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DESPATCH

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EAST AFR PROT

No. 13497

C.O. 13497

1908

Bacteriological ...

Sends with covering letter from ...

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(Minutes.)

Print ... to end of last line: for advisory Cttee Print – & send to Mr Keith to put on the Agenda Paper for the next meeting – the diagrams to be reproduced in colour

G. J. R.

22/4

Mr Keith

C. A. H.

16/5

Sir C Lucas

Send on – for version ...

[illegible] 26/5

8R.

C.P.L. 16 at once

Governor's Office,

Nairobi,

EAST AFRICA PROTECTORATE.

No. 102

My Lord,

In accordance with Your Lordship's Circular of December 25rd 1907, I have the honour to transmit herewith the Bacteriological Report for the period of October to December together with a copy of the Principal Medical Officer's covering letter.

P.M.O. Mar. 10th

Dr. Ross Mar. 8th

I have the honour to be,
With the highest respect,
My Lord,
Your Lordship's most obedient,
humble servant,

H.M. PRINCIPAL SECRETARY OF STATE
FOR THE COLONIES,
DOWNING STREET,
LONDON, S.W.

C.O
13497
16 APR 08

No. 18/1908.

P.M.O's Office,
Nairobi.
10th March 1908.

I have the honour to transmit the Bacteriologists Report to the end of December 1907.

As explained in the Report the period covered is from October to December, 3 months only, the dates for rendering the half-yearly Bacteriological Reports having been changed by C. O. Circular of 23rd December 1907, from March and September to June and December.

I have the honour to be,

Sir,

Your obedient Servant,

Principal Medical Officer.

The

Secretary

to the Administration.

The present report covers the three months October to December 1907. Until the end of January 1908 my instructions were that half yearly reports should cover the periods April - September and October - March and the recent change of date and the fact that I had to proceed to Uganda in the beginning of February are the cause of the delay in forwarding the report.

During these three months there has been a slight increase in the amount of material sent to the Laboratory for examination. As usual, the greater part of the routine work of the Laboratory consists of blood examinations.

Blood examinations and Malaria.

Of the seventy-nine blood smears sent for examination differential leucocyte counts were done on fifty-four. In many of these a large mononuclear increase made it appear probable that the patient had suffered from recent malaria and in nine instances this increase with the presence of pigment in the large mononuclears made this diagnosis certain. In nine cases the blood smears were too poor for either diagnosis or differential count to be made. Fourteen cases showed malaria, of these one was simple Tertian, five Quartan, five subtertian or tropical malaria and there were two mixed infections Tertian and Subtertian

and

and one mixed infection, Quartan and Subtertian. The Subtertian parasites met with here are practically invariably unpigmented, although pigment can usually be seen in the large mononuclear leucocytes. Since I have been in the country I can only remember one instance in which what may be called the classical pigmented tropical ring parasites have been met with. The parasites seen here resemble the typical tropical ring forms in every respect except in the lack of the grain or two of pigment. Crescent forms are very rarely seen - one has been seen in the three months.

Of the two remaining blood smears one showed Filaria perstans and the other was from a case of Tick fever.

Trypanosomiasis. Gland punctures were done in five cases and in two - both patients came from the Lake Victoria region - trypanosomata were found.

Enteric Fever.

The widal reaction was tried in seven cases. In two, both Europeans, a positive result was obtained.

Dysentery

Three specimens of faeces were sent, in all of which Amoebae were found. In the light of the recent work in Manila it would seem that Schaudinn's distinctions between A Coli and A histolytica will not stand. In these three cases, where large active Amoebae were seen, Schaudinn's description of the A histolytica would have applied, but the smaller and less active Amoebae corresponded more to his description of A Coli.

Syphilis

Syphilis. One smear from secondary lesions was sent and the Treponema Pallidum demonstrated.

Worms. In a case in the native hospital which died of Appendicitis a large abscess was found on postmortem examination. In the tip of the Appendix numerous Trichocephalus trichiurus were found with their whips buried beneath the mucous membrane and extending to the point where the appendix had perforated. In view of Metchnikoff's recent theory this case seems of some interest.

Urine - Bilharzia.

Four specimens of urine were sent. In two of these blood and pus was found, in one pure unaltered blood and in the fourth case the ova of Bilharzia. These ova all had terminal spines, no lateral spines being seen.

Plague.

No cases of Plague have been reported. Two rats were sent to the Laboratory but these had evidently been killed by violence and no signs of disease could be found.

