

SECTION 2

Examination for Mites of the Skin and of the Internal Organs

MORE THAN 50 species of mites have been reported to live on or in domesticated mammals and birds of North America. These include the parasitic mange and scab mites, scaly-leg mite, depluming mite, ear mites, feather and quill mites, flesh mite, air-sac mite, chigger mites, roost mite, sinus mite, and nasal mites.

For a discussion of parasitic (and nonparasitic) mites, reference is made to the book by Baker and Wharton (1952): *An Introduction to Acarology*.

The mites (also the ticks) belong in the phylum Arthropoda (animals with an exoskeleton and jointed limbs). Arthropods without antennae and mandibles belong in the class Arachnida (spider-like animals). In the class Arachnida is the order Acarina, which includes the mites and the ticks; this order comprises "arachnids with mouthparts set off from the rest of the body on a false head (capitulum or gnathosoma)" and in which body segmentation is greatly reduced or absent.

Mites are smaller than ticks, most species being either microscopic or under 1 mm. in length. They are covered by a relatively soft, often translucent skin through which respiration takes place, in the smaller species. The larger species breathe through skin openings (stigmata) connected with tracheal tubes.

The body may be ornamented by spines or hairs (setae), or by scale-like plates. The legs (4 pairs for adults and nymphs; 3 pairs for larvae) are provided with claw-like hooks or suckorial cups (Figs. 227, 235).

Depending upon the species, the food of parasitic mites includes mainly blood, lymph, living and dead epithelial cells, or feathers. Mouthparts are adapted for either piercing or chewing.

The mite life cycle usually begins with the laying of the egg, from which a six-legged larva emerges. After feeding, the skin is shed and the eight-legged but sexually immature nymph appears.

Following one or more skin molts, the sexually mature adult mite is formed. Variations occur in the life cycle of certain mite species. For example, the air-sac mite, *Cytodites nudus* of poultry is viviparous; the sinus mite, *Pneumonyssus caninum* of dogs has not been observed to have a nymph stage.

According to Baker and Wharton (1952) the parasitic mites are grouped under three suborders:

- I. Suborder SARCOPTIFORMES (7 families)
- II. Suborder TROMBIDIFORMES (5 families)
- III. Suborder MESOSTIGMATA (4 families)

Following is a brief listing and description of the parasitic mites of domesticated animals; by suborders and families.

I. Suborder SARCOPTIFORMES

Family 1. SARCOPTIDAE

Three important genera of mange and scab mites belong in this family, namely the genera (1) *Sarcoptes*, (2) *Notoedres*, and (3) *Cnemidocoptes*.

(1) *Sarcoptic mange mites*. These mites are the cause of sarcoptic mange or itch. The fertilized females work their way deeply into the epidermis, forming tunnels where they deposit their eggs. Close proximity to nerve endings results in intense irritation. The skin thickens and rather dense crusts form (Fig. 208). The infestation usually involves thin-skinned areas first. There is considerable loss of hair. These mites cause the most common form of mange in swine and horses. The morphologic characteristics of sarcoptic mites are shown in Table 1, page 128, and Fig. 201.

Species and hosts:

Sarcoptes scabiei var. *equi* — Horse

Sarcoptes scabiei var. *bovis* — Cattle (Fig. 207)

Sarcoptes scabiei var. *ovis* — Sheep

Sarcoptes scabiei var. *caprae* — Goat

Sarcoptes scabiei var. *suis* — Swine (Figs. 209 to 213)

Sarcoptes scabiei var. *canis* — Dog (Figs. 214 to 218)

Sarcoptes scabiei var. *vulpis* — Fox

(2) *Notoedric mange mites*. These resemble the sarcoptic mites but they are somewhat smaller; and the anus is located on the dorsal abdominal area rather than terminally (Fig. 221). Notoedric mange is fairly common on cats and rabbits. Lesions are first noticed on the face and other areas of the head, later spreading to various parts of the body, particularly to the forelegs. Advanced lesions give cats an appearance of old age because of the wrinkling of the skin of the face. See Table 1, page 128, for morphology.

Species and hosts:

Notoedres cati — Cat, fox (Figs. 219 to 223)

Notoedres cati var. *cuniculi* — Rabbit

(3) *Cnemidocoptic mites*. Scaly-leg and depluming scabies of birds are caused by mites of this genus. In the rather common disease, scaly-leg, the mites burrow under the scales of the legs and toes, causing dense crusts to form (Fig. 224). Scaly-leg mites are approximately 0.5 mm. in diameter. They are globular in shape. The legs of the adult female are very short; whereas the legs of the male are longer and are provided with suckers. See Table 1, page 128, and Fig. 202.

The depluming mite inhabits the skin at the bases of the feathers, especially around the head and neck. Infested birds pick out or scratch out the affected feathers because of the intense irritation. The morphology of depluming mites is much like that of scaly-leg mites, except that the size of the female is approximately 0.35 mm.

