SCARABIASIS OR THE PRESENCE OF BEETLES IN THE INTESTINE

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THE occurrence of dung-beetles in the stools of persons is a condition that has been called scarabiasis or 'beetle-disease'. Cases in Ceylon and India* have been reported from time to time by a number of observers, Dey (1919, 1920), Sen (1924), Chakravarty (1919), Senior-White (1920), Senior-White and Sen (1921) and Iyengar (1928).

The belief that in such cases the beetles were passed with the fæces is founded on the report of the medical officers concerned with the clinical aspects of each case, but there is one record by Chakravarti of two live bettles having been passed after the administration of a salt-water enema, and Senior-White has stated that a compounder had told him of two beetles being found in the intestine at autopsy, no note unfortunately having been made as to the part of the intestine in which they were located. The reports in general state that the insects are passed at intervals which may extend over some months. These and other circumstances have led one to conclude that adult beetles live in the intestine of the patients.

Geographical distribution

The condition appears to occur in certain parts of Bengal, Assam, Burma, and Bihar (Ranchi), in South India, and Ceylon. The following is a summary of their species and distribution as recorded by previous observers :—

*Onthophagus unifasciatus.**	Senior-White (1920) Iyengar (1928)	Metale, Ceylon. Ranchi, Bihar.
Onthophagus bifasciatus.	Senior-White and Sen (1921). Iyengar (1928)	Bengal. Bengal and Burma.
Caccobius mutans. *Onthophagus bifasciatus.*	Iyengar (1924 and 1928).	Faridpur, Bengal.
Onthophagus bifasciatus.	Sen (1924)	Faridpur, Bengal. Akyab, Burma.

* Senior-White identified as *O. bifasciatus*, whereas Arrow considered the species *O. unifasciatus*.

We now add further notes regarding beetles that have been forwarded to us either in a dry state or in spirit by the medical officers concerned.

The infestation of the alimentary canal of children is perhaps more common than such records would lead one to believe; they apparently connote a rural disease, of which a relatively small proportion of cases have come to the notice of doctors.

One noticeable feature about the condition is the age-incidence : it has not been reported from sucklings and only once from an adult;

(*Continued from previous page*)

It will be noticed that it is definitely less in Mirpur than in Muzaffarpur. Of the 5 persons giving ++++ reactions, only two gave history of contact, while one, a boy of 21, looked very suspicious but physical signs were negative. There were 23 persons giving +++ reactions in Muzaffarpur and out of these only 8 had a history of contact. None of these showed any physical signs of active or quiescent disease. In Mirpur there were only 16 persons with +++ reactions and none of them had a definite history of contact. None of these showed any physical signs of tuberculosis.

Without further survey it is not possible to give any reasons for the higher incidence of infection in Muzaffarpur where the inhabitants are better socially and there is very little overcrowding. As far as reliable history goes there have been 11 deaths from tuberculosis in this village within 10 years. Out of these 9 belonged to one family of weavers and two belonged to two different agriculturist families. Of the latter two, one was a case of Pott's disease in a young man of 20, and the other was a case of 'galloping' phthisis in a married woman aged 24, both seen and diagnosed by me on previous occasions.

The present history of these families is interesting. There are 8 surviving members of the weaver family and out of these 6, *i.e.* 75 per cent, are tuberculin-positive. All the members are weak and pale and two young men looked suspicious although physical examinations were negative. One girl aged 10 has phlyctenular conjunctivitis and gave ++++ reaction. The family of the girl who died from acute phthisis consists of 15 members. Out of these 14 were exposed to infection but there were only 6, *i.e.*, 43 per cent, positive. The lower incidence of infection in this family may be due to much better social standard and also to the fact that this family lives in much bigger houses with spacious compounds and both men and women spend most of their days in the open fields.

In conclusion I must thank Dr. Munshi Singh, medical officer in charge Shanker dispensary, and Dr. Ram Rakha, medical officer in charge of the tuberculosis dispensary, Jullundur City, and the civil authorities for rendering me valuable assistance in this work. My thanks are also due to Dr. A. C. Ukil for help and advice in preparing this paper.

