from growth by scraping and washing with sterile salt solution. After 24 hours drying in the incubator, one-half of the surfaces is to be inoculated with typhoid bacillus and the other half with L. bacillus. In the same way L. bacillus scraped agar is to be inoculated, one-half with typhoid and the other half with L bacillus. After three days incubation, the tubes are to be examined.

The following possibilities can occur :—

I. The typhoid scraped agar may show no growth over the control half but a good growth over the L. bacillus inoculated portion and in the L. bacillus scraped agar may show a good growth over the typhoid inoculated region but none over the control region.

II. In the typhoid scraped agar there may be no growth over the control (typhoid) half and also none over the L. bacillus inoculated region, and in the L. bacillus scraped agar no growth on either half.

III. There may be no growth in the typhoid (control) region in the typhoid scraped agar and also none over the L. bacillus inoculated region, but in the B. bacillus scraped agar there may be good growth over the typhoid region but none over the control region.

In the first case, it can be definitely stated that the bacillus is not typhoid ; in case of the second alternative the bacillus is typhoid ; in the third case, the bacillus is not typhoid but probably belonging to the typhoid group.

In examining a scraped agar slant, inoculated with a bacillus, for determining whether there is a growth or not, it will not do to simply look at the tube with the naked eye, for the uneven surface of the scraped agar (due to the remains of slight growth of the old culture) do not allow to easily make out whether there is a growth. The tube must be examined from the back of the agar surface by a magnifying lens. Often the whole length of the inoculated portion is occupied by a deposition of crystals which look like growth, but on careful examination will be found to be not so.

Summary :—

1 Bacillus growing in culture media, as agar, produces a specific toxine.

2. The toxine is destroyed by keeping it for half an hour at 50° C.

3. It is not soluble in salt solution.

4. Typhoid bacillus also produces a toxine best developed on the 3rd or 4th day.

5. This toxine will prevent the growth of typhoid bacillus, but has no action on other bacilli.

6. By the help of this toxine typhoid bacilli can be easily identified.

7. Taking into account easy way by which this test can be applied and its absolute specificity, use of complicated and innumerable culture media employed for differentiation and identification of typhoid bacillus becomes unnecessary.

A Mirror of Hospital Practice.

SPIROCHÆTE FEVER.

BY W. H. KENRICK, D.T.M.,
CAPTAIN, I.M.S.,
Civil Surgeon, Raipur, C. P.

WHETHER cases of fever associated with the presence of Spirochætes in the blood should all be considered to be cases of relapsing fever is open to question.

The cases which came under my notice at the Saugor Jail in the latter part of 1907, were practically identical in symptoms with those described as African Tick Fever, relapses were the exception, and there was nothing of an infectious or epidemic character.

These cases were returned as malarial fever, and beyond the presence of the Spirochæte, instead of the malaria parasite, in the blood, and the inability of quinine to modify the course of the fever, there was nothing to distinguish them from a somewhat prolonged paroxysm of quartan infection.

Nearly 50 per cent. of the fevers occurring in the Jail during this period were of this nature.

Thus the returns of the Jail sickness during the year will show just twice the amount of malaria as it really existed. It is only by a very careful blood examination, made at an opportune moment, that an error in this respect can be avoided. The peculiarity of the fever was, that it only showed itself in those prisoners occupying a particular barrack.

Solitary cases, seven in all, occurred at irregular intervals of three days to three weeks during the months of August, September and October; the remaining cases of fever among the occupants of this particular barrack, and the cases of fever among men in other barracks, showed in all those in which the blood was examined the presence of malaria parasites, and were undoubtedly true malaria.

The endemic index of the Jail precincts was very low, not more than two cases of enlarged spleen being found among twenty children, while an examination of their blood proved negative in every case.

It is probable that many fevers, ascribed to malaria, occurring in jails, schools, orphanages, etc., in not particularly malarious places, are really due to Spirochætes, and that there is thus a very large margin of error in the returns showing the prevalence of the former disease in such institutions.

Dry films of the blood of one of these cases of Spirochæte fever were sent to Kasauli, and the parasites present were declared to be typical specimens of Spirochæta obermeieri. While examining live specimens in fresh films, I observed changes, probably of a reproductive character, taking place in certain of the parasites.

The central core of certain of the elongated slowly-moving forms became broken up into a number of round spore-like bodies, arranged regularly one behind the other throughout the length of the parasite (fig. 1); suddenly the enclosing sheath burst, and the spores became loosely grouped together in a round mass, free in the plasma (fig. 2).

