minutes at this temperature. The thermal death-point is between 65° and 70° C.

Resistance to Glycerine.—An important feature, and one which can be put to practical use, as already noted, is the resistance of the organisms to the action of 50 per cent. glycerin. It is not of the same degree in all instances. In the case of polyneuritis, encephalitis, and rabies the organisms remain viable in glycerin for some months. The virus of trench fever resists its action for about three months. On the other hand, the organisms of influenza and nephritis show a feeble resistance, at the most three or four weeks being the viable period.

CONCLUSION.

Such, then, is a brief account of certain filter-passing organisms. In three of the diseases—*influenza*, *trench fever*, *trench nephritis*, and possibly in *encephalitis*—microscopical examination is sufficient for the purposes of clinical diagnosis. In *polyneuritis*, and in most cases of *encephalitis*, blood during the febrile stage is the only means of diagnosis.

As far as can be determined these organisms are definite entities—that is, they are not stages in the life-history of a more complex organism. No evidence could be obtained that they were mere products of the breaking down of larger cocci, as suggested by Rosenow.

In rabies no naturally acquired cases have come under review, nor has there been time to go into the microscopic distribution of the virus in the tissues.

REFERENCES.

- ¹ Flexner and Noguchi, *Journ. Exp. Med.*, 1913. ² Noguchi, *ibid.*, 1911.

ULCERO-MEMBRANOUS LARYNGITIS OF STREPTOCOCCIC ORIGIN.

BY

J. A. M. HEMMEON, F.A.C.S.,

CAPTAIN, CANADIAN ARMY MEDICAL CORPS.

During October and November, 1918, a series of cases of laryngitis was admitted to No. 3 Canadian General Hospital, Boulogne, both from the front and base areas, presenting unique features both in their laryngeal pictures and in the almost complete absence of general symptoms. No attempt will be made in this brief report to trace their connexion with any of the influenzal or other streptococcic infections prevalent at that time.

Similar conditions of the larynx were not seen in patients suffering from influenza in hospital at that time, nor has the condition been noted in any reports of necropsies following death from influenzal infection that I have seen.

Colonel Haven Emerson, M.R.C.U.S.A.¹, has classified eleven diseases as respiratory infections among members of the American Expeditionary Force, but, while mentioning acute pharyngitis and tonsillitis, he does not include laryngitis, yet of the cases observed 30 per cent. were seen in American troops. Fifty cases were observed in this hospital.

Symptoms and Course.

Onset.—There is usually a feeling of malaise or vague chilly sensations, headache, and pains in limbs. The temperature reached its maximum in from forty-eight to sixty-two hours, and in ten cases rose to 102°. Twenty-five cases had no elevation of temperature, and in fifteen the temperature varied from 99° to 101°, subsiding within forty-eight hours. Nearly all cases were admitted as walking cases, and complained only of the laryngeal discomfort.

Laryngeal Symptoms.—Cough, hoarseness, or aphonia appeared in from one to five days. Aphonia at some stage of the disease was present in forty cases, ten being hoarse only. Cough was uniformly present and was spasmodic and unproductive. Recovery was complete in from eight to twenty-five days, the average being seventeen days. Functional aphonia followed in eight cases.

Objective Signs.—The fauces might present no changes, but were usually somewhat red and engorged; the epiglottis was not involved. The vocal cords showed ulcero-membranous changes, usually the middle third of the cords was involved, and in this respect the picture resembled that of traumatic laryngitis from gas. The greyish translucent membrane lay symmetrically on both cords, and might involve as much as two-thirds of the upper surface and free edges of the cords. This membrane may be removed with difficulty by grasping with forceps or briskly rubbing with cotton tightly rolled on an appli-

cator. Its removal leaves a raw bleeding surface, which is quickly covered by the re-forming membrane. After the third or fourth day the edges of the membrane are seen to be curling up, or may have been removed, and a shallow ulcerated surface is exposed. The free edges of the cord were invariably involved, and very early showed thickening, and later a "mouse nibbled" appearance.

Oedema of the glottis, supra-glottic or infra-glottic tissues was not observed, and the arytenoids and ventricular bands were not involved in any way. Aphonia, at first due to mechanical disturbance, thickening or ulceration of the cords, may continue as a functional condition.

Treatment.

Treatment consisted of three factors, which we have arranged in the order of their importance: (1) Voice rest; (2) no smoking; (3) inhalations of medicated steam.

Inhalations may relieve the cough, but probably have no influence on the course of the ulcero-membranous process. Abstinence from smoking, especially army cigarettes, probably relieves irritant symptoms. Voice rest is most important and should be complete. It is evident that the greatest possible quietude of the vocal cords is essential, and even whispering was prohibited. Not only is recovery hastened by voice rest, but the patient is not likely to adopt a whispering voice after the cords have healed, which frequently leads to a condition of functional aphonia, as has often been seen after enforced or permitted whispering during the course of laryngeal disease.

The cases of functional aphonia generally yielded quickly, at the first treatment, to *persuasive* suggestion as used in pure functional aphonia cases seen among soldiers, and as opposed to the "*peremptory*" suggestion treatment.