One smear was sent from Uganda and in this many bacilli morphologically resembling plague bacilli were seen and also some rod shaped bacilli. There was some doubt as to the origin of this smear and it was only possible to report that, if this smear came from internal organs soon after death, the case was probably plague, but that if it was a smear of blood

from

from the finger and could not exclude the possibility of these bacilli being the same pathogenic organisms [illegible] commonly found in the air.

In [illegible], a [illegible] of a [illegible] [illegible] in the native hospital, but no bacteria were seen and a sufficient cause for the swelling was subsequently found.

Examination for Police.

One stain was sent for examination for blood but the result was negative.

Analyses.

One well water was sent. The preliminary tests showed such marked sewage pollution that a complete analysis was not carried out. The old Nairobi water supply was also analysed and found to be quite unfit for drinking purposes.

Soda water: [illegible] of the [illegible] population of Kisumu suffered from poisoning and samples of Soda water and chemicals found on the manufacturers premises were sent for analysis. The chemicals were apparently the usual ingredients used in the manufacture of CO_2 gas and of Lemonade; but the Soda water was found to contain Zinc. Presumably the H_2SO_4 used in the manufacture of the gas had in some way come into contact with the zinc lining of the connecting pipes with the result that $ZnSO_4$ found its way into the Soda water.

The contents of a dog's stomach were examined

for

for Strychnine. Such examinations are evidently work for a professed Toxicologist and not for a Bacteriologist and in such cases I do not profess to give more than a mere expression of opinion.

Sections of Organs.

Two small round celled Sarcomata have been examined.

Sections of a spleen sent for examination showed an old infarct.

Section of tumour from clavicular region showed a fibro sarcoma.

Anthrax. A quite unexplainable outbreak of Anthrax occurred among the 1st Battalion of the Kings African Rifles. There were fortunately only two cases but where these two men contracted the disease remains a mystery. The disease has never been met either among the guns or among stock but two soldiers belonging to different companies were affected within five days of one another. When seen, one case was nearly recovered and attempts to cultivate the bacillus from the very typical but nearly dried up malignant pustule failed. But from the second case - who subsequently died of the disease - the bacillus was recovered with two Staphylococci and these were subsequently obtained in pure cultures.

Apart from the routine work of the Laboratory research work has as before been much hindered by lack of experimental animals. The most urgently required work is connected with the conveyance of

the

the T. Gambiense by the various local tests but
[illegible]
[illegible]ly I am unable to work at this subject unless I am supplied with animals. In the absence of such animals I have continued work on the trypanosomata of the Glossina Fusca, a preliminary report on which was attached to my report of October last. That preliminary report is again attached to this report and the results subsequent work have been added in an endeavour to give as complete an account as possible of the subject at the present time.

Vaccine. During the three months eighty-one dozen capillary tubes were issued. Medical Officers whom I have seen who have used this vaccine say that vaccinations with it have been almost invariably successful.

At present forty dozen tubes per month are being issued.

SUMMARY OF ROUTINE WORK OF LABORATORY

October - December 1907.

[illegible]ment leucocyte counts		48.
"	and Malarial pigment present	9
Negative blood examinations		9
Malaria	Simple Tertian	1
	Quartan	5
	Subtertiana	5
	Tertian + Subtertian	2
	Quartan + Subtertian	1
Filaria Perstans		1
Tick fever		1
Fæces for Amœbae		5
Vidal reactions		7
Trypanosomata-Gland punctures		5
Syphilis- Treponema pallidum		1
Anthrax		2
Worms		1
Plague (Rats smear and puncture of bubo)		4
Urines		5
" Bilharzia		1
Sections of tumours		4
Analyses- Strychnia		1
	Soda water and Chemicals	1
	Waters	2
Stains for blood		1

TRYPANOSOMATA OF GLOSSINA FUSCA.

In the light of the discoveries by Gray and Tulloch of trypanosomata in the gut of the Glossina Palpalis and of Novy's subsequent comments and his more recent work on the trypanosomata of the mosquito, it seemed to be a matter of some interest to examine the other tsetse flies, & to determine whether or no they harboured the same or similar parasites. The fly available was the Glossina Fusca and I propose to describe first in detail the results of the examinations. All these flies came from Kibwezi, on arrival, except for the few that were dissected at once, the flies were fed on a dog, either infected or clean, and every day, until the last fly had been used, they were given an opportunity of feeding again, those that had fed on a clean dog on the same dog, and those that had fed on an infected dog, on another clean dog except in the experiments A. B. C. D. where flies were fed again on infected dog. The infected dog had been inoculated with a trypanosoma from a mule, this trypanosoma bearing on a morphological resemblance to the Trypanosoma dimorphum. Each fly was caught in a test tube, killed with chloroform, pinned out, the abdomen opened and when the body fluid was required it was drawn up in a capillary tube. The intestines were then dissected out and put in a drop

of

of normal saline.

