SOME PARASITES OF DOMESTICATED ANIMALS

Thesis for the Degree of B. S.

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THESIS

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The object of this thesis is to give a brief classification and description, with remedial treatments, for some of the most common insect parasites infesting domesticated animals.

Parasites are forms of animal life that subsist on the products of the bodies, or on the bodies of other forms of animal life. They are degenerate forms of higher types of insects. After many generations of obtaining food so easily, and of being protected by the warmth of the host's body, and continually depending upon it for nourishment; the parasites have nearly lost the power of free locomotion. This was plainly demonstrated with lice collected for this study from cats and guinea-pigs As soon as the hosts had been dead for a short time, the lice all crawled from the skin and remained on the ends of the hairs, dying soon afterward.

The habits of all the insect parasites should be studied for economic reasons. In very many instances a thorough knowledge of their habits has been necessary in order to free the domesticated animals, and even man, from them. For example, the common "Red-louse" was found on cows necks and backs so plentifully, as to be a great source of irritation, causing in some places nearly allthe hair to drop off, and even scabby patches to form on the skin.

The following is a brief description and classification of each of several of the more common species.

CLASS HEXAPODA

ORDER DIPTERA

Family Oestridae. The individuals of this family are parasitic only in the larval condition. The fly's eggs are laid on different parts of the animal's body;-each species on a particular portion and in no other place. Horses with their fore legs, nostrils,or jaws covered with the small, yellowish-colored eggs, are a common sight in summer. A tough chitinous material surrounds the egg and a cap of the same substance covers the top. When the animal moistens the eggs with its tongue , the cap is removed and the larva crawls into the mouth of the animal. If successful in getting to the stomach, it there attaches itsself and develops. In general, it resembles the larva of many other flies, being when adult, white, cylindrical, and about one-half an inch long. In the spring when the larva loosens its hooks from the stomach walls, the larva can be seen in fresh horse manure near stables. This is a common sight, for nearly all horses are each year infested with a few bots. If their systematic destruction is desired,-do not allow, in summer, manure to accumulate in large, exposed heaps. The piles of manure are very favorable places for the development of the larva into an adult fly. The eggs may be destroye by carefully washing and scraping them from the animal's hair If done carefully and soon after being laid, it should entirely

prevent infestation . In appearance, the flies are never hairy. Their heads are large , consisting mainly of large,brilliantly reflective eyes. The bodies are one-half to two-thirds of an inch long. Probably everyone has seen the peculiar manner in which the females suspend their flight in the air. The flies have a great power of vision, and are attracted from a distance by their particular host; instinct apparently telling them when and where to lay their eggs. About fifty species of bot-flies are known. All of their larvae are not parasitic on domesticated animals. Those most commonly infesting domesticated animals in America are as follows.

Gastrophilus equi (Fab). This fly attacks horses, but is seldom seen and is not plentiful. The eggs are attached to the lips and sides of the animal. A cloth attached under the horse's throat will assist in preventing the eggs being laid.

Hypoderma lineata. This is the warble, or bot-fly of cattle. The larva enters the stomach, as does Gastrophilus; but from the stomach, it burrows through its walls to the skin, falls to the ground, and subsequently develops there into an adult fly. Forty to sixty percent of American cattle are affected by it. The only sure remedy is the complete extinction of the larvae for one season. The fly never attacks cattle when they stand in the water, mud, or shady,protected places, in sheds,and elsewhere.

Oestrus ovis(Linn). The sheep bot. The eggs of the insect are deposited in the nostrils of the sheep. They soon hatch there,and the larvae crawl farther into the head, causing much irritation,- often the death of the sheep. The eggs are laid at midday during hot summer weather. The adult larvae crawl from the sheep's head , and the transformation to the fly takes place in the ground as with other bot-flies. Other species of this genus infest rabbits, squirrels, and reindeer. The principal remedies are, to rub the sheep's nose with tar during the egg-laying season , and to provide fresh earth for the sheep to rub its nose in, when the fly is troublesome.