Species and hosts:

Cnemidocoptes mutans. Scaly-leg mite — Chicken, turkey, pheasant, caged birds (Figs. 225, 226)

Cnemidocoptes gallinae. Depluming mite — Chicken

Family 2. PSOROPTIDAE

(1) *Psoroptic mites*. The mites of this genus are the cause of sheep scab, cattle scab, and similar infestations on other hosts. They differ from the sarcoptic mites in morphology (Table 1, page 128) and in their manner of producing lesions. Psoroptic

mites do not burrow into the epidermis, but remain upon the surface or under scabs and scaly accumulations. In sheep, the thickly-wooled areas are attacked first. Itching is fairly pronounced and there is considerable loss of wool. In rabbits, a species of psoroptic mite infests the ear canals, resulting in severe otitis externa which is accompanied by thick scab formation. The psoroptic mites may be as large as 0.8 mm., hence they may be seen with or without the use of a hand lens. See Table 1, page 128, and Figs. 203 and 227 for morphology.

Species and hosts:

Psoroptes equi var. *equi* — Horse

Psoroptes equi var. *bovis* — Cattle (Fig. 228)

Psoroptes equi var. *ovis* — Sheep (Figs. 229 to 231)

Psoroptes equi var. *caprae* — Goat

Psoroptes equi var. *cuniculi* — Rabbit (Figs. 232, 233)

(2) *Chorioptic mites*. These were formerly known as symbiotic mites. They are the cause of so-called leg, foot, or tail mange. In heavy infestations the abdomen and other parts of the body are involved. Chorioptic mange is more common in the horse than in other domesticated animals. The lesions resemble those produced by psoroptic mites; in fact, the mites themselves are quite similar, except for the leg details (Table 1, page 128, and Figs. 204, 235) and for size. Chorioptic mites reach a maximum length of approximately 0.4 mm.

Species and hosts:

Chorioptes equi — Horse (Fig. 234)

Chorioptes bovis — Cattle (Figs. 236 to 239)

Chorioptes ovis — Sheep

Chorioptes caprae — Goat

(3) *Otodectic mites*. As their name implies, these mites invade the ear canals. They are parasites of dogs, cats, foxes, and other carnivora. Their presence is characterized by otitis externa, accompanied by bacterial decomposition of the secretions and of the exudate. Ear mites may be seen grossly or with the aid of an otoscope, their size being approximately 0.5 mm. in diameter.

For specific diagnostic features, see Table 1, page 128, and Fig. 205.

Species and hosts:

Otodectes cynotis. Ear mite — Dog, cat, fox, other carnivores (Figs. 240 to 243)

Family 3. EPIDERMOPTIDAE

This family contains two genera of uncommon skin mites infesting chickens, namely the genus *Epidermoptes* and the genus *Rivoltasia*, each including one species.

Epidermoptes bilobatus causes a rare form of avian scabies which is characterized by brownish-yellow, elevated scabs on the body and upper portions of the legs. The mites of both sexes have suckers on all of the leg-terminations. The length of the adult female is approximately 0.2 mm.

The other species of epidermoptic mite is *Rivoltasia bifurcata*, a feather-eating form, rarely reported from chickens. Apparently only slight damage is done to the infested feathers. These mites are approximately 0.25 mm. in length.

Species and hosts:

Epidermoptes bilobatus. Scaly skin mite — Chicken

Rivoltasia bifurcata. Feather-eating mite — Chicken

Family 4. CYTODITIDAE

This family of mites contains only one species, the air-sac mite of birds. Cytoditid mites belong to a small group of ectoparasites which have adapted their mode of living to the deeper tissues of the body. Therefore they are not, in a strict sense, skin parasites.

Cytodites nudus appears to be a fairly common inhabitant of the air-sacs, bronchi, lungs, and the bony cavities connected with the respiratory system. It is commonly called the air-sac mite. Hosts include chickens, turkeys, pigeons, and pheasants. Unless air-sac mites are abundant, they apparently do little harm; but in large numbers they may be associated with emaciation and anemia. Infected chickens have been known to show symptoms suggestive of avian tuberculosis. Close inspection of the air-sacs,

soon after the host dies, is necessary in order to detect air-sac mites. They may be seen as minute translucent dots, slowly moving about. These mites are less than 0.6 mm. in length. They resemble the sarcoptic mites.

Species and hosts:

Cytodites nudus. Air-sac mite — Chicken, turkey, pigeon, pheasant (Figs. 246, 247)

Family 5. LAMINOSIOPTIDAE

Laminosioptes cysticola is commonly called the subcutaneous mite or flesh mite of birds. Very little is known of its habits. Perhaps it is a skin parasite with a tendency to penetrate to the loose subcutaneous tissues, where it dies. The living mites are seldom observed, probably because they do not produce gross lesions until they die. Most frequently their presence is indicated by yellowish nodules several millimeters in diameter in the subcutis. These nodules appear to be caseo-calcareous enclosures around the mites, thus representing a defensive mechanism of the host. Subcutaneous mites are elongated, measuring approximately 0.25 mm. long by 0.1 mm. wide. A distinctive microscopic feature is the transverse constriction around the body posterior to the second pair of legs.