A. August 22nd. Flies fed on infected dog No. 99.

" 23rd. Three flies examined showed Trypanosomata fairly numerous.

" 24th. Two flies examined showed nothing. Remaining flies fed again on a dog No. 99.

" 26th. Three flies examined - negative.

" 27th. Six flies examined - negative.

One fly examined showed numerous trypanosomata. Thus fifteen flies were fed on August 22nd. After 24 hours five flies were examined and two showed nothing. Of the ten remaining flies fed on August 24th one only and that after 48 hours showed trypanosomata. Apparently therefore feeding on a dog whose blood shows a high trypanosoma infection does not ensure one finding the parasites after even 24 hours though one may find parasites after even 48 hours.

B. The above experiment was repeated with six flies.

August 27th. Flies fed on dog 99.

" 28th. One fly, which had not fed, showed very scanty trypanosomata. Three flies which had fed were negative.

" 30th. Two flies which had fed again on August 28th were negative.

This seems to confirm the conclusion arrived at in A.

C. September 9th. Flies fed on infected dog 104.

" 10th. After 20 hours.

One fly - very scanty trypanosomata

One fly - scanty trypanosomata in the bright unaltered blood of fore gut but very many in the

dark altered blood of hind gut. Many rosette forms were seen in this latter and agglomeration present without any loss of motility.

One fly - trypanosomata much plentiful in altered than in unaltered blood. No rosettes nor agglomeration.

September 11th. One fly - negative.

One fly - no parasite in unaltered blood, swarms of trypanosomata in the altered blood.

The body fluid of this last fly was examined but nothing found.

" 12th. One fly - negative.

Two flies many trypanosomata in altered blood.

" 13th. One fly very many trypanosomata.

" 14th. One fly trypanosomata plentiful.

There seems to be nothing here to modify the conclusion A. Feeding on an infected dog did not result in all flies being infected and the numbers present in three flies examined 30 hours after feeding varied very much, though presumably, if the trypanosomata were the result of development of the parasite taken from the dog, there would have been about the same numbers in each fly. On the other hand after four and five days starvation swarms of trypanosomata were found in two flies and nothing at all in a third.

D. Flies fed on infected dog No.102 on September 12th, afterwards fed on clean dog No.99.

Sept. 15th. One fly, fairly numerous Trypanosomata.

Sept. 16th. One fly - gut nearly empty but swarms of Trypanosomata of most various shapes and sizes. Many were typical, others were rounded and in others again the position of the centrosome varied, in some being posterior to, in others beside and in others anterior to the nucleus. In nearly every one the undulatory membrane was clearly visible. Masses of these Trypanosomata were attached to the wall of the gut by their flagella but this attachment was not permanent for occasionally one could be seen to move away and then return again to the gut-wall.

Sept. 18th. One fly - negative.

One fly - intestinal contents negative but body fluid showed a few degenerating Trypanosomata.

Sept. 19th. One fly - intestinal - contents - negative Body fluid showed a few faintly stained Trypanosomata.

Sept. 20th. One fly. Body fluid negative.

Intestine - swarms of parasite as various in shape and size as those seen on Sept. 16th, with the exception of the fact that in no case was the motor nucleus seen anywhere but posterior to the trophic nucleus.

Attempts

Attempts were made to agglutinate these trypanosomata by (1) serum from dog 106 on which the fly had fed on Septe[illegible] 12th and (2) by goat serum.

(1) Serum of infected dog. There was some of motility in a few members to the [illegible] of the normal forms. The long forms were less affected, there being no immediate loss of motion but apparent decrease of locomotion. After one hour no trypanosomata could be seen moving but there was no agglutination.

(2) Goat serum - This had no effect, the parasites being as active as ever after one hour and some could still be seen moving after 2½ hours whereas in (3) the control, in normal saline, though active after sixty-five minutes, none could be seen moving after 2½ hours.

Sept. 21st. One fly - negative.

Sept. 23rd. One fly - negative.