* de Meillon (1937) has reported it from South Africa.

only those who have cut their teeth and are able to take solid food have been affected.

teric symptoms. Progressive emaciation has been a marked sign and sometimes there are

Donor	Source of specimen	Age of patient	Number of specimens	Identification	Determined by
Dr. Murphy ..	Chandpur Bagan, South Sylhet, Assam.	No information.	7	*Onthophagus bifasciatus* .. 6	Arrow.
				Onthophagus orientalis .. 1	
Dr. Meek ..	Cachar, Assam	Do.	1	*Caccobius (Aspectus) indicus*	Beeson and Arrow.
Dr. Chatterjee ..	Faridpur, Bengal	3 years	6	*Caccobius (Onthophagus) nitidiceps* .. 1	Do.
				Onthophagus bifasciatus .. 2	Do.
				Onthophagus orientalis .. 1	Do.
				Onthophagus centricornis .. 2	Do.
Dr. G. Panja ..	Faridpur		2	*Onthophagus unifasciatus* .. 2	Do.
Dr. Bhaduri ..	Sylhet, Assam	1½ year	9	*Caccobius unicornis* .. 9	Arrow.
Dr. Dutta ..	Chittagong	3 years	1	*Onthophagus orientalis*	Do.
Dr. Pillai ..	Travancore		6	*Onthophagus cervus* .. 1	Do.
				A new species of *Onthophagus* 2	Do.
				Onthophagus unifasciatus 3	Do.
Dr. Roy Chowdhury.	Sylhet	1½ year	2	*Onthophagus bifasciatus* .. 1	Arrow.
				Onthophagus cervus .. 1	Do.
Dr. Coltman ..	P. G. Hospital, Calcutta.	19 years*	1	*Saprinus* sp.	Do.
Dr. Dutt ..	Barisal	No information.	2	*Onthophagus bifasciatus*	Do.
Dr. Ghose ..	Cossipore, near Calcutta.	Do.	5	*Onthophagus bifasciatus*	Do.
per Dr. Maplestone	Not known	3 years	7	*Caccobius unicornis*	Do.
Dr. Ghosal ..	Not known; from somewhere in East Bengal.	No information.	2	*Caccobius unicornis* .. 1	Do. } Possibly from the same child.
				Onthophagus bifasciatus .. 1	Do. }
Do. ..	Do.	Do.	2	*Onthophagus bifasciatus*	Do.
Dr. Ojha ..	Not known	Do.	1	*Onthophagus bifasciatus*	Do.
per Dr. Maplestone	Do.	Do.	2	*Onthophagus bifasciatus*	Do.
Dr. Sen Gupta ..	Hope Tea Estate, North Bengal.	Do.	1	*Onthophagus bifasciatus*	Do.

* Associated with intestinal myiasis, *Sarcophaga ceylonensis* bred out.

Dr. Coltman's case was the only one which was much above the ordinary age, and it otherwise proved to be interesting. The patient was a wireless operator on a ship and had been admitted to hospital for bacillary dysentery. He there passed a large number of maggots which were brought to us in water and we were able to breed out only 2, which proved to be *Sarcophaga ceylonensis:* subsequently he passed others and though none from this batch could be reared in the laboratory, the characters of their posterior spiracles pointed to their also being larvæ of *Sarcophaga*. It was in the latter stool that a coprid of the genus *Saprinus* was found.

All previous observers have reported the occurrence of only one species of Coprid from the same patient, whereas it will now be seen that invasion by more than one species may take place in the same patient. Out of 6 beetles forwarded by Dr. Pillai from Travancore three species of *Coprinæ* from one stool were encountered, and among Dr. Chatterjee's collections from Faridpur there were as many as 4 species in a single stool.

The passing of beetles in the stool naturally causes a great deal of alarm in a family, especially when it is attendant upon a long train of symptoms. The child has perhaps been in indifferent health, has lost his appetite and frequently had diarrhœa and occasionally dysen-

slight rises of temperature. He has usually been treated for his intestinal symptoms and the passing of an insect with the stool naturally causes great alarm. The stool is usually semi-solid, never hard, and after it has been voided, the attention of the mother may be attracted to some movement in it, a beetle gradually looms up to the surface, emerges and flies away. As a rule the infestation is by more than one beetle and sometimes large numbers are passed over a period of months, the health of the child improving in the intervals.

