

RECENT EXPERIMENTS ON THE LIFE-HISTORY OF ASCARIS LUMBRICOIDES.

BY

F. H. STEWART, MAJOR I.M.S.

RANSOM and FOSTER have published a preliminary account of experiments on this subject, in the *Journal of Agricultural Research* of November 19th, 1917. They found that a repetition of my experiments on the feeding of rats and mice with ripe ascaris eggs gave results agreeing very closely with those recorded by me in the *BRITISH MEDICAL JOURNAL* of July 1st, October 7th, and December 2nd, 1916, and in *Parasitology* of February, 1917. In addition to these experiments they made further attempts to infect pigs with *Ascaris suilla*, but with negative results. Their experiments were conducted on pigs several months old, and they suggest that the failure of these and of other experiments may have been due to the animals employed being past the age of greatest susceptibility to infection. It may be well to explain that in this experimental work the pig may be substituted for man, and that any facts proved regarding the development of *Ascaris suilla* in the pig may be assumed to hold true for the development of *Ascaris lumbricoides* in man.

In an experiment conducted in September, 1917, ripe eggs were administered to a pig two weeks old. This animal died seven days thereafter, and ascaris larvae measuring from 0.7 to 1.2 mm. were found in the lungs, trachea and pharynx. This experiment agrees with those published by me in the *Indian Medical Gazette* of August, 1917, and in *Parasitology* of January, 1918.¹

Ransom and Foster also found an ascaris larva in a fragment of the lung of a pig aged six weeks that had died from unknown causes, and in the intestine of which they also found numerous immature ascarids, the largest about 50 mm. in length. They state that guinea-pigs are susceptible to pulmonary infection with ascaris larvae.

Summing up our present knowledge of the larval development of this worm, it has now been established that the ripe eggs of ascaris will hatch in the intestine of man, the pig, rat, mouse, and guinea-pig, that the larvae enter the blood stream of the host, pass through the liver and heart to the lungs, there migrate from the capillaries into the alveoli, and thence through the bronchi and trachea to the pharynx. They reach the lungs and trachea between the sixth and eighth days after infection. Further, in the mouse the larvae then migrate down the alimentary canal and are passed alive but not active in the faeces from the tenth to the sixteenth day.

I have recently been able to perform three additional experiments on young pigs. Two of these, A and B, were four days old at the commencement of the experiment, the third, C, was aged two months and ten days. To both A and B a dose of about 22,000 ripe eggs of *Ascaris suilla* was administered, to C about 50,000. The embryos in these eggs were moving actively, and the cultures were tested on rats and proved infective, larvae being subsequently found in the lungs. A and B suffered from ascaris pneumonia on the eighth day after infection; C showed no sign of pulmonary trouble.

Pig A was killed on the fourteenth day, and young forms of ascaris, measuring between 2.5 and 3.8 mm., were found in great number in the small intestine and caecum. Their heads had lost the appearance of the larval head and had taken on the adult head character. Pig B was killed on the nineteenth day, and although there can be no doubt that on the eighth day the lungs contained thousands of active larvae, not a single worm was found in the stomach, small intestine, caecum, or colon. The nature of the faeces found in the colon proved that the pig was not suffering from diarrhoea due to excessive infection, which might have accounted for the disappearance of the worms. Pig C was killed thirty-one days after infection, and again no worms were found in the intestine.

These experiments are puzzling. In the case of A the increase in size of the worms to 3.8 mm., when the largest larva found in the intestine of mice measures 2.37 mm. and in the lung of the pig 1.5 mm., and the assumption of the adult head character amount almost to proof of the theory of direct development without an intermediate host. The disappearance of the worms in B five days later may or may not have been accidental. Further experiments

are required on direct infection and on the possibility of the infection of the definitive host by the larvae passed in the faeces of mice.

Pulmonary Ascariasis in Man.

Lutz,² in recording the experiment performed in Brazil in 1887, in which he administered ascaris eggs to a woman aged 32, states that the woman suffered during the first few days from acid dyspepsia, followed by unusually severe bronchitis, with slight remittent fever. This confirms the observation of Mosler,³ and proves that the passage of the larvae through the lungs, even of adult man, may give rise to pulmonary symptoms. Thirty-five worms were passed by this woman under anthelmintic treatment, and about ninety-six eggs had been administered to her in doses of about twelve at a time throughout the course of a month.

My thanks are due to Dr. Keatinge, Director of the School of Medicine, Cairo; to Mr. Branch, Chief Veterinary Inspector to the Egyptian Ministry of the Interior; and to Mr. Casdagli, for the means of carrying out the above experiments.

