Clinical Illustrations

OF THE

PERSISTENCE OF DISEASE GERMS

IN THE HUMAN BODY.

BEING AN ADDRESS TO THE CLINICAL AND PATHOLOGICAL SOCIETY OF PAISLEY.

BY

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AMONG the many important services which bacteriological science has rendered to surgical practice not the least interesting is the evidence which it has afforded of the persistent power of living in the human body which is exhibited by most, if not by all, of the micro-organisms known to be the causes of disease. Some of these, having once obtained possession, seem to be immortal within the limit of the life of their host. They may go asleep for a time, but they do not perish. Recovery from the particular disease caused takes place, and the patient enjoys what appears to be, and really is, most excellent health for months or years, when recrudescence occurs to show that the enemy had only called a truce and had not in reality retired permanently from the conflict.

Until recently the only diseases which were regarded as undoubtedly recidival were syphilis and cancer. Both were known—indeed, were expected—to reassert themselves after, it might be, long periods of apparently unimpaired health, and in both a fatal issue might be arrived at after frequent and fallacious assurance of fully re-established physical well-being. Syphilis, it is now recognized, is the product of a *contagium vivum* in the shape of a micro-organism—the *Spirochaeta pallida*—the presence of which has been demonstrated even in the latest tertiary manifestations of the disease; while, if analogy may be trusted, it is not too much to expect that something similar may, in the future, be discovered as having a causative relation to cancer.

But I wish to suggest, and to illustrate my contention from clinical experience, that this liability to recurrence, so long obvious and recognized in the cases of syphilis and cancer, may be observed, in varying degrees, in almost all diseases in which micro-organisms play an important part. The germs rest and remain either near the place where they first made their presence felt by the production of a definite lesion or in some place, more or less distant from it, to which they were transferred, during the currency and progress of that lesion, usually along one or other of the great high-roads of the body, the sanguineous and lymphatic vascular systems. In either situation they may lie dormant for longer or shorter periods of time, until aroused and awakened by some disturbance in the conditions attaching to themselves or their host or the relations existing between the two. This behaviour of disease germs, whether bacterial or protozoal, probably has its analogy in facts connected with the vegetable world. White of Selborne seems to have been impressed with the truth that it was possible for seeds to remain long dormant in the soil and yet to germinate when favourable conditions arose. Thus, under the heading of "Seed Lying Dormant," we find this paragraph in the *Natural History of Selborne*: "The naked part of the Hanger is now covered with thistles of various kinds. The seeds of these thistles have lain probably under the thick shade of the beeches for many years, but could not vegetate till the sun and air were admitted. When old beech trees are cleared away the naked ground in a year or two becomes covered with strawberry plants, the seeds of which must have lain in the ground for an age at least. One of the slides or trenches down the middle of the Hanger, close covered over with lofty beeches near a century old, is still called 'strawberry slider,' though no strawberries have grown there in the memory of man. That sort of fruit did once no doubt abound there and will again when the obstruction is removed."

In a conversation which I lately had with a well-known botanist regarding this matter, I gathered that he enter-

tains no doubt of the fact that seeds may lie dormant in the ground for shorter or longer periods, although he does not think White's particular illustrations of it quite convincing in the light of our present knowledge regarding the free distribution of the seeds of such plants as the thistle and wild strawberry by the winds and the birds of the air. He suggests, as a more convincing instance of the fact, the circumstance that when old pasture is turned over by spade or plough a large number of plants may appear whose presence can only be accounted for by their seeds having lain inactive in the soil so long as it was undisturbed.

I shall now proceed to offer you some clinical illustrations of the facts on which I have based these remarks.

The following case demonstrates what is not an altogether unfamiliar experience in regard to erysipelas, and shows how a fresh traumatism will rearouse sometimes the virulence of germs lying quiescent in a part in which they have on a former occasion caused widespread and dangerous disease.

CASE I.—Recurrent Erysipelas.

