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half an inch. This procedure of crossing and traversing is continued until the end of the incision is reached, when the needle finally emerges a quarter of an inch beyond in a like manner to the initial entry. The wound is again washed with saline solution, swabbed with bin-iodide in spirit (1 in 1,000), and the edges firmly approximated by pulling on the ends of the suture, which must be left long. A flat pad of sterilised lint, wrung out in the bin-iodide lotion, is laid on the wound. Next, a sterilised plate of lead sheeting, about two and a half inches broad and a couple of inches longer than the incision, with holes bored in the median line an inch further apart than the wound length, is threaded with the suture ends and laid on the lint pad. The suture ends are firmly pulled, and, as the lint pad is withdrawn, are tightly tied, so that the plate presses evenly on the wound.

The advantages claimed are: (1) Fine, linear, almost imperceptible scars; (2) rapid union of the skin edges, owing to the even, level pressure of the leaden plate, and also to the sealing of the wound by the lead salt formed; (3) easy removal of the suture (seventh day) by tipping up one end of the plate, and snipping with scissors, when a quick sliding movement of the plate carries the suture out quite painlessly.

In using this combination care should be taken to dry the wound edges well, and to carry the suture at a right angle, or even a little forward, in crossing the wound.

SOME REMARKS ON PROTECTIVE INOCULATION AGAINST MALTA FEVER.

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Some years ago an anti-toxin was prepared for Malta fever and was extensively used in Malta, but as the results proved unsatisfactory its use was abandoned. A preventive inoculation by means of an emulsion of dead Micrococcus melitensis was attempted in four or five cases some time back at Netley, and I believe the results are recorded in one of Professor Wright's articles, but, unfortunately, I have been unable to come across the article in question, and so have not had the benefit of perusing it.

This communication deals only with the result of the inoculation and the development of agglutinins in the blood of a single case and so is of small value, as time and many inoculations, combined with prolonged residence in Malta, alone can prove whether any temporary or lasting immunity can be gained by this method.

Lieutenant-Colonel W. B. Leishman, R.A.M.C., very kindly supplied me with the material, which was contained in two glass capsules, A. and B., the contents of B. to be used about ten days after A. The material
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was prepared in the same manner as that previously employed at Netley; that is to say, it was made from fresh agar cultures of the Micrococcus, emulsified in sterile normal salt solution, and sterilised by heating to 60° C. for twenty minutes, and to prove that sterility was complete cultures were attempted on agar and in broth for four days at 37·5° C.; the results showed the vaccine to be perfectly sterile.

The two doses supplied were: A. 0.25 cc. of emulsion, containing about 250,000,000 cocci, and B. 0.5 cc. of emulsion, containing about 500,000,000 cocci. The first inoculation was made on September 23, 1905, and the site chosen was the right flank. The syringe (all glass) and needle were sterilised by boiling for ten minutes, and the skin was thoroughly scrubbed with soap and water, followed by a solution of 1 in 40 carbolic. The capsule was washed in 1 in 40 carbolic and the end broken off with sterilised forceps.

There were no symptoms for eighteen hours after inoculation, then slight headache and a sensation of coldness appeared, but the temperature was normal though the pulse had risen to 92. Four hours later the temperature had risen to 101.6° F. with all the usual symptoms of fever. The fever reached 102° F. twenty-four hours after inoculation and reached normal in about forty hours, the pyrexia lasting from eighteen to twenty hours. At the end of the second day the site of inoculation had become red for about an area of four square inches, and contained in its centre an indurated spot about the size of a two-shilling piece, which was not painful but very tender. There was malaise for twenty-four hours after the subsidence of the fever, and after three days health was absolutely restored, except for the tender seat of inoculation and for tender enlarged lymphatic glands in the right inguinal region. From this time onwards the site of inoculation became larger, finally attaining the size of a small hen's egg; the skin over this swelling became purplish in colour, such as one sees around a chronic ulcer. The swelling was very tender to the touch, and owing to its position was constantly being pressed on by the clothes on every bending movement, and as deep fluctuation was elicited, Captain Riach, R.A.M.C., cut down on it on the fourteenth day after inoculation, and at a depth of about half an inch, through brawny tissue, one or two drops of turbid serum escaped, followed a little later by a larger flow of about a drachm. Unfortunately, being aboard ship, there were no means at hand to examine this material, but it appeared, macroscopically, to be that of a sterile abscess, which, I would suggest, was due to toxins destroying the surrounding tissues. For the next ten days serum was perpetually escaping through the incision, and for the following six days the fluid kept on collecting, taking the first opportunity of any bending movement to break open the wound again. Twelve days after the inoculation the bursa behind each tendo-Achilles became acutely inflamed, the sulcus on either side of the tendon became oblitered, and the part became hot, red, and tender to the touch, rendering
walking painful. This condition only lasted two days, but again appeared on two subsequent occasions at intervals of a few days. Now, on board ship, there was practically no opportunity for violent exercise, and the only exercise indulged in was walking up and down the deck; and these attacks came on without any apparent cause, and must, I think, have been due to the inoculation. About four years previously I had had an attack of bursitis on the left side, but then only after prolonged and violent exercise; further, after arriving in Malta, I have had plenty of violent exercise without any recurrence of the bursitis. If this condition was due to the inoculation, then it is interesting as showing that the toxins, in the absence of the bacteria, may possibly cause inflammation of synovial membranes. The view that this condition was so produced is strongly strengthened by information given me by Captain J. Crawford Kennedy, R.A.M.C., namely, that inflammation of these bursæ is not at all uncommon in Mediterranean cases; and further, in the short experience I have gained of this disease, I have been forcibly struck by the sharp attacks of synovitis that these patients suffer from and by the rapidity with which these conditions pass off, leaving the affected parts apparently as sound as before.