Habitat and life history

Very little is known of any of the above-named species, Arrow (1931) giving the following information :—

Onthophagus bifasciatus	A specimen found upon a dead rat by Dr. Gravely.
Onthophagus unifasciatus	Dr. Beeson has found this species on a dead lizard at Bangalore and it has also been seen in heaps of decaying grass-hoppers at Yammiganur: it is the species most commonly associated with scarabiasis.
Onthophagus cervus	One of the most abundant of Indian Coprinæ.

The life-history of members of the sub-family *Coprinæ* has an important bearing on their method of invasion of the victim and it may be assumed that all species are dung-rollers, their life-history differing only in small details.

As far as is known each egg is laid separately in carefully prepared chambers in a mass of dung with a store of food sufficient for the needs of the young insect during the whole period of immaturity and parasitism and as a rule it is not observed. The total number of eggs laid is as a rule small, in some cases as few as three or four and probably always less than a dozen : they hatch in a few days after their deposition. According to Lefroy the larval life of an Indian *Onthophagus* lasts about 21 days. The pupal stage is assumed inside the chamber and after about 4 weeks' interval the adult stage is attained, therefore the life-cycle from egg to adult covers a period of from 6 to 7 weeks.

Mechanism of infestation

How do the beetles obtain access into the human intestine ?

Two hypotheses hold the field, that they gain entrance with the food, and that they enter by the anus.

It is quite possible that the invasion takes place through the mouth. Beetles during their early stages may be ingested accidentally with the food, when for instance young children eat food picked up from mud floors, as they often do. The mud floors of houses in East Bengal, where such cases commonly occur, are smeared every morning with a mixture of cowdung in water, but whether these species of beetle oviposit in cowdung is not known.

If the invasion takes place by the mouth, the eggs or later stage insects must be not only able to resist the action of the intestinal juices but also grow and develop to the adult stage in the alimentary canal. It is of course possible for an insect that habitually lives in ærobic surroundings to complete its life-cycle in an anærobic medium, *Apiochæta ferruginea* being a good example.

Coleoptera are holometabolous insects and if the invasion takes place through the mouth, it should be possible to confirm it by making a very careful search for the early stages and finding the larval and pupal skins in the stool. We have had no opportunity so far of having a patient under our care in the hospital, and hence such an investigation has not been possible.

That the invasion takes place through the anus was first suggested by Senior-White and Sen (1921), and Fletcher (1924) thought the adult beetles, guided by a keen sense of smell in search for human ordure, effect an entrance *per anum* in children of the age of 2 to 5. The identification of the sex of the beetles that had been generally found in the stools is in favour of this suggestion, as all, except one, turned out to be of one sex, which would not have been likely if the infestation had been derived *per os*. However although the sex-ratio in all of our own collections was not ascertained, in one instance when 7 beetles were forwarded to us for examination, 6 males and 1 female, and in another, out of 9 specimens, 6 males and 3 females were recorded.

Iyengar also believes that the beetles effect an entry *per anum* while the child is asleep and not at the time of defæcation, as previously suggested by Senior-White and Sen (1921). In support of this hypothesis he has cited the instance of *Macropocopris*, which usually lives on the droppings of the wallaby in Australia. 'These beetles cling to the fur of the wallaby and as soon as the wallaby evacuates, they jump on to the droppings and live on them. This is their normal procedure but often enough it has been found that they effect an entry into the cloaca of the wallaby and live in its lower intestines'.

Children in rural India between the ages of 2 to 5 years usually visit a screened place adjacent to their dwelling and sit on the ground. The stool is seldom cleaned up at once: it may, however, be washed away or left to be eaten by jackals, dogs and other scavengers. When it is thus left for 3 or 4 days, many insects, especially beetles, take shelter under it and at the time of a child defæcating the beetles might enter the rectum through the anus.

The presence of more than one species in the excreta of the same patient perhaps connotes invasion by the anus.

On the other hand the freedom of helpless sucklings is against the hypothesis, as they particularly lie about on the floors and are often in such an unclean condition that they should be most attractive to the beetles.

Whether the infestation be *per os* or *per anum* it is difficult to explain how the patients continue to pass the insects for months on end even after the subjects have been removed to better sanitary surroundings.

Our thanks are due to Dr. G. Arrow of the British Museum and to Mr. Beeson of the Indian Forest Service for the trouble they have taken to identify the specimens forwarded to them.

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A Mirror of Hospital Practice

APPLICATION OF VAUGHAN'S MODE OF DELIVERY, WHERE FORCEPS WERE DEFINITELY INDICATED*.

