



ANNALS

OF THE

TRANSVAAL MUSEUM.

AUGUST, 1908.

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VOL. I.

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No. 2.

A LIST OF THE TICKS OF SOUTH AFRICA,

With Descriptions and Keys to all the Forms known.

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There are probably none of the external parasites of domestic animals of more importance to the stock raiser in South Africa than the ticks, owing to the large number of diseases which they transmit from animal to animal. The ticks of South Africa have, however, only been studied with regard to their connection with the transmission of diseases, and very few people are aware of the distinction between the various species and the various forms of the same species.

With a view to throwing a little more light on these creatures, and mainly of assisting the work of those interested in the study of the diseases referred to, a study of the ticks of South Africa was taken up by me about three years ago while in the Transvaal. Since then a large number of the life histories of these ticks have been worked out, and their immature stages carefully studied and compared. There are still many species which I have not been able to see owing to the rareness with which they occur, but in such cases I have compiled the literature from other authors and placed it in such shape as I consider will prove useful to the South African workers. There is still an immense amount of work to be done on this subject, and my only plea for placing this paper before the public is in the hopes that it will arouse more interest in such studies, and consequently advance the work.

FAMILY IXODIDAE.

The ticks or *Ixodida* are distinguishable from the other families of the order *Acarina* by the following characters:—

They are always large enough to be visible to the naked eye, flat when young, more or less swollen when fully engorged with blood; the females almost always larger than the males, often attaining in certain species the size of a hazel nut. The integument is always coriaceous, and usually of a dull colour, such as brown or reddish-brown, but sometimes adorned with bright colours and designs.

November, 1907. I also took specimens from a hedgehog found near Pienaar's River a few weeks later.

This genus is an intermediate form between *Rhipicephalus* and *Dermacentor*. The palpi and general form would lead one to place it in the genus *Rhipicephalus*, but the size of the posterior coxae and the absence of anal plates in the male bring it closer to *Dermacentor*. Nuttall and Warburton in 1907 described a species *Rhipicentor bicornis*, from which this genus was erected; again, early in 1908, Neumann described the same species which he called *Rhipicephalus gladiger*, not knowing that it had been previously described. Upon examining the specimens of *vicinus*, which we forwarded to him for determination, he came to the conclusion that they would warrant the establishment of a new genus, and by a rare coincidence proposed the name *Rhipicentor*. Before publication, however, he found that he had been anticipated by Nuttall and Warburton.

There are only two species in the genus, *bicornis* and *vicinus*, the latter of which is found in the Transvaal. The co-types of *vicinus* are deposited in the Transvaal Museum, Pretoria.

GENUS DERMACENTOR. KOCH.

Ixodes (ex p.), Latreille (1795).

Dermacentor, Koch (1844).

Pseudixodes, Haller (1882).

Dermacentor, Koch (Neumann, 1897).

Eyes present, base of rostrum wider than long, rectangular on the dorsal surface; palpi short and thick; stigmatic plates short and comma shaped. Ventral surface of male without shields, similar to that of female. Coxae I bidentate in both sexes; coxae IV in the male very much larger than the others. *Dorsal shield* usually ornamented with various designs.

Only one species of *Dermacentor* has been reported from South Africa, *D. rhinocerotus*. I have never seen specimens of this species, but the description as given by Neumann follows:—

DERMACENTOR RHINOCEROTIS. (DE GEER).

THE RHINOCEROS TICK.

Acarus rhinocerotis, De Geer (1778).

Ixodes rhinocerinus, Denny (1843).

Ixodes rhinocerotis, Gervais (1844).

Amblyomma rhinocerotis, Koch (1844).

Amblyomma rhinocerinus, Koch (1844).

Dermacentor rhinocerotis, Gerstäcker (1873).

Dermacentor rhinocerotis (De Geer) (Neumann, 1897).

Plate XVI, figures *o*, *p* (*a*, *b*).

