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General Secretary for India and the East,
CALCUTTA.

Original Communications.

ON THE PASSAGE FROM THE HUMAN INTESTINE OF SWARMS OF MAGGOTS, AND AN EXPLANATION OF THE SOURCE FROM WHICH THEY ARE DERIVED.

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[Read at the Burmah Branch of the British Medical Association.]

ABOUT the middle of December last I was consulted by Mr. W.—on account of symptoms like those of chronic dysentery, from which he was and had been for some months past suffering.

At an early opportunity I examined one of his motions, and found that it was a well-formed normal evacuation, with blood and slime smeared over it, and a little free blood around it. There was no pain complained of either in the rectum or elsewhere; nor was there any constitutional disturbance that I could discover. The patient stated, however, that a few days previously, some maggots had come away from him in one of his motions. Thinking he might be the subject of thread-worms I inspected his anus, but could not find thereon any trace of these parasites. He was given some cannabis indica and perchloride of mercury in a mixture. Ten days later I saw the patient again: he was better in that his bowels were regular, and he seldom had more than one motion a day; but as the bleeding had not ceased, I made a digital examination of his rectum. Some fulness of the gut wall posteriorly was found, but no other unevenness or abnormality was noticed. I then wrote him a prescription for ʒss doses of hazeline to be taken three times a day, and for a rectal injection of hazeline and water (a table spoonful of each) after every evacuation. About ten days later the patient wrote me word that he had had, on the morning of the day on which he wrote, an evacuation which not only contained maggots, but which was positively mottled throughout in color from the presence of either innumerable small maggots or of the eggs from which maggots proceed, and he forwarded for my inspection a fragment, the size

of a small marble, of the motion in question. On examination of the feculent fragment, I found in it two fully grown maggots in active movement, and scattered throughout it several small maggots only large enough to be just visible. Seeing that this fragment of excrement, not larger than a small marble, which was taken at random from the commode, contained two fully-grown and several newly-born maggots, the sum of the maggots passed in the entire evacuation must have been many hundreds; and I would invite special attention to the fact that the maggots found in the evacuation were not of one age; some were fully grown, while others were newly born, and that, therefore, they must have belonged to different broods of insects.

I saw the patient on the following day, and, on questioning him, ascertained that for some days preceding the passing of these maggots he had suffered from a dull growing pain referred to the cæcum, a "building up" pain as he described it, which was occasionally, also throbbing in character; and, further, that the discharge of the maggots was followed by immediate relief of the pain, which had at the time of my visit, a few hours only having elapsed, almost completely disappeared. He could not account for the presence of these maggots in his stools; he had not recently eaten anything in which they, or the eggs from which they came, could have been contained; indeed, from the time he had sought my advice, he had lived on the simplest and cleanest of food, while he had taken nothing to drink but tea or filtered water. I persisted in pointing out how impossible it was for such numbers of maggots to escape from him, if they or the eggs from which they proceeded, had not been introduced into the alimentary tract with his food or his drink. He, on the other hand, enumerated the items of his daily fare without furnishing me with the slightest clue as to the origin of the maggots.

The next day, however, it crossed his mind that some six or eight weeks previously he had with the object of curing his imaginary dysentery, daily eaten large quantities of preserved candied *bael* fruit, on which he had noticed some whitish bodies resembling the immature maggots recently found in his stool, and having some of the *bael* fruit still by him, he sent me several slices of it. I examined the *bael* fruit and found many small maggots still on it, of the same species as those obtained from his stools.

Here then was evidence conclusive of two facts:—firstly, of the ingestion of maggots, and, secondly, of the passage with the stools, some two months later, of large numbers of the same species of maggots in different periods of existence.

I at once put my patient on calomel and rhubarb at night, and Friedrichshall water in the morning, and ordered rectal injections of a solution of quassia after every evacuation. From this time he quickly lost all his symptoms, and when I saw him a fortnight later, he seemed quite well.

I propose now to leave the patient and take up the life-history of the maggots to which he had acted the part of host.