Species and hosts:

Laminosioptes cysticola. Subcutaneous mite — Chicken, turkey, goose, pigeon, pheasant

Family 6. DERMOGLYPHIDAE

These are uncommonly reported inhabitants of the feathers of birds, where they apparently feed, hence the name feather-eating mites.

(1) *The genus Falculifer*. One species, *Falculifer rostratus*, is a feather-damaging mite of pigeons. It is usually found between the barbs of the large wing feathers, causing the loss of barbules. Its length is approximately 0.5 mm.

Species and host:

Falculifer rostratus — Pigeon (Fig. 249)

(2) *The genus Freyana*. One species, *Freyana chaneyi*, has been reported from turkeys in Maryland, Texas, and Louisiana. It is said to congregate in the grooves under the shafts of the wing feathers. Little else is known about this mite.

Species and host:

Freyana chaneyi — Turkey

Family 7. ANALGESIDAE

The genus Megninia. This genus of analgesid feather mites is represented by three species in North American domesticated birds.

Megninia gallinulae has been reported only from Canada and then rarely. It is associated with loss of scales from the lower portions of the legs of chickens, and with a crusty dermatitis in the region of the head.

Megninia cubitalis is a similar mite which has been briefly mentioned as occurring on the feathers of chickens in southern United States. It is approximately 0.4 mm. in length.

Megninia columbae is approximately 0.3 mm. in length, and has been reported as occurring on the feathers of the neck and body of pigeons in South Carolina.

Species and hosts:

Megninia gallinulae — Chicken

Megninia cubitalis — Chicken, turkey

Megninia columbae — Pigeon

II. Suborder TROMBIDIFORMES

Family 1. DEMODICIDAE

These mites are the cause of demodectic, follicular, or red mange in a variety of hosts. The mites have a distinct appearance. The non-hairy body is elongated; the very short four pairs of legs are situated anteriorly; and the abdomen is transversely striated (Fig. 206). The adults are approximately 0.1 to 0.39 mm. in length. Demodectic mites live in the hair follicles and the sebaceous glands where they reproduce quite rapidly. Loss of hair is usually the first symptom of infestation, later to be followed by

dermal hyperemia, and eventually by the formation of pustules. The latter are caused by secondary pyogenic bacterial infection.

Although demodectic mange is quite common in dogs, it may also occur in horses, cattle, sheep, goats, and swine. In these less common hosts the only observable lesions may be the formation of cutaneous nodules, varying in size up to 10 or 15 mm. in diameter. These nodules are filled by caseous pus containing an abundance of the mites.

Species and hosts:

Demodex equi — Horse

Demodex bovis — Cattle

Demodex canis var. *ovis* — Sheep

Demodex caprae — Goat

Demodex phylloides — Swine

Demodex canis — Dog (Figs. 244, 245)

Family 2. TROMBICULIDAE

This family includes the chigger mites, also called redbugs. Only the larval stage is parasitic; the adults and nymphs being free-living or predaceous on insects and other arthropods. Larval chiggers may infest the skin of many mammals, including man, and also the skin of many avian hosts. It is believed that their principle hosts are snakes, lizards, turtles, ground birds, and rabbits.

In attacking the host, chiggers insert the mouthparts (chelicerae) and inject a tissue-liquefying saliva. Within a few hours intense pruritus with swelling occurs. The pruritus lasts for days to weeks. Chiggers do not bodily enter the skin while feeding on liquefied tissues. Usually after several hours' attachment they release their hold and drop to the ground for further development. Larval chiggers are difficult to detect on animals. They vary in color from yellowish to red and their length is about 0.45 mm.

Species and hosts:

Eutrombicula (= *Trombicula*) *alfreddugési*. North American chigger — Various mammals and birds (Fig. 248)

Neoschöngastia americana. Chicken chigger — Chicken, other birds, rabbits, lizards, snakes. Found in southern United States.

Family 3. MYOBIIDAE

(1) *Syringophilus bipectinatus*, a quill mite, is an inhabitant of the quills of domesticated and wild birds. Its presence is indicated by a powdery accumulation inside the quills of the larger feathers, causing their partial to complete loss. The adult female measures about 0.9 mm. in length by about 0.15 mm. in width. It is seldom reported.

(2) *Psorergates ovis*, a so-called itch mite of sheep, was first reported by Carter (1941) in Australia. Its first occurrence in North America was noted by Bell *et al.* in Ohio in 1952. Davis (1954) has also studied the sheep itch mite.

Infested sheep rub, scratch, or bite at the wool because of a mild chronic dermatitis. Tags of wool hang from the fleece or drop off.

