

exercise a distinctly irritant effect on the mucous membrane of the alimentary canal.

In the identification of any hair the points to which attention should specially be directed are three: (1) The number of cells of which it is composed; (2) the thickness of the wall; and (3) the characters of the base or point of attachment. The length of plant hairs varies considerably, sometimes by as much as 100 per cent., and they are frequently remarkably twisted. The walls of some are characterised by the presence of certain markings—e.g., those found on the culinary herbs, which are warted, and those of the nettle, which show spiral striation.

Certain plants do not possess hairs on the edible parts, and these are merely enumerated here:—Fruits: Pineapples, bananas, currants, and nuts (excepting chestnuts). Vegetables: Roots in general, lettuce, spinach, rhubarb, leeks, and asparagus. Herbs: Parsley and fennel. Cereals: Maize only.

Examples of the hairs found on the other edible plants in common use are appended in the illustrations, which have been made from actual specimens, either by microphotography or with the help of the camera lucida. To those, of course, who are familiar with the appearance of the various kinds of animal parasite met with in the fæces there is no likelihood of plant hairs being mistaken for parasites. The illustrations are intended rather for those who have had no opportunity to become familiar with the appearance of the more uncommon animal parasites met with in the fæces.

Reading.

## NOTES ON AN OUTBREAK OF CEREBRO-SPINAL MENINGITIS

AT H.M. TRAINING ESTABLISHMENT, SHOTLEY, AND THE METHOD OF TREATMENT ADOPTED—JULY 14TH TO AUGUST 14TH, 1916.

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THIS outbreak of 19 cases occurred between July 14th and August 14th this year. It is somewhat remarkable because it occurred in the months when cerebro-spinal meningitis cases usually decline and because it came on after a series of 9 isolated cases occurring at Shotley between November, 1915, and July, 1916. Of the 19 cases, 6 yielded proved cultures of the meningococcus from the cerebro-spinal fluid; 1 of the others gave a positive throat swab. It is hard to escape the conclusion that the 13 cases in which the cerebro-spinal fluid did not yield the meningococcus should nevertheless be considered cases of cerebro-spinal meningitis for the following reasons.

1. They are clinically indistinguishable from cerebro-spinal meningitis. I am not depending only on my own judgment for this statement, nor on that of Surgeon E. J. Tongue, who has attended all these cases with the greatest skill and pains. It is also the opinion of Captain Sheffield Neave, R.A.M.C., who saw all the cases (and who has a very large experience of cerebro-spinal meningitis both clinically and bacteriologically), and of Major A. M. N. Pringle, who saw the last 8, among which were the mildest of the cases. Major Pringle has been for many years medical officer of health for Ipswich.

2. They occurred with other proved cases of cerebro-spinal meningitis.

3. Such cases in which the meningococcus is not recoverable have been frequently noted by many writers as occurring during outbreaks—Sophian, M. Foster, Lundie, Thomas and Fleming, and Netter and Debré, &c. Sophian, however, considers that the meningococcus should be recognisable in about 85 per cent. of the cases in certain outbreaks. It has also been stated that many mild cases have been overlooked and called influenza.

4. Even in the 2 fatal cases the meningococcus was not recovered during life, though repeated lumbar punctures were done. It is not surprising, therefore, that it was not recovered from the others.

5. Stiffness of the back and neck were present in all cases, as also were Kernig's sign and headache. Lumbar puncture showed increased pressure in all cases but 1, and a greatly increased quantity of fluid in all but 3, the

average quantity being 63 c.c. instead of the normal 10 c.c. Vomiting was present in 9 cases out of the 13. Many other symptoms of meningitis were present in individual cases.

A short summary of each of the 19 cases is given; the 6 proved bacteriologically are Cases 2, 4, 7, 9, 15, and 17.

CASE 1.—Boy, 16, Dormitory 36; joined barracks Oct. 24th, 1915. Admitted July 14th. Temperature 103° F.; nausea, headache. 15th: Stiffness of neck and back, Kernig's sign, severe headache, photophobia, twitching of muscles, drowsy. Lumbar puncture—increased pressure, 50 c.c. withdrawn. 16th: Condition the same. Lumbar puncture—increased pressure, 70 c.c. Patient improved rapidly, but complained of weakness of right leg on August 1st. August 23rd: One month's leave; went to light duty on return. Still has weakness of right leg.

