Summary of the principal differences between Calliobdella lophii *and* Ganymedes cratere.

CALLIOBDELLA LOPHII.	*GANYMEDES CRATERE.*
Posterior sucker well developed without a thickened rim.	Anterior sucker well developed with a thickened rim and 5 muscular bands.
1 caecum.	2 caeca.
Vesiculae seminales *present*.	*No* vesiculae seminales.
Respiratory vesicles 11 pairs.	Respiratory vesicles 3 pairs.
Undifferentiated abdomen.	Abdomen divided into: (1) a Testis region with 6 annuli to a segment. (2) a Caecum region with 1 annulus to a segment.
Neck of 11 annuli.	Neck reduced to 3 annuli.
Slight dorsi-ventral flattening.	Pronounced dorsi-ventral flattening.
No gustatory papilla.	Gustatory papilla in anal region.
Vas deferens situated external to (*i.e.* on the body wall side of) the testes.	Vas deferens situated internal to (*i.e.* on the stomach side of) the testes.

Generic characters. A leech divided in a very marked manner into a short neck, and a very flattened abdomen. Each "complete" segment of the abdomen consists of six annuli, but only the first six are so divided. Along the side of the abdomen are *three* pairs of respiratory vesicles. Two caeca. No vesiculae seminales. Blackish-brown star-shaped pigment cells are not present. There is no special development of the reproductive system.

Specific characters. It is difficult in a hitherto unknown animal to decide which characters are generic and which specific. The following points are probably of only specific value: host, *Callionymus lyra* (?). Anterior sucker over four times the size of the posterior with a muscular rim and five muscular bands. The last segment of the anal region bears ventrally a sensory papilla. No eyes[1].

I am indebted to Messrs T. J. Evans and T. Reed of Guy's Hospital Medical School for affording me facilities for my investigations; to C. C. L. for sending me the leech; to Mr J. T. Cunningham of the South-Western Polytechnic, Chelsea, London, S.W., for his ever kind and valuable help; and to Mr Harold R. Southam for reproducing the drawings from my rough sketches.

[1] I now consider the presence or absence of eyes of specific and not of generic value as in my previous paper (*loc. cit.*). Thus we have in the genus *Platybdella*, *P. quadrioculata* with four eyes and *P. anarrhichae* without eyes; and others.

A NOTE ON THE VARIABILITY IN S
AMBLYOMMA HEBRAEUM KOC

By L. E. ROBINSON, A.R.C.Sc. Lond.

(*From the Cooper Laboratory for Economic Research,*

(With 3 Text-figures.)

Variability in the size and, in a lesser degree, th features of male ticks, has arrested the attention of all w occasion to examine moderately large numbers of example species. In the case of the female tick, this variability, thou coextensive with that of the male, is more or less obscured range of variation in size, depending upon the degree of e and, also, by the fact that in the female tick the taxonom are, as a rule, less pronounced. The present note is on with variability in the size of the male.

The earliest allusion to this subject, in the published ticks, is that of Aragão (1911), who, in the introduction to the ticks of Brazil, condemned Neumann's then recen variety of *Amblyomma cajennense-parviscutatum*, on the g he had observed the appearance of the *parviscutatum* form progeny of typical females of *A. cajennense*. He also notic varieties could be produced artificially, in *A. cajennense* a by the forcible removal from the host, before engorgement w of individuals in the larval or nymphal stages. Aragão a parallel examples in collections of other species of *Ambly* passed through his hands, notably, *fossum* and *braziliense* dition is, therefore, generally attributable to malnutrition

In some notes on the genus *Rhipicephalus*, Warbu commented on the frequent occurrence of variation in si *cephalus* males, and his paper is illustrated with some stri representing pairs of males of three different species, each been derived from a single host.

Nuttall (1913), who for some long time had suspected the true cause of this variability, but was forestalled in publication by Aragão, has since published some remarkable results which he obtained with *Rhipicephalus appendiculatus* raised in his laboratory; and, subsequently, Cunliffe (1913 and 1914), working in Nuttall's laboratory, obtained confirmatory results with *R. pulchellus*, and, experimentally, with *R. sanguineus*.