REFERENCES.

¹ BRITISH MEDICAL JOURNAL, 1918, i, p. 266. ² *Centralbl. f. Bakt. und Parasitol.*, 1888, p. 425. ³ Leuckart, *Menschliche Parasiten*, II, pt. 1, p. 222.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

LUMBAR PUNCTURE IN ECLAMPSIA.

I do not know to what extent lumbar puncture has been tried in cases of eclampsia, but a note on a case in which I used it with apparently satisfactory results in Belfast Union Maternity Hospital may be of interest.

The patient, a primipara, had had fourteen fits, which were increasing in severity, the first being six hours before puncture. She was comatose between the fits. Eighty cubic centimetres of cerebro-spinal fluid were withdrawn, the puncture being made above the last lumbar vertebra. Subsequently she had five fits, decreasing in severity. The puncture was performed at 1.30 p.m., and she spoke a few words in reply to a question about 6 p.m., and drank a little during the evening. The last fit was about 7 p.m. Natural dilatation was waited for, a little chloroform was given, and forceps were used for final delivery, which took place eighteen hours after the puncture. The fetus was stillborn; it had evidently been dead for some time, the cord being green. The albumin disappeared from the urine in a few days, but headache persisted for about the same time. She was discharged from hospital quite well a fortnight later. The fluid came with a little rush at first, and afterwards about one drop per second. It was clear and limpid, specific gravity 1008, very slightly alkaline; albumin was present, but no globulin. Fehling's solution was slightly reduced, giving a reddish-yellow deposit.

The usual routine treatment was carried out from the start—namely, washing out the stomach and bowel, mist, alba being left in stomach. The contents of stomach were a dirty green. Morphine gr. 1½ and atropine gr. ⅓ were injected. Normal saline was injected into the rectum, and, as she was full-blooded and cyanosed, 15 oz. of blood were withdrawn from the arm. Linseed poultices were applied over the renal area.

It cannot, of course, be said how far the other treatment was responsible for the improvement in this case, but the fits were becoming more severe and the coma was deepening before the puncture, and afterwards the fits were less severe and the general condition of the patient seemed distinctly improved. Her condition looked very grave, and I decided to try the withdrawal of some spinal fluid experimentally as an alternative to Caesarean section or leaving her to the sedative treatment alone.

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University, Belfast.

It is reported that a deposit of pitchblende showing a high percentage of radio-active substance has been discovered on the Kingswood Estate, Buckfastleigh, Devon.

J. C. CASTRO (*Siglo Medico*, 1918, p. 690) states that beriberi occurs much more frequently in Spain than is generally believed. It is particularly prevalent in Avila, Estremadura, and Hurdes. He records a case seen by him at Barquillo (Avila) in a man whose diet consisted almost entirely of potatoes. Rapid cure followed a change of residence and the use of a diet more varied and richer in vitamins.

army that periodical rewards should be given whenever there is a war in progress, but these are given on a fixed system.

Rewards can be divided into two classes: Those most worth having are the immediate awards—the V.C., D.S.O., and M.C., for valour. In addition, a certain number are given for general good service. As far as the risks go, the man who does the dirtiest and most dangerous work, and gets least pay and rewards, is the infantry soldier, so that the R.A.M.C. is not the only branch of the service that may have a grievance.

Rewards other than immediate are given chiefly to certain appointments, such as those of D.M.S., D.D.M.S., A.D.M.S. and their staffs; ambulance and hospital commanders, and consultants.

In an ordinary group of medical officers a few have exceptional merit, a few are exceptionally bad, but the majority have a fairly uniform standard, and as the ordinary military work is very cut and dried it is very hard to choose amongst the majority class. Selection, therefore, naturally goes by seniority and responsibility, and I have found that temporary officers are just as keen on seniority as anybody else quite irrespective of age and medical experience.

That commanding officers should get most of the rewards seems only fair, as if things go wrong they get the blame. In the R.A.M.C. the regulars get most of the administrative appointments, as they are not only the seniors but have had the most experience.

The point I wish to make is that rewards have been for years, and still are, given on a system prevailing in the army. Whether this system is right or wrong may be a moot point, but the regular R.A.M.C. is not responsible for it. As a matter of fact the majority of awards are selected by combatant officers, and not by the R.A.M.C. at all. The regular R.A.M.C. have come in for abuse lately, but I do not think they should be blamed for the system of giving rewards, so long prevalent in the army, and for which they are in no way responsible.—I am, etc.,

B.E.F., Jan. 14th.