ORDER SIPHONAPTERA

The fleas. The members of this order of insects are small, have sucking mouth-parts and are wingless. Their most notable character, is their long posterior legs,which enables them to jump, making capture very difficult. The few species troublesome to dogs and to the human body can be eradicated by cleanliness and the use of pyrethrum.

CLASS ARACHNIDA

ORDER ACARINA

The mites. This order consists of individuals with unsegmented bodies, having a sack-like appearance and four pairs of legs. All families except one produce eggs instead of living young. The mites are very small and variable. Itch

mites belong to this order. Others are small mites causing scab and mange diseases of horses. The effect of one species is seen in the scaly legs of chickens, The latter affliction of fowls has been seen commonly, and like itch, spreads from one individual to another. The use of grease together with extreme cleanliness will usually remove mites in any form in which they may affect animals.

CLASS HEXAPODA- ORDER HEMIPTERA

FAMILY PEDICULIDAE

This is a class of insects in which the sucking lice are degenerate forms of what had once more nearly the appearance of true bugs. The metamorphosis is incomplete. The lice suck blood from the animal host, and are analogous to scale insects which obtain nourishment from plants in the same manner. Wings are absent. The young are similar to the old except in size. The lice infest animals only, and are not capable of adapting themselves to hosts of another class from those to which they are accustomed. Eggs are laid and glued upon the hairs of the host, and open as do those of the botfly by means of a cap; though surplus moisture is unnecessary for this purpose.

Pediculus capitis (De G.). Plate 4, No. 1. This is the common head-louse of man, and all races are affected by it. It is the best known of any louse. It has a very similar appearance to the cow louse but is smaller. Cleanliness

is usually a satisfactory remedy.

Haematopinus eurysternus-Plate 3, No. 1. This is the common"blue louse"of cattle. Specimens were collected in great numbers at the college barns during the winter of 1900-1901. The large size and sucking capacity of this species, together with the great numbers in which it usually thrives; irritate stock very much. It is not unusual to see cattle with nearly all the hair from their necks, shoulders, backs, or hips, rubbed off. The females are larger than the males, usually being from one-fifth to one-eighth of an inch long. The males are characterized by two brushes at the posterior portions of their abdomens, one being on each side of the center. The males are provided with black stripes; one along the center of the body, reaching to their abdomens. This is plainly seen from the dorsal surface. Both sexes have,-on the ends of their beaks,-two rows of curved hooks, not readily seen upon a hasty examination of the specimens. Rows of very prominent tubercles are found on each side of the abdomens. Spiracles can be seen in the tubrcles,-one in each,- in the form of cylindrical tubes extending forward and inward toward the center of the body. They are found in the tubercles of the six posterior segments, not including the last one. The antennae are as long as the head. The eggs are oval in form, and have a cap at the upper end of each, which is removed upon the eggs' hatching.

Haematopinus urius (N) Plate 3, No. 3. This is the common hog-louse. It is very large, often approaching in size the above species. It often occurs in great numbers. The killing of a large percentage of hogs at an early age, destroys many lice and tends to keep them in check. The color of the individuals is grey. The head is long. Males are characterized by having large, often irregular, black spots on their abdomens. On each, a pad-like organ on the outer portion of the tibia , is arranged for firmly grasping the hair of the host. The eggs are large and of a yellowish color.

ORDER MALLOPHAGA.

This order is nearly related to the hemiptera. The general appearance of the insects is similar to that of the previous true lice, and they are with equal accuracy termed lice. The members of this order have biting mouth-parts; metamorphosis is incomplete. The adults are similar to the young. The antennae are five jointed, except in the genus Trichodectes. The abdomens are oval, nine to ten segmented. Suctorial organs are often present, but are inconspicuous and undeveloped. The eyes, when visible, are located back of the antennae. The eggs are glued to the hairs, and open by means of a cap. Several days are needed for incubation to take place.

Trichodectes latis (N) Plate 2, NO. 1-2. This is a very common species infesting dogs, having an especial preference for puppies. Its head is large in proportion to its

body. The color is dark yellow. The legs have strong, curved claws. The joints of the thorax are as long ~~as long~~ as the abdomen, which is ten jointed. The length of its body is equal to that of the cat-louse (Trichodectes subrostratus N), but the body of the former is broader. . This species reproduces very rapidly.