Psorergates mites have legs more or less equidistant apart, whereas the legs of the common mange and scab mites are in groups of two. The adult itch mite of sheep may be as large as 0.189 by 0.162 mm.

Species and host:

Syringophilus bipectinatus. Quill mite — Chicken, turkey, pheasant, other birds

Psorergates ovis. Sheep itch mite — Sheep

Family 4. CHEYLETIDAE

Mites of this family are elongated and possess pincer-like feather-clasping organs (palpi) on each side of the mouthparts. Most of the cheyletid mites are free-living predators of insects or of other mites. One species, *Cheyletiella parasitivorax*, has been reported from the skin of cats and rabbits of North America in recent years (Cooper, 1946; Roth, 1947).

This mite may be found in large numbers in the fur. In North America no gross lesions have been attributed to its presence. Cheyletid dermatitis of cats and humans has been reported in Europe. Probably this mite preys upon parasitic mange mites. It has also been found attached to fleas, possibly as a means of transportation. The adults are about 0.45 mm. long.

Species and hosts:

Cheyletiella parasitivorax — Cat, rabbit

Family 5. SPELEOGNATHIDAE

A speleognathid mite, *Speleognathus striatus*, was reported in North America from the nasal cavity of the domestic pigeon by Crossley (1952). Its pathogenicity is unknown. Probably it is transmitted through contaminated drinking utensils. The length is about 0.5 mm.

Species and host:

Speleognathus striatus. A nasal mite — Pigeon

III. Suborder MESOSTIGMATA

Family 1. DERMANYSSIDAE

Two genera of this family, Dermanyssus and Bdellonyssus, contain parasites of domesticated birds.

(1) *The genus Dermanyssus*. One important species, *Dermanyssus gallinae*, is the common chicken mite (red mite, roost mite). Its hosts include chickens, turkeys, pigeons, English sparrows, and other birds. Man and other mammals may be attacked if the mites are abundant. This mite has needle-like mouthparts for sucking blood. Red mites breed in the hosts' surroundings, attacking mostly at night or when the birds are nesting. Adult females, engorged with blood, may reach a length of 1 mm.

Species and hosts:

Dermanyssus gallinae. Common red mite — Chicken, turkey, pigeon, other birds, occasionally mammals (Fig. 250)

(2) *The genus Bdellonyssus* (= *Liponyssus*). Three species of feather mites have been reported from North America. Although resembling mites of the preceding genus, they differ mainly in that they are found on their bird hosts both day and night, where they suck blood.

The most common feather mite is *Bdellonyssus sylviarum*, or Northern feather mite. A second species, *Bdellonyssus canadensis*, was reported from Canada by Hearle (1938). A third species, *Bdellonyssus bursa*, the tropical feather mite, occurs in the South Atlantic and South Central states. Many birds, in addition to chickens are reported to harbor these mites. Adult feather mites are about 0.7 mm. in length.

Species and hosts:

Bdellonyssus sylviarum. Northern feather mite — Chicken and many other bird species (Fig. 251)

Bdellonyssus canadensis. Canadian feather mite — Chicken and other bird species

Bdellonyssus bursa. Tropical feather mite — Chicken and other bird species

Family 2. RAILLIETIDAE

One species of mite belonging to this family has been rarely reported from cattle in North America. Probably it is more common than the records show. Leidy in 1872 found *Raillietia auris* in the external ear canal of cattle near Philadelphia. It was not until 1950 that it was again reported, this time by Olsen and Bracken in Colorado. Benbrook (unpublished data), in 1925, identified this mite from the ear canals of a steer that had been shipped into Iowa from Minnesota. This steer showed incoordination and apathy. At necropsy, the mites were seen moving rapidly over and near the tympanic membrane. No other evidence was found to account for the symptoms. The adults are approximately 1.5 mm. in length.

Species and host:

Raillietia auris. Ear mite — Cattle (Fig. 252)

Family 3. HALARACHNIDAE

The mites of this family occur in the respiratory passages of marine mammals (seals, walruses) and land mammals (carnivores, monkeys, rodents).

One species, *Pneumonyssus caninum*, is of interest to the veterinarian. This mite occurs quite commonly in the frontal sinuses of dogs. Chandler and Ruhe (1940) first described it as a new species. Later references are those of Martin and Deubler (1943), Douglas (1951), Koutz *et al.* (1953), Olds (1953), and Furman (1954).

As yet its significance as a pathogen is not clear. Catarrhal or purulent sinusitis is often observed in the affected dogs. No nymphal stage is known. The mature mites are white, and 1 mm. long.

Species and host:

Pneumonyssus caninum. Frontal sinus mite — dog (Fig. 253)

Family 4. RHINONYSSIDAE

Rhinonyssid mites are parasitic in the nasal passages of various birds. Two species, *Neonyssus columbae* and *Neonyssus melloi*, have been reported in pigeons from Texas by Crossley (1950 and 1952). No further information is available. These mites are viviparous, producing larvae in which the nymphs are already developed. The adult length is about 0.7 mm.