In the course of work on ticks, chiefly of the genus *Amblyomma*, the author has come across numerous examples of variability of this nature, and as the particular case which forms the subject of this note is an instance which has occurred under more or less natural conditions, as distinct from observations made on laboratory-raised stock, he ventures to believe that the case is sufficiently interesting to be placed on record.

The tick material under consideration is all derived from a South African estate—Gonubie Park—an experimental stock farm, the property of Messrs William Cooper and Nephews, situated on the coast, some ten miles east of East London. At the time that it was acquired by its present owners (1905), the estate was heavily infested with ticks, comprising all the species to be found in that part of Africa. The Bont tick (*Amblyomma hebraeum*) was a common species, and could be obtained in large quantities, and, until April or May, 1906, consignments collected on the estate were sent to this laboratory at frequent intervals.

As a result of the regular practice of dipping the stock running on the estate, the ticks began to disappear, and by the following season it was with the greatest difficulty that we could obtain supplies from this source, which had hitherto proved so fertile. The eradication of the ticks proceeded so rapidly, that in 1908 the greater part of the estate was practically tick-free, and Mr W. F. Cooper, who sent me specimens of *Amblyomma hebraeum* at this time, reported that this species was confined to a ravine which ran through a part of the estate. This ravine had not been cleared, and the rank vegetation afforded excellent cover for many kinds of wild game, especially hares and duiker, and it was upon such hosts that the ticks had mainly subsisted for two seasons.

The correlation diagrams (Figs. 1 and 2) represent measurements of the length and breadth of the scutum in two lots of *Amblyomma hebraeum* males. Lot No. C. 263, comprising 80 individuals, was collected by Dr S. Williamson at Gonubie Park, in 1905. The diagram (Fig. 1) shows that the length of the scutum ranged from 5·7 mm. to 4·2 mm., the breadth from 4·9 mm. to 3·5 mm., while the mean $\frac{\text{breadth}}{\text{length}}$ ratio is