Trichodectes scalaris (N) Plate 1, No. 1. This is the common "red-louse"of cattle. It is very common in Michigan, and was found quite abundantly on College cattle during the winter of 1900-1901. Its effects on the hosts are apparently the same as those of Haematopinus, judged by the irritation which the pest causes. Its name "red-louse"is applied because of the red, chitinous material, conspicuously located as rib-like, parallel blotches on the abdomen. This together with the same material of the head and other parts of the body, gives the insect the appearance of being nearly entirely red. Other prominent characteristics are;- the heart-shaped head; sides of head being covered with bristles; smalland inconspicuous eyes; and the small, first segment of the thorax.

Trichodectes subrostratus (N) Plate 2, No. 3-4. This louse found on the cat, is somewhat smaller than the preceding species. It is inconspicuous, of a whitish color, and usually occurs in great numbers. It is very slender, easily killed; and is in direct direct contrast to both species of Haematopinus in size and tenacity of life. The head and thorax

together are as long as the head and thorax abdomen, which has nine segments. Both sexes are characterized by one and sometimes two or three very long, coarse hairs on the last four segments of the abdomen. A groove is provided on the under surface of the head for clasping the host's hair. The specimens held to the hair very tenaciously, even after death. In those collected in February, 1900-all crawled away from the dead cat's body. They firmly clasped the hairs about one-eighth of an inch from the skin, dying there very soon after the death of the host.

Gyropus ovalis (N) Plate 1, No. 3. This is one of the two most common lice of the guinea-pig. Both this and the succeeding species were found on the same animal. The pest is smaller than any of the species described, is of a whitish color, is very fragile,and is easily killed. The body is rather broad, appears stout,and has a moderate amount of chitinous material throughout. The color is pale yellow or white; head and thorax have a bright,reddish tinge,- making the abdomen seem colorless and inconspicuous. In the specimens of this and the succeeding species from the same animal, both were mingled,and in great numbers. As with Trichodectes subrostratus, the lice crawled from the host as soon as it was killed, remaining on the hairs. The tenacity of life in this species is not great.

Gyropus gracilis Plate 1, No. 4. This species is

also found on the guinea-pig. It is very much more slender and inconspicuous in appearance than the preceding species, being smaller, due more to diameter than length. The body is elongate and lacks firmness, due to the absence of much chitinous material. The color is pale yellow, rather translucent with a darker, more conspicuous head and thorax. The entire body is densely and very finely pubescent. The tarsi are very small and slender. This species can usually be distinguished from Gyropus ovalis, from the latter's comparitively short, firm appearance; contrasted with the very slender, inconspicuous body of Gyropus gracilis. Both species usually are intimately associated with one another, and have very similar habits.

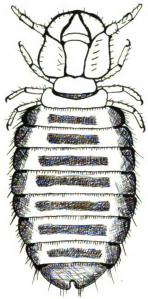
Menopon. - Two species of this genus are very nearly alike, and infest the same fowl in the same colony. They are often described as one general species. They are the great pests of domestic fowls, and where found, usually are in great numbers. Unlike any of the other described species, they are found in colonies containig twenty-five, fifty, or one-hundred individuals, and they appear to prefer the abdomen, and the portion of the body under the wings; probably because the warmth and protection is greatest at these two places. They are very active on the host, and are extremely irritating, especially to young fowls. At least a few can be found during every month of the year, even in the best regulated poultry

houses. The members of the species have a very long abdomen, occupying at least three-fourths of the length of the entire body. The body is conspicuous in another manner, as it is entirely covered with long, coarse hairs; two rows being on each of the ten segments of the abdomen, except the last one. Equally conspicuous ones are along the sides of the body, and on the head and legs, with a dense fringe of them underneath. The digestive tract can be seen through the abdominal walls as an irregular mass of dark material, the conspicuousness and shape varying with the individual louse. Four good remedies are known,- the use of pyrethrum; grease; free access of fowls to a dust bath; and the spraying of the hen-house with kerosene or whitewash.