The results so far as regards the effect of feeding on an infected dog confirm the conclusion A. The question arising from the agglutination experiments will be discussed later.

B. Two flies fed on September 21st, one on infected dog No.102 and one on clean dog.

Sept. 23rd. Both flies showed swarms of trypanosomata in the intestine.

The conclusion is that the feeding of the fly

fly on the infected dog probably had nothing to do with the parasites in its intestine. They were neither more nor less in number [illegible] did they differ in appearance from the [illegible] fly that had [illegible]

Sept. 26th. Three flies fed, two on infected dog and one on clean dog.

Sept 26th. One fly - infected dog - trypanosomata numerous, not affected by goat serum.

One fly - infected dog - negative.

One fly - clean dog - negative.

O. Sept. 21st. One fly fed on dog 102.

Sept. 24th. Three flies fed on clean dog.

Sept. 27th. All four flies - negative.

K. Sept. 24th. Seven flies fed infected dog.

One fly fed clean dog.

Sept. 30th. Two flies - infected dog - negative.

One fly - infected dog - very scanty trypanosomata.

Oct. 2nd Two flies (one clean dog) negative.

Oct. 3rd. Three flies - negative.

T. Sept. 23rd. Three flies fed on infected dog.

Two flies fed on clean dog.

Oct. 3rd. Two flies-infected dog - negative.

Oct. 4th. One fly - infected dog - very scanty trypanosomata.

One fly - clean - dog - trypanosomata fairly numerous, both normal and rather stumpy forms being seen. The addition of goat serum resulted in partial agglutination without loss of motility but

it was found that the control in normal saline showed the same change but to lesser degree.

Oct. 8th - One fly - clean dog - trypanosomes numerous. No examination by addition of goat serum but some flies dissected from the room in the control.

In this specimen an opportunity occurred of watching the method of division. This does not appear to be at all the simple operation usually described. When first seen division was just beginning in the flagellum. This extended in the usual manner and resulted in division into a large and small element: The small element quickly swam out of the field.

The large trypanosome now left immediately began to divide, division beginning as before at the flagellum.

Division proceeded till complete except in the posterior sixth of the parasite. Instead of proceeding further, the divided parts suddenly came together and fused completely. The resulting body then gradually lengthened and appeared to be going to divide transversely, but when almost complete the whole doubled on itself and the two ends again fused. The body then again lengthened and prepared for transverse division which this time was apparently complete as the two elements got some

some distance apart and no connection could be seen. But instead of separating as expected the two bodies again came together and [illegible] of 2 [illegible] into an apparently normal trypanosome. There then followed in turn incomplete longitudinal division, fusion, incomplete transverse division, fusion and finally, complete longitudinal division which resulted in the formation of two equal trypanosomata. But whereas the body in process of division had been exceedingly active though not moving much about the field, the two elements, the result of the division, immediately became very sluggish, moving rather in a series of jerks than with the constant lashing movement of the trypanosome.

The trypanosomata seen in the [illegible] in one respect do not resemble the T. Grayi nor the T. tullochii. The flagellum seldom extends more than 2-3 μ beyond the body. The most usual form met with the resembles the trypanosomata of the mule, referred to above, in the arrangement of nucleus and centrosome. The latter is usually a small dot but may take the form of a short rod; it is usually situated at the extreme posterior end. The nucleus is always anterior to the centrosome and is round or oval in shape. A diplosome can sometimes be seen. The normal shaped forms are 25-30 μ in length by 1.5-2 μ broad; but,

besides

besides these, every kind of distorted form can be seen, the commonest form being club shaped, 15-20μ long and 2-5μ broad at the broadest part. In some flies the trypanosomata have been much larger, 30μ -45μ [illegible] broad, the commonest forms being [illegible] In these latter the centrosome is usually some distance [illegible] from the posterior end, and is usually rod-shaped; the nucleus is oval or irregular in shape. In the same flies in which these forms of trypanosomata were found there were also numerous quite circular forms, 4-7μ in diameter. The nucleus of these is round and usually centrally situated, the centrosome, round or rod shaped, being usually nearer the periphery. From the centrosome a well marked flagellum extends either directly outwards or circles for some distance round the circumference with only the terminal portion extending from the main body of the parasite, the flagellum is 10-12μ in length.

In one fly, while these circular forms were fairly common, there were enormous numbers of long forms in which the relative positions of the centrosome and nucleus, were exceedingly variable. In some the centrosome was immediately behind the nucleus. In these forms the posterior end of the trypanosoma was rounded, not rather pointed as in the other forms described; the centrosome, when posterior, was seldom quite terminal; it was usually rod shaped and the nucleus oval.