The fragment of excrement which was received on the 5th of January, contained, as has been stated, two fully grown and several newly hatched maggots. The two adult maggots were removed, killed, but not without difficulty, for they were most tenacious of life, and mounted in vaseline. A minute portion of the excrement was placed under the microscope and several empty egg shells and one or two recently born maggots were detected in it. Both the fully grown and newly hatched maggots were obviously of the same species, their characteristic feature being the possession, at the oral extremity, of two very prominent recurved hooked processes. The remainder of the faecal fragment was placed in a watch-glass beneath an inverted glass cup, and by the following morning, it was alive with maggots. Four days later, making five days in all, it was noticed the maggots had left the faeces and got to the edge of the watch-glass, some of them having retreated to its under surface. Here they became motionless; their appearance underwent change, and in two days it was clearly obvious they had passed completely into the chrysalis stage of their existence. On the morning of the 24th, being 19 days from the date on which the motion was passed, eight flies were seen flying about within the glass cup. The flies were captured and placed under a glass jar, where they were supplied with some faeces, some citron peel, and some moist sugar. On the 27th the faeces in this jar was seen to be covered over with eggs, and, on the following day, it was alive with maggots. So that, in 22 days, the insect completed the cycle of its life. A second generation, which behaved in precisely the same way, was raised from the first.

The flies are about as large as fully gorged mosquitoes; the males are distinguished from the females by their smaller size and by the presence of two filamentous prolongations, taking origin near the anus, and probably representing the penile organ.

The fly is probably the *musca vomitoria*, the larva of which are figured on page 15 of Leuckart's parasites.

The second generation of flies was reared from maggots imprisoned, when in their chrysalis stage, in a closed test tube, set aside in a drawer from which all light was excluded; and I would invite particular attention to this circumstance, for, I think, that the test tube

wherein these maggots underwent their metamorphosis might aptly be likened to a short length of the human intestine.

The passage of maggots from the intestine of man, is not to the best of my knowledge by any means a common event, either in this country or elsewhere. Indeed, on the contrary, it seems to be a condition of such infrequent occurrence that, when observed in England, the circumstance is published in the medical journals; while, in so far as Burma is concerned, the present instance is the only occasion in which the phenomenon has come under my notice.

Nevertheless, I should not have taken up your time Mr. President, and the time of the members of the branch, with the history of this case, were it not that from the facts recorded, light is thrown on a question which seems to have greatly exercised the minds of medical men who have reported similar cases.

The point to which I allude is the source of the vast numbers of maggots which are sometimes discharged from the anus of man. It is certain they are the produce of flies, but how do eggs from flies sufficient for such swarms of maggots get access to the intestine? Dr. Finlayson, of the Glasgow Western Infirmary, reporting in the *British Medical Journal* of June 8th, 1889, makes a statement to the effect that if the eggs of flies bred in *middens* are deposited about the rectum of man during the act of defecation, and subsequently enter the bowel, as has been supposed, then the large extension of the *water-closet system*, which has recently taken place, would seem to explain why cases of the kind are now so seldom met with. I do not think the solution offered by Dr. Finlayson, is at all satisfactory of this vexed question, and I only bring this recently expressed view forward in order to show you that our medical brethren at home, in seeking to explain the sources of these maggots, have not yet advanced beyond the stage of conjecture.

I think, however, that in the face of the evidence I have adduced, it is not necessary to speculate any longer on the matter. *It seems clear that these insects are capable of propagating, and do propagate their kind while sojourning within the human intestines.*

My patient, who had partaken of *bael* fruit on which the ova of flies had been deposited, passed some six weeks subsequently to the consumption of any of this *bael* fruit swarms of maggots. Now I have shown you that the insect I am considering reproduces its kind in 22 days, so that we are forced to admit that if the origin of the maggots passed per anus was the *bael* fruit, that these insects must have propagated their kind while dwelling within the intestines of the patient.

And that I was able to rear these flies through two successive generations on fæces shut up in test tubes and watch-glasses, affords in my belief ample confirmation of this view; since, if they can be cultivated under these conditions, they can surely be as readily produced within the capacious coils of a distended colon.

