SHORT NOTE ON "GROUSE DISEASE."¹

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DURING the spring and early summer months of the last three years the opportunity has occurred of examining several cases of so-called "grouse disease." The cases obtained may be divided into two groups. In the first group, cases of which alone were obtained previous to this year, the birds were very emaciated, the disease was obviously a chronic one, no growths of any organism were obtained from the spleen or heart blood, while in the duodenum were present enormous masses of *Hymenolepis microps*, in the intestine large numbers of *Davainea urogalli*, and in the caeca large numbers of strongyles. Cobbett and Graham Smith (1910¹) considered (and so far as these cases are concerned I see no reason to disagree with them) that the presence of these intestinal parasites explained this chronic disease. With regard to the possibility of an acute epizootic disease occurring among grouse, they state that they cannot tell whether it exists or not, and that they can only say that so far as their experience goes they have not seen it. This spring, however, I had the opportunity of obtaining specimens from an outbreak of what would appear to be an acute epizootic. The birds which died were plump and in good condition. They were usually found at the bottom of the valleys around the streams. Whether they had gone there to quench a feverish thirst or had simply gravitated there from weakness it is impossible to say. Post-mortems were obtained on two fairly fresh specimens. In both there was a practical absence of intestinal parasites of any kind, the birds were plump, and the only evidence of disease was that in one case there was an acute enteritis, while in the other nothing very abnormal to the naked eye was found except a white patch at the apex of the heart. From the first a culture was made from the inflamed intestine, while from the second cultures were made from the spleen and heart blood. A pure growth of an apparently coliform organism was obtained in all the cases, being a uniform layer in the case of the intestinal culture, thirty-five discrete colonies in the case of

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the heart blood, and thirty-two similar colonies in the case of the spleen. The intestinal culture was plated out, appeared pure, and from single colonies two cultures were made which will be denoted as A and B, while cultures were also made from single colonies of the heart blood and spleen, cultures denoted respectively by the letters C and D. The following are the reactions of these various organisms. Sugar reactions read after 48 hours at 37° C.

	A	B	C	D
Glucose . . .	Acid.	Acid.	Acid.	Acid.
Lactose . . .	Acid ; ? gas.	Acid + gas.	Acid.	Acid.
Cane sugar . . .	0	0	Acid.	Acid.
Dulcite . . .	0	0	Acid.	Acid ; ? gas.
Mannite . . .	Acid ; ? gas.	Acid.	Acid.	Acid.
Litmus milk . . .	Acid + clot.	Acid + clot.	Acid + clot.	Acid + clot.
Indol . . .	Present.	Present.	Present.	Present.
Adonite . . .	0	0	0	0
Sorbite . . .	Acid.	Acid.	Acid ; ? gas.	Acid.
Raffinose . . .	0	0	Acid.	Acid.
Inulin . . .	0	0	0	0
Dextrose . . .	Acid ; ? gas.	Acid + gas.	Acid.	Acid.
Galactose . . .	Acid ; ? gas.	Acid.	Acid.	Acid.
Maltose . . .	Acid ; ? gas.	Acid + gas.	Acid + gas.	Acid ; ? gas.
Salicine . . .	0	Acid + gas.	Acid.	Acid.
Lactose neutral red.	Acid ; ? gas ; no fluorescence.	Acid + gas ; no fluorescence.	Acid ; no fluorescence.	Acid + gas ; no fluorescence.
Gelatin . . .	No liquefaction.	No liquefaction.	No liquefaction.	No liquefaction.
Nitrites . . .	Present.	Present.	Present.	Present.
Motility . . .	?	?	Non-motile.	Non-motile.
Morphology . . .	Bipolar.	Bipolar.	Bipolar.	Bipolar.
Gram . . .	Negative.	Negative.	Negative.	Negative.

Cobbett and Graham Smith (*loc. cit.*) isolated from some of their cases organisms, giving the following reactions :—

Group.	Type.	Glucose.	Lactose.	Cane Sugar.	Dulcite.	Mannite.	Milk.	Indol.	Remarks.
I.	<i>B. acidi lactici</i>	A + G	A + G	0	0	A + G	A + C	+	{ 12 organisms from livers, lungs, and blood. 3 organisms from livers and lungs. 10 organisms from livers and lungs. 9 organisms from livers, lungs, spleen, and kidneys.
II.	<i>B. coli communis</i>	A + G	A + G	0	A + G	A + G	A + C	+	
III.	<i>B. coli communior</i>	A + G	A + G	A + G	A + G	A + G	A + C	+	
IV.	<i>B. lactis aerogenes.</i>	A + G	A + G	A + G	0	A + G	A + C	+	

12 organisms of Group I.	were isolated from 10 different cases.
3 " Group II.	" " 3 "
11 " Group III.	" " 10 "
9 " Group IV.	" " 6 "

Discounting case 57, in which an organism of the Groups I. and IV. was obtained, pure cultures of the organisms of the four groups would appear to have been obtained in twenty-eight cases. An organism apparently belonging to the Gaertner group was also obtained from the liver and spleen of grouse 47, and from the lungs, spleen, and pancreas of grouse 51. Grouse 47 does not appear in the above list, but grouse 51 appears as having had an organism of Group III. isolated from its liver.

The organisms isolated by me from my two cases conform to no type of organism of the coli group, and while resembling one another broadly, yet they differ from one another in slight details. Such a variability is characteristic of the organisms of the hæmorrhagic septicæmia group whose pleomorphism in morphological appearance has been long known and to whose variability in biological characters Dr. Wang and I have drawn attention (1915²). The only feasible explanation of my own findings and those of the Grouse Committee I can offer, therefore, is that in one variety of "grouse disease" we are dealing with a hæmorrhagic septicæmia, comparable to the chicken cholera of fowls, pigeons, singing birds, etc. I do not mean to suggest, however, that every organism isolated by the Grouse Committee belonged to this amended hæmorrhagic septicæmia group; but the very multiplicity manifested by them and the fact that they were isolated apparently in pure cultures from several organs of the same bird rather points to them belonging to the group. That the chicken cholera organism in its intensified form can produce all the reactions given above in MacConkey's classification of the lactose fermenters is evident from the paper by Dr. Wang and myself.

REFERENCES.

1. COBBETT AND GRAHAM SMITH *Journ. Hyg.*, Cambridge, 1910, vol. x. p. 1.
2. M'GOWAN AND WANG . . . *Journ. Path. and Bacteriol.*, Cambridge, 1915, vol. xx. p. 21.