Species and host:

Neonyssus columbae. Nasal mite — Pigeon

Neonyssus melloi. Nasal mite — Pigeon

Apparatus and Technique for the Examination of the Skin To Detect Parasitic Mites

Some species of mites that live on the skin, also those that inhabit the internal organs, can usually be seen with the unaided eye. A hand lens, of x 3 or greater magnification, is a useful agent for detection when used in a bright light. Any mites seen may be placed in a drop of water on a microslide. Then a coverglass is applied and the preparation is examined under low power (x 100) and high power (x 400) of the microscope. The substage condenser and the diaphragm are adjusted so as to provide a relatively low degree of light in order to reveal details of structure.

For the detection and identification of the various species of mange and scab mites, it is advisable to make scrapings of the skin, using the following apparatus and technique:

APPARATUS FOR SKIN SCRAPINGS (FIG. 191)

1. *The microscope*. Magnifications of approximately x 100 and x 410 are most suitable for the detection of skin mites. Therefore, the optical equipment should include an 8X or 10X Huyghenian ocular, 16 mm. and 4 mm. achromatic objectives, and a substage condenser of 1.25 numerical aperture. A mechanical stage and a binocular body tube with matched



FIG. 191—Apparatus for microscopic examination of skin preparations for animal parasites:

- | | | |
|-----------------------|----------------------------|--------------------|
| 1. Microscope | 6. Scalpel | 11. Ear swab |
| 2. Xylene | 7. Coverglasses | 12. Hand magnifier |
| 3. Lens paper | 8. Microslides | 13. Jar for waste |
| 4. Microscope lamp | 9. Black paper | 14. Towel |
| 5. Coverglass forceps | 10. Mineral oil dispensers | |

oculars are not essential, but they will save the examiner's time and help to reduce eyestrain. The addition of an oil immersion objective will equip the microscope for all the important clinical procedures that require microscopy.

2. *Xylene*. This is the only safe lens-cleaning solvent, except water. It should be dispensed from a dropper-bottle.
3. *Lens paper*. This is essential for keeping optical lenses clean. Squares of about 8 cm. (3 in.) may be stored in a covered container. They should be used once, then discarded.
4. *Microscope lamp*. Daylight should not be relied upon. There are many suitable types of microscope lamps. A simple type to be recommended consists of a metal shade enclosing a 60 watt, inside-frosted, blue bulb.
5. *Coverglass forceps*. These should always be used when handling micro coverglasses.

6. *Scalpel.* A detachable-blade surgical scalpel is preferred for scraping the skin. The blade should be convexly curved.
7. *Coverglasses.* Any 18 mm. or 22 mm. ($\frac{3}{4}$ or $\frac{7}{8}$ in.) square, glass or plastic coverglass is suitable. The plastic covers are more economical and they require no cleaning before they are used, after which they are discarded. Coverglasses should be stored in a covered container, such as a small glass dish.
8. *Microslides.* These are the standard 75 x 25 mm. (3 x 1 in.) glass slides. They should be washed and dried before using, and they may be used repeatedly.
9. *Black paper.* A sheet of dull-surfaced black paper is used as a background in preparing the specimens on the microslides.
10. *Mineral oil and dispensers.* Any light-bodied mineral oil may be used to prepare the skin scraping. It may be dispensed from a dropper-bottle or from a small lubricating oilcan.
11. *Ear swabs.* Wooden applicator sticks 15 cm. (6 in.) in length are tipped with absorbent cotton for the removal of specimens from ear canals.
12. *Hand magnifier.* This should provide a magnification of x 3, or greater, for the examination of skin parasites, ear canal surfaces, or ear swabs.
13. *Jar for waste.* Skin mites may live for hours in mineral oil or in water. Discarded slides and swabs may be placed in a jar containing a disinfectant, such as 3 per cent aqueous saponified cresol solution.
14. *Towels.* Soft linen or cotton towels are used for cleaning the hands and equipment.



FIG. 192—Placing a drop of mineral oil on a microslide.

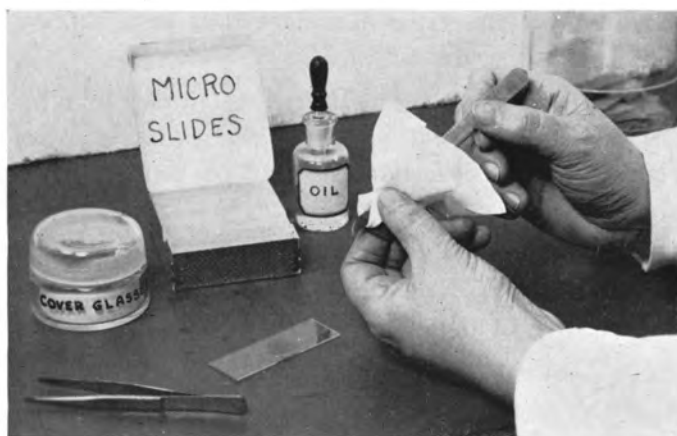


FIG. 193—Cleaning the scalpel blade.



