

at the bottom of the tube, but the fluid remains clear. All cultures have a powerful, musty odour.

GENERAL REMARKS.

Definition.—Several writers seem to have confused Streptothrix and Cladothrix. Thus Macé, in his account of what he calls "Cladothrix dichotoma," describes an undoubted streptothrix. But the distinction is simple enough. Cohn's definitions were:—Cladothrix: very fine leptothrix filaments; colourless, not articulated, straight or wavy, with false branching. Streptothrix: very fine leptothrix filaments, colourless, non-articulated, straight or slightly spiral, with true branching. Besides these, they are further distinguished by the former possessing a sheath, which the latter does not. It is, in fact, the presence of a sheath in Cladothrix that accounts for the false branching; for it holds together filaments which without it would fall asunder.

History.—The first to discover the cladothrix was Cohn, who two years later described and figured it, together with another organism which von Graefe and afterwards Foerster had observed in the lacrymal canal, and which Cohn now names Streptothrix Foersteri. Cienkowski next studied the cladothrix. In 1877 he stated that he had seen both true and false branching, but as he makes no mention of Streptothrix it is probable that he has confounded the two. Zopf in 1882 published an excellent description of Cladothrix, which was accompanied by several valuable plates; he, however, could not distinguish between the two varieties and says that they could not be separated. But he denies that he has ever seen true branching in any organism whatever, and therefore it is evident that he had never studied the streptothrix. Winter, two years later, considered Streptothrix and Cladothrix as synonymous terms. Macé, in 1888, succeeded in cultivating an organism which he called Cladothrix dichotoma, but, as mentioned before, this was a true streptothrix and differed in several particulars from true Cladothrix dichotoma. The specific cause of cattle disease in Guadeloupe—farcin de bœuf—was described in 1889 by Nocard as a cladothrix, but subsequent investigation by Metchnikoff showed it was a streptothrix. Billet, who has considered the cladothrix from every point of view, and has gone into it very exhaustively, has endeavoured to cultivate this organism on ordinary media, but not altogether with success. But in the hanging drop he has observed all the stages of development of the cladothrix, including the formation of rods and coccus forms. Since 1890 Russell cultivated a true cladothrix from sea-water, and Eppinger, from a case of meningitis, has isolated a streptothrix, although he calls it a cladothrix; other forms of streptothrix have been isolated by Gasperini, Almquist, Doria, Gruber, Sauvageau and Radais, and lastly by myself.

Reproduction.—The methods by which reproduction is provided for in the different species are various. In Cladothrix dichotoma Billet claims to have observed the formation of true endogenous spores. The first stage in their formation is a retraction of the protoplasm of the filaments into a rectangular bacillus-like body, which then divides into two portions, each of which again similarly divides, so that we have the appearance of fine angular or rounded bodies (spores) enclosed within a clear hyaline sheath. In my cladothrix no spores could be observed. Macé says the filaments of Cladothrix dichotoma (*sic*) may become segmented into very short rods or spherical bodies, which may be considered as arthrospores. Doria, according to Sauvageau, describes sporiferous filaments which are very much thicker than the vegetative filaments and segment into spores. These swell up by a process but little known, though certainly connected with the presence of air in the interior, and rupture of the investing membrane sets the spores at liberty. The method of sporulation described by Sauvageau and Radais in *Oöspora Guignardi* is very similar to that of Doria and of my Streptothrix C. The surface of all cultures on solid media is covered with a white powder, which consists of short sporiferous filaments, distinguished from the ordinary vegetative filaments by their much greater thickness. Segmentation takes place simultaneously along the whole filament. The spores are round or oval and can easily be separated from each other. They stain easily with aniline dyes and with Gram's stain. Almquist describes a very curious method of fructification. When cultivated in a thin layer of fluid the plant gives rise to filaments which rise out of the fluid into the air and there become segmented into oidiospores. These spores become covered with oil produced by the plant itself, so as not to be wetted, and can then be distributed by the wind to other places for development.