After the disappearance of the membrane the cords were red, injected, and somewhat thickened or roughened on the edges. In a few cases recovery was hastened by the daily application of some astringent to the cords. Partial rest of the voice was enjoined for a convalescent period of a week or ten days. Those patients who might have to use the voice in giving or transmitting commands to troops were detailed to duties not entailing the use of a loud voice for such time as would permit the cords to resume their normal appearance. Too early use of the voice appeared likely to lead to a subacute or chronic laryngitis with permanent damage to the cords.

Bacteriology.

Cultures were taken from the cords by three methods. An attempt was made to adapt an applicator moving in a curved glass tube, as in taking smears from the nasopharynx; this was not successful. Some of the smears were made by indirect laryngoscopy, care being taken to reach the larynx without contaminating the sterile cotton on the applicator. Other smears were made by direct laryngoscopy through a short laryngoscopic tube.

Out of 50 cultures, 35 showed streptococci in almost pure growth; 10 showed the same as the prevailing organism, and the remainder were indefinite. Of the 35 streptococcic growths, 25 were classified as *Streptococcus haemolyticus* and 10 were *Streptococcus viridans*. Further subdivision of these groups was not attempted owing to difficulty in securing carbohydrate media.

REFERENCE.

- ¹ U.S. Army Medical Bulletin, December, 1918.

SHELL WOUND OF LEFT SIDE OF NECK: INJURY OF GREAT VESSELS AND DIVISION OF VAGUS NERVE:

RECOVERY AND RETURN TO FIRING LINE.

BY

CAPTAIN (TEMPORARY MAJOR) G. BELL, A.A.M.C.,
LATE SURGICAL SPECIALIST, 1ST AUSTRALIAN CASUALTY
CLEARING STATION.

THE following case appears to be worthy of record on account of the nature and severity of the injury, and as an example of recovery after complete division of the vagus. Owing to the additional injuries to the great vessels, necessitating ligature of the left common, external and internal carotid arteries as well as of the internal jugular vein, the fact that the man recovered sufficiently

to return to his battalion is remarkable without reckoning his recovery from an attack of trench fever, and from a gunshot fracture of the thigh.

Private C. (Australian infantry), aged 20, was wounded in the neck by a fragment of shell on April 28th, 1917, and was admitted to the 3rd Australian Casualty Clearing Station on the same day. He remembered nothing after being wounded with the exception that he had a slight recollection of being in a motor ambulance until he became conscious after operation.

The wound of entry was on the left side, over the horizontal ramus of the lower jaw, which was splintered, but without solution of continuity. The track then extended inferiorly and posteriorly to a large clot surrounding a wound of the left internal jugular vein, which was almost completely severed immediately below the level of the superior border of the thyroid cartilage. The left common carotid artery, immediately below the bifurcation, was slightly lacerated and contused, but the intima was not severed. The artery was thrombosed at this level, and the thrombus extended into the proximal portions of the external and internal carotid arteries. The proximal and distal ends of the divided internal jugular vein were ligatured. I ligatured the left common, external and internal carotid arteries immediately beyond the limits of the injury and thrombus, and the intervening thrombosed portions of these vessels were removed. The left vagus nerve was found completely severed. The track was then followed to the fissured transverse process of a cervical vertebra (sixth), and from this position the shell fragment was removed.

The vagus nerve was sutured with catgut and the wound sutured, free drainage anterior and posterior to the sternomastoid being provided. The patient was in the casualty clearing station for six days; he could only whisper; there was no hemiplegia; the pulse rate was 140.

The remainder of the history I obtained for the most part from the patient. He was admitted to No. 5 General Hospital on May 5th, 1917. The pulse was still 140, and this rate was maintained for about two weeks after the date of being wounded. The sutures were removed on May 12th, 1917. The wound had healed on May 16th, and he arrived in England on May 17th, 1917. There was weakness of the left arm (inability to abduct) for six weeks after being wounded. By the end of June, 1917, he could walk at a slow pace. He noticed that the left armpit and left side of the chest perspired very freely from about May 16th to June 16th, 1917. Improvement of voice was noticed by the end of June, 1917; the pulse rate was then about 100. A note made on the medical history sheet previous to August 5th, 1917, states "slight paresis deltoid and biceps." He was admitted to the command dépôt on that day. Any sudden severe exertion made him feel giddy, and he was unable to do physical drill on account of coughing and severe vomiting. No discomfort was caused by marching at the ordinary rate.

Between August 5th and November 10th, 1917, he was classified four times, and on each occasion the medical officer remarked on his rapid pulse. He rejoined his battalion on November 10th, 1917, and was evacuated, suffering from trench fever, on February 2nd, 1918. The temperature remained high for one week; the pulse reached 120, and remained rapid till the beginning of April, 1918. He again rejoined his battalion in June, 1918. On September 2nd, 1918, he was evacuated for shell wound of the right thigh (compound fracture of femur), which became septic. The highest temperature recorded in his notes was 103°, and the highest pulse rate 120. He last vomited in November, 1918.

