

Simpson light has proved of great benefit in these cases. Several patients who came under treatment were suffering from deep-seated suppuration of these glands, which required a good deal of packing. When they were put under treatment all packing was removed and the rays were applied to the affected parts. They were afterwards protected by wire meshing, and all of them without exception healed rapidly, the average treatment being about nine applications. Soft chancres have also healed rapidly, and destructive lesions of a phagedænic nature have been arrested and healed without any marked deformity.

Notes on a Few of the Cases Treated.

CASE 1.—Private — was admitted to the Military Hospital, Rochester-row, suffering from several gummatous ulcers on the right leg, covering an area of about 5 inches square. He was given injections of salvarsan, kharsivan, hectine, and mercury and potassium iodide by the mouth. He made little or no improvement, although he had been in hospital for many weeks. On the application of the Simpson light he made immediate progress, and this steadily continued until he was discharged practically cured. During that time he had 28 treatments. Some of the ulcers were $\frac{3}{8}$ in. deep. Scar-tissue sound and healthy-looking.

CASE 2.—Private — was admitted to hospital suffering from tertiary ulcer on the right leg, measuring 4 in. \times 2 in. \times $\frac{1}{4}$ in. After 59 treatments the ulcer had almost completely healed. Scar-tissue very good.

CASE 3.—Private — was admitted to hospital suffering from a large phagedænic ulcer on the dorsal surface of the body of the penis measuring 2 $\frac{1}{2}$ in. \times 1 $\frac{1}{4}$ in. \times $\frac{3}{8}$ in. He was discharged from hospital quite healed without any cicatricial contraction after 16 applications.

CASE 4.—Private — was admitted to hospital suffering from soft chancre and suppurating glands of the inguinal region. The ulcer in the groin was 1 $\frac{1}{2}$ in. \times $\frac{1}{2}$ in. \times $\frac{1}{4}$ in. After 14 applications his lesions completely healed.

CASE 5.—Driver — was admitted to hospital suffering from syphilis. The size of the sore on the corona was 1 $\frac{1}{2}$ in. \times 1 $\frac{1}{4}$ in. This completely healed after 12 treatments.

CASE 6.—Private — was admitted suffering from soft chancre at the base of the penis, the sore measuring 1 $\frac{1}{2}$ in. \times 1 $\frac{1}{2}$ in. This completely healed after 14 treatments.

CASE 7.—Private — was admitted suffering from a large sore on the right buttock 2 $\frac{1}{2}$ in. \times 1 $\frac{1}{2}$ in. \times $\frac{1}{4}$ in. *S. pallida* was discovered. Patient first had syphilis in 1910. This large ulcerated mass completely healed after 11 treatments, leaving a most satisfactory cicatrix.

CASE 8.—Private — was admitted to hospital suffering from a phagedænic ulcer extending two-thirds of the way round the body of the penis, and extending from the base of the penis to within $\frac{1}{4}$ in. of the corona. The *S. pallida* was demonstrated in this case. This extensive ulceration completely healed without any cicatricial contraction after 17 treatments. The depth in its centre was $\frac{3}{8}$ in.

CASE 9.—Private — was admitted suffering from soft sore of a phagedænic nature, situated at the junction of the body of the penis and the scrotum measuring 1 in. \times 1 $\frac{1}{2}$ in. This healed satisfactorily after 11 treatments.

CASE 10.—Private — was admitted to hospital suffering from a sore which was apparently soft in character (but from which the *S. pallida* was afterwards demonstrated) situated at the base of the penis and measuring 1 in. \times 1 in. This healed satisfactorily after 10 treatments.

From an extended experience of this treatment for venereal lesions I have come to the conclusion that the best results are obtained by giving a treatment three times a week (every other day) with an exposure of two minutes' duration, and varying the treatment with the open and focal rays from time to time according to the condition of the lesion. By following the above method it is now a rare thing for any of the patients to get a marked reaction.