Place in classification.—Cohn considered—and his opinion has been closely followed by Zopf and others—that Streptothrix and Cladothrix were closely allied. Sauvageau and Radais, on the other hand, think these two plants have nothing in common. They regard Cladothrix as a bacterium and Streptothrix as a mycelium; the latter, therefore, should be placed amongst the mould fungi and not amongst the bacteria. As regards Streptothrix, Doria believes they belong neither to the bacteria nor to the moulds, but to a special group of their own. Almquist agrees with Cohn and Brefeld that Streptothrix is a bacterium and forms a connecting link with the Hyphomycetes. I rather incline towards Sauvageau's view that Streptothrix and Cladothrix are not at all closely allied. The latter, I think there can be no doubt, belongs to the group of Bacteria; but the proper place for Streptothrix is by no means so readily determined. In certain characters—for example, the appearance of so-called coccus forms and short rods—they resemble the bacteria; other characters, however, such as the musty odour which most of them possess, and especially their fructification by means of conidia, point very conclusively to the Hyphomycetes. They undoubtedly form a connecting link between the two families, but, I think, should be placed rather among the latter than the former.

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A Mirror OF HOSPITAL PRACTICE, BRITISH AND FOREIGN.

Nulla autem est alia pro certo noscendi via, nisi quamplurimas et morborum et dissectionum historias, tum aliorum tum proprias collectas habere, et inter se comparare.—MORGAGNI *De Sed. et Caus. Morb.*, lib. iv. Proœmium.

ROYAL FREE HOSPITAL.

PNEUMONIA FOLLOWED BY ULCERATIVE ENDOCARDITIS
AND MENINGITIS.

(Under the care of Dr. SAINSBURY.)

CASES of malignant endocarditis, though not very infrequent, are always interesting, and in particular in their etiology. The present case illustrates the well-known but ill-understood relation between pneumonia and this form of endocarditis. According to Osler pneumonia was present in 11 out of 23 cases observed in Montreal and in 54 out of the 209 cases which he analysed in his Gulstonian Lecture. Meningitis is a not infrequent further complication; it was observed in 25 of the 209 cases, and in 15 of these 25 there was also pneumonia. For the notes of this case we are indebted to Mr. Wilmot H. Evans, B.Sc. Lond., registrar.

A furniture porter was admitted into the Royal Free Hospital on Nov. 11th, 1892, under the care of Dr. Sainsbury, complaining of pain in the side and shortness of breath. In his family history there was nothing noteworthy. He had lived in London for the greater part of his life, well clothed

and well fed, but he frequently got wet through, and his hours of work were very long. He had never taken more than a moderate amount of alcohol until about a fortnight previously, but since then he had taken much rum. He had rheumatic fever at the age of twenty-one and had had winter cough for many years. Seven days before admission he got wet through early in the morning and kept his wet clothes on all day. Two days later he awoke complaining of great pain in the abdomen, and though he got up the pain increased so much that he had to return to bed. During the day he shivered several times, but had no distinct rigor; there was also some diarrhoea. That night he was in much pain and was unable to sleep, and with every breath he felt a sharp stabbing pain in the right side, and his cough (which he had had about two months) became more troublesome. The next morning he consulted a medical man. He was told that he had pleurisy and that he should go to bed. A poultice was applied to the side. That night he was very restless and was slightly delirious. The next two days he continued in much the same condition, but his cough grew worse, the amount of sputum increased and some of it was said to have been black. Each evening delirium came on and he could not sleep. On the 10th he was delirious, got out of bed and walked downstairs. When the medical man saw him, he said the patient had "inflammation of the lungs" and advised his friends to take him to a hospital; the next day he was admitted to the Royal Free Hospital.

Nov. 11th.—The patient lies on his back in bed, though he can lie on the side. His face is somewhat cyanosed. Temperature 100.6°; pulse 100; respiration 38. He complains of pain, stabbing in character, in the right side, much worse on breathing deeply. He has a cough, which is not severe; the sputum is viscid and in parts it is "rusty." The respiration is short and shallow. On percussion the note on the left side is normal; on the right in front it is resonant also, but in the axilla and behind there is dullness. On auscultation expiration is slightly prolonged all over the chest, due to the emphysema present; in the right axilla the breath sounds are weak and at the back on the right side there is well-marked bronchial breathing, best heard to the inner side of the angle of the scapula, and here there is well-marked pectoriloquy. No adventitious sounds are to be heard. Vocal resonance is diminished in the right axilla, but is increased at the back on the right side. The heart's apex beat is in the fifth space in the nipple line, but is very indistinctly felt. The heart sounds are normal but faint. The appetite is poor; there is much thirst; the tongue is coated with white fur. The urine has a specific gravity of 1018 and contains no albumen. He was put on a milk diet and five grains of carbonate of ammonium were prescribed every four hours.

12th.—He has had a fairly good night, though delirious at times. He tries to get out of bed, but answers fairly well questions put to him.