March 5th, 1891. Since the completion of the foregoing paper, I have received a letter from my patient dated March 12th, from which I append the following extract:—

“On Sunday and Monday last I ate a number of worm tablets, and on Monday night I took a pill as prescribed by you: on Tuesday morning I took a good drink of Hunyadi with the result that I passed a large number of maggots, and I also saw some three or four hours later a number of those ‘stupid’ flies on the stool. It was severe ‘wind-gripes’ in the stomach that made me take the medicine.—R. W.”

So that although I considered my patient cured, such is not the case; on the contrary, he continues to act the part of a favorable host to the parasites in question, and to periodically breed them in, and discharge them from, his bowels, in swarms.

The insects were submitted to M. Bigot, who identified them as “*Phora Bicolor*,” many of whom are parasitic in their habits.

A further contribution on the presence within the intestinal canal of man of the larva of a dipterous fly.

It may be within the recollection of some of the members that I brought before the Society a few months ago the history of a case wherein maggots in large numbers were passed per anum, and I showed, I hope, to the satisfaction of my hearers, that the larvæ in question were born and reared within the intestines of the patient, that the ova of the fly to which the maggots were related, and likewise young maggots were swallowed with food and underwent development, whilst sojourning within the human intestine into flies which deposited ova and thereby produced swarms of maggots.

As far as it was open to demonstration, I showed that the fly in question lived a normal life within the coils of the human intestine where it reproduced its kind indefinitely; and I stated my belief that the vexed question as to the source of the swarms of maggots occasionally voided from the anus of man had thereby been solved.

I also produced and invited the attention of the members to specimens of the insect in the several stages of its metamorphosis, *viz.*, egg, maggot, chrysalis, and fly.

Yesterday I received from the patient whose illness had furnished me with data on which

the foregoing conclusions were based, the following letter:

‘Rangoon, October 8th, 1891.

‘My dear doctor,—I have your note, and am sorry to say I am not quite clear of the maggots yet. They trouble me about every two months. I can always say when I am going to pass some, as my stomach becomes unsettled, stools loose, tongue coated, and I feel generally out of sorts for a couple or three days. Last Tuesday was the last time I passed about, say, 8 to 12 flies, and a goodly number of maggots.

‘The maggots were very small, simply white specks with no life visible to the naked eye. They live in the stool in groups of about twenty.

‘Yesterday I took $\frac{1}{2}$ oz. of castor-oil which has given me a good clear out, and I feel almost right again to-day; and it will probably be a couple of months before I am troubled again.

‘I purged myself severely on one occasion, but it seems impossible to rid myself entirely of them.

‘Otherwise I am well and strong, attend drill with the mounted company and take a fair amount of exercise as riding, swimming and tennis.

‘It creates an uncomfortable feeling when I think I have got these wretched things about me and can’t rid myself of them.

‘R. W.’

I wish now to bring to notice that I have recently in two other cases found the same insect inhabiting the human intestine. The following are the circumstances:—

On the first day of last month two Karen girls by name Aye Myah and Mah Bway, and aged respectively 15 and 14 years, were brought to the General Hospital from a school at Kemendine, suffering from what was considered to be beri-beri.

They were both fairly stout, well proportioned girls, and looked well fed. Aye Myah, the elder, showed no obvious symptom of illness beyond muscular weakness, confined apparently to the lower limbs, but this was so marked as to prevent her from walking, and she had to be carried to the wards. Mah Bway, on the other hand, was suffering from fever at the time of her admission, but she was not nearly so feeble as Aye Myah, and was able, with support, to walk slowly.

In both the patellar tendon-reflex was absent.

Fragments of their stools were set aside in perfectly clear test tubes for examination. Abundant ova of ascarides were found in the excrement from Aye Myah, and a few tricocephalus ova in that from Mah Bway, while after Aye Myah’s excrement had stood for a few hours small maggots were seen moving in it.