UNDECORATED REGULAR.

"RURAL WATER SUPPLIES AND THEIR PURIFICATION."

SIR,—Your reviewer, in his kindly notice of my little volume on *Rural Water Supplies and Their Purification*, unintentionally does me a slight disservice, for which I am perhaps to blame for not having made my intentions absolutely clear to the reader. Thus he says:

The practical sanitarian will, however, ask himself whether Sir Alexander Houston has not taken too narrow a view of the whole problem, and whether it would not be better to improve the whole supply at its source by structural alteration of the filtration plant, etc., rather than every day to treat 10 gallons in a cistern.

I am, of course, entirely in favour of public water supplies and in communal and collective effort to accomplish water purification. My little book was written with the avowed object of trying to help those who, as regards water supply, are cut off from collective aid, and are obliged as individuals to make the best of existing circumstances. I quite agree, however, with your reviewer when he says:

One lays down the book with the feeling that water purification, which can be easily accomplished by communal and collective effort, presents great difficulty to the individual.

It was this feeling that induced the author to say in conclusion:

In this brief account of Rural Water Supplies and their Purification the author has doubtless failed in many particulars, but if the reader cares to write and explain his (or her) difficulties, or to offer any suggestions or criticisms, the author will endeavour to answer any such communications to the best of his ability.

—I am, etc.,

London, Jan. 21st.

A. C. HOUSTON.

ANTE-NATAL TREATMENT OF VENEREAL DISEASES.

SIR,—I would just like, with your permission, to say that, as far as I can remember, no one in the speeches that were made at the London Hospital claimed that it and the Thavies Inn were the only places where residential treatment was provided for ante-natal treatment of venereal disease. Any of us would, I am sure, have deeply regretted

to have said anything which could detract from the merit of the pioneer and excellent work done by the Lock Hospital, in this or any other direction—work done under great difficulties during many years when no other hospital was treating these cases. All credit to that hospital.—I am, etc.,

London Hospital.

KNUTSFORD.

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE.

THE University Senate on January 17th gave approval by 162 votes to 14 to the report of the special syndicate on the re-arrangement of the Previous Examination, Part I, according to which Greek is made an optional subject, together with certain modern languages. The additional subjects of the "Little-go" are also abolished.

Dr. W. H. R. Rivers, F.R.S., formerly University Lecturer in Physiology and Experimental Psychology, has been appointed to the newly-created post of Praelector in Natural Sciences at St. John's College.

The following medical degrees have been conferred:

M.B. AND B.CH.—H. T. H. Butt.
M.B.—S. Riddiough, L. G. Higgins, P. K. Liang.

UNIVERSITY OF EDINBURGH.

AT the meeting of the University Court on January 13th, when the scheme for the establishment of a Chair of Mental Diseases in the University to which reference was made last week was approved, the Dean of the Faculty of Medicine reported that Dr. R. Murray Leslie of London (Ettles Scholar in Medicine in 1892) had provided an endowment for a gold medal in connexion with the Ettles scholarship in medicine, in memory of his mother, to be known as "the Leslie gold medal in medicine." The Court recorded its cordial thanks to the donor.

At the same meeting the following additional examiners were appointed or reappointed: Dr. Dawson Turner (Medical Physics), G. P. Yule, M.A., B.Sc. (Public Health), Professor Farmer (Botany), Professor J. P. Hill, F.R.S. (Natural History), Dr. A. Lauder (Chemistry), Professor J. A. Gunn (Materia Medica), J. H. Pringle, M.B., F.R.C.S. (Surgery); Professor A. Donald (Midwifery).

CONJOINT BOARD IN SCOTLAND.

THE following candidates have been approved at the examinations indicated:

FINAL EXAMINATION.—*Medicine*: D. A. Stegman, T. F. Minford, J. M. Speirs, R. L. Wright, J. A. S. Campbell. *Surgery*: W. Gibb, J. A. S. Campbell. *Midwifery*: Hassan Amin Madwar, T. F. Minford, G. L. Stanley, J. M. Speirs, R. L. Wright, S. H. Waddy. *Medical Jurisprudence*: D. A. Stegman, W. Carew, Veeravagu Katheravelu Paramanayagam, D. Mackay, G. Beveridge, L. H. Perles.

The following candidates, having passed the Final Examination, have been admitted L.R.C.P.E., L.R.C.S.E., L.R.F.P. and S.G.:

L. Samuels, W. F. Gawne, Lachman Singh Ahluwalia, A. K. Towers, V. A. Rankin, J. V. Griffith, G. A. Grandsault, Q. Stewart, W. B. Watson, B. Cheintz, R. I. Duggle.