14th.—He continues in the same condition with much delirium and but little sleep. In the right axilla the breath sounds are bronchial and there is increased vocal resonance. Behind at the right base some fine crepitations can be heard. The temperature has fallen to normal.

16th.—Condition practically unchanged. Crepitations are heard in the right axilla. The expectoration has increased and the sputum is more markedly "rusty."

18th.—He sleeps better, but complains of his feet feeling cold. The cough is much better and there is no "rusty" sputum. The delirium has gone.

23rd.—The bronchial breathing has entirely disappeared, but there is some dullness at the right base.

26th.—At six o'clock this morning the temperature rose to 101.4°. He complains of a sharp pain in the left axilla, but no physical signs can be discovered. He has had slight shivering this morning. In the evening the temperature fell about a degree.

27th.—He had a rigor about noon, and the temperature rose to 103.4°, but fell rapidly to 98°, with profuse sweating. He felt a severe pain in the left axilla.

28th and 29th.—On each day he felt a chill, and the temperature rose to over 103°, falling again rapidly. No abnormal physical signs can be detected in the chest. He was delirious at night.

30th.—At mid-day he had a rigor, the temperature rising to 102°. He was ordered five grains of quinine every six hours. The sputum was examined for tubercle bacilli, but none were found.

Dec. 1st.—The temperature is 103.2°; no abnormal signs

can be discovered in the lungs. The first heart sound has a blowing character at the base. In the afternoon he became very drowsy, and his breath was very offensive. Exploratory needles were inserted behind in the seventh and eight spaces, and a little bloodstained fluid was withdrawn. The temperature has risen to 105.4°.

3rd.—He is very drowsy. The tongue is dry and brown, but the breath is less offensive. The legs and arms are cold and bluish. The pupils are unequal. There is external strabismus. No optic neuritis. A double blowing murmur can be heard at the base of the heart. He sank gradually. During the day the temperature rose until it was over 106°. In the night he had clonic spasms of the arms and legs, and died.

Necropsy performed by Dr. ANDREWES.—Brain: In the subarachnoid space there was much exudation of semipurulent lymph with excess of fluid. The meningitis was well marked on the convexity, but was still more marked at the base of the brain. There was no actual pus. The brain itself was healthy. Heart: On that segment of the aortic valve which lies opposite the right coronary artery there was a mass of greenish vegetation, soft and friable. It was as large as a small hazel-nut and into it projected a small aneurysm of the valve. The two other cusps of the valve were healthy. The aorta showed slight fatty degeneration of the intima and had not been infected by the vegetation. Lungs: Both were very congested and oedematous. On the surface of the lower lobe of the left lung there was a small whitish patch, which was sharply outlined. The lower lobe of the right lung had nearly recovered from the pneumonia, but close to the base, in the centre of the lobe, there was a small cavity (about three-quarters of an inch in diameter) full of pus, apparently sweet. On the right side there were dense, pleural adhesions, but there were none on the left. The other organs were healthy.

We are also indebted to Dr. Andrewes for this further note with regard to the microscopical and bacteriological examination of some of the parts removed. "Cover-glass preparations made from the aortic vegetation showed numerous organisms all of one kind—viz., short bacilli, with bipolar staining, often arranged end to end or even in short chains. At first it was thought that there might be diplococcus pneumoniae, but it was not possible to demonstrate any very distinct capsule, and on the whole they appeared to be short bacilli rather than diplococci. Sections of the vegetation showed these same organisms, arranged in sharply defined masses, here and there throughout its thickness. Numerous cultivations made from a fragment of the fresh vegetation both on gelatin and on agar-agar, remained perfectly sterile; not a single colony grew. The growth of the organism under aerobic conditions was not tested. The meningeal exudate contained numerous pus cells and a few micro-organisms of various sorts. Cultivations yielded various species, including staphylococcus pyogenes aureus. No one organism predominated, and no satisfactory conclusion could be drawn."