At the moment of writing I have two cases under my care with acute inflammation of the bursa behind the triceps tendon; in one case the inflammation is now rapidly subsiding and has only been present forty-eight hours. Other cases have shown inflammatory conditions of the knee, hip, ankle, shoulder, elbow, phalangeal and metacarpal joints, sacro-iliac synchondrosis, sternoclavicular joints, sheaths of flexor and extensor tendons of the hand, and in none of these did the attack last longer than fourteen days, and in several cases only three or four days, and this in spite of the cases being so severe (hip and knee especially) that, with my lack of experience, I took them to be cases of acute septic arthritis that might require operation at any moment, and yet within a fortnight they were absolutely restored, as far as symptoms and physical examination could determine.

The first opportunity of examining the agglutinating power of the serum was in the Lazaretto, at Valletta, on October 18th, i.e., twenty-five days after the inoculation. An emulsion was made with 0·6 per cent. NaCl solution from a fresh agar culture, supplied me by Captain Kennedy. Dilutions of 1 in 30, 1 in 60, 1 in 120, and 1 in 240 were made and the sedimentation method employed; controls of normal salt solution and emulsion were also put up. After one hour, distinct clumping had taken place in the 1 in 30 and slight clumping in the 1 in 60 dilution; the others had remained uniformly turbid. After twenty-four hours the 1 in 30 showed one big clump; 1 in 60 complete clumping; 1 in 120 distinct, though less marked; 1 in 240, and the controls, showed no signs of clumping. At the laboratory of the Valletta Hospital, on November 27th, i.e., sixty-five days after inoculation, the serum gave
the following results: 1 in 20, 1 in 30 and 1 in 60 marked clumping and practically no free cocci in half an hour; 1 in 120 and 1 in 240 no clumping in half, three-quarters, or one hour. These tests were done microscopically, and the slides with the dilution drops were kept in a covered moist chamber during the waiting time, and the ½ objective was used. Sedimentation tubes of 1 in 30 and 1 in 60 also showed clumps. On February 20th, i.e., 150 days after inoculation, I again tested the serum in the following dilutions: 1 in 10, marked clumping in ten minutes; 1 in 20, distinct clumping in ten minutes; 1 in 40, 1 in 60 and 1 in 120, no signs of clumping in ten, twenty or forty minutes. The emulsion showed no clumps, and the controls showed only free cocci.

Thus, the result of the inoculation, as far as the production of agglutinins is concerned, is very satisfactory, but whether the formation of agglutinins means the production of immunity is quite another matter. The second dose was not taken on account of a rather severe epidemic of diphtheria on board ship at the time it should have been administered, for at such a busy, anxious period one could not risk being laid up with an attack of fever, or with the possibility of an attack of inflammation or synovial membrane.

This result seemed worthy of being placed on record as so little has been attempted in this direction, and the more one sees of this fever in Malta the more one is forced to believe that the only method of efficiently combating this disease will be by preventive inoculation, for the coccus appears to be almost omnipresent and, in many instances, to have its hold on an individual for weeks, even months, before it causes the sufferer to take to bed, during which period it is probable that the individual is capable of spreading the disease either through his excretions or by the intermediary of biting insects. It is to be hoped that more will undergo this inoculation, as it is only by means of submitting to it that its value in the production of immunity can be estimated. When one considers the great liability to contract the disease when stationed in Malta and the probability that, if the disease is contracted, it means a sojourn in bed of eight to twelve weeks, with a convalescence spreading over several months, then the inconvenience and slight risk of the inoculation pale into insignificance, and would, I am sure, be readily faced by many now resident in Malta, if only it was placed before them in a proper light.