FIG. 194—Dipping the cleaned scalpel blade into the drop of mineral oil before scraping the skin.



FIG. 195—Scraping a fold of a suspected facial lesion with the oiled scalpel blade.



FIG. 196—Scraping a fold of a suspected lesion on the leg.

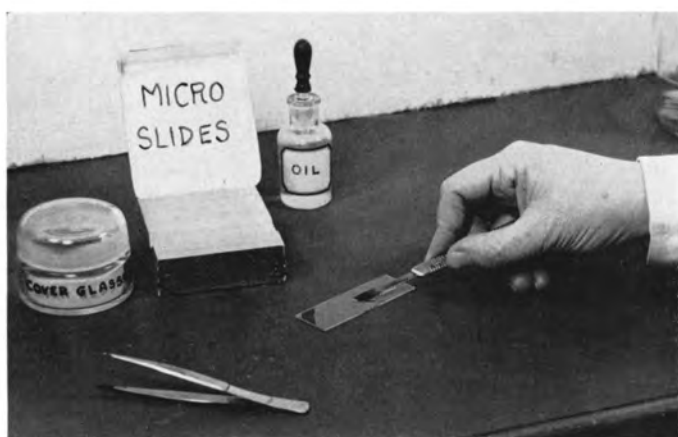


FIG. 197—Transferring the scraping from the scalpel blade to the drop of oil on the microslide.

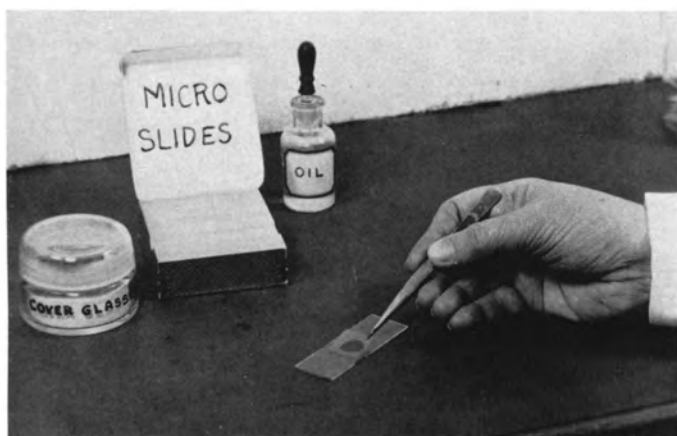


FIG. 198—Applying the coverglass, using forceps.



FIG. 199—Removing ear mites on a dry cotton swab. The patient is under restraint in a canvas roll.



FIG. 200—A black paper background and a hand magnifier are used in examining the cotton swab for ear mites.

TECHNIQUE FOR SKIN SCRAPINGS

1. Place a drop of mineral oil on a microslide (Fig. 192).
2. Clean the scalpel blade by wiping it with paper (Fig. 193).
3. Dip the clean scalpel blade into the drop of oil on the microslide (Fig. 194).
4. Pick up a fold of the patient's skin at the edge of the suspected area, pinching it firmly between the thumb and forefinger. With the oily scalpel, scrape the crest of the fold several times in the same direction. Scrapings will adhere to the blade. Stop scraping when a slight amount of blood appears (Figs. 195 and 196).
5. Transfer the scraping from the scalpel blade into the drop of oil on the microslide, using a slight rotary motion (Fig. 197).
6. Apply a coverglass to the scraping on the microslide by gently lowering it by means of a coverglass forceps. Additional oil may be added at the coverglass edge in order to fill the space beneath it. Do not press on the coverglass (Fig. 198).
7. Examine the preparation under low power ($\times 100$) in a methodical manner so that all portions of the coverglass area are seen (Fig. 14). For best results, manipulate the substage condenser and diaphragm of the microscope so as to provide a relatively low degree of light, evenly distributed.

Oily preparations of mites may be kept for days as demonstration specimens. The mites show motion for many hours.

8. For the detection of ear mites in the dog, cat, fox, and rabbit, the patient may be restrained in a canvas sheet (Fig. 199). A cotton swab is introduced into the external auditory canal and gently rotated. The swab is then placed on a piece of black paper and examined by means of a hand lens (Fig. 200). Living and dead ear mites may be seen. If necessary, individual ear mites may be transferred on the tip of the scalpel blade from the cotton swab to a drop of oil on a microslide for microscopic examination. For best results a coverglass should be applied.

An electrically illuminated otoscope may be introduced directly into the ear canal for the detection of ear mites, thus making microscopic examination unnecessary.