In August, 1886, the captain of a ship trading between Glasgow and Calcutta met with a carriage accident in the latter city, in consequence of which he sustained a fracture of the lower end of the fibula, with a compound dislocation of the lower extremity of the tibia, of his right leg. From his account of the progress of his injury it was evident that sepsis early invaded the wound and the ankle-joint, and serious illness followed. Suppuration was abundant and much swelling and inflammation occurred around the injury. But in May, 1887, he left Calcutta and arrived in London. There were several sinuses open, from which pus was discharging, and much thickening existed around the lower part of the leg and ankle. He was admitted to a hospital, where an operation was performed and some dead bone extracted. This interference was followed at once by a severe attack of erysipelas, which ultimately spread as high as the armpit, and evidently placed his life in great danger. After this was entirely recovered from, he came to his home in the west of Scotland and soon felt remarkably well, walking about a good deal with the aid of crutches. But as matters did not improve so far as the condition or usefulness of the limb were concerned, he determined, upon medical advice, to have the leg amputated in its lower third. He was admitted for this purpose under my care in the Western Infirmary, and in December, 1887, I operated on him. I found the ankle-joint firmly ankylosed and sequestra lying loose in the tibia, fibula, and astragalus. I did not, therefore, amputate, but, having freely opened up the soft parts, extracted the sequestra, curetted the cavities and their sinuses, irrigated thoroughly and stuffed the recesses of the wound lightly with iodoform gauze. For a day or two the patient was remarkably well, but on visiting the hospital one morning, a few days after the operation, I was informed that he had been seized with a severe rigor the previous evening and had vomited several times during the night. His temperature was very high and he complained of great pain in the wound. Already I found, on inspection, a red blush of the skin of the leg above the highest turns of the bandage, and it was evident that erysipelas was present. This continued to spread upwards until it involved the thigh as well as the leg. He was treated in isolation and ultimately made a good recovery, the wound healing soundly and permanently, so that he was able once more to take command of his ship.

It is highly improbable that both the surgeon who operated in London and myself had, on occasions separated from one another by about seven months, introduced some virulent strain of streptococcus into the wound and so given rise to the erysipelas. All that we did was to disturb the soil, break down barriers which walled off the streptococci existing in the part itself, and opened the lymphatic spaces in the skin for their entrance. A fact like this does something probably towards the explanation of those cases of recurrent, or, as they have been called, habitual, erysipelas of the face and head which are occasionally observed in certain individuals. An attack is aroused by the slightest traumatism, by exposure of the face to a cold wind, or even occasionally by violent sneezing or blowing of the nose. No immunity whatever seems to be conferred by previous attacks.

Staphylococcal osteitis, or osteo-myelitis, one of the most formidable diseases of childhood, has for many years been recognized as one apt to be characterized by relapses of inflammation in the part, sometimes without, sometimes with a renewal of suppuration, and especially, perhaps, since Paget published in 1869 his well-known paper on Residual Abscess, mainly in reference to instances of this disease and of tuberculous disease of bone. Few patients pass through a serious illness of this kind, especially with

necrosis and the formation of sinuses in such important bones as the femur, tibia, or humerus, without having relapses, sometimes numerous, and often very serious in character.

CASE II.—*Recurrence of Staphylococcic Osteomyelitis.*

Not long ago I had under my care a young man who, eleven years previously, had been in my wards with sequestra in the upper and lower ends of one humerus, the result of recent severe osteomyelitis. I then removed the sequestra and, after a time, his wounds securely healed. Still, during the eleven years which have since passed he has been laid up on four occasions owing to the occurrence of inflammatory attacks in that bone, with fever and other signs of constitutional disturbance, and on three of those occasions abscess formed. His last illness was in October, 1909, when I evacuated a large abscess which existed in front of the upper end of the humerus, extending into the armpit and under the pectoral muscle. There was no sequestrum, but the pus yielded a pure culture of the *Staphylococcus aureus*.