Male.—*Body* oval, wider behind, a little restricted at the level of the eyes. Dorsal surface (XVI, *o*) convex, 7 to 8 mm. long by 5 to 5.5 mm. wide; ground colour of shield clear brick red on specimens from Natal, ochre yellow or greenish yellow on those from Mozambique, spots of reddish

brown, punctuations large, not very numerous; the dark spots limit, in front a surface in the shape of a curvilinear triangle, reddish yellow, which resembles a shield of a female, bordered by a dark colour, except on the transverse margin of the rostral emargination; from the angles of this emargination start two short, narrow, interrupted, curved lines which limit behind a small, irregular, clear area; eyes yellow marginal, in the dark coloured margin opposite coxae II; eleven posterior festoons penultimate, and the ones next the median dark coloured, the other seven light coloured on all, or nearly all, of their extent; near the margin in front and on each side two successive light coloured spots, which continue the series of the festoons; the remainder of the shields show six light coloured spots, paired, symmetrical; two small posterior, two large ones in front of these, two small ones, one on each side of the posterior extremities of the anterior shield-like spot; these spots are separated by brown lines as follows:—A median and two successive transverse lines, the anterior concave behind, the posterior straight; the light spots are sometimes of a more reddish yellow, the light coloured anterior spot is sometimes divided into two by a deep, transverse, irregular sinuous line, resulting from the extension and the anastomosing of the two curved lines which mark off the areas of the anterior angles; sometimes a brown spot fusiform and median cuts this transverse line; the two small anterior light spots of the posterior half join in front with the anterior shield-like spot, of which they seem to be appendages; and punctuations are deeper. *Ventral surface* brick red or reddish brown; sexual orifice opposite coxae II; sexual grooves very close on account of the great size of the coxae, parallel at first, nearest together opposite coxae IV, then sharply diverging and ending near the anterior edge of the antepenultimate festoon; anal disc brown, very prolonged backward; stigmatic plates large, whitish. *Rostrum* 1.1 mm. long, dorsal base wider than long, posterior margin concave; mandibles [*XVI, p (b)*] 1.75 mm. long, digit with inner apophysis elongate transversely, with two short points, outer apophysis with two teeth, one small, terminal, a little sub-ventral, the other very strong; hypostome long, a little spatulate, denticles in front very small and numerous, behind them six longitudinal rows of teeth of about eleven teeth to each row, followed by four rows of squamiform teeth, the outer prolonged backward; palpi a little longer than the hypostome, wide on their dorsal surface, narrow on the ventral; article I short, ring-like; article II longer than wide, dorsal surface of the same colour as the shield and prolonged behind on the first article; article III shorter than article II, almost square; both provided with hair on their margins and dorsal surface; article IV small, embedded in a terminal excavation of article III. *Legs* strong, reddish brown, lighter on their dorsal surfaces; coxae regularly increasing in size from first to fourth pair, which last are very large, very close to the median line; all coxae sprinkled with whitish hairs; coxae I divided into two strong teeth, the outer more slender than the inner; coxae II and III with a strong tooth near the posterior external angle; coxae IV with two teeth, the outer of which is stronger; articles IV, V, and especially VI, of legs with strong teeth on their lower margins; a light coloured spot on the dorsal side of the distal end of article II of leg I, the other articles, except the tarsi, of all the legs ringed with ferruginous red on their distal ends, and with thin whitish hairs; tarsi relatively elongate, the false articulation very close to the distal end of tarsi I, near the middle in the others; a strong parallel spur, caruncle short, reaching scarcely the third of the length of the claws.

Female.—*Body* short, oval, wider behind, 7 to 8 mm. long by 4 to 5 mm. wide; blackish brown, with the exception of the dorsal shield; the rostrum and the legs reddish brown. *Dorsal shield* [XVI, p (a)] very large, reaching almost to the middle of the length of the body, a short oval, the posterior margin emarginate by two shallow sinuses, which divide into three not very prominent lobes, of which the median is twice the lateral ones in size; anterior emargination for the insertion of the rostrum limited by two wide blunt points; cervical grooves very short, transformed into two deep pits; punctuations large, scattered in the anterior half, very fine and numerous on all the surface, which is rather shiny; colour clear brick red on individuals from Natal, clear ochre yellow on female from Zanzibar, with two reddish brown spots occupying and bordering the two anterior cervical pits, two other irregular spots about the eyes (which are small and clear yellow) and on the lateral margin which precedes them two other irregular spots behind those of the cervical grooves. *Dorsal surface* of abdomen with a marginal groove very far from the margin, limiting more or less clearly the inner extremity of the eleven posterior festoons; irregular grooves, one transverse, the other longitudinal, of which three are constant, a median and two close to it; striations of integument very apparent, hairs abundant, whitish in the marginal grooves, yellow, purplish red and blood red in the posterior third, where they form two wide lateral clusters, some on the festoons. *Ventral surface* with large, whitish, scattered hairs; sexual grooves rather separate, rendered deeper by the integumental prominences which come from the interval between the coxae, diverging at the level of coxae IV; anus rather anterior; ano-marginal groove relatively long; stigmatic plates greyish white, short, comma shaped. *Rostrum* with dorsal base twice as wide as long; its posterior angles prolonged in short points; colour of the shield in its middle; porose areas deep, separate, a little oval and diverging, ventral surface wide, semi-circular; mandibles long [XVI, p (b)]; digit with inner apophysis with three points, the median longer; outer apophysis with three successive teeth, the terminal one a little sub-ventral, the basilar one strong and a little bent downwards; hypostome and palpi like those of the male. *Legs* like those of the male, except that the coxae are relatively feeble, increasing a little from first to fourth pair; the inner tooth of coxae IV is stronger than the outer.