Remarks by Dr. SAINSBURY—The patient was admitted on the seventh or eighth day of the disease; on the eleventh day the temperature became normal and on the fourteenth day the disease appeared to have departed. After an interval of seven or eight days there occurred a sudden rise of temperature and thence onwards till death seven days later an irregular pyrexia was maintained. The delirium reappeared with the return of fever and the disease assumed a typhoid character. A probable diagnosis of malignant endocarditis was made, which was enforced by the discovery of the double bruit at the base, but it must be confessed this bruit was very feeble. The case, it has been remarked, shows in its etiology a sequence of events frequently witnessed—viz., lobar pneumonia—malignant endocarditis, also in the further occurrence of meningeal trouble it is not unusual; but I would point to the presence of a small abscess in the centre of the pneumonic lobe as a rare event in pneumonia. I would also draw attention to the occurrence of one attack of rheumatic fever at the age of twenty-one, which, though the lesions of the aortic valve appeared at the necropsy to be wholly recent, may possibly have caused slight mischief to this valve, the subsequent and fatal endocarditis being grafted upon a slight damage of this kind. This is supposition only, but the precedence of an illness with marked endocardial affinities should not be overlooked, and it is clear that an acute inflammation such as was here found might obliterate all evidence of an old standing inflammatory residuum.

CHISLEHURST, SIDCUP AND CRAY VALLEY
COTTAGE HOSPITAL.A CASE OF FRACTURE WITH DISLOCATION IN THE
CERVICAL REGION; NECROPSY.

(Under the care of Dr. G. W. DAVIS.)

THE following is an interesting account of a case of damage to the spinal cord in the cervical region, with fracture and displacement of parts of the fourth, fifth and six cervical vertebrae. It is probable that the cord was completely crushed by the injury, for from the first the deep reflexes were absent, and it is the absence of these which indicates the extent of the injury. There can be no doubt that the decision not to operate in the case of this patient was the correct one. The statistics of operation for paraplegia dependent on injury to the cervical spine are decidedly against any interference, especially in recent cases.

W. G. H.—, a sawyer aged twenty-one, was in a boat-swing on May 7th, 1892, with a companion. The swing was descending, and W. G. H.—, in the higher seat, let go the propelling rope to save his hat. In the act of leaning over the side to again secure the rope he was struck on the forehead by the first of the swing shores; this blow threw him across the swing, which then carried him to the further support, by which he was hurled to the ground, alighting on his head. The accident happened at 2.30 P.M. He was unconscious for an hour; his nose bled. He was thought to be drunk by the bystanders and was carried twenty feet and laid on the grass. A medical man who was present had him conveyed to the hospital. Dr. Davis was sent for at 5 P.M. and saw him at 5.20 P.M., about three hours after the accident. On admission the man was found to be very muscular and heavily built, with fair complexion. He was very collapsed but conscious. The pulse was heaving and slow (48); the head and face were markedly cyanosed; the smell, taste and hearing were good; the tongue could be protruded straightly; deglutition was good; the pupils were equal, they were contracted and did not react to light. No lesion was discovered on the head, except the bruise over the right frontal protuberance; there was partial abduction of the arms, which were externally rotated, and the forearms and wrists were so flexed that the fingers touched the upper part of the deltoid on the same side; this position of the arms was involuntary. There was impairment of sensation throughout both upper extremities; localisation of feeling was most marked over the region of the deltoid. There was much pain over the lower cervical region; over the right scapular region, and down the right arm; there was a feeling as of a weight on the right arm and the patient continually reiterated his request that the weight might be removed; there was complete motor and sensory paralysis from and below a line drawn on a level with the lower border of the second costal cartilage; bordering and above this line was a hyper-æsthetic zone of about one inch in breadth, but extending, so far as it was possible to test, all around the body. The skin reflexes were absent, with the exception of the plantar reflex; slight stimulation elicited no response, but if the finger nail was drawn sharply and firmly across the sole of the foot the great toe was, after a distinct interval, momentarily abducted to the extent of about one-eighth of an inch. The conjunctival reflex was normal. The knee-jerk and ankle-clonus were not obtainable. Faeces had been passed involuntarily between the time of accident and admission. There was partial priapism. His temperature was 96°. Four ounces of dark-coloured urine were drawn off and found to contain a trace of albumen. The respiration was altogether diaphragmatic. At 11 P.M. some vomiting occurred; besides much food-stuff, which contained a teaspoonful of blood-clot. The patient asked frequently to have his head raised—that is, that the head might be so extended as to tilt the chin and arch the neck. A cervical cushion, as suggested by Hilton, was tried, but could not be endured.

May 8th.—The shock seemed to have passed off. Cyanosis was much less marked. The zone of hyper-æsthesia was not so well defined. Pain was complained of in the abdomen when the urine was drawn off. The urine was normal. Bullæ had developed over the phalangeal end of the left index metacarpal and over the inner side of the left gastrocnemius. Towards evening he said, "The pain at the right arm is better and comes and goes, but the pain in the neck keeps jumping." Temperature at 8 A.M., 100°; at 8 P.M., 98.4°.