On January 16th, 1919, he was admitted to the 1st Australian General Hospital. The femur was firmly united in good position. On February 28th, 1919, he could wheel himself about in a wheel chair. There was slight hoarseness, but no dysphagia, and the appetite was good. The average pulse rate since admission while resting has varied between 80 and 90. After wheeling himself at a rapid rate for 200 yards in a wheel chair, the pulse rate rose to 144; after five minutes it fell to 108, and in fifteen minutes to 96. Physical examination revealed no abnormality. X-ray examination after a bismuth meal showed that the stomach was normal in shape, position, and time of emptying. X-ray examination showed no abnormality of the transverse processes of the cervical vertebrae of the left side. The right vocal cord was natural, and moved freely; the left was perfectly white, but only moved very slightly. Speech was accomplished by compensation, the right vocal cord coming across to the left. No pulsation could be detected in the left superficial temporal artery.

THE Belgian Royal Academy of Medicine, at a meeting on February 22nd, passed a resolution calling on the Government to enforce the laws against alcoholism and on the legislature to institute additional measures.

DR. ALICE HAMILTON has been appointed assistant professor of industrial medicine in Harvard Medical School. She is said to be the first woman to hold a teaching appointment in that university. She was for three years professor of pathology in the Women's Medical College of North-Western University and was bacteriologist to the Memorial Institute for Infections in Chicago for eight years. Since 1910 she has been engaged in investigating industrial poisons for the Federal Department of Labour.

Lettsomian Lectures

ON

JAUNDICE: WITH SPECIAL REFERENCE TO TYPES OCCURRING DURING THE WAR.*

By WILLIAM HENRY WILLCOX, C.B., C.M.G.,

M.D. LOND., F.R.C.P. LOND., COLONEL A.M.S.,
PHYSICIAN TO OUT-PATIENTS, ST. MARY'S HOSPITAL, LONDON.

LECTURE II.—PART I.

TOXIC JAUNDICE PRODUCED BY THE ACTION OF CHEMICAL POISONS.

BEFORE the war our knowledge of this form of jaundice was largely dependent on animal experiments. Cases occasionally occurred in man, and these were usually accidental or industrial in nature and often of medico-legal interest. Thus we were familiar with the jaundice occurring in poisoning by phosphorus, also that occasionally following the administration of arseno-benzol derivatives for therapeutic purposes, and of chloroform as an anaesthetic in those rare and tragic cases of delayed chloroform poisoning. Apart from these instances, the subject of toxic jaundice was of academic rather than of practical interest.

Since the war experiments on the largest scale have unavoidably been carried out on munition workers and those engaged in work involving the use of dangerous poisons. We have become intimately acquainted with the many forms of toxic jaundice, and its dangers have been closely brought home to us, and in consequence the utmost precautions have been taken to prevent its occurrence in those exposed to risks of poisoning.

TETRACHLORIDE OF ETHANE POISONING.

This substance is a colourless liquid smelling like chloroform and having a specific gravity of 1.614 and a boiling point of 147° F. It is of interest because the first cases of toxic jaundice observed¹ in this country after the outbreak of war were due to the inhalation of the vapour of tetrachloride of ethane.

This substance, sometimes known as acetylene tetrachloride, was used in the preparation of cellulose varnish ("dope"), which was extensively employed in the manufacture of aeroplanes in order to give a firm airtight and waterproof coating to the calico stretched on the framework of the aeroplane wings. Several coats of dope had to be applied.

The dope was made by dissolving acetate of cellulose in a mixture of benzene, acetone, methylated spirit, and tetrachlorethane. It was a viscid colourless liquid smelling like chloroform, and on evaporation it gave off a mixed vapour of the volatile liquids which was 1.91 times as heavy as air.

In September and October, 1914, the occurrence of several cases of illness associated with jaundice was noticed² at the Hendon aeroplane factory. Cases of a similar nature were later observed at other aeroplane and seaplane factories. The outbreak of war naturally caused greatly increased activity in these factories, and the workers were employed overtime, so that any toxic influences to which they might be exposed in their work would be greatly increased.

My first acquaintance with the subject was on November 5th, 1914, at my out-patient department at St. Mary's Hospital. The case was as follows:

CASE I.

G. M., a man aged 36, had been employed at the Hendon aeroplane factory since August 8th. On October 24th he felt ill; he had nausea and retching in the morning, some slight pain in the upper abdomen, and jaundice. He gave up work. The symptoms increased in severity, and at my examination there was marked jaundice, and the patient appeared seriously ill. Pulse 96, temperature 99.5° F. The liver was felt about one inch below the right subcostal border in the right nipple line on inspiration. No abdominal tenderness was present; no anaemia. He said that the stools were pale and the urine high-coloured. There was no history or evidence of syphilis or alcoholism. The tongue was furred and dry. He thought his illness was due to some condition associated with his work, because ten other workers were affected similarly. On inquiry he stated that aeroplane "dope" was used in the factory, and he thought this was composed of "collodion, chloroform, ether, and acetone." He said that men who did not use the dope also

* Delivered before the Medical Society of London, April-May, 1919.