Emile Reymond in the operating theatre of the hospital at Nanterre, to which he was surgeon. It may be remembered that Dr. Reymond, who was a member of the French Senate and an enthusiastic airman, died from wounds received during a reconnaissance in the early part of the war.