Then, delicate wavy filaments became extruded from some of the spores, the remainder arranging themselves in two or three lines on either side of and between the filaments; the latter which gradually increased in length kept up a continuous active movement or flagellation, their free ends became slightly thickened, and one by one they broke free, and progressing by

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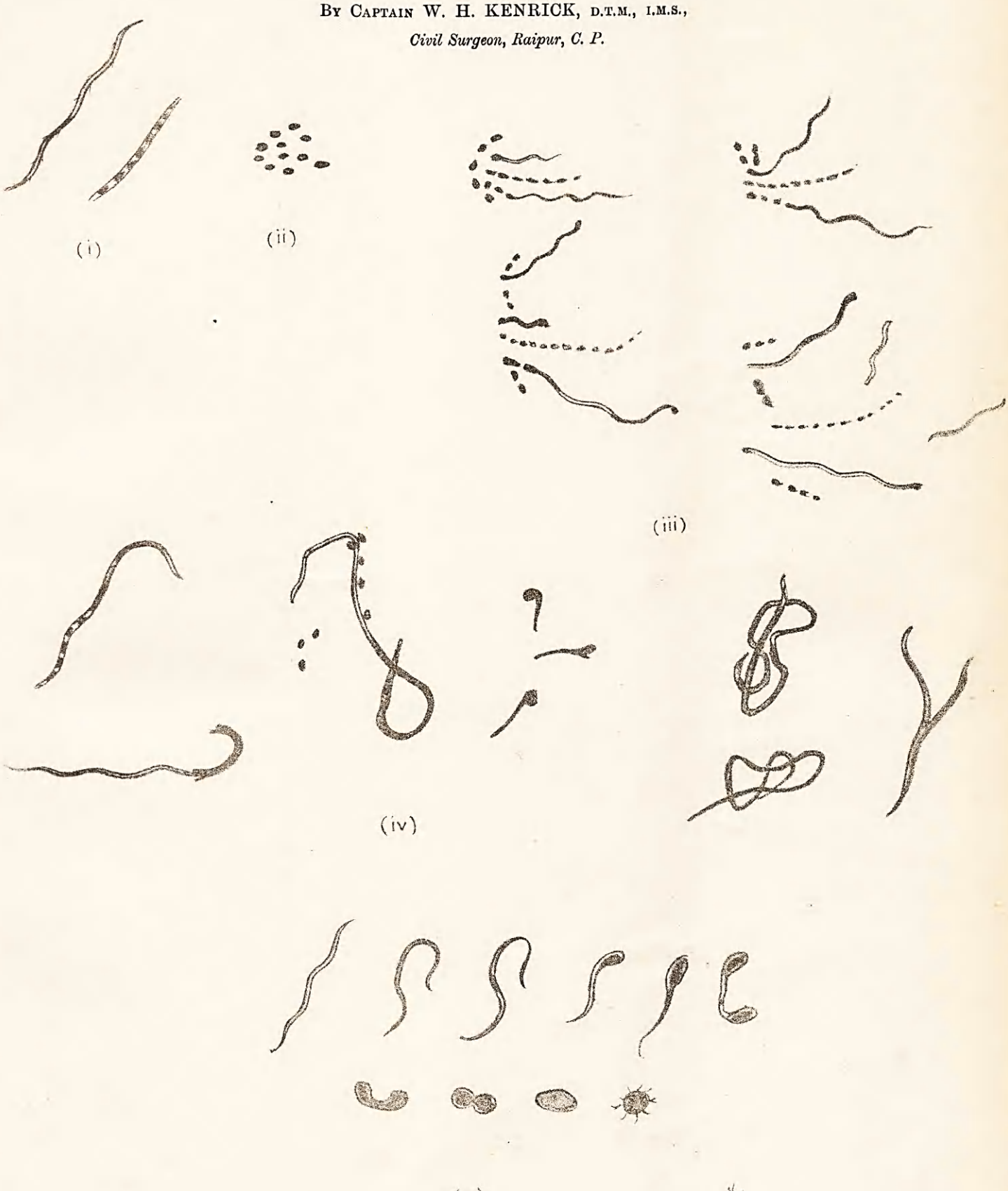