He remains well since that time, but I greatly fear that his troubles may not be at an end, for he has several times enjoyed excellent health for longer periods of time than that which has elapsed since this last abscess was opened. Indeed, I do not think that it is fully appreciated what a lifelong trouble this infantile infective disease of bone often proves itself, laying a man aside from business time after time during his life. Twice I have seen men over 70 years of age laid up by most painful and serious abscesses, occurring, in each case, in connexion with a tibia from which in early life numerous and large sequestra had separated and been removed after long-continued suppuration. In each the tibia was greatly deformed, and showed the depressed scars of many old sinuses, and more than one relapse had occurred during the long life of both men. But recurrence is not always confined to the part in which the primary infection happens to take place. It may occur years afterwards in another part of the body.

CASE III.—*Recurrent Staphylococcic Abscess in Right Tibia Nine Years after Amputation of the Left Leg on account of Acute Osteomyelitis of the Left Tibia.*

On January 26th, 1909, there was admitted to my male ward in the Western Infirmary a shoemaker, aged 25. More than eight years previously he had been treated in the Royal Infirmary by the late Mr. Henry E. Clark on account of osteomyelitis of great severity beginning in the neighbourhood of the lower epiphysis of the left tibia. Nearly the entire shaft of the tibia necrosed and lay exposed in a wound which extended almost from ankle to knee. He was extremely ill and early developed a right pleurisy, while shortly afterwards the knee-joint seems to have become involved. Mr. Clark amputated in the middle of the thigh, and thereby, I have no doubt, saved the patient's life. After complete recovery he learned shoemaking, and has since worked at that trade, enjoying good health and getting about fairly well with a crutch. Twelve weeks before coming under my care, however, he began to suffer from severe aching pain, aggravated at night, in the front of the shaft of the tibia of his remaining leg (right) a little above the junction of its middle and upper thirds. After a time a strictly defined swelling of the bone occurred, like a large node; and when I saw him there was over the most prominent part of this swelling a reddened and very tender spot of skin where fluctuation was distinct. There was no constitutional disturbance or fever present. Under chloroform the abscess was incised, and a small opening was found in the bone beneath, which led into a cavity of some size. On enlarging this opening, I was able to scrape out of the cavity with a spoon one or two small sequestra and much coarse granulation material. When the skin was incised, some of the pus as it flowed was received into a sterile tube, and, on cultivation, yielded an abundant growth of *Staphylococcus pyogenes aureus*. He made a good recovery, sound healing ultimately occurred, and he once more works at his trade.

It will be observed that there are some unusual and aberrant features presented by this instance of staphylococcic osteitis. The age of the patient (25 years), the fact that the disease occurred in the shaft of the bone and not near either extremity, the epiphyses being united, the further fact of the absence of all fever or other general disturbance of health, are none of them in accord with the facts to be observed in a primary attack of the disease. All the circumstances point strongly, in my opinion, to the conclusion that the pyogenic organisms were carried to the patient's right tibia at the time when they were working such havoc with the left one. There they lay quiescent for between eight and nine years, but at last produced mischief characteristic in kind, though much mitigated in intensity. It is an occurrence analogous to that of the woman who has a breast amputated on account of a

cancerous tumour, who, after enjoying excellent health for some years, begins to suffer from rheumatoid aching and pains in one thigh, and one day breaks that thigh-bone by putting her weight on it when stepping out of bed. A residual fragment, or perhaps germ of cancer, has rested without material change in her thigh-bone for years, and then by a sudden renewal of growth and activity has led to spontaneous fracture.

But a secondary infection of bone by staphylococcus may occur even when the primary disease caused by it was not an osteitis.