Hosts.—Rhinoceros (South Africa) and some other mammals, usually found on the genitals.

Habitat.—Mozambique, Durban, Cape Colony, Zanzibar, Zambesi.

GENUS HAEMAPHYSALIS. KOCH.

Rhipistoma, Koch (1844).

Gonirodes, Duges (1888).

Opistodon, Canestrini (1897).

Haemaphysalis, Koch (Neumann, 1897).

No eyes, base of rostrum rectangular, elongated transversely twice as wide as long. Palpi conical, the second article forming a strong, conical, lateral, and basilar projection. Stigmatic plates circular or short comma shaped. Ventral surface of male without anal plates; coxae I not bifid; coxae IV in the male of normal dimensions. Integument of uniform brownish colour.

Only one species has been reported from South Africa.

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ANIMALS WHICH ACT AS HOSTS FOR SOUTH AFRICAN TICKS.

I.—MAN.

Argas persicus.
 „ *vespertilionis.*
Ornithodoros savignyi.
 „ „ *caecus.*
 „ „ *pavimentosus.*
 „ *talaje capensis.*
Hyalomma aegyptium.
 „ „ *impressum.*
Ixodes pilosus.
Rhipicephalus appendiculatus.
Amblyomma hebraeum.

II.—DOMESTIC ANIMALS.

CATTLE.—*Ixodes pilosus.*

Ornithodoros savignyi.
 „ „ *caecus.*
 „ „ *pavimentosus.*
Hyalomma aegyptium.
 „ „ *impressum.*
Rhipicephalus sanguineus.
 „ *punctatissimus.*
 „ *evertsi.*
 „ *oculatus.*
 „ *capensis.*
 „ *appendiculatus.*
 „ *bursa.*
 „ *simus.*
 „ *duttoni.*
Margaropus annulatus decoloratus.
 „ „ *australis.*
Amblyomma hebraeum.
 „ „ *eburneum.*
 „ *marmoreum* (larvæ and nymphs).
Haemaphysalis leachi.

HORSE.—*Ixodes pilosus*

Hyalomma aegyptium.
 „ „ *impressum.*
Margaropus annulatus decoloratus.
 „ „ *australis.*
 „ *lounsburyi.*
Rhipicephalus sanguineus.
 „ *capensis.*
 „ *appendiculatus.*
 „ *bursa.*
 „ *simus.*
 „ *evertsi.*
 „ *lunulatus.*
Amblyomma hebraeum.
 „ *variegatum.*

ASS.—*Hyalomma aegyptium.*

„ „ *impressum.*
Margaropus annulatus decoloratus.
Rhipicephalus evertsi.
 „ *bursa.*
Amblyomma hebraeum.

MULE.—*Ixodes pilosus.*

Hyalomma aegyptium.
 „ „ *impressum.*
Rhipicephalus evertsi.
 „ *appendiculatus.*
Amblyomma hebraeum.
 „ *variegatum.*

SHEEP.—*Ornithodoros savignyi*.
 „ „ *caecus*.
 „ „ *pavimentosus*.
Ixodes pilosus.
 „ *rubicundus*.
Hyalomma aegyptium.
 „ „ *impressum*.
Rhipicephalus sanguineus.
 „ *appendiculatus*.
 „ *bursa*.
 „ *evertsi*.
 „ *simus*.
Margaropus annulatus decoloratus.
Amblyomma hebraeum.
 „ *variegatum*.