slow undulatory movements were lost among the red corpuscles. The residual mass consisted of a few of the spores, arranged both irregularly and in one or two thin wavy lines (fig. 3). Stained (Romanowsky) films of the same case of fever showed typical Spirochætes, long forms, involution forms and sporulating (?) forms, the last named being of two kinds, one faintly stained, in which the central core in part of the parasite showed well-marked dark and light bands, some of these dark bands, especially near the free end, showing a certain rounding off into spore-like bodies; while the other kind, probably further advanced in the process, were for half their length, very deeply and uniformly stained, the other half consisting of a mere empty sheath, faintly stained. Lying outside, but in contact with this sheath at various places, were several free spores, these latter being as deeply stained and of apparently similar consistence, to the central core in the other half of the parasite. (fig 4).

Numbers of small spores were also seen free in the field. Some of the stained parasites were seen to be partly twisted into skein-like forms, while others had the appearance of having split longitudinally.

The films in this case were taken during the decline of the fever, (temp. 104° F.), four hours after the acme (105° F.), and seven hours after its onset.

That the Spirochæte, under conditions unfavourable to its survival, can become a more or less resisting, encysted form, I was able to observe in a fresh blood specimen, some hours after it had been taken.

The slow undulatory movements became faster and lashing in character; then, while the parasite became rapidly shorter in length, first one and then the other became thickened and rounded (fig. 5). These two rounded ends appeared to coalesce and a slightly elongated spherical body resulted; this became round and stationary, while its surface became covered with minute flagella-like projections.

There were unmistakable peritrichal flagella in many of the living specimens; this condition has been observed by Zettnow and Borrel, while Breinl and others have demonstrated its absence.

The conclusion is that besides the varieties, Spirochæta obermeieri and Spirochæta duttoni, the causes respectively of Relapsing and African Tick fever, there are other varieties differing slightly morphologically; and that there is a process of reproduction by sporulation as well as by fission.

SURGICAL ASEPSIS IN ITS SIMPLER FORMS.

By ERNEST F. NEVE, M.D., F.R.C.S.E.

In the Kashmir Mission Hospital, where we have to deal with a very large number of operations, sometimes over thirty in one day, it is essential to adopt methods which, while efficient, are as simple as possible. On a busy day we may be called upon to do half a dozen aseptic major operations, three or four cataracts, two or three septic necrosis of bone cases, fifteen or twenty entropions, and two or three hæmorrhoid cases. Thus we have a mixture of septic and aseptic and of major and minor operations.

Modern aseptic surgery is just as much antiseptic surgery as the original Listerian practice from which it has evolved. It is a war against sepsis. As in military matters it is the man behind the gun who is of primary importance, so is it in surgery. No method, however elaborate or theoretically complete, is reliable unless it be applied intelligently, conscientiously, with patience, and I think I may add with faith. Given that thoroughness and care, then the simpler the methods the better.

Where much of the work has to devolve upon Indian subordinates, these facts must be emphasised. Our antiseptic measures form a chain. In my experience the weakest link in that chain is the cleaning of the patient's skin prior to operation. In the Mission Hospital we have two operation rooms, two rooms in which preliminary cleaning is done and two special assistants for this work. One operation room, one lavatory and one assistant are reserved for aseptic cases. The thoroughness with which the cleaning is done is far more important than the exact method employed. The assistant, after first rendering his own hands aseptic, washes the operation site and surrounding area with soap and water, then with turpentine, followed by 1—20 carbolic lotion. This is followed by 1—500 biniodide of mercury spirit lotion of the following formula: Mercuric iodide 1 grain, Iodide of potassium 12 grains and spirit 1 ounce. In aseptic cases, first the site of the incision is cleansed and the washing is carried on centrifugally. In septic cases the instructious are to begin at the periphery and work centripetally, the centre being the point of maximum sepsis.

The above method sounds severe, but experience shows that the average skin stands it well. In the case of more sensitive skins, and certainly of Europeans, we find it wiser to use the turpentine sparingly. If a pad is left on the operation site, it should be of carbolic acid 1—60 or biniodide of mercury 1—2,000 in sterilized lint and never salalembroth wool, the salt of which, in a moist dressing, is apt to dissolve out and become concentrated and irritating. Wet carbolic pads are never placed on the hands or feet on account of the special risk of gangrene. The next weakest link in the antiseptic chain is the hands of operator and assistant. The latter wears strong rubber gloves, which are sterilized by boiling.

What is the actual range of usefulness of gloves for the operator? I always wear rubber