CASE IV.—*Ostitis of Femur occurring in a Man, 54 Years of Age, Four or Five Months after Recovery from Large Carbuncle on Neck.*

An iron turner, aged 54, was admitted into hospital under my care on May 5th, 1908, on account of pain in the left thigh and lameness of three months' duration. The pain, when first felt in the limb, was referred to the neighbourhood of the shin and ankle. This was not very severe, and lasted only for a week. It caused him to limp but he continued at work. He stated that "the pain then shifted to the knee and thigh, and has remained there since." During three or four weeks before I saw him it had been intolerably severe, interfering with his ability to walk and therefore to work, while it frequently robbed him of a whole night's rest. On examination a distinct enlargement of the middle of the femur, which tapered off above and below, was observed. There was no fever whatever, the temperature always being found normal night and morning. Four or five months previously the patient had suffered from a large carbuncle on the back of the neck, which had caused him great pain, and kept him from work for five or six weeks. The scar left by it was a large and irregular one. It was immediately after his return to work that he began to experience painful sensations in his left lower limb. This tumour of the thigh did not suggest to my mind the characters of a neoplasm. Nor did I, at first, quite see why a man, aged 54, who had always been very healthy and had no history of syphilis, should suffer from this painful enlargement of the middle part of his femur. He was far removed beyond the age when one expects to meet with staphylococcic osteitis, nor is the middle of the thigh-bone one of the *elite* situations of such an ailment. Moreover, though pain was great, fever was entirely absent. On May 7th I cut down on the thickened bone through the front of the thigh, making an incision through skin and muscles of about 3 in. in length. The periosteum, which was greatly thickened, was reflected to each side, when it was seen that the surface of the bone was very rough and irregular, owing to new formation. A wedge-shaped piece of the femur was removed by chisel and mallet. In the cavity thus opened there was a certain quantity of greyish fluid. I regret to say that, by some mistake on my part, no culture was made from this fluid, but the following is a report sent to me by Dr. J. H. Teacher on the portions of tissue which I removed at the operation:

"I picked off from the bone all the soft tissues I could get, and have to report on them and on one small piece of bone accidentally included. They all show a septic condition, apparently subacute, there being present many polymorphonuclear leucocytes and also granulation tissue. There is nothing like sarcoma. The osteophytes are not yet ready for cutting, but I should be greatly surprised, in view of the above and their characters, if they prove to contain tumour."

A later note from the pathologist stated that further examination had convinced him that there was nothing to suggest sarcoma. The wound suppurated a good deal, and, although the patient's strength was well maintained, healing was somewhat slow in its progress, principally because some bare bone, which was early observed after my operation, was slow to separate. It was extracted in August by the assistant surgeon who had charge of my patients during my absence on holiday. Sound healing occurred ultimately, and the man returned to his work towards the end of the year.

Although, unfortunately, no bacteriological examination of the fluid from the central part of the thickened femur of this man was made, I have no doubt now in my own mind, from the characters which I noted in the part both before and during operation, as well as from Dr. Teacher's subsequent pathological report, that the osteitis was due to staphylococci furnished by the carbuncle from which he suffered immediately prior to the first symptoms of the mischief in his femur.

The following case is an interesting example of the limited recurrence of an empyema owing to the persistence in the part of the *Staphylococcus pyogenes albus*:

CASE V.—*Case of Empyema due to Staphylococcus pyogenes albus: Recurrence of Suppuration nearly three Years afterwards, the same Organism being present.*

On January 29th, 1907, A. R., a young woman aged 17, suffering from an empyema of the right side, was transferred for operation to my female ward from that of my colleague, Professor Gemmell, to which she had been admitted on December 20th, 1906. The following facts are extracted from the journal of that ward: On December 8th the patient began to