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THE patient, 37 years of age, was a Brahmin. She had had one abortion and eight children, all are alive except the second, the last was delivered by me, about 4 years ago. I had seen the patient only once, when she was about 8½ months pregnant. The child was in the LOA position, with the head fairly small and easily pushed through the brim.

In August last, the husband informed me that his wife had influenza but that she did not need me to visit her.

About 8 p.m., on the 5th of September, the *dai* who was to assist me in the case, came and reported that the patient had been having slight labour pains, since early in the morning but that I need not go immediately. I suspected uterine inertia, and so left instantly. When I got there about 8-30 p.m., I saw that the patient had a definitely pendulous abdomen and was walking about in her room. She had taken a dose of castor oil at 6 p.m. and the pains were now coming more regularly and more strongly. She was also suffering from bronchitis, after the influenza, she had in August. About 9 p.m. she passed a loose motion followed by another in a short while.

On internal examination I found the os two fingers dilated, the head floating freely above the brim but the exact size of the head could not be gauged, because of the extreme thickness of the abdominal wall. Strong pains were now coming every 5 minutes but there seemed to be no progress at all, and the patient was becoming anxious and restless. At 11 p.m. I did another internal examination and found that the os had now dilated to 2½ fingers only. I douched the vagina with half an ounce of chloral hydrate mixed with two teaspoonfuls of boric acid in two pints of water, as hot as the patient could stand. A binder was next applied.

12 midnight.—The patient was becoming exhausted and begging of me to apply forceps but refused to have any anæsthetic.

12-25 a.m.—The os was fullly dilated and the head apparently fixed, remained stationary even with the strong pains and seemed fixed behind the pubic rami.

12-30 a.m.—The membranes ruptured but still there was no progress of the head.

1 a.m.—The head was still in the former position. I was considering putting the patient in the Walcher's position and applying forceps but in this there were two difficulties—

(1) The patient objected to an anæsthetic.

(2) The bed was extremely low and neither bricks nor books were available to raise it.

Accordingly I decided to use Vaughan's method of delivery. After some difficulty the patient agreed and at 1-20 a.m. she was put in the squatting position.

1-25 a.m.—After only one strong pain, a portion of the head was showing, at the perineum. I then quickly put the patient lying on her back as usual, and took control of the perineum.

1-30 a.m.—The large head was delivered. As soon as the head was out, the pains ceased altogether, so the shoulders and the rest of the body had to be extracted manually.

2 a.m.—The pains fortunately started again and the placenta was expelled without any trouble. As usual, the patient was given a dram of liquid extract of ergot in water followed by injections of 1 c.cm. pituitrin extract and 10 c.cm. polyvalent puerperal anti-streptococcal serum and she was advised to take quinine and ergot mixture, from the next morning.

After some trouble in the puerperium the patient made a satisfactory recovery.

Remarks

1. The true conjugate, in Walcher's position it is said, is lengthened by half an inch; it would be interesting to find out exactly by how much it is increased in the squatting position.

2. Once the head has passed through the brim, the patient should be put back into the orthodox position and the perineum controlled, in the usual way, to prevent a rupture.

3. In all borderline cases and in those with slight disproportions, before the application of forceps, the patient may be put into this position.

4. As this seems rather an uncomfortable position at term, even for an Indian patient, I should adopt this mode of delivery, only in a case of difficult and prolonged labour.

* Abridged by the Editor.

DIPHTHERIA IN AN UNUSUAL LOCATION

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ON 28th October, 1938, I saw a girl, aged eight months. It was said to be the third day of her illness. Her upper lip was markedly swollen and everted, and on its inner surface there was an ulcer extending over almost the whole of its length and breadth. The ulcer was covered by what seemed to be a thick, white slough. At the centre of the lower lip, there was a small white patch, this lip was not swollen. The girl was running a temperature between 100.4°F. and 102°F., from the beginning of her illness. Moist sounds could be heard over both the lungs, especially over the left base. She was given prontosil album from that morning, besides local treatment. Exactly how the ulcer developed could not be learned from the parents; all that could be gathered was that it had begun as a tiny vesicle and assumed these proportions within three days.

By the evening of the next day the swelling of the upper lip appeared slightly less. The white slough had been removed by the patient's mother, leaving a raw surface. The lower lip was slightly swollen. Otherwise, there was no change.