The remedies for all the lice mentioned can be summarized, in general, by saying that any strong solutions like scotch snuff, tobacco water, and kerosene emulsion; will kill allthe lice. Care must be taken to vary the strength and number of applications to the species, and to the condition of the affected animal.

The lice which are here referred to have been colle ected by the writer. The method of preserving them is to fir first place the lot collected in a solution consisting of one hundred parts of ninety-six percent alcohol; one hundred parts of distilled water; and ten parts of forty percent commercial formalin. From this solution they are transferred, after a

few hours to a solution of pure alcohol. From there they are placed in a turpentine clearing solution; then are removed to glass microscopic slides, and are immersed in damar under cover glasses. The specimens will keep for years in this condition. A complete list accurately labeled is very valuable for reference to any worker on insect parasites.



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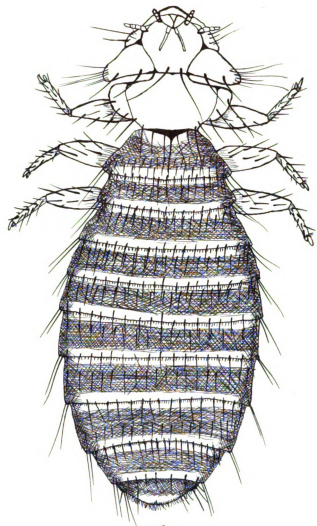

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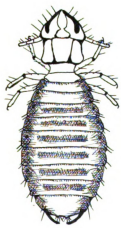

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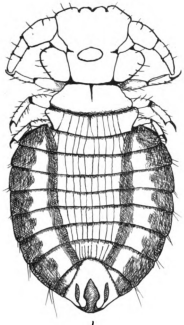

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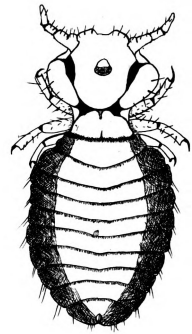

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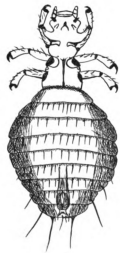

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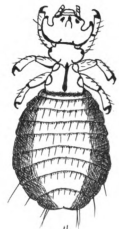

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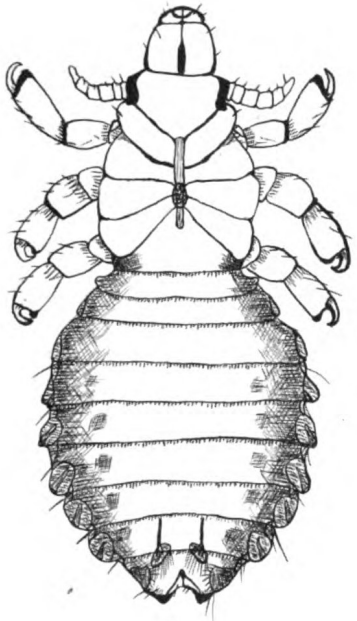

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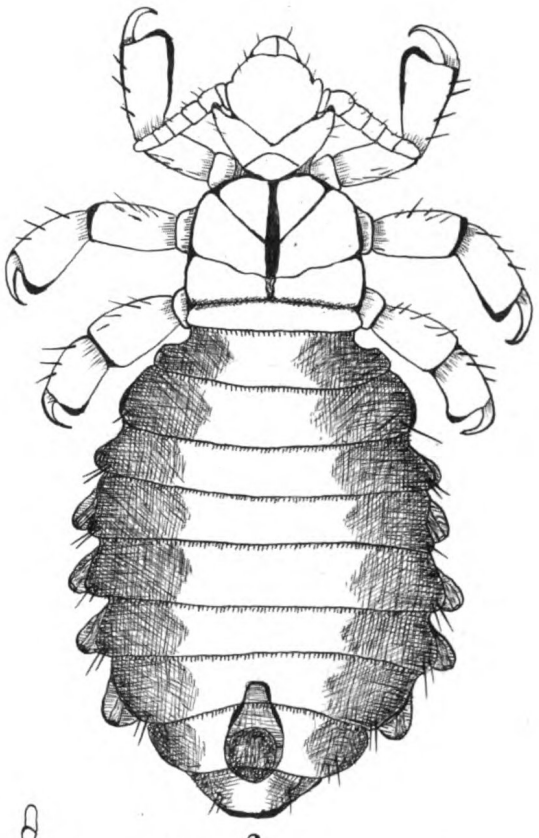