As regards agglutination by goat serum the results

were

were unsatisfactory and certainly do not so far agree with the results obtained by the Sleeping Sickness Commission. Cultivation of the trypanosomata has so far failed. It would seem that there are several trypanosomata of the Tsetse fly. Among those described above there would appear to be at any rate three distinct forms (1) the forms, normal in shape but larger than the animal trypanosomata (2) the very large forms and (3) the "cultural" forms. The relationship between these forms and the circular bodies is still undetermined and the results are still too few any definite conclusion to be drawn.

Parasites of Hyeanistes. In the last half annual report the discovery of trypanosomata and Filaria in the Hyeanistes cristatus was noted and measurements given. Microphotographs of these parasites are now included. During the past six months there has been noted the finding of a trypanosoma in a Hyeanistes on the west coast of Africa.

Examination of Stomoxys.

The intestinal contents of many stomoxys have been examined but in only one series of flies was anything found. These flies were caught on a mule known to be suffering from trypanosomiasis and trypanosomata were found in the intestinal canal of the flies examined soon after capture. In one fly there was also found an active filaria [illegible] 165 μ in length by 8 μ in thickness.

Further experiments with Trypanosomata and Glossina Fusca.

Since the above was written, work has been continued with the Glossina Fusca. In all two hundred and fifteen flies have been examined and in fortynine trypanosomata were found, giving a percentage of infected flies of about 22.8.

These two hundred and fifteen flies may be further subdivided:- Four flies were examined immediately after arrival and were all found to contain trypanosomata of the type T. Tullochii: Fiftyseven flies were examined after they had been feeding on an infected dog and twentyone of these showed trypanosomata, twenty of the type T. Tullochii and one "cultural" form - a percentage of infected flies of about thirtyseven: One hundred and fiftyfour flies were fed on a healthy dog and in twentyfour of these trypanosomata were found, nineteen of the type T. Tullochii and five "cultural" forms - a percentage of infected flies of 15.5. Taking all the infected flies fortythree showed trypanosomata of the type Tullochii and six showed "cultural" forms.

It will be seen from this that the percentage of infected flies was higher among those fed on an infected dog than among those fed on a healthy dog. This difference would disappear if flies examined twentyfour hours after feeding were excluded or if one excluded flies showing very few parasites and only considered those which showed such numbers of parasites as to be evidently the result of

multiplication

2

1 The [illegible] of the foregoing experiments is [illegible] at pp 152 - 155 of [illegible]

multiplication in the gut of the fly and not simply of ingestion with their food. The number of flies fed on the infected dog is smaller than among the other class and the probable error is therefore greater. In any case, if feeding flies on an infected dog had anything to do with the presence fortyeight hours afterwards of trypanosomata in the intestine of these flies, certainly a much larger percentage than thirtyseven should have shown the parasite. One would naturally expect every fly to become infected if the trypanosomata of the dog had anything to do with those in the fly.

Further trypanosomata were found in all four flies examined immediately after arrival and in 18 of the flies fed on an uninfected dog. The presumption must be that the feeding on the infected dog had nothing to do with the presence of parasites of the "sultural" type and of the type T. Tullochii in the flies, but that the latter were probably all infected in some way before they reached the laboratory.

Having arrived at this conclusion, attempts were made to determine whether or no the trypanosomata in these flies were pathogenic. Kibwezi, whence these flies came, has long been a well known "fly belt". In the days before the railway it was notorious and caused much loss to the Uganda transport. On finding tsetse from this belt with intestines swarming with trypanosomata one naturally at first supposed that these trypanosomata would be pathogenic. But there

was an objection to this. All strains of trypanosomata met with so far have been fatal to dogs, yet a trypanosome, fatal to dogs, did not develope, at any rate constantly, in the Glossina Fusca even when that fly was fed on a dog whose blood was swarming with parasites. Of the same batch of flies fed on an infected dog, two days after feeding some would shew swarms of trypanosomata in the gut and others none at all. Of the twentyone flies which showed trypanosomata after feeding on the infected dog, only one showed "cultural" forms, whereas, were the development in the fly simply a culture of the parasites from the dog, one would expect to find nothing but cultural forms.

Inoculation of dog with trypanosomata of Glossina Fusca.