suffer from severe headache, which confined her to bed. Next day her headache was even more severe; she suffered also much pain in the back, and was highly feverish. On the evening of December 10th she became delirious. From that time up to December 20th the pain and delirium continued, and the patient was said not to have had any sleep. There had been no vomiting, convulsions, or rigors. The Widal reaction proved negative. On admission the patient lay in bed obviously suffering great pain. There was no retraction of the head or rigidity of the limbs, but she screamed aloud whenever she was touched. The pupils were normal, but there was an internal squint of the left eye. Respirations 40, pulse 120, temperature 104.4° F. No abnormality in thorax or abdomen was made out, and there was no rash. On December 21st she was conscious when roused, and answered coherently when spoken to. On December 24th it is noted that there has been marked dyspnoea, the respirations averaging 60, and the pulse ranging from 124 to 162 per minute. Her highest temperature on that day was 103.4° F. Consolidation was noted at both bases, and on the right side the dullness extended up to the interscapular region. Along with the dullness there were crepitus and tubular breathing. She has been less noisy and has not cried out so much as before, lying semi-comatose. On January 1st it is noted that no improvement had occurred, that the patient had lost much flesh, and that numerous furuncular sores had formed on her body and upper limbs. Diarrhoea had been present for about a week. The temperature had oscillated considerably, but the pulse remained rapid. The patient was semi-comatose, motions and urine being passed in bed. On January 7th considerable improvement in her condition was recorded, the diarrhoea had ceased, and she was much stronger and more intelligent. Widal's test with *Bacillus typhosus* and *Bacillus paratyphosus* gave a negative result. On January 29th it is noted that Dr. Gemmell suspected the presence of fluid in the right pleural sac, and on the introduction of an exploring needle, it was found to be purulent, and the patient was transferred to my ward for operation.

On January 30th I excised a portion of the eighth rib and evacuated 2½ pints of pus. The patient, although extremely weak, stood the operation well, and showed no signs of shock or collapse. She made rapid progress, and on February 10th it is noted that her condition was very satisfactory, the temperature being practically afebrile, and she was eating and sleeping well. The discharge was almost entirely serous under strict antiseptic dressing, and rapidly diminishing in amount. She was now much stronger and could sit up in bed. She continued steadily to improve and to gain strength, but it was not until June 8th that she was dismissed. By that time her wound was satisfactorily sound, and her weight and strength well restored.

On February 21st, 1907, Dr. Teacher reported as follows: "The organism from the case of A. R. (empyema) proves on subculture to be *Staphylococcus pyogenes albus*."

Nearly three years after her dismissal she was again admitted to hospital, being placed this time under Dr. Edington's care, in a ward reserved for the treatment of septic cases; and he has kindly furnished me with a short note of her case as observed by him.

She was admitted on December 9th, 1910. She had remained well since her previous illness till a fortnight before her present admission, when the region of the scar became swollen. She had pain in the swelling one week later, when she was seen in the outdoor department and recommended for indoor treatment. The swelling burst on the day of admission and a small quantity of discharge oozed away. On December 10th the condition noted was a fluctuant swelling about the size of a walnut, situated in the middle of the old scar. Incision allowed a few drops of turbid fluid to escape. The main bulk of the swelling was composed of infiltrated connective tissue. This was incised, after which a probe was passed through a sinus into the pleural cavity. This sinus was situated in the middle of the eighth rib, that is, in the interval from which a piece of the rib had been formerly removed. The periosteum having been elevated the rib was divided in front of and behind the sinus and the intervening parts removed. On then enlarging the opening into the pleura, the finger found a limited cavity, bounded above and behind by the lung, and in front by the ribs. The cavity contained turbid watery fluid. A drainage tube was inserted and the wound partially closed. The bacteriological report, dated December 12th, 1910, is as follows: "No organism seen in film. A very scanty growth of *Staphylococcus albus* obtained on culture."

If we now turn from pyogenic to pathogenic organisms we shall, perhaps, be still more struck by the viability of many of them.

It is almost unnecessary to refer in this connexion to tubercle, so well recognized by all practitioners is its tendency to recurrence even after long cessation of active symptoms. Indeed, it is often hard to be sure whether a tuberculous lesion is a primary infection or not. It may be only the awakening of some latent, perhaps unknown, infection of many years' standing, and von Behring has expressed the belief, probably with every justification, that pulmonary tuberculosis in the adult results not seldom from the tardy evolution of an intestinal infection contracted in early life. Recrudescence of the tuberculous process in joints, bones, glands, and skin is too well known to every practitioner to require illustra-

tion, occurring as it often does repeatedly in a patient's lifetime, sometimes with prolonged intervals of suspense between the attacks. Again, the injury which is followed by active tuberculosis in a hip or knee is probably only the quickener of a latent deposit which already existed there; and when a consumption supervenes upon a typhoid fever or an influenza, or a tuberculous meningitis on an attack of measles, it is not improbable that in each case the fever has only awakened into activity germs which settled in those parts months or years before.