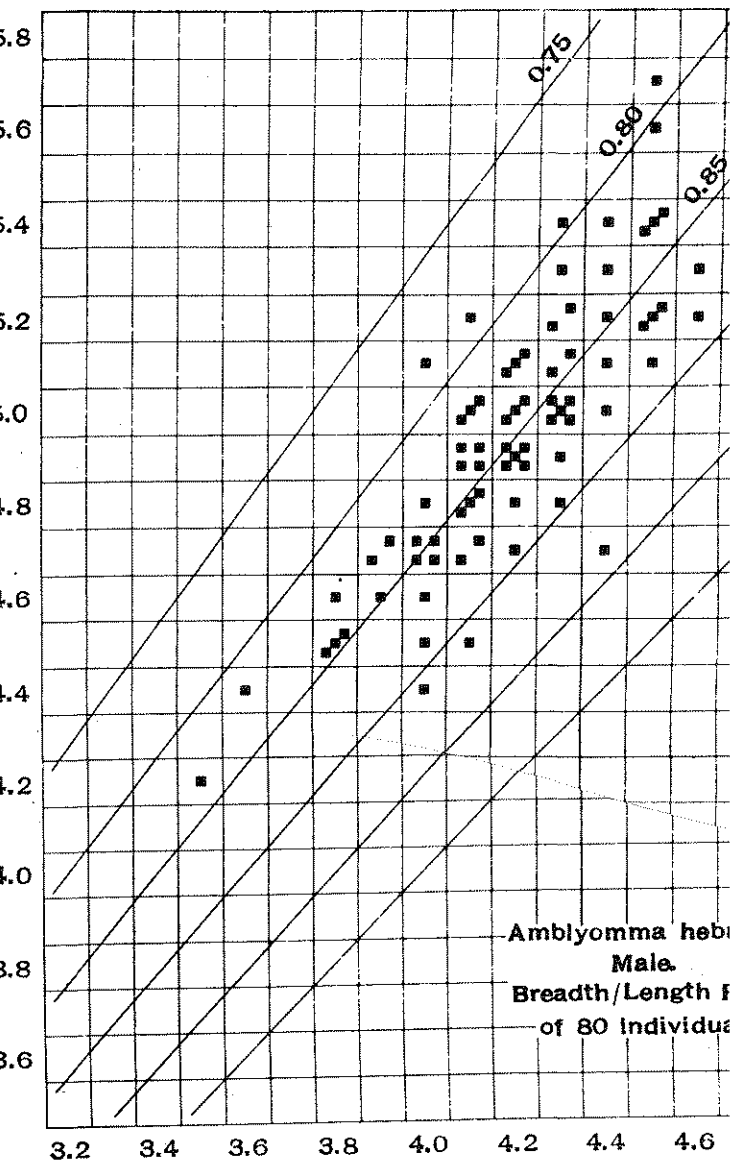

Fig. 1. Correlation diagram of the measurements of length and breadth of 80 m
Amblyomma hebraeum (Lot No. C. 263) collected at Gonubie Park, S. Africa, i
Lengths plotted as abscissae, breadths plotted as ordinates: all measurem
millimetres. The inclined lines indicate the principal $\frac{\text{breadth}}{\text{length}}$ ratios.

