America, say that such can only be explained on the view of infection of one case from another. The facts of such epidemic outbreaks are known to all. How often do such attacks occur? As an instance, I shall refer to the intercommunication between New York and Europe in the year of cholera 1873. In that year, according to the register of the offices at New York, there were 760 vessels which arrived from different parts of the world, giving an aggregate of 316,956 individuals, but of these 266,055 came from Europe. Of these 113,920 came from England, which was free from cholera; from the remainder of Europe the numbers were 152,135, and about 400 vessels served to convey the individuals, making up the last figures, from ports infected with cholera. If we inquire into the statistics we find that cholera chiefly occurred on four vessels only. Eleven cases were registered from the *West-phalia*; one fatal case from the *Ville du Havre*; from the *Washington* three fatal cases; and from the *Holland* one fatal case.

Although the chances of contagion aboard ship are very favourable, yet how small was the number of cases of cholera. Take the ship with eleven cases, and we find that they belonged to two German families only; two died during the voyage, nine were landed on Dix Island, and of these but one died and the rest recovered. How is it conceivable that cholera should have confined itself to two families without attacking others? I believe that both families had contracted cholera before going on board; indeed, an epidemic may occur in a ship provided the passengers have all come from a place where cholera exists. The contagionists have, however, replied that some remarkable epidemics have happened on board ship, which could not be explained on the above mentioned view. It is a question whether cholera can infect on board ship. The contagionists take facts conveniently, they select those instances which occur least frequently and adopt them, to the exclusion of the great majority of instances which tells against them. I recall the articles which I wrote in the *Vierteljahresschrift für öffentliche Gesundheitspflege* and in the *Zeitschrift für Biologie* to prove that I have thoroughly investigated the nature of epidemics of cholera on ships. Rumours of false returns concerning cholera on board ship have been bruited. But these falsifications can hardly be committed when an epidemic occurs during a voyage. It may be said that my instance of 1873 does not disprove the contagiousness of cholera. Cholera, like small-pox, does not attack everyone who is brought into relationship with it. If even a few instances of contagion were proved to have occurred on board ship, we should have to admit the contagiousness of the disease.

(To be continued.)

TWO CASES OF CHARBON.¹

By A. F. M'GILL, F.R.C.S.,
SURGEON TO THE LEEDS GENERAL INFIRMARY.

THE two cases which form the subject of this paper are examples of a disease which manifests itself in many various ways, and which has received several names, but which is distinguished by the presence of a characteristic organism, the bacillus anthracis. The cases apparently have but little in common. In the first the symptoms were mainly general; in the second local. The first proved rapidly fatal, the second terminating in recovery.

CASE 1.—A butcher, aged sixty-four, at the time in perfect health, was on July 23rd skinning a beast which had that day been slaughtered. The beast was known to be diseased, several other animals in the same pasture having previously been affected; its spleen was found to be greatly enlarged and soft. The man while examining the viscera to find out the nature of the ailment, knocked a small piece of skin off the lower part of his right forearm. The next day his hand was swollen, and he felt ill; on the evening of July 25th, two days after the accident, he applied to and was admitted into the Leeds Infirmary. On admission the forearm was seen to be enlarged, tense, and shining, the swelling extending above the elbow; there was a small excoriation above the wrist, which did not present any unusual appearance; the

lymphatic glands in the axilla were not enlarged. He seemed depressed and ill, but not more so than the local disturbance would account for; his temperature was 100°. There were no unusual symptoms about the case, which was looked upon as ordinary diffuse cellulitis. Numerous incisions were made in the forearm and arm, and a poultice was applied. The next day (July 26th) the condition of the arm remained stationary, but the general condition was worse. The temperature was only 100° both morning and evening, but the appearance was pinched and the aspect bad. On July 27th the temperature had fallen to 97.4°; the following note was made at noon:—The body and extremities were cold; the pulse could hardly be distinguished; the aspect was pinched and death-like. Yet his mind was clear, he could give a lucid account of his accident, and was not aware of his dangerous moribund condition. At 4 P.M. Dr. Barrs examined the serum and blood obtained from his arm. These fluids did not contain any organisms. At 6 P.M., four days after his inoculation, the patient died. A post-mortem examination was made twenty-two hours after death. The following notes were taken from the post-mortem register:—Rigor mortis present; body well nourished; right arm and forearm along the inner side were swollen and red, with many small punctures visible. There was a small unhealthy-looking abrasion at the point of inoculation on the right forearm. The tissues on the front of the chest were oedematous, and the pectoral muscles soft. The lungs were soft, congested, and oedematous; spleen very soft and diffuent; kidneys normal; liver slightly fatty; other organs healthy. Dr. Barrs examined several specimens of blood obtained from various parts of the body, and found that quantities of the bacillus anthracis containing spores were present. Mr. W. B. Russell examined the spleen pulp, and also found large numbers of the same organisms.