As it seemed that the parasites in the fly could have nothing to do with at any rate this particular strain in the dog an attempt was made to prove it. Flies were fed for a few days on a clean dog and then examined. When a fly was found with quantities of parasites in the gut, the intestinal contents diluted with normal saline were injected subcutaneously into a dog. Two experiments were carried out, (1) with the trypanosomata of the type T. Tullochii and (2) with trypanosomata of the "cultural" type. In neither case did infection of the dog follow. It may be said that these experiments are too few but so far as they go they are fair tests, for large numbers of parasite were injected and the accompanying bacteria had no

ill effect on the dog. It is possible that the dog is not the appropriate host for either of these trypanosomata but if this is the case it follows that these trypanosomata can have nothing to do with the "fly disease" of the Kibwezi district.

Inoculation of dog with intestinal contents of Glossina Fusca fed on an infected dog.

The next experiment carried out was with a view to seeing whether the intestinal contents of a fly that had fed on the infected dog were infectious to another dog and if so for how long.

(1) A fly which had fed for some days on a clean dog was fed on an infected dog and after eighteen hours was dissected and the intestinal contents in normal saline were injected subcutaneously into a clean dog. These contents showed trypanosomata of the most various shapes and sizes but no "cultural" forms. The dog showed parasites in its blood on the seventh day and died on the twenty-fifth day. During the course of the disease the parasites in the blood bore a morphological resemblance to T. dimorphon, as did those in the original infected dog.

II and III. Two experiments were carried out as above but with twenty-four hours interval between feeding and injection of intestinal contents. The dogs died on the sixth and seventh days and showed no trypanosomata nor, post-mortem, any cause of death. The experiments were therefore inconclusive.

Interrupted feeding experiment with Glossina Fusca.

A further experiment was now made to show that 5-

the

the Glossina Fusca could convey this trypanosoma from infected to healthy dog. Having found in previously reported experiments with Glossina Fusca and T. Gambiense that, whereas an interval of even eight hours between the feedings prevented infection from being conveyed, infection was conveyed when there was practically no interval, two flies which had fed on a clean dog were allowed to half fill themselves on the infected dog and then to finish their feed on the clean experimental dog. Trypanosomata were found in the blood of the latter on the tenth day and the animal died on the eleventh day, showing, post-mortem, an enlarged spleen. The flies used in this experiment were dissected fortyeight hours after feeding and found to contain trypanosomata of the type T. Pullochii

One may consider as controls to this experiment two dogs used to feed the flies when they arrived and afterwards if one wished to keep flies alive. Dog No.104 had one hundred and fiftysix flies fed on it during a period of sixty days. No trypanosomata could ever be found in the blood and when the animal died no cause of death could be discovered. During life the temperature gave no indication of a trypanosomiasis nor were there any signs of such an infection post mortem - Dog No.99 had sixtytwo flies fed on it during a period of fortysix days and its history was similar to that of No.104 except that post mortem the intestine was found to be full of tape worms.

Origin

Origin of trypanosomata in Glossina Fusca.

The question of the origin of these flagellates in the tsetse fly is still as undetermined as is the case of the flagellates of the mosquito. Koch's supposition that the T. Grayi is in the relation to the trypanosoma present in crocodiles will certainly not hold for flies coming from Kibondi where there are no crocodiles. In no fly has there been seen any trace of any but mammalian blood. Recently Stuhlmann, working in German East Africa with Glossina Fusca has described what he considers a development of animal trypanosomata in recently hatched flies which were given their first feed on an infected animal. Unfortunately I have not got Stuhlmann's original paper but depend entirely on a precis by Mesnil. From this it would appear that Stuhlmann examined freshly hatched flies and found no flagellates. From this he concluded that there was no hereditary infection of the fly. Among freshly hatched flies that had fed on an infected animal he found that 80 - 90% showed flagellates and from this he concluded that these flagellates were derived from the trypanosomata taken up by from the infected animal. But if this were the case every fly should have become infected and there remains unexplained the 10 - 20% of flies which showed no infection. In Mesnil's review there is no mention of control experiments carried out by feeding the freshly hatched flies on a clean animal. If such controls were not carried out, in the presence of this 10 - 20% of infected flies one inclined to think that

the

Trypanosomata of Gl. fusca

(cultural forms)

12μ x 2μ

13μ

5μ

Trypanosomata of Gl. fusca

Common forms, Type 3 Bullenden

14μ x 3·5μ

20μ x 1·5μ

16μ x 2·5μ

45 x 4μ

40μ x 1·5μ

Trypanosomata of Gl. pallidipes and G. morsitans

8·2μ

14μ.