Obituary.

DEPUTY SURGEON-GENERAL JAMES HOWARD THORNTON, K.C.B., Bengal Medical Service (retired), died at Hove on January 6th, the day before his 85th birthday. He was the son of Major James Thornton, of the 78th Foot, now the 2nd Battalion of the Seaforth Highlanders, the Ross-shire Buffs. He was educated at Chatham House, Ramsgate, and at King's College, London; he graduated B.A. Lond. in 1854 and M.B. in 1855, and took the diploma of M.R.C.S. the same year. He entered the I.M.S. on January 9th, 1856, having won the appointment of assistant surgeon, which was given to King's College for competition by Mr. W. H. Melville, one of the Directors of the East India Company. He became surgeon on January 9th, 1868, surgeon-major on July 1st, 1873, brigade surgeon on March 1st, 1882, and deputy surgeon-general on June 30th, 1886, retiring on August 13th, 1891. His service in India was spent alternating between civil employment in Bengal, where he held the civil surgeoncies of Shahabad (Arrah), Monghyr, and Bankura, and military duty. He had a very long record of war service: Indian Mutiny, 1857-59, action of Benares, relief of Arrah, capture of Jagdespur, action of Surajpur, defence of the Alambagh, outside Lucknow, capture of Lucknow, and operations in Oudh and Gorakhpur; was mentioned in dispatches in the *London Gazette* of October 13th, 1857, received

the Mutiny medal with two clasps, and a year's service for Lucknow. China 1860, action of Sinho, capture of the Taku forts, and occupation of Peking; medal with two clasps. North-East frontier of India 1862-63, Khasia and Jantia Hills campaign, wounded; mentioned in dispatches. Bhutan war, 1865-66, forcing of Durunga pass, capture and recapture of Dewangiri; medal with clasp. Egypt, 1882, medal and Khedive's bronze star. Soudan, 1885, Suakin, as principal officer of the Indian contingent; mentioned in dispatches, *London Gazette*, August 25th, 1885, clasp and C.B. North-West frontier of India, Hazara campaign of 1888, as principal medical officer; mentioned in dispatches, clasp. He received a good service pension on December 8th, 1886, and was created a K.C.B. on June 24th, 1904. He recorded his varied war services in a work entitled *Memories of Seven Campaigns*, published in 1895.

MAJOR MILES CHARLES CARISTON SETON, Australian A.M.C., who was shot in London on January 13th, was the representative in the male line of the family of Seton of Cariston, in Fife. He was born in 1874, and educated at Edinburgh High School and University, where he graduated M.B. and C.M. in 1900, also taking the diploma of F.R.C.S.Ed. in 1908. As a student he distinguished himself in athletics, and won the half-mile championship of Scotland. After graduating, he served as a civil surgeon in the South African Field Force and as a captain in the Cape Medical Staff Corps, and received the King's and Queen's medals. After the war he practised for some time at Calvinia, in Cape Colony, and, after a visit to Scotland, subsequently went out to Australia, where he was in practice at Melbourne, and honorary anaesthetist to the Alfred Hospital, Melbourne. In 1915 he joined the Australian Army Medical Corps, in which he served in Egypt and England, and was promoted to major towards the end of 1918.

CAPTAIN ALEXANDER GEMMELL, D.Sc., an analytical chemist employed in anti-gas research, has died as the result of experiments in atmosphere charged with poison gas. Captain Gemmell, after commanding the anti-gas school in the Scottish Command, was transferred in 1917 to the anti-gas department, London, and was engaged in research work under the late Lieut. Colonel E. F. Harrison, C.M.G., whose lamented death took place early in November last, shortly after his appointment as Controller of the Chemical Warfare Department of the Ministry of Munitions.

PROFESSOR GUSTAVE BOUCHARDAT of Paris, well known for his researches on urea and sugar, died recently.

Medical News.

THE Belgian Government has appointed Professor Léon Frédéricq, of Ghent, who was imprisoned by the Germans for having declined to lecture in Flemish, to be rector of the University.

IT is announced that the medical university at Peking now being erected by the Rockefeller Foundation at a cost of £1,200,000 will be opened not later than next October. Another medical university will be built at Shanghai.