CASE 2.—On August 6th I saw a middle-aged man who had been under the care of Dr. Nowell. Four days before, while dressing a beast, which had been feeding in the same fields as that mentioned in the last case, and which also had an enlarged spleen, he scratched his right arm about an inch above the wrist. He thought nothing of it at the time, but in two days his forearm was swollen and a circumscribed sore appeared at the seat of the scratch. This sore gradually but rapidly increased in size. When I saw it, it presented the typical appearance of a malignant pustule. There was a black dry patch, rather larger than a shilling, situated an inch above the right wrist on the centre of the flexor aspect of the forearm, this was surrounded by a reddish-purple zone covered by small indistinct vesicles, and gradually faded into the surrounding skin; the whole forearm was considerably swollen. There was not much constitutional disturbance, though the patient was somewhat feverish, flushed, and anxious. I recommended immediate excision, and after consultation with Dr. Nowell excised the pustule the same afternoon, cutting wide of the inflamed skin in all directions. The wound was dressed with iodoform, freely applied, and silk. On September 18th Dr. Nowell kindly sent me a note of the further progress of the case. He says—"The case of malignant pustule has progressed well; iodoform and dry lint were used as dressings until about a fortnight since, when I substituted resin ointment, once or twice touching the weaker prominent granulations with silver nitrate. He came for the last time on the 15th, but promised to call and let me see the wrist by-and-bye. The wound is now healed and evenly filled up except an oval about the area of two lines by one." The pustule at the time of removal was placed in weak alcohol and subsequently examined by Dr. Jacob, who has furnished me with the following report:—"The pustule when hardened in alcohol still preserved its black centre, with a trace of the red areola. A section through the centre showed considerable necrosis of the epithelioid elements with partial separation of the epidermal layer by sero-fibrinous and cellular infiltration. A section stained with gentian violet and resin showed a large number of bacilli and spores scattered over the field, occupying the deeper as well as the more superficial layers of the corium. The bacilli were thick, short-jointed rods, the spores large and rounded, resembling rather those obtained by cultivation of the bacillus anthracis in meat infusion than those generally found in cases of anthrax in man. There were besides several collections of micrococci of the ordinary septic type."

There are several points which require notice in relation to these cases.

1. In the first case, though a careful examination was

¹ Read before the Leeds and West Riding Medico-Chirurgical Society.

made, no specimens of the bacillus could be discovered in the patient's blood two hours before death, though at the post-mortem examination large numbers were found. This is often the case—indeed, it seems that life cannot be carried on when the bacilli in considerable number are present in the blood. The bacilli cannot live without the presence of oxygen, and as soon as they are developed in the blood, they speedily deoxygenate that fluid, rendering life impossible. It is probable that the spores of the bacillus circulate in the blood during the continuance of the disease, and it has been proved by experiment that they thrive without oxygen; as soon as the time comes for them to be developed into bacilli the patient dies.

2. The condition of Case 1 on the day of his death forcibly reminded me of a patient dying from cholera collapse. There was the same cold and clammy body and extremities, the same pulselessness, the same rapid breathing, and the same remarkable clearness of the mental faculties.

3. The satisfactory result which attends the early excision of malignant pustule is again exemplified. The success of this treatment has been proved at Guy's Hospital, where of fifteen cases in which excision was practised, thirteen made a good recovery. At Guy's it has been customary to apply chloride of zinc or some other strong caustic to the wound caused by the excision. Microscopic examination, however, proves that the bacillus is not found in the subcutaneous tissue, and this case shows that the application of a caustic is unnecessary.

4. As animals which die of splenic fever are in this district disposed of in the usual manner and sold for human food, it is interesting to know what is the effect of the bacillus when taken into the stomach. Koch made some experiments on sheep, with the object of elucidating the point. He found that sheep might be fed with unlimited quantities of the bacilli free from spores, and that no bad result occurred; but if the virus contained spores in an active state of development, death invariably occurred within two days. Fortunately the meat that is eaten will all be cooked, and we may hope that the bacillus is thus destroyed, and that no harm results. But the risk that is run by the persons who have to prepare and dress the meat derived from diseased carcasses is only too evident. While meat of this description is sold in the open market, we should remember that cases of charbon may come under our notice, in which it will perhaps be impossible to ascertain the mode of infection.

SOME OBSERVATIONS ON THE SPINAL CORD IN HEALTH AND DISEASE AT THE REGION OF THE FOURTH AND FIFTH DORSAL VERTEBRÆ.

By ALEXANDER HARKIN, M.D., F.R.C.S.,

CONSULTING PHYSICIAN TO THE MATER INFERMORUM HOSPITAL,
BELFAST.

(Concluded from p. 58.)