GOAT.—*Ornithodoros savignyi*.
 „ „ *caecus*.
Ixodes pilosus.
Hyalomma aegyptium impressum.
Margaropus annulatus decoloratus.
Rhipicephalus capensis.
 „ *appendiculatus*.
 „ *simus*.
Amblyomma hebraeum.
 „ *variegatum*.
 „ *marmoreum* (larvæ and nymphs).

FIG.—*Ixodes pilosus*.

DOMESTIC DOG.—*Ixodes pilosus*.
 „ „ *howardi*.
Ornithodoros savignyi caecus.
Hyalomma aegyptium.
 „ „ *impressum*.
Margaropus annulatus decoloratus.
Rhipicephalus sanguineus.
 „ *bursa*.
 „ *evertsi*.
 „ *punctatissimus*.
 „ *appendiculatus*.
 „ *simus*.
 „ *capensis*.
 „ *lunulatus*.
Amblyomma hebraeum.
Aponomma exornatum.
Haemaphysalis leachi.

CAT.—*Ixodes pilosus*.
 „ „ *howardi*.
Rhipicephalus sanguineus.
Hyalomma aegyptium.
Haemaphysalis leachi.

FOWLS.—*Argas persicus*.
 „ *vespertilionis* (probably).
 „ *transgaripepinus* (probably).
Ornithodoros savignyi.
 „ „ *caecus*.
 „ „ *pavimentosus* (not very readily).
 „ *talaje capensis*.
Hyalomma aegyptium impressum (larvæ and nymphs).
Amblyomma hebraeum.

DUCKS, GEESE, TURKEYS, PIGEONS, CANARIES.—

Argas persicus.

Probably all those mentioned under Fowls.

III.—WILD ANIMALS.

CARNIVORA.

LION (*Felis leo*)—

- Haemaphysalis leachi*.
Rhipicephalus sanguineus.
Amblyomma hebraeum eburneum.
Rhipicephalus simus.

LEOPARD (*Felis pardus*)—

- Haemaphysalis leachi*.
Ixodes pilosus.

BLACK-FOOTED WILD CAT (*Felis nigripes*)—

- Haemaphysalis leachi*.

CIVETTE (*Viverra civetta*)—

- Haemaphysalis leachi*.

GENET (*Genetta felina* ?)—

- Rhipicephalus sanguineus*.
Haemaphysalis leachi.

MEERKAT (*Cynictis penicillata*)—

- Haemaphysalis leachi*.

CAPE HUNTING DOG (*Lycan pictus*)—

- Amblyomma hebraeum*.
Rhipicephalus simus.
 „ *nitens*.

DELANDES FOX (*Otocyon megalotis*)—

- Rhipicephalus sanguineus*.

JACKAL (*Canis sp.*)—

- Rhipicephalus simus*.
Haemaphysalis leachi.

UNGULATA.

BUSHBUCK (*Tragelaphus scriptus*)—

- Ixodes pilosus* (C.C.)

WATERBUCK (*Cobus ellipsiprymnus*)—

- Rhipicephalus sanguineus*.

REED BUCK (*Cervicapra arundinum*)—

- Rhipicephalus evertsi*.
Hyalomma aegyptium.

ANTELOPES of various species—

- Hyalomma aegyptium*.
Amblyomma hebraeum eburneum.
Rhipicephalus evertsi.
 „ *appendiculatus*.

CAPE BUFFALO (*Bos caffer*)—

- Amblyomma hebraeum*.
Rhipicephalus appendiculatus.

GIRAFFE (*Giraffa capensis*)—

- Amblyomma hebraeum*.
Hyalomma aegyptium impressum.
Rhipicephalus evertsi.

HIPPOPOTAMUS (*Hippopotamus amphibius*)—

- Amblyomma hippopotamense*.

RHINOCEROS (*Rhinoceros sp.*)—

- Amblyomma hebraeum*.
 „ *marmoreum*.
 „ *crenatum*.
Dermacentor rhinocerotis.

BUSH PIG (*Potamochoerus choeropotamus*)—

Hyalomma aegyptium.

Rhipicephalus simus.

ELEPHANT (*Elephas africanus*)—

Amblyomma hebraeum.

ZEBRA (*Equus sp.*)—

Amblyomma variegatum.

RHODENTIA.

STRIPED MOUSE (*Avicanthis pumilio*)—

Haemaphysalis leachi (nymph).