The more rapidly-moving, larger skin mites may be captured by touching them with an oily cotton swab. This slows them down so that they may then be transferred to a drop of oil on a microslide for microscopic examination.

References for Section One will be found starting on page 169.

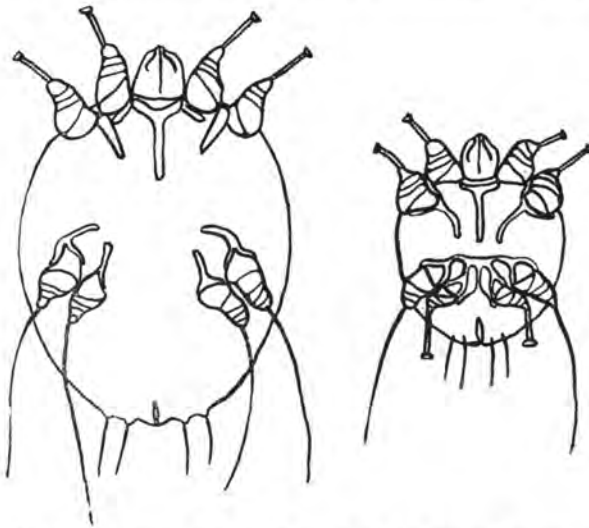


FIG. 201—Female and male mites of the genus *Sarcoptes*, drawn to show the diagnostic features listed in Table 1.

TABLE 1
MICROSCOPIC CHARACTERISTIC OF THE SARCOPTIFORM MANGE AND SCAB MITES

Group	Leg Characteristics		Anus
	Egg-laying Female	Male	
SARCOPTIC	Suckers on a long <i>unjointed</i> pedicle on pairs 1 and 2, Fig. 201	Suckers on a long <i>unjointed</i> pedicle on pairs 1, 2, and 4, Fig. 201	Terminal
NOTOEDRIC	As above	As above	Dorsal
CNEMIDO-COPTIC	No suckers, Fig. 202	Suckers on an <i>unjointed</i> pedicle on pairs 1, 2, 3 and 4, Fig. 202	Terminal
PSOROPTIC	Suckers on a long <i>jointed</i> pedicle on pairs 1, 2, and 4, Fig. 203	Suckers on a long <i>jointed</i> pedicle on pairs 1, 2, and 3, Fig. 203	Terminal
CHORIOPTIC	Suckers on a short <i>unjointed</i> pedicle on pairs 1, 2, and 4, Fig. 204	Suckers on a short <i>unjointed</i> pedicle on pairs 1, 2, 3, and 4. Pair 4 rudimentary. Fig. 204	Terminal
OTODECTIC	Suckers on a short <i>unjointed</i> pedicle on pairs 1 and 2. Pair 4 rudimentary. Fig. 205	Suckers on a short <i>unjointed</i> pedicle on pairs 1, 2, 3, and 4, Fig. 205	Terminal

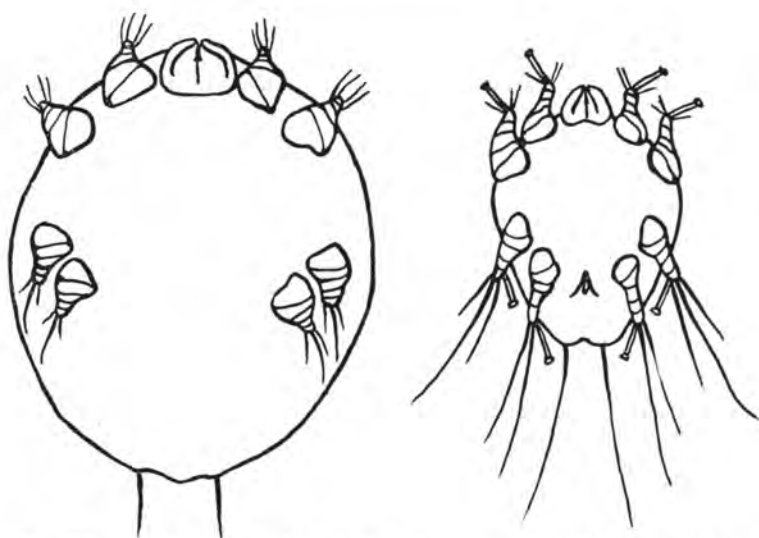


FIG. 202—Female and male mites of the genus *Cnemidocptes*, drawn to show the diagnostic features listed in Table 1.