CASE 1. *Paralytic chorea*.—This case, the first of which I have any record, occurred in 1850. It was that of a bank clerk aged eighteen years, of bilious habit and sluggish intellect. He was ill with paralytic chorea and what is now termed symptoms of incoördination and defective inhibition. His left hand had become unmanageable; he could not retain the hold of a pen, a teacup, or a book for a moment; and the loss of control extended to the left leg, which he dragged after him in walking. He was prone to involuntary laughter, and his features were seldom at rest. The senses of sight, hearing, taste, and smell on the affected side were much impaired. After giving a trial to various local and constitutional remedies in vain, and finding that the fourth dorsal vertebra was exceptionally sensitive to percussion, I applied a small blister over the fourth and fifth vertebræ, and with the healing of the raw surface every choreic and paralytic symptom had departed.

CASE 2. *Facial paralysis*.—About the same time a married lady, the mother of two children, consulted me for an attack of facial paralysis, accompanied with ptosis and derangement of vision in one eye, partial loss of taste, smell, and hearing on the same side, with loss of sensation in the integuments of the face and cheek on that side; the third,

fifth, and seventh cranial nerves were engaged. In her case the fourth and fifth dorsal vertebræ were painful on pressure, and these only. After fruitlessly trying a variety of remedies then in vogue, I ordered a blister to be applied over the tender vertebræ; this was done, and before the expiration of a week all the motor and sensory functions in abeyance were completely restored.

CASE 3. *Chorea*.—In the summer of 1860 I was called to a case of well-marked chorea in an unmarried female, aged seventeen, her second attack. Her previous illness lasted for six weeks; she had then been under the care of a skilful practitioner, who prescribed cold shower-baths and drachm doses of carbonate of iron. I found her suffering from incessant jactitation of both upper and lower extremities, which seldom ceased even during sleep. Her head and tongue were in constant motion; there was no history of rheumatism or evidence of cardiac disease. Having found the fourth dorsal exceedingly sensitive to pressure, a blister was applied over it for eight hours; it rose well. I did not prescribe any other mode of treatment, and at the end of eight days the patient was restored to perfect health.

CASE 4. *Facial paralysis*.—On June 14th, 1870, Miss P— called on me. She had contracted facial paralysis by sitting for some time at the open window of a railway carriage. Her mouth was drawn to one side, her left eye was permanently open, tears streamed unchecked from it over the cheek; common sensation and hearing were much impaired on the same side; she put out her tongue very awkwardly, and spoke with difficulty. On examining the vertebral column she shrank with a cry of pain when tapped over the fourth and fifth dorsal spines, over which a blister was applied. I saw her forty-eight hours afterwards, when she showed a marked improvement. Complete recovery resulted in the course of a few days.

CASE 5. *Chorea*.—C. K—, a lad thirteen years of age, was brought to me on Sept. 9th, 1870. He had but recently recovered from a prolonged attack of rheumatic fever, fourteen days after which the present symptoms supervened. He had been treated, his mother informed me, for some time without any benefit as an out-patient at the General Hospital. The left arm and leg, which suffered most from the rheumatic attack, were now the most affected with choreic movements. His eyes, lips, and head were in almost perpetual motion; there was no perceptible cardiac complication. I did not prescribe any medicine, but over the fourth and fifth dorsal vertebræ, which responded as usual to pressure, I applied the ordinary counter-irritant. On the 12th he had acquired control of the left hand, could hold a cup steadily, and perform any manual office freely. On the 19th he was quite well, with the exception of nervous twitches in his face. I then applied a second blister over the same place, and when he visited me on the 26th every abnormal symptom had disappeared.—Second attack: On Jan. 23rd, 1871, the lad had a return of the disease, almost a counterpart of the first attack. I ordered a blister, as before, to the same region, but was disappointed in not discovering any improvement. On the healing of the raw surface, however, I applied dry cupping glasses over it and near it, with great relief; a second application of the glasses completed the cure. I then took the lad into my service. Good fare and suitable occupation established his health, and he afterwards took to seafaring, and has been for some years an able bodied seaman in a coasting vessel.

CASE 6. *Facial paralysis*.—On Feb. 2nd, 1880, a lady called with her daughter, Miss L—, aged nineteen years. The latter stated that when passing from an overheated room into the outer air, then below zero, she suddenly felt a burning sensation in her right cheek, followed by sore-throat. She was then menstruating. On reaching home it was observed that her mouth was drawn to the left side when she attempted to speak or laugh; she was unable to corrugate her eyebrows, to wink with the right eye, or to close it, and when going to sleep had to bring down the right upper eyelid with her fingers. She could not distinguish even the largest type with that eye, and the sense of hearing on that side, and that of taste with the right half of the tongue, and of smell in her right nostril, were almost entirely obliterated. She suffered from epiphora, tears were constantly flowing over the affected cheek; when attempting to masticate, her food remained in the right side of her mouth till relieved by the finger, and she could not clear her mouth of saliva by ordinary expectoration. Common sensation was almost absent on the affected side. Her speech was indistinct, and she could not pronounce any