CASE 2. *Meningococcus found in cerebro-spinal fluid.*—Boy, 16, Dormitory 7; joined barracks July 12th, 1916. Admitted July 19th. Temperature 102.4° F.; malaise, papular rash on chest and arms. 20th: Headache, pain in neck; temperature 103°. 21st: Same; Kernig's sign. Lumbar puncture—increased pressure, 50 c.c., clear. 22nd: Same; vomited twice. Lumbar puncture—increased pressure, 75 c.c., very turbid. 23rd: Headache severe, retraction of head and neck, frequent vomiting, delirious. Lumbar puncture—increased pressure, 70 c.c., turbid. 24th: Same. Lumbar puncture—40 c.c., turbid. This patient afterwards improved rapidly, and went on a month's leave on Sept. 18th.

CASE 3.—Boy, 15, Dormitory 7; joined barracks July 9th, 1916. Admitted July 20th. Temperature 103° F.; malaise, pains in neck. 21st: Temperature 102°; drowsy, Kernig's sign, stiffness of neck and back. Lumbar puncture—increased pressure, 70 c.c., clear; lymphocytes in excess. 22nd: Same; herpes. 23rd: Headache severe, vomiting, photophobia, retraction of head and neck. Lumbar puncture—increased pressure, 60 c.c., turbid. After this the patient improved, and was discharged to a month's leave on August 27th.

CASE 4. *Meningococcus found in cerebro-spinal fluid.*—Boy, 16, Dormitory 7; joined barracks July 6th, 1916. Admitted July 21st with headache, malaise, stiffness of neck, Kernig's sign. Lumbar puncture—increased pressure, 70 c.c., clear. 22nd: Drowsy, vomiting, severe headache, rigor; temperature 102° F. Lumbar puncture—increased pressure, 60 c.c., very turbid. 24th: Marked retraction. Lumbar puncture—35 c.c., turbid; meningococcus found. After this the patient improved and went on a month's leave on Sept. 4th.

CASE 5.—Boy, 15, Dormitory 7; joined barracks July 5th, 1916. Admitted July 21st. Temperature 103.8° F.; headache, pain in neck, Kernig's sign. Lumbar puncture—increased pressure, 80 c.c., clear; polymorphs in excess. 22nd: Temperature 103°; very drowsy, headache, retraction of neck, no vomiting. Lumbar puncture—increased pressure, 75 c.c., cloudy. 23rd: Very much better. The patient rapidly improved up to August 8th, when he had recurrence; headache, pain in neck, dazed, knee-jerks exaggerated, Kernig's sign, signe de la nique, Brudzinski's sign. Lumbar puncture—increased pressure, 65 c.c., clear. August 9th: Vomiting, headache, herpes, stiffness of neck. The patient improved again steadily, and was sent on a month's leave on Sept. 4th.

CASE 6.—Boy, 17, Dormitory 41; joined barracks Nov. 10th, 1915. Admitted July 22nd with vomiting, headache, and nausea. Temperature 100° F. 23rd: Kernig's sign, pain and stiffness of neck and back. Lumbar puncture—increased pressure, 65 c.c., clear; polymorphs in excess. 24th: Improving; headache, pain in neck and back up to August 11th, Kernig's sign still present, and headache frequent. The patient was sent on a month's leave on Sept. 3rd.

CASE 7. *Meningococcus found in cerebro-spinal fluid.*—Boy, 15, Dormitory 12; joined barracks July 6th, 1916. Admitted July 22nd in a dazed condition, unable to speak or hear, pain in neck, Kernig's sign. 23rd: Condition same; temperature 100.6° F. Lumbar puncture—increased pressure, 70 c.c., clear. 24th: Temperature 103°; still unable to speak, vomiting, hæmaturia, severe headache, pain in back of neck. Lumbar puncture—increased pressure, 65 c.c., turbid. After this the patient rapidly improved, and was sent on a month's leave on Sept. 3rd.

CASE 8.—Boy, 17, Dormitory 6; joined barracks May 19th, 1916. Admitted July 22nd with sore-throat, headache, and nausea. Temperature 103° F.; vomiting, some rash on chest, drowsy, stiffness of back, Kernig's sign. Lumbar puncture—increased pressure, 70 c.c., clear; cells in excess, polymorphs and lymphocytes equal. 23rd: Vomiting, headache, pains in neck and back, retention of urine. 24th: Marked improvement; retention of urine continues. After this the patient gradually improved, and was sent on leave on August 19th.