Thinking the presence of these maggots was due to some fly having 'settled' on the excrement before it was transferred to the test tube, I had fresh collections made, at the time of evacuating, under ample precautions, while the tubes were immediately stoppered with clear cotton wool.

There was nothing abnormal to be seen in the excrement at first, but subsequently maggots developed in both specimens of excrement, which in due course became metamorphosed into flies.

Whether the cases were examples of true beri-beri I am unable to say. Both girls recovered considerable power in their limbs, and in less than three weeks more able to run about and took their discharge from the hospital.

And as to whether there was any causal relation between the presence of the maggots in the intestine and the muscular paresis of the lower limbs I am likewise unable to offer any opinion.

REPORT ON FEVER ON THE CHAMAN EXTENSION RAILWAY.*

FROM SURGEON L. J. PISANI.

From the Medical Officer, Chaman Extension Sind-Pishin Railway, Shelabagh, to the Surgeon-General with the Government of India, Simla.

(Concluded from p. 75.)

II.—TYPHUS FEVER.

I believe that this disease probably accounted for a large proportion of the mortality during the winter months. It is almost impossible to believe that any other febrile disease could have decimated the gang of 45 men and other gangs as described at the commencement of this report, except a fatal form of contagious fever. Relapsing fever is a disease which, I believe, never assumes such fatality even in cases where there is famine, and if we consider the incidence of the mortality amongst the members of the hospital establishment who were not lowered in any way by destitution, I think that we can at any rate safely assume that relapsing fever, if it did affect them, as it undoubtedly must have, cannot account by itself for the large number of deaths. The fact of the frequent co-existence of relapsing and typhus fevers due to their close connection as to the causes contributing to their origin, and the cases detailed hereafter all point to the abovementioned conclusion being the correct one.

Six cases of typhus, and one case, of which from the character of the temperature I have entertained some doubts, have been seen since 19th April. Of these cases, two were members of the

hospital establishment, namely, a dresser and an assistant surgeon. The former got ill four days after my arrival, and I was consequently unable to trace infection from any previous case in hospital. In the case of the assistant surgeon infection was probably derived from the dresser, whom he was attending, there was an interval of seven days between the commencement of the dresser's and the assistant surgeon's illness. In the other cases attempts to prove the source of infection were futile. The chief difficulty experienced was to differentiate from symptoms alone in those cases where the history was doubtful, between cases of typhus and relapsing Fevers. Cases of the latter disease are sometimes known to be accompanied by a rash, and if of a severe type not uncommonly assume a typhous condition; under these circumstances the difficulties in diagnosing are much enhanced.

No two of the cases came from one residence, and a good many of them were not of a severe type. As detailed histories of all these cases are attached, I need only make a few remarks:—

Temperature.

Case I.—Death on 15th day; the temperature approached the normal on the 6th and 7th days, this was said to be due to antifebrin.

Case II.—Gradual rise up to 6th. The temperature was descending on the 14th, when the development of pneumonia produced a fresh rise. Between the 5th and 14th days this chart is not unlike that given by Wunderlich in his atlas for a case of severe typhus.

Case III.—Became normal on 12th day.

Case IV.—On 15th day.

Case V.—On 14th day.

Case VI.—No exact history.

Rash.—Except in two cases the rash was present when first seen. In Case II it appeared on the 8th, in this case it was generally more raised than usual. In Case V it began to appear on the 4th and was all out on the 6th. It was generally of a purplish red at first, gradually becoming darker, then dusky brown, and gradually assuming lighter shades, finally disappeared during the convalescence. Except in Case I, in which the rash was profuse, there was always some mottling, in the cases of darker skin the only thing noticed was a more blurred outline of the spots which again became more evident on the disappearance of the mottling.

Delirium was present in all cases except in Case V. Its character will be seen in the histories of the cases.

In none of these cases did any relapse occur, and an examination of the blood on several occasions in Cases V and VI gave negative results.

Though these cases may in some point or other differ from cases of typhus of a typical type, they approach to this kind of fever more than to any

* This report has been placed at our disposal by the Surgeon-General with the Government of India.—ED., I.M.G.