Writing lately on "Syphilis: Recent Methods of Diagnosis and Treatment," Dr. Ivy McKenzie makes the following remarks:

A second infection of syphilis is extremely rare, and no case of a hard chancre occurring in a tabetic or general paralytic has ever been reported. Krafft-Ebing failed to inoculate with the virus of a typical hard chancre nine cases of general paralysis, which gave no history and showed no sign of syphilis. Such observations have naturally led to the conclusion that one attack of syphilis confers a permanent immunity. It is more likely, however, that the patient still harbours the virus, because Neisser has shown that as long as spirochaetes are present reinoculation is impossible, whereas, after thorough treatment of experimental syphilis and trypanosomiasis, it is possible to reinfect the animal almost immediately. The term "acquired immunity" as applied to syphilis, signifies, therefore, a condition of equilibrium between the host and the spirochaetes of the original infection, whereby an inoculation with fresh material does not produce the usual manifestations. The existence of latent periods in disease is not peculiar to syphilis. Thus, trauma, an attack of measles, or of influenza are not the causes of tuberculous infection; they are the conditions which give rise to disturbed relations between the patient and the organism which may already have been present for some time.

In syphilis and tubercle, therefore, we may be satisfied that their respective specific organisms, once admitted into the body, have their potentiality for mischief terminated only by the death of their host. And the same latent persistency may be observed in cancer, although as yet we know of no causative germ related to it.

Let me now direct your attention to the extraordinary viability of the *Bacillus typhosus*. The fact of its power of survival in the body has of recent years, as you know, become a matter of grave concern, on account of the danger which often follows to the public health from the prolonged persistence of the bacilli in the urine or alvine evacuations of certain patients who have recovered from typhoid fever, and who may from these sources continue to spread disease and disaster amongst those with whom they live or work.

Surgeons are familiar with many sequelae of typhoid fever, due to the presence of the bacillus, in which relapses are of very frequent occurrence. They are too numerous to mention here, but there are at least two which are comparatively common—namely, inflammation of certain bones with or without abscess and necrosis, and inflammation of the gall bladder with or without gall stones. In bone abscess a pure culture of the typhoid bacillus has been obtained at least six years after recovery from the fever, and in the case of an abscess about the gall bladder fourteen years and a half after (Kean on *Surgical Complications and Sequels of Typhoid Fever*).

CASE VI.—Repeated Attacks of Severe Pain in a Tibia for Twenty-seven Years subsequent to the occurrence of Typhoid Ostitis with Abscess in that Bone.

I know a lady, now 65 years of age, who passed through a severe attack of typhoid fever in 1884, which confined her to the house for five months. During convalescence a painful swelling of the lower part of the left tibia occurred. Her brother, who is a medical man, informs me that this was operated on in March, 1885, on account of abscess. Her progress was slow, and she was lame for two or three years thereafter. She then became subject to attacks of agonizing pain in the part at shorter or longer intervals of time, although her health was well maintained. This liability to sudden onset of pain still continues, several attacks having occurred during last year. No swelling is observed during an attack, but sometimes a limited spot of great tenderness can be made out. There has never been any recurrence of suppuration.

The following are shortly the facts of an interesting case of cholecystitis, consequent upon typhoid fever, which I have quite recently had under observation:

CASE VII.—Case illustrating the Persistence of the Typhoid Bacillus in the Gall Bladder.

Mrs. H., aged 39, was admitted under my care in the Western Infirmary on October 8th, 1907. In May, 1907, she suffered from an attack of typhoid fever. When convalescent, but

before she had left her bed, severe pain occurred in the right hypochondrium. She herself soon afterwards felt a "lump" in that region which was tender to pressure, and she drew her doctor's attention to it. During August and September she had repeated attacks of most severe pain in this swelling. They were accompanied by vomiting and profuse perspirations, but there were no rigors. She did not suffer from jaundice or notice any alteration in the colour of the stools. She stated that during each attack of pain the tumour in the abdomen increased markedly in size.