Rhipicephalus sanguineus (?) (nymph).

CAPE HARE (*Lepus capensis*)—

Hyalomma aegyptium impressum (all stages, but especially larvæ and nymphs).

Rhipicephalus sanguineus.

„ *appendiculatus*.

„ *evertsi*.

CHIROPTERA.

BAT (*Rhinolophus augur*)—

Ixodes pilosus howardi.

BAT (*Miniopterus schreibersi*)—

Argas vespertilionis (Pretoria).

INSECTIVORA.

HEDGEHOG (*Erinaceus frontalis*).

Ixodes pilosus howardi.

Rhipicephalus sanguineus.

„ *bursa*.

„ *simus*.

„ *lunulatus*.

Rhipicentor vicinus.

Haemaphysalis leachi.

AVES.

OSTRICH (*Struthio australis*)—

Argas persicus.

Amblyomma hebraeum.

Hyalomma aegyptium impressum (all stages).

SECRETARY BIRD (*Serpentarius secretarius*)—

Argas persicus.

OWL (*Strix flammea*)—

Rhipicephalus lunulatus.

PENGUIN (*Spheniscus demersus*)—

Ornithodoros talaje capensis.

QUAIL (*Coturnix capensis*)—

Amblyomma marmoreum (larvæ).

LARK, THICK-BILLED (*Calendula crassirostris*)—

Hyalomma aegyptium impressum (nymphs).

KORHAAN (*Otis sp.*)—

Hyalomma aegyptium impressum (nymphs).

RINGED PIGEON (*Turtur semitorquatus*)

REPTILIA.

IGUANA (*Varanus niloticus*)—

Aponomma exornatum.

Amblyomma hebraeum cburneum (Zanzibar).

- LIZARD (*Varanus sp.*)—
Aponomma exornatum.
- LIZARD (Species unknown)—
Amblyomma marmoreum (larvæ).
- MAMBA (*Dendraspis angusticeps*)—
Aponomma laeve capensis.
- PYTHON (*Python sebae*).
Aponomma exornatum.
Neumaniella transversale.
- SNAKES (Species unknown)—
Aponomma laeve capenses.
Aponomma latum.
Amblyomma marmoreum.
- TORTOISE (Species unknown)—
Amblyomma marmoreum.
 „ *sylvaticum* (C.C.)

RELATION OF SOUTH AFRICAN TICKS TO DISEASE.

DISEASE.	HOST.	ORGANISM CAUSING DISEASE.	TRANSMITTED BY.
Redwater Texas Fever Bovine Piroplasmosis	Cattle	<i>Piroplasma bigeminum</i>	<i>Margaropus annulatus</i> <i>decoloratus</i> <i>M. annulatus australis.</i>
East Coast Fever Rhodesian Redwater	Cattle	<i>Piroplasma parvum</i>	<i>Rhipicephalus appendiculatus</i> „ <i>capensis</i> „ <i>evertsi</i> „ <i>simus</i> „ <i>nitens</i>
Distemper Malignant Jaundice Biliary Fever of Dog Canine Piroplasmosis	Dog	<i>Piroplasma canis</i>	<i>Haemaphysalis leachi</i>
Biliary Fever Equine Piroplasmosis	Horse Mule Donkey	<i>Piroplasma equi</i>	<i>Rhipicephalus evertsi</i>
Heartwater	Sheep Goats Cattle	Unknown	<i>Amblyomma hebraeum</i>
Spirillosis	Cattle	<i>Spirochaeta theileri</i>	<i>M. annulatus decoloratus</i>
Human Tick Fever	Man	<i>Spirochaeta duttoni</i>	<i>Ornithodoros savignyi caecus</i>