9th.—An enema of gruel and oil was administered without effect until followed by gentle massage over the course of the

colon. Towards evening the susceptibility to noises increased. Temperature at 8 A.M., 99° F.; at 8 P.M., 98.4° F.

10th.—Since the previous night he had been wandering at times. The sensitiveness to sound was increased; the discomfort and pain in the neck were such that no position of the head was bearable; an icebag was applied to the head; an enema followed by massage led to a motion of the bowels. Temperature at 8 A.M., 97.4° F.; at 8 P.M., 99° F.

11th.—Deep pressure over the trunk was distinctly felt, but could not be localised; he asked for the bedpan, but passed nothing but flatus, as on all previous days. A consultation of the medical officers of the hospital was held with a view to decide as to whether it would be desirable to interfere either by extension or by operation, or to place the patient in a fixed apparatus, and it was decided that it would be rather to the patient's interest to follow an expectant line of treatment, placing him in a fixed apparatus. Temperature at 8 A.M., 99° F.; at 8 P.M., 101° F.

12th.—A cushion under the neck was now well borne. There was a feeling over the trunk as of the pattering of mice running over it. There was some redness of the right elbow. Temperature at 8 A.M., 96.4°; at 8 P.M., 101°.

13th.—Towards the evening he complained of being "short of wind," and occasionally moved the muscles of the neck in laboured inspiration. Slight cyanosis was present about the lips and the ears. Temperature at midday, 100.2°; at 8 P.M., 102°.

14th.—Inspiration was laboured all day, the difficulty increasing as the day advanced, accompanied by a perpetual nodding of the head from the traction of the neck muscles at each inspiration. To the rhythm of this nodding he imagined that he heard the ringing of church bells (he was one of the ringers of the church bells in his parish). Several times in his delirium he threatened to commit suicide. Temperature at 8 A.M., 98°; at 8 P.M., 96°. There was some difficulty in swallowing late in the evening.

15th.—Died quietly at 2.30 A.M.

Necropsy.—Rigor mortis was well marked; there was much post-mortem hypostasis. Palpation with care over each separate spinous process failed to discover the site of the lesion. On reflecting the muscular flaps from the neural arches infiltration with extravasation into tissues hardened by coagulated inflammatory exudation was remarked opposite the left lamina of the fifth cervical vertebra, which was seen to be fractured about its centre in such a manner as to leave a gap of a quarter of an inch on the left side of the fifth arch. The neural arches of all the vertebrae were uncovered, but no further fracture was found, and the vertebrae from the atlas to the sixth cervical were removed for further examination. On reflection of the scalp a large discoloured patch was found just behind the right parietal eminence. On removal of the vertex the dura mater was found glued to the bone opposite the site of the bruised scalp and also at the corresponding part on the inner surface of the cerebrum, the medium of connexion being fresh lymph. The brain itself appeared to be healthy, but there was some fluid of a carmine tinge in the lateral ventricles. Further examination of the removed vertebrae showed the following: A longitudinal conjugate section through the vertebrae and included cord showed that the spinal canal was diminished by two-thirds of its extent through the projection backwards of the body of the fifth cervical vertebra, which was wedge-shaped and detached from the anterior common ligament. The cord opposite the site of pressure was greatly diminished in bulk and diffuent. Examination of the dry bones disclosed the following fractures:—Fourth vertebra: fracture of the right transverse process. Fifth vertebra: fracture of the left lamina and crushing and starring of the vertebral body. Sixth vertebra: fracture of the projecting lip on the superior surface of the vertebral body on the left side; detachment of the superior posterior edge of the body. No visceral lesion was discovered. The remainder of the spinal canal was not opened for lack of time.

Remarks by Dr. DAVIS.—Most of the symptoms in the case above reported have already been accounted for and their significance recognised: the contraction of the pupils in lesions above the second dorsal nerves; the fall of blood pressure from disconnexion of the vaso-motor nerves from the higher centres; the position of the arms in lesions involving the sixth cervical nerves.¹ Every case may, however, be the means of bringing about a more exact knowledge of some or more particular symptoms. The case reported would seem to assist in the elucidation of three points: 1. Although

¹ Wm. Thorburn in Brit. Med. Jour., vol. ii. 1888.