On examination, it was easy to make out a tense pyriform tumour in the situation of the gall bladder, which extended down almost to the level of the umbilicus, and was very tender on pressure. She was kept in bed for several weeks, and, by rest, great improvement occurred, so that all her pain subsided and the tumour diminished so as to be only doubtfully perceptible on palpation. When she was allowed again to be up and to walk about relapse quickly occurred. On December 10th I operated, opening the inflamed and somewhat thickened gall bladder, stitching it to the abdominal wall and inserting a drainage tube. It contained a quantity of muco-pus and inspissated bile, but no gall stones. Then and on several subsequent occasions cultures of the fluid were made, and yielded a pure growth of *Bacillus typhosus*. In January, 1908, the typhoid bacillus was no longer found in the discharge, but a very short Gram-negative bacillus was present. On February 3rd the drainage tube was removed, and on March 10th the patient went home. She was then in good health and free from all pain, but the sinus still furnished some glairy discharge. She continued well, except on occasions when the discharge was retained by a temporary closure of the fistula; and in November, 1908 (seven months after leaving hospital) the fistula healed securely. About the same time she became pregnant. She enjoyed excellent health throughout her pregnancy, having no trouble whatever with the gall bladder. The child, which was her twelfth, was born on August 20th, 1909, after an easy labour. She remained well until the middle of October, when pain and the former tense swelling were once more felt in the right hypochondrium; and after several recurring attacks of the pain and vomiting she came back under my care. I reopened the sinus without much difficulty and reintroduced a small drainage tube. A pure culture of *Bacillus typhosus* was again obtained from the discharge on four different occasions. In December bile began to flow freely from the tube and the typhoid bacillus was still in pure culture. Dr. Carl Browning, who conducted the bacteriological investigations, has referred to the case in a lately published paper entitled "Latent and Chronic Infections with Typhoid Bacillus" (*Glasgow Medical Journal*, August, 1910), and from that paper I may quote what is to be said further regarding the bacteriology of the case.

"Subsequently there was found," he writes, "in addition to *Bacillus typhosus*, *Bacillus proteus* and a very short Gram-negative bacillus. On the last examination, in January, 1910, typhoid bacilli were still present. *Bacillus coli* was not found in the discharge from the gall bladder at any time. The typhoid bacillus from this case gave all the typical reactions and was agglutinated to the limit (1 in 8,000) by an antityphoid immune serum from a rabbit. The urine was examined on three occasions during November to December, 1909, but *Bacillus typhosus* was never found. Thus, in this case, typhoid bacilli are still present in the bile passages two and three-quarter years after the acute illness. The patient's serum was tested on several occasions from October to December, 1909, with her own strain of *Bacillus typhosus* as well as with the laboratory culture. The Widal reaction was positive, but not markedly so (agglutination in forty minutes with a dilution of 1 in 40) at room temperature."

She was dismissed on February 12th, 1910, in good health, but with discharge still escaping from the sinus. Within the last few days her doctor kindly sent a reply to a note of inquiry regarding her present condition which I had addressed to him, and in that reply he writes as follows, under date February 10th, 1911:

"I saw Mrs. H. yesterday. After leaving the hospital a year ago the sinus continued open till August, when it closed and remained so until January of this year. Then there occurred once more a great swelling of the gall bladder. With hot fomentations constantly applied the sinus opened up again, and the swelling subsided. She is now once more going about as usual, there being a little discharge daily from the wound."

Probably the bacilli still persist. The question of treatment in such a case is one of some difficulty. If the organisms were altogether confined to the gall bladder its entire removal might be contemplated. But no doubt they are present throughout the biliary passages generally, and in these circumstances removal of the gall bladder would prove futile.

I shall conclude my clinical illustration of this subject by detailing shortly the main facts of a case of amoebic abscess of the liver, the only example of the disease which I have ever had occasion to treat.