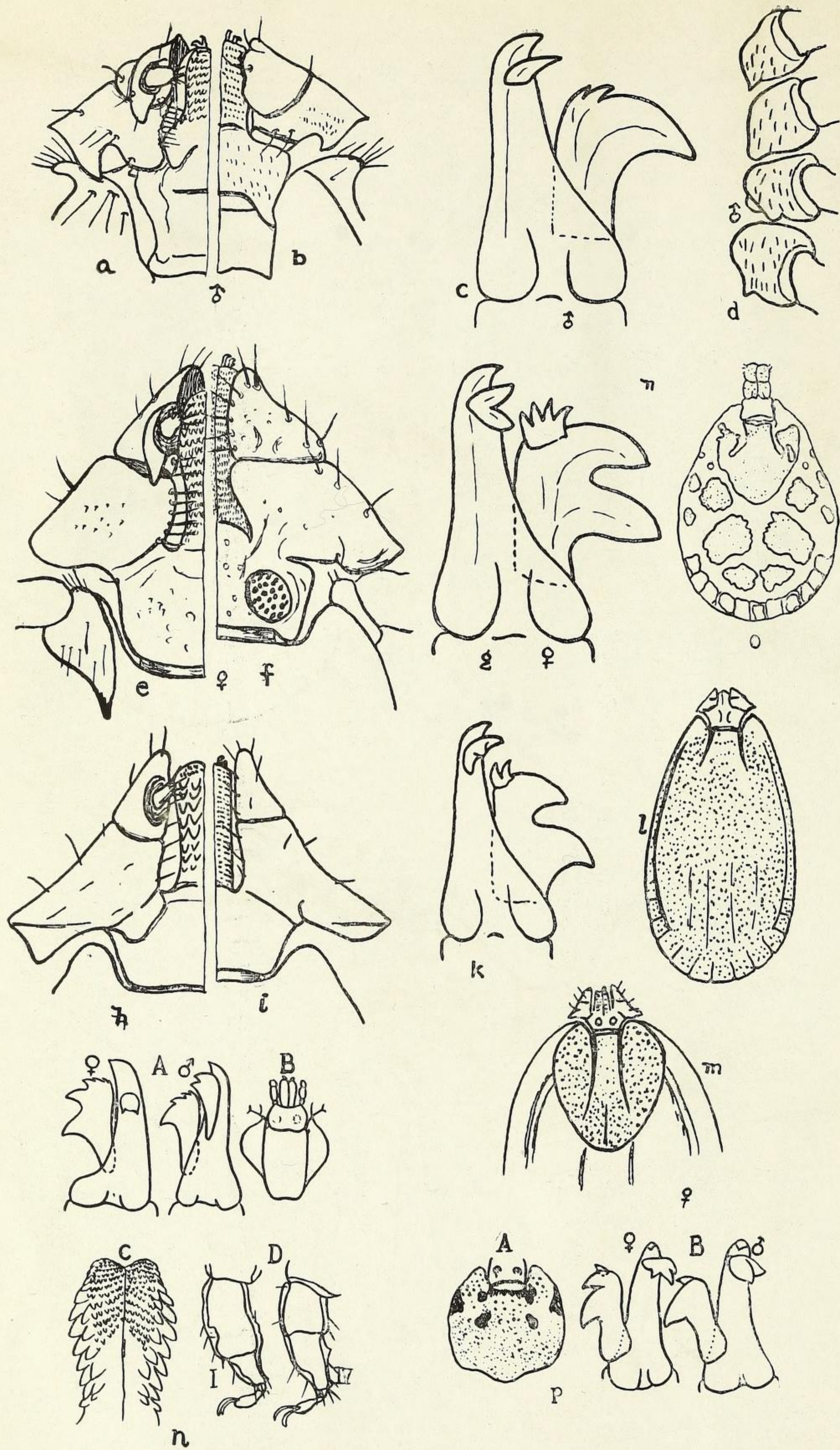


Plate XVI. **Haemaphysalis, Neumaniella, Dermacentor.**

Haemaphysalis leachi (Andouin).

- (a) Ventral surface of rostrum of male.
- (b) Dorsal surface of rostrum of male.
- (c) Mandible of male.
- (d) Coxae of male.
- (e) Ventral surface of rostrum of female.
- (f) Dorsal surface of rostrum of female.
- (g) Mandible of female.
- (h) Ventral surface of rostrum of nymph.
- (i) Dorsal surface of rostrum of nymph.
- (k) Mandible of nymph.
- (l) Dorsal shield of male.
- (m) Dorsal shield of female.

(n) *Neumaniella transversale*, (Lucas), larva (from Neumann).

- (a) Mandibles of male and female.
 - (b) Dorsal shield of female.
 - (c) Hypostome of male.
 - (d) Tarsi I and IV of male.
- (o) *Dermacentor rhinocerotis*, (de Geer), dorsal shield of male (from Neumann).
- (p) *Dermacentor rhinocerotis*, (de Geer), (from Neumann).
- (a) Dorsal shield of female.
 - (b) Mandibles of male and female.

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