CASE 9. *Meningococcus found in cerebro-spinal fluid*.—Boy, 16, Dormitory 29; joined barracks July 21st, 1916. Admitted July 24th with headache, stiffness of back, and Kernig's sign. Lumbar puncture—increased pressure, 55 c.c., clear. 25th: Frequent vomiting, headache severe, retraction of neck, drowsiness. Lumbar puncture—increased pressure, 50 c.c., turbid. After this the patient steadily improved; he had a papular rash, however, from August 6th to 8th. Sent on a month's leave on Sept. 4th.

CASE 10.—Boy, 15, Dormitory 28; joined barracks June 9th, 1916. Admitted July 24th with erythematous rash on trunk and limbs. Temperature 99.8° F.; stiffness of neck and back, Kernig's sign. Lumbar puncture—increased pressure, 75 c.c., clear; lymphocytes in excess. 25th: Headache, vomiting, pains in neck and back. 26th: Same. The patient improved rapidly, and was sent on a month's leave on August 24th.

CASE 11.—Boy, 16, Dormitory 20; joined barracks June 9th, 1916. Admitted July 27th with headache, pains in neck, and Kernig's sign. Lumbar puncture—increased pressure, 50 c.c., clear. 28th: Headache, vomiting, pain in back of neck. This was a mild case and the patient improved rapidly. He was sent on a month's leave on August 27th.

CASE 12.—Boy, 16, Dormitory 28; joined barracks June 9th, 1916. Admitted July 27th with pains in legs, stiffness of neck and back, and Kernig's sign. 28th: Stiffness and pain in back continued, reflexes exaggerated. This was a very mild case. Lumbar puncture—pressure normal, clear. The meningococcus was recovered from a throat swab.

CASE 13.—Boy, 15, Dormitory 13; joined barracks May 10th, 1916. Admitted July 27th with headache, a temperature of 100° F., stiffness of neck and back, and Kernig's sign. 28th: Condition same. Lumbar puncture on 29th; pressure normal, clear. 30th: Vomited several times. This was another very mild case. Duty on August 29th.

CASE 14.—Boy, 17, Dormitory 28; joined barracks June 23rd, 1916. Admitted July 28th with stiffness of neck and back and Kernig's sign. Lumbar puncture on 29th showed increased pressure, fluid flocculent. The patient improved rapidly, and was sent to duty on August 30th.

CASE 15. *Meningococcus found in cerebro-spinal fluid*.—Boy, 16, *Ganges* ship. Admitted July 29th with mild sore-throat; symptoms of cerebro-spinal meningitis only appeared on August 2nd; pain in back of neck, Kernig's sign, nausea, and vomiting. Lumbar puncture—increased pressure, 75 c.c., slightly turbid. August 3rd: Frequent vomiting, severe headache, pains in back of neck; temperature 101.8° F. 4th: Very restless, severe headache and backache, retention of urine, retraction of head. Lumbar puncture—increased pressure, 90 c.c., yellow. The patient died next day. Meningococcus grown from post-mortem specimen of cerebro-spinal fluid, but not in life.

CASE 16.—Boy, 16, Dormitory 14; joined barracks July 6th, 1916. Admitted August 4th with temperature of 102.4° F., headache, stiffness of neck and back, marked Kernig's sign, nausea. Lumbar puncture—pressure normal, 35 c.c., clear. 5th: Severe backache, headache, vomiting. 9th: Very much better. The patient improved regularly, and was sent on a month's leave on Sept. 4th.

CASE 17. *Meningococcus found in cerebro-spinal fluid post mortem*.—Boy, 16, Dormitory 31; joined barracks March 14th, 1916. Admitted June 22nd with malaise and a temperature of 101.2° F. No definite signs of disease could be recognised. The temperature ran an irregular course and at times the patient's stool suggested typhoid. Blood negative to Widal's reaction. Cerebro-spinal meningitis symptoms first appeared on August 9th—pain and stiffness of neck and back, tremulous tongue, severe headache, Kernig's sign, vomiting. Lumbar puncture—increased pressure, 65 c.c., clear. 11th: Kernig's sign, Brudzinski's sign, Macewen's sign, signe de la nique, and Babinski's sign all present. Lumbar puncture—increased pressure, 47 c.c., straw-coloured. 13th: Much pain, headache, backache; temperature 101°. Lumbar puncture—increased pressure, 50 c.c., opalescent. 15th: Retention of urine in addition to other symptoms. Died on the 21st. The meningococcus was recovered from a post-mortem specimen, but not in life.