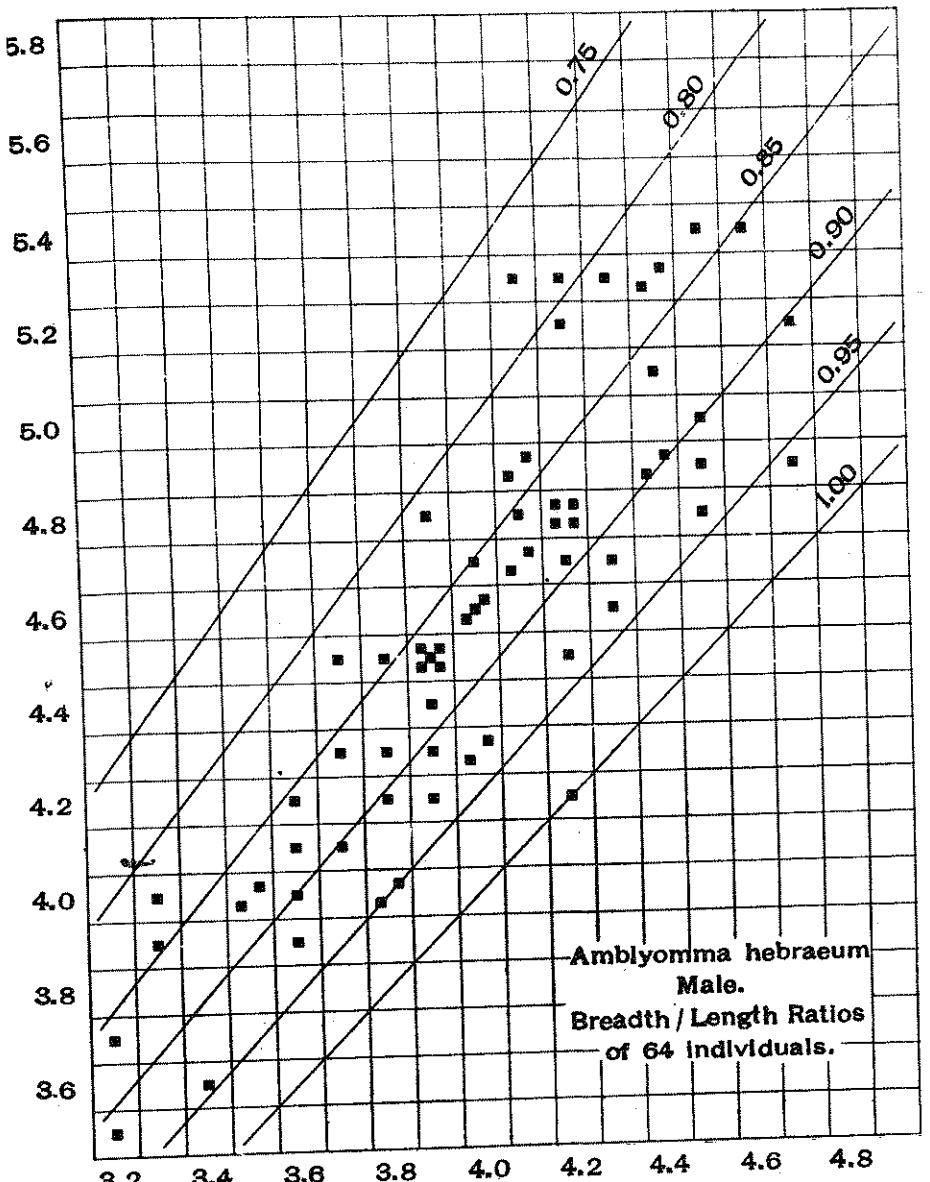

Fig. 2. Correlation diagram of the measurements of length and breadth of 64 males of *Amblyomma hebraeum* (Lot No. C. 309) collected at Gonubie Park, S. Africa, in 1908. Other details as in Fig. 1.

0·85 approximately. In the case of Lot No. C. 309, compr
collected at Gonubie Park in 1908 by Mr W. F. Cooper, it i
that the length of the scutum ranges between 5·4 mm.
the maximum and minimum breadths are 4·7 mm. and 3·
tively, while the mean $\frac{\text{breadth}}{\text{length}}$ ratio has risen to 0·87.
of comparison, these figures are set out in tabular form

Measurement	Lot No. C. 263 (collected in 1905)	Lot (colle
Maximum length	5·7 mm.	5
Minimum ,,	4·2	3
Mean ,,	4·97	4
Maximum breadth	4·9	4
Minimum ,,	3·5	3
Mean ,,	4·22	4
Maximum $\frac{\text{breadth}}{\text{length}}$ ratio	0·94	1
Minimum ,, ,,	0·78	0
Mean ,, ,,	0·85	0

A comparison of the two diagrams shows a strikin
the general disposition of the square dots representing
ticks; in Fig. 1 the dots are collected in an elongate
compact group, while in Fig. 2 they are widely scattered
is, of course, explained by the greater variability in si
which had lived under the adverse conditions brought
measures taken for tick eradication.

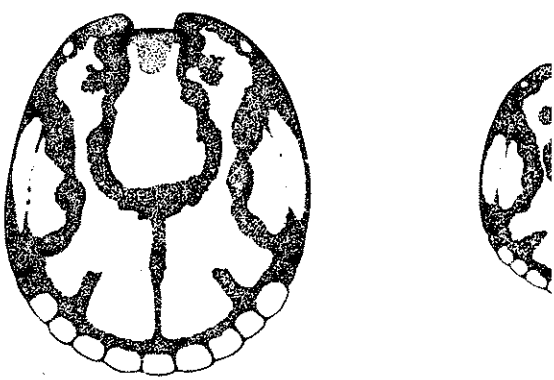

Fig. 3. *Amblyomma hebraeum* ♂. The scuta of the largest and sm
Lot No. C. 309. Magnified 10 diameters.

Fig. 3 conveys a clearer impression than bare measurements of the remarkable difference in size of the extreme individuals in the series comprising Lot No. C. 309.

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IS *LEUCOCYTOZOON ANATIS* THE CAUSE A NEW DISEASE IN DUCKS?

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(With Plates I—III.)

During the past summer numerous inquiries were recei Professor Elford, Dominion Poultry Husbandman, Experimenta Ottawa, with regard to an apparently infectious disease appearing ducks. So frequent and insistent were the appeals for aid connection that the co-operation of the Health of Animals Brar requested. This resulted in an investigation being underta ascertain the clinical nature of the disease; to demonstrate, if p the cause; and also institute measures for its prevention.

As a serious outbreak had occurred on a poultry farm in the of Ottawa, Ont., which threatened to jeopardize the existence plant, this place was chosen as a favourable location for comn studies.

On arrival at the poultry farm in question, it was learned t young ducks had been dying on an average of 20 a day. The would continue thus for a few days, after which there appeare a remission for about a ten day period, with a recurrence at the tion of this time when the fatalities would again be enormous.

Symptoms of the Disease. The affection runs a rapid an course with very slight prodromal symptoms to indicate its The first clinical feature observed is an impaired appetite. reluctance to take the ordinary amount of food is particularly not in ducks having access to swimming pools. These birds prefer to in the cool water undisturbed, evincing no response to the call for f and this fact is indeed significant.