X 5μ

Plasmodium of Guinea Fowl

2082

Leucocytozoon

Leucocytozoon of Stun Bird

Plasmodium of Pigeon

the infection may have existed in these flies [illegible] is some recognised form of the flagellate [illegible] very small amount. The few flies examined on arrival at this Laboratory showed very scanty [illegible] scanty that it was only by prolonged search that were discovered.

Novy MacNeal and Torrey, in their recent paper on "Trypanosomes of Mosquitoes" argue that, since the trypanosomata in culture tubes are identical with those in the gut of the mosquito, therefore the latter are really "cultural" forms. In the case of the Glossina Fusca one is at once met by the difficulty that the commonest forms found are not "cultural" forms, but have the centrosome always posterior to the nucleus. Of the fortyfive infected flies examined only six showed "cultural" forms, the remaining thirtynine showing trypanosomata of the type T. Tullochii. Yet these latter had evidently multiplied in the gut for they were [illegible] in such numbers as to preclude all possibility of their having been taken up by the fly from some outside source.

It will be necessary to get cultures of the fly trypanosomata to settle this question but unfortunately so far cultures have always failed owing to overgrowth of the accompanying bacteria. Further attempts will have to be made by one of the methods recommended by Novy.

Morphologically

Morphologically Novy's description of the T. culicis would apply to the "cultural" forms of the Glossina Fusca except as far as concerns the flagellum. There is usually considerable difficulty experienced in staining the flagellum and diplosome and when the flagellum can be made out it can only be seen extending 1 - 2 μ beyond the protoplasm. The diplosome is rarely seen, probably from this difficulty in staining. In specimens showing these cultural forms acretropism is not seen as described by Novy in the T. culicis; the flagellates may be seen in enormous numbers attached by their flagella to the gut wall and some of them from time to time move away and swim free, but these free forms do not collect round air bubbles. Rosettes are often seen containing sometimes innumerable flagellates, all with their anterior end pointing to the centre of the rosette. The nucleus is round or oval and the centrosome is either a small dot or is rod shaped and is situated anterior to, beside or beside and just behind the nucleus.

In some of the specimens there is seen an evident portion of an undulating membrane. The circular forms do not as a rule show a flagellum but this may be due to bad staining, as flagella have in a few cases been seen extending from the centrosome and circling round the parasite with the last 2 - 3 μ projecting away from the parasite.

The trypanosomata of the type T. Tullochii are more various in size and shape than are the cultural forms.

They

They vary in size between short stumpy forms 14 μ long and long thin ribbon like forms 40 μ long.

Some of the intermediate forms closely resemble the blood forms as seen in dogs and other animals. The nucleus is round or oval and the centrosome is round and always situated posterior to the nucleus though never at the extreme end of the flagellate. There is hardly any free flagellum to be seen beyond the protoplasm. The undulating membrane can usually be made out. Since the accompanying drawings were made a modification of Romanowsky's stain has been found, which, while it does not show the internal structure of the flagellate so well as does the Leishman, nevertheless much more constantly stains the membrane and flagellum. From specimens stained by this method it would appear that membrane and flagellum are constantly present but that the flagellum is exceedingly short. In trypanosomata of this type, none are ever seen attached to the gut wall, aerotropism is never seen and rosettes are exceedingly scarce.

Conclusions.

Any conclusions arrived at depending on the results of the above experiments must be considered as provisional until these experiments are repeated but results so far make the following conclusions probable.

1. Two forms of trypanosomata are met within Glossina Fusca in about 15% of the flies examined.

2. Intestinal contents of flies showing either of these forms are not pathogenic to dog.
3. Intestinal contents of a fly fed eighteen hours before on a dog infected with trypanosomata are pathogenic when inoculated into another dog.
4. There is no development of these trypanosomata from the dog in flies fed on an infected dog.
5. The Glossina Fusca can convey this trypanosoma of the dog from infected to clean dog by interrupted feeding.

Trypanosoma of Eycanistes cristatus.

In a previous report I described a trypanosoma found in the Eycanistes cristatus. Drawings of this parasite are now given. The trypanosoma appears to be exceedingly thick as in many specimens the nucleus is almost invisible owing to the thick layer of overlying blue stained protoplasm.

Two attempts were made by my Laboratory Assistant, L. S. S. Pillay, to infect fowls with blood rich in these trypanosomata, but in neither case did infection follow inoculation.