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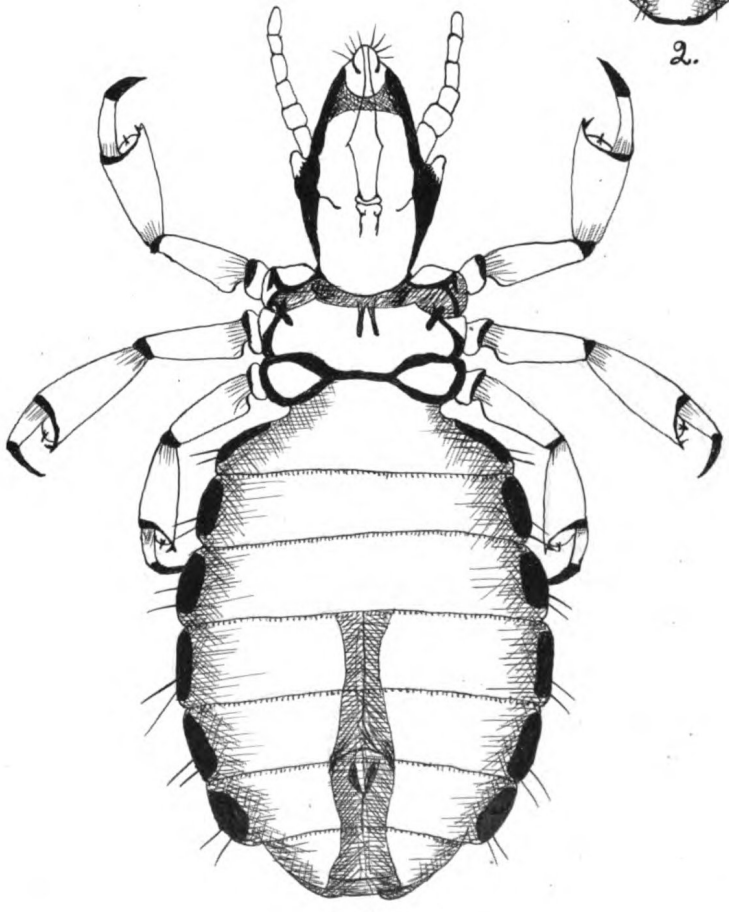

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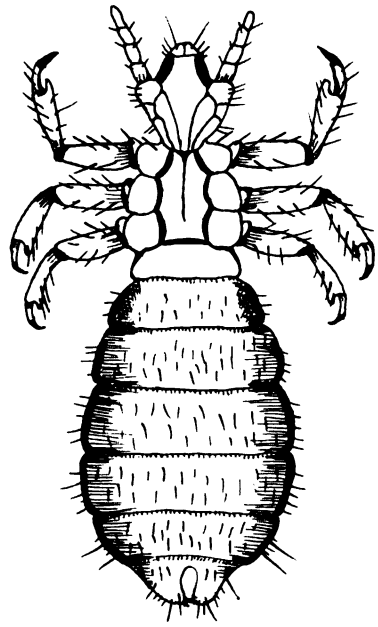

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Plate 1.

No 1. Trichodectes scalaris (M)
2. Menopon
3. Gyropus ovalis (M)
4. " gracilis

Plate 2.

No 1. Trichodectes latis (M) male
2. " " " female
3. " subrostratus (M) male
4. " " " female

Plate 3.

No 1. Haematopinus eurysternus (M) male
2. " " " female
3. Haematopinus urius (M)

Plate 4.

No 1. Pediculus capitis (De G)

Plate 4.