MR. T. P. GOSTLING, formerly chairman of the Worcester Division and president of the Worcestershire and Herefordshire Branch of the British Medical Association, who is retiring from practice for reasons of health, was recently the recipient of a presentation, at a large meeting in the Guildhall, Worcester, presided over by the Mayor. The parting gifts, presented on behalf of more than 200 subscribers by Lady Hindlip, consisted of an illuminated address, a service of plate, and a cheque, and a set of diamond earrings to Mrs. Gostling. The Mayor, on behalf of the citizens of Worcester, spoke of the appreciation and the love and affection they all had for Mr. Gostling as a man and a doctor. Mr. Gostling was for twenty years honorary surgeon to the Worcester General Infirmary, and on his retirement last December his medical colleagues presented him with a silver salver.

AT the meeting of the Medical Society of London to be held on Monday next at 8.30 p.m., a discussion on the modern treatment of gonorrhoea of the genito-urinary organs will be introduced by Colonel L. W. Harrison, R.A.M.C. He will be followed by Captain D. Thomson, Lieut.-Colonel R. Bolam, Major A. Campbell, Captain D. Lees, D.S.O., Captain David Watson, Mr. Campbell Williams, and others. Medical officers of the Colonial and Allied armies will be welcomed at the meeting.

A COURSE of four lectures on malaria will be delivered at noon on January 31st, February 7th, 14th, and 21st, in the Lecture Theatre of the Medical School, King's College Hospital, by Colonel Sir Ronald Ross, K.C.B., K.C.M.G., F.R.S., consultant in malaria at the War Office, and physician for tropical diseases, King's College Hospital. Officers and men of the Royal Army Medical Corps are invited to attend. Microscope specimens and lantern slides will be shown at the two last lectures.

A DISCUSSION on reconstruction in the teaching of obstetrics and gynaecology to medical students will take place at a meeting of the Section of Obstetrics and Gynaecology of the Royal Society of Medicine on Thursday evening, February 6th. Dr. Walter Griffith will open the discussion by a general survey of the subjects to be taught and the methods of teaching them. Dr. J. S. Fairbairn will follow with a paper on the training of the student from the standpoint of preventive medicine, and Dr. Lovell Drage will deal with the teaching of the student from the point of view of a general practitioner. Further particulars can be obtained from the senior honorary secretary of the Section (1, Wimpole Street, W.1).

THE council of the Royal Society of Medicine has arranged to have a meeting every Wednesday evening for the reception of medical officers of the Home and Dominion forces, and of America and our Allies. If it can be arranged, each evening will be opened by a short informal discourse. The first of these will be given by Sir John Bland-Sutton on Wednesday, February 5th, at 8.30 p.m. He will speak on "Gizzards and counterfeit gizzards," illustrating his remarks by specimens. At these meetings visitors will be free to raise and discuss any question in which they are interested, but the social side of the evenings will be emphasized. Tea and coffee will be provided and smoking will not be forbidden.

WHAT is termed "a mass meeting of the medical profession" has been called by the National Medical Union, at Wigmore Hall, Wigmore Street, London, on Sunday, February 2nd. The chair will be taken by Professor William Russell of Edinburgh, at 4 p.m. It will be proposed to form a provisional committee to arrange for the election of a body representative of the whole profession to watch its interests, and to be prepared to act in an advisory capacity in connexion with prospective legislation and the proposed establishment of a Ministry of Health.

SPECIAL branches of the employment exchanges for both employers and employed in every neighbourhood have been set up to deal with discharged men only, and in many instances special sections for disabled men have been established. A great part of the work is carried on by men in the same position as those whom they are helping back to civil employment. Of the discharged men who take part in this work a considerable proportion are themselves disabled. The loss of an arm, a leg, two legs, and even eyesight has not been found an insuperable obstacle to efficient work if willing employers can be found.

LAST July the Carnegie trustees offered to establish and equip a central institute for maternity and child welfare in Edinburgh. At a meeting of the Provisional Committee on January 17th the draft constitution was submitted dealing with the membership and administration of the institute, which, it was suggested, should be called "the Scottish Carnegie Institute." Steps are being taken to find a suitable site for the building.

Sanidad y Beneficencia, the organ of the National Public Health Service of Cuba, issued a special number (July-August, 1918) as a homage to the memory of Carlos F. Finlay, the first propounder of the view that yellow fever is transmitted by a mosquito. Dr. Juan Guiteras and Professor Aristides Agramonte contribute biographical sketches on Finlay, Drs. Claudio Delgado and Jorge Le-Roy an account of his scientific work, and Drs. Le-Roy and Cassá a bibliography of his publications. The number forms a solid volume of 197 pages, containing a summary of the literature relating to the man and his discovery.