Plasmodia of Pigeon and Guinea Fowl.

The finding of Plasmodia in Pigeon and Guinea fowl has been described in a previous report. Drawings of both these parasites are now given.

Haemocytozoon of Spur Fowl.

In the blood of a Spur Fowl shot near Nairobi, parasites were found in the large mononuclear leucocytes.

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leucocytes. These parasites stained a uniform pale blue and showed chromatin in small dots which were either collected into groups or scattered more or less irregularly. The parasite filled the greater part of the leucocyte, sometimes filling the whole leucocyte. The nucleus was either pushed to one side of the leucocyte or was beat round the edge of the parasite.

Filaria in gut of Glossina Fusca.

In sixteen of the two hundred and fifteen flies examined or about [illegible] microfilariae were found in the intestinal contents. These filariae were always of one kind. Their average length was 240 μ, they had sharp caudal extremities and no sheath could be made out. They appeared to remain in the gut of the fly, for no sign of their passage into the body cavity was ever seen. At no matter what period after arrival the flies were examined no difference could ever be seen in the filariae. The possibility of their having been taken in with the blood of the dogs on which the flies were fed can be excluded for filariae have never been found during the frequent examinations of the blood of these dogs nor post-mortem in the bodies of such of the dogs as have died.

Robt. H. Ross

March 6 1902

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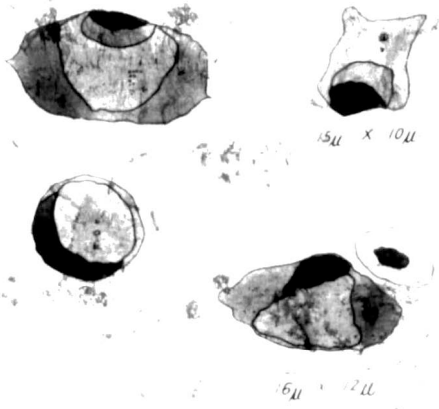
Plasmodium of Guinea Fowl

1μ x 4μ (Parasite)

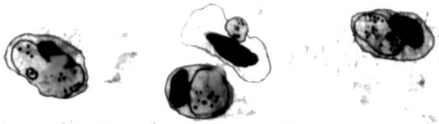
Leucocytozoa of Spur Fowl.



15μ x 10μ

6μ x 12μ

Plasmodium of Pigeon.



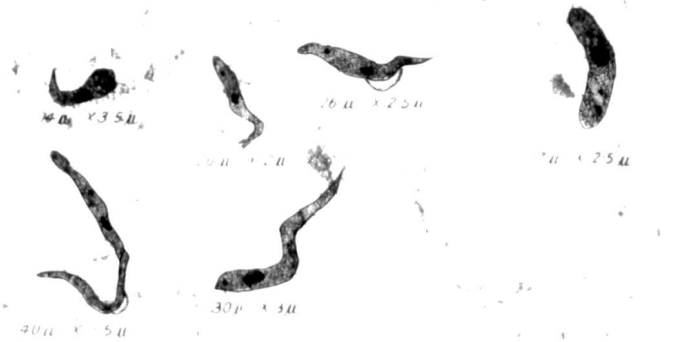
11μ x 4μ
(Parasite)

TRYPANOSOMATA OF GL. FUSCA.

(CULTURAL FORMS)

TRYPANOSOMATA OF GL. FUSCA.

COMMONER FORMS. TYPE T TULLOCHII



TRYPANOSOMATA OF BYCANISTES CRISTALUS

TRYPANOSOMATA OF GL. FUSCA.

(CULTURAL FORMS)

TRYPANOSOMATA OF GL. FUSCA.

COMMONER FORMS. TYPE T TULLOCHII

TRYPANOSOMATA OF BYCANISTES CRISTALUS.

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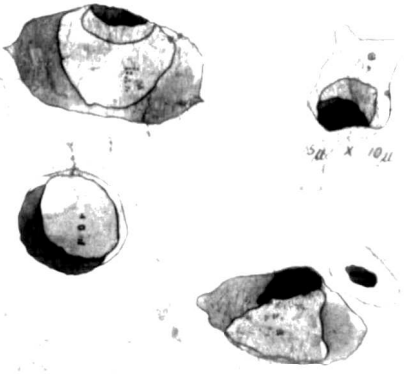
PLASMODIUM OF GUINEA FOWL.

LEUCOCYTOZOON OF SPUR FOWL.



PLASMODIUM OF PIGEON.