INFLUENCE OF FEBRILE CONDITIONS ON INOCULATION AGGLUTININS.¹

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SOME agglutination reactions performed for diagnostic purposes at the British Red Cross Hospital, Netley, suggested that pyrexia or pyrexial conditions lead to the removal from the serum of agglutinins due to inoculation. The microscopic method was used throughout. The cases quoted are consecutive, with the omission of those which had been inoculated more than one year previously or not at all. Of 14 cases with a positive agglutination reaction to *B. paratyphosus* (B) and with the bacillus present in the stools, 8 gave no reaction with *B. typhosus* in the early stages. Only 3 gave more than slight agglutination. The mean interval since inoculation was seven months both for the 8 and the 14 cases. Of 9 cases of septic origin with temperature of over 103° F. 6 gave no reaction to *B. typhosus* in dilutions of serum 1 to 20; of the remaining 3, 2 were cases of erysipelas examined on the first morning of pyrexia. The mean interval since inoculation was six months. Similarly a deficiency of agglutinins was found in other febrile conditions. For comparison reference may be made to a series of agglutination reactions performed some months previously on a number of patients with slight flesh and other wounds. Considering those who had been inoculated not more than seven months, it is found that practically 100 per cent. gave at least a distinct trace of agglutination in dilution of serum 1 to 50. Of the febrile cases quoted which had been inoculated not more than seven months, a similar amount of agglutination was present only in 16 per cent. Thus there is evidence that marked pyrexia, perhaps 102° F. for five days, is associated with diminution or complete disappearance of the agglutinins resulting from inoculation. Such effect is not invariable, nor probably is it due directly to the temperature of the blood.

Slighter degrees of pyrexia also appear to have a proportional effect on the inoculation agglutinins. As an instance of this the control cases referred to may be placed in three classes according to their reaction in dilution of serum 1 to 50: (1) complete agglutination; (2) partial agglutination; (3) trace of agglutination. The mean interval since inoculation was 5·6, 5·8, and 5·9 months respectively, and the mean number of doses was identical. A measure of the severity of these cases is given by the interval between the date of wound and discharge from hospital. This is approximately 5, 9, and 12 weeks. Hence, even in mild cases the amount of agglutinins present shows an inverse ratio to the severity of the wound. This factor, therefore, must be taken into consideration in statistics dealing with the amount of agglutinins compared to the interval since inoculation.

Do the agglutinins return after subsidence of the pyrexia?—Cases have been examined where the agglutinins were absent subsequently at long intervals. In a case of sepsis the agglutinins apparently returned temporarily. In a case of malaria the agglutinins increased after cessation of the rigors. In one patient who had passed through prolonged and severe pyrexia for many

¹ Being a preliminary note on a report to the Medical Research Committee.

weeks marked agglutinating power was present, but the serum had not been examined previously.

Are the agglutinating bodies absent from the blood?—Possibly they are present as agglutinoids, and as such may account for some of the vagaries of agglutination which occur in inoculated persons with typhoid and paratyphoid infections.

If the views expressed here are correct, certain deductions follow:—

1. *Diagnosis of enteric fever in inoculated persons.*—When an inoculated man develops a *B. typhosus* infection his serum will pass through the following stages: (1) Presence of inoculation agglutinins (perhaps to the fourth day); (2) agglutinins absent (about fifth day); (3) presence of infection agglutinins. These stages may or may not overlap, producing the variations of agglutination frequently occurring. Possibly agglutinoids may complicate the third stage further. But in any case the result is that after the fifth day of marked pyrexia a positive agglutination reaction to *B. typhosus* is a proof of typhoid fever as reliable for inoculated as for uninoculated persons. When an inoculated man develops a paratyphoid infection the third stages may be represented to some degree by group agglutinins.

2. *Immunity to typhoid fever.*—Although agglutinins and immune bodies are independent, it is probable that in a mass of individuals immunity and agglutinating power run approximately parallel. If this is so, it is possible that immunity due to inoculation is diminished by any febrile condition, whether septic, paratyphoid, or of any other nature.

Conclusions.

Inoculation agglutinins are diminished or entirely removed by febrile conditions. It is possible that they are converted into agglutinoids.

In certain cases they may return, but usually do not do so.

A positive agglutination reaction to *B. typhosus* after the fifth day of pyrexia has the same value in an inoculated as in an uninoculated person.