CASE 18.—Boy, 16, Dormitory 21; joined barracks May 12th, 1916. Admitted August 13th with a temperature of 102.8° F., back and neck very stiff and painful, knee-jerk absent, slight papular rash on trunk, Kernig's sign, Brudzinski's sign, Macewen's sign, and signe de la nique all present. Lumbar puncture—increased pressure, 65 c.c., clear. 14th: Condition same; vomited several times. Special signs present as before. 15th: Much improved. 24th: Patient vomited; also a red papular rash on limbs. Further vomiting on August 31st and Sept. 1st. On Sept. 10th the patient went on a month's leave.

CASE 19.—Boy, 17, Dormitory 41; joined barracks August 11th, 1916. Admitted August 14th (three days after

joining from *Powerful*) with a temperature of 104° F., sore-throat, and headache. 15th: Intense pain at back of neck and in back, severe headache, knee reflex absent, Kernig's sign. Lumbar puncture—increased pressure, 56 c.c., clear. 16th: Great improvement, which continued next day. After this the patient made an excellent recovery. He was sent on a month's leave on Sept. 9th.

All these cases were treated by the advice of Captain Sheffield Neave on similar lines: early puncture, free washing out of the spinal canal with  $\frac{1}{2}$  per cent. solution of carbolic in normal saline, and then injection of Pasteur serum, prepared from Gordon's strains, into the canal.

I wish to draw attention to the admirable results obtained in these 19 cases by the above method, though, of course, one cannot generalise from so small a number. Out of 19 cases only 2 were fatal.

Each lumbar puncture shown in the summary of cases was followed by the washing out and injection. The last 2 cases were injected with Lister Institute serum prepared from Gordon's strains; the dose of this is 30 c.c., as against 10 c.c. in the other.

As to the origin of the outbreak it seems scarcely necessary to look beyond Shotley. The dormitories affected were 11 in number, mostly widely apart; there are 36 dormitories in Shotley. One case came from *Ganges* ship.

## Medical Societies.

### ROYAL SOCIETY OF MEDICINE.

#### SECTION OF ELECTRO-THERAPEUTICS.

##### *Pharyngeal Pouches.*

AN ordinary meeting of this section was held on Dec. 15th, Dr. G. HARRISON ORTON, the President, being in the chair.

Captain N. S. FINZI read a paper, supplemented by a series of skiagrams, on "Pharyngeal Pouches." He first discussed the situation and origins of such pouches. Usually, by the time the radiographer saw a pharyngeal pouch it had reached an advanced stage, sometimes so advanced that it obstructed the œsophagus by pressing upon the contents. His present purpose was to treat of the subject of diagnosis from the X ray appearances. He found that the best substance to give the patient to eat with the object of facilitating the radiographic representation was a semi-solid paste of bismuth oxy-chloride. The consistency should be such that it did not flow back immediately to its natural level. Such a paste was found to adhere to the pharynx for an appreciable time. He regarded as very important the examination of cases of suspected pouch by the fluorescent screen; otherwise much difficulty was experienced in differentiating them from malignant strictures. The diagnostic feature to watch for was the way in which the bismuth that had been given left the pouch. If the condition were a pharyngeal pouch, the bismuth could be seen leaving the mouth of the pouch, and passing thence straight into the œsophagus. Sometimes it was exuded in that way by the contraction of the muscles of the throat. In the conditions with which such pouches were liable to be confused—i.e., carcinomatous or fibrous strictures—the bismuth was arrested, and later it could be seen leaving the centre or the lower end of the dilated œsophagus. He showed a number of skiagrams to illustrate the points. Sometimes a pouch became inflamed, and an indentation formed at the lower end in consequence of adhesions having occurred. One case in which the diagnosis was very obscure was that of a very old and weak patient in whom some of the bismuth given passed into the trachea and into one bronchus. It was natural to suppose there was a growth, which was causing complete obstruction, and that some part of the bismuth was escaping through a sinus into the trachea. It proved, however, to be a pouch. He found that a true lateral view gave a far better idea of the condition in these pouch cases than did any other. In the case of a very large pouch it was well to place the X ray tube some distance off, so as to have parallel rays impinging, and to correct distortion. If the pouch were somewhat low, and the patient was a tractable one, he should be bidden to commence to swallow and try to retain the larynx in that higher