CASE VIII.—*Amoebic Abscess of the Liver occurring more than Six Years after Recovery from an attack of Dysentery.*

On April 30th, 1910, N. M., aged 27, a soldier, was admitted into the Western Infirmary under my care. He had served in the army for four years, and two of those years were spent in

South Africa (1902-1904). While there he suffered from a severe attack of dysentery, and was in hospital for some months. His recovery, however, was complete and satisfactory, and in the summer of 1904, as his own battalion had been recalled to this country while he was ill in hospital, he was attached to another, and found himself able for all his work. He was, after a time, sent to this country, and rejoined his old battalion at Maryhill Barracks, Glasgow, where it was then quartered. After serving there for another year, his time of service expired, and he went back to work as a baker, the trade which he had learnt before joining the army. He continued to enjoy excellent health and worked uninterruptedly as a baker until his present illness began. Ten weeks before his admission into hospital he one day felt ill, and was seized with shivering. He was laid up, and a week later began to suffer pain in the right hypochondrium. This continued for a week, and then seemed to alter its position, becoming localized about the level of the fourth interspace on the right side and being only felt on deep inspiration. Soon, however, the pain became generalized over the side and gradually increased, but varied in intensity from time to time. About a fortnight before admission swelling became obvious, bulging the lower ribs on the right side outwards; and it was said that for a week the pain had been very severe, almost entirely preventing sleep. The patient looked extremely ill and exhausted, complained of great weakness, and frequently moaned on account of pain. All over the right chest, front, side and back, about as high as the fifth intercostal space, and also over a considerable area in the right hypochondrium there was dullness on percussion. Over the bulging part of his side distinct fluctuation could be made out in the intercostal spaces, in spite of the fact that the slightest pressure elicited loud complaints of pain. There seemed to be no doubt that the abscess was there adherent to the chest wall.

The operation proved a very simple one. I made an incision in the sixth interspace at a point where fluctuation was very distinct, and before cutting through the whole thickness of muscle the contents of the abscess began to flow. Having extended the opening, I introduced a large and long drainage tube, drawing off nearly a pint of reddish-brown fluid. Some of this was received in a sterile tube and sent to the laboratory for examination. On the following day the patient was very well although weak; he was free from pain and had enjoyed some sleep. He progressed most satisfactorily. On May 13th it is noted: "The drainage tube has been removed and a smaller and shorter one inserted. The discharge is decreasing and becoming serous in character." It was soon trifling in amount and entirely serous, while the patient rapidly gained flesh and strength. On June 3rd, the wound having been absolutely healed for some days, he was allowed out of bed, and on June 10th was sent to the convalescent home. Dr. Carl Browning reported as follows regarding the discharge:

"Amoebae, containing red corpuscles, were seen in the pus. Cultures yielded no growth of any kind."

This tropical abscess of the liver, therefore, was solely due to the protozoal organism, being sterile so far as *Bacillus coli* and cocci were concerned. This is, I believe, in accordance with what is usual. It seems marvellous that the amoebae of a dysentery contracted and satisfactorily recovered from in South Africa should remain in this soldier's liver and put his life once more in danger in Glasgow six years afterwards by the sudden development of hepatic abscess, that well-known sequel of dysenteric disease. But the fact is one beyond any possibility of dispute.

SALVARSAN ("606") AND ARSENIC CANCER.

BY

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It is now known that the active agent in the so-called "606" is arsenic, and as it has gained wide popularity, it becomes a duty to examine and record the facts which concern its possible drawbacks.

I have been myself through a long professional life a zealous, not to say enthusiastic, advocate for the two minerals—arsenic and mercury. They have been, indeed, my sheet anchors in practice, compared with which all the rest of the *Pharmacopoeia* has seemed almost useless. They are remedies concerning which definite assertions may be made, and from which definite results may be always expected. They are tools concerning which all that has seemed necessary was that we should know how to use them.

My faith in their efficiency remains, after more than sixty years' experience, unshaken, but, as I very much regret to say, regarding one of them, I have been obliged of late years to feel that there are drawbacks which almost forbid its use. In former years I regarded arsenic