Immunity conferred by inoculation may be affected at the same time as the inoculation agglutinins.

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A FATAL CASE OF ANTHRAX:

INFECTION BY A SHAVING BRUSH.

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With Clinical Notes by

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THE following notes have been supplied by Mr. E. W. G. Masterman:—

The patient, aged 34, a worker in the wooden parts of aeroplanes, was admitted to the Coventry and Warwickshire Hospital on Dec. 6th, 1915, at 12.30 P.M. with what appeared at first to be an acute septic infection of the skin. He walked into the hospital, and although looking very ill did not appear to be at all apprehensive of his condition. He stated that he was in his usual health up to Dec. 3rd, when he inadvertently irritated a small pimple on his neck by picking at it. Swelling and redness had appeared around the sore, which had continued to increase and spread. The patient had considerable, almost symmetrical, œdema on both sides of the lower jaw and upper neck. Here there was not much redness, but there was a large patch of erythema, with

slight œdema, covering the whole of the front of the chest. This patch had rather ill-defined edges. Over the anterior edge of the left sterno-mastoid, about $1\frac{1}{4}$ inches below the level of the angle of the jaw, was a small yellowish pustule (about $\frac{1}{2}$ or $\frac{3}{4}$ of an inch) with a black necrotic centre and an area of inflammation around it. There were no vesicles round this nor any induration (it was not at all like the "typical" malignant pustule). The temperature on admission was 98° F., pulse 92, and respiration 20. He was quite conscious. At 6.30 P.M. the patient somewhat suddenly collapsed; he perspired freely, the pulse became imperceptible at the wrist and his extremities became cold. Despite all efforts he remained in much the same condition, although mentally he was conscious and confident that he would be all right the next day. During the evening I excised the pustule for examination, a small operation which he did not seem to feel much. About midnight he gradually lapsed into coma and died at 1.30 A.M., just 13 hours after admission.

Smears of the blood from around the pustule showed many anthrax bacilli, some of which were abnormally swollen. Cultures from this blood upon a sloped agar tube yielded colonies of *staphylococcus albus* and *bacillus anthracis*. From these latter subcultures have been made. After death the spleen was removed and smears of the spleen pulp showed abundant *bacillus anthracis*.

The excised pustule, which I forwarded to the Clinical Research Association, is thus reported on by the Director: "This is an inflammatory lesion of the skin and subcutaneous tissue showing vesicles and dense leucocytic infiltration. Large Gram-positive bacilli are found in it in large numbers; these organisms are indistinguishable from anthrax bacilli. We have no doubt that the lesion is due to the *bacillus anthracis*."

The man had been employed as a wood turner in the flying machine department of a local factory. He had at no time been occupied with the painting of the aeroplanes. Careful inquiries failed to elicit any connexion between the illness and his occupation or his home surroundings.

The case having been notified to the Home Office, that office communicated with the Local Government Board, it appearing to them unlikely that there was any association between the illness and the man's occupation. I then learnt from Dr. F. J. H. Coutts, of the Local Government Board, writing for Dr. A. Newsholme, that some cases of malignant pustule had occurred last year which had been traced to shaving brushes. (These cases were subsequently recorded in THE LANCET of Jan. 1st, 1916, by Dr. Reginald R. Elworthy.) Inquiries were therefore made along this new line. The pustule was situated just below the angle of the left lower jaw, and therefore within the shaving area. Inquiries at the house where the man lodged elicited the following information. A co-lodger, a friend of the patient, stated that until quite recently, while he has been in Coventry, the patient used to go to a barber to get shaved; the friend chaffed him about this and with some others purchased for him a present in the form of a safety razor. The deceased purchased a shaving brush from a local firm of leather merchants. This shop was visited and it was ascertained that they had in stock about half a gross of the same make of shaving brush, which were purchased in October last from a firm trading in London and Birmingham. Half a dozen of these shaving brushes, together with that of the deceased, were then obtained and forwarded to the laboratory of the Local Government Board. The shaving brush of the deceased was found to contain anthrax spores. Four of the other brushes were examined, with negative results. The source of infection was therefore not clear, as the shaving brush used conceivably might have been infected from the skin.