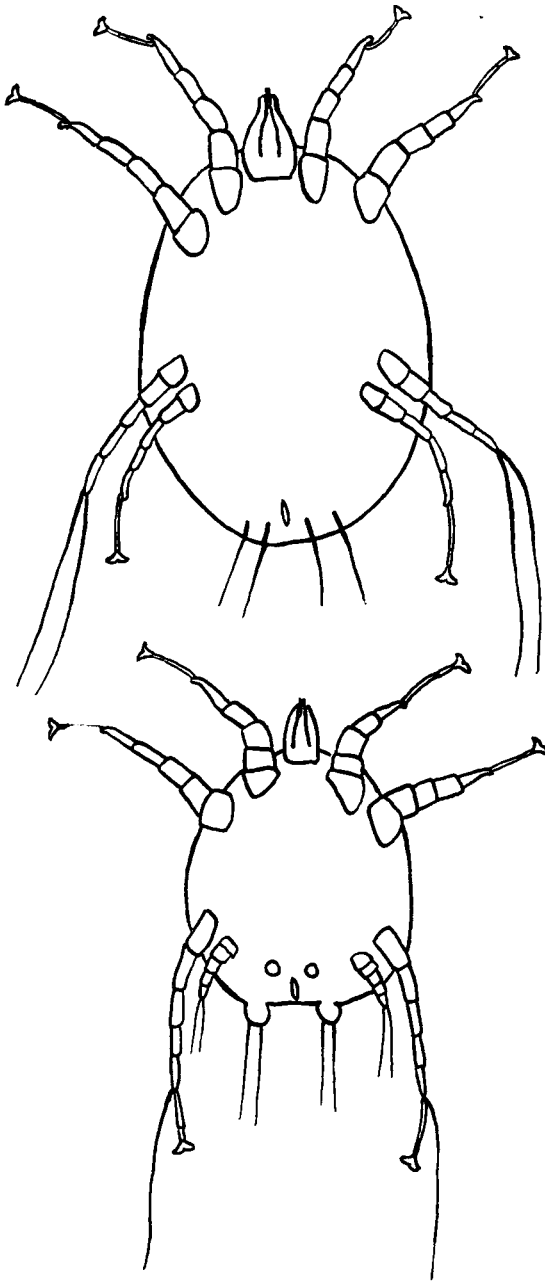


FIG. 203—Female and male mites of the genus *Psoroptes*, drawn to show the diagnostic features listed in Table 1.

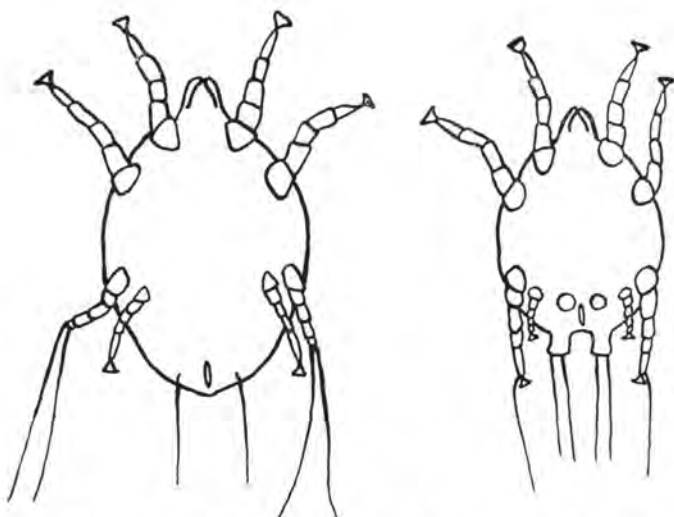


FIG. 204—Female and male mites of the genus *Chorioptes*, drawn to show the diagnostic features listed in Table 1.

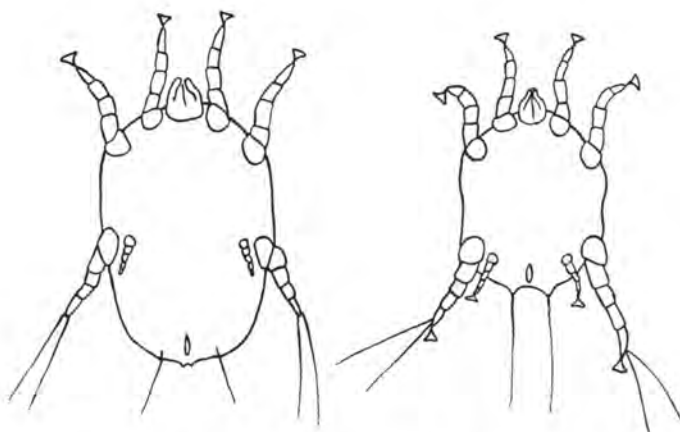


FIG. 205—Female and male mites of the genus *Otodectes*, drawn to show the diagnostic features listed in Table 1.

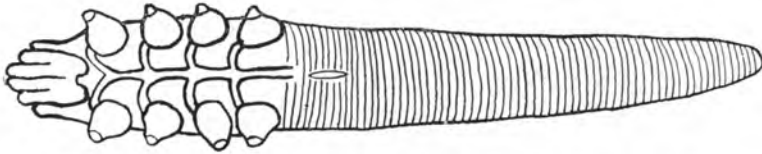


FIG. 206—Female mite of the genus *Demodex*, drawn to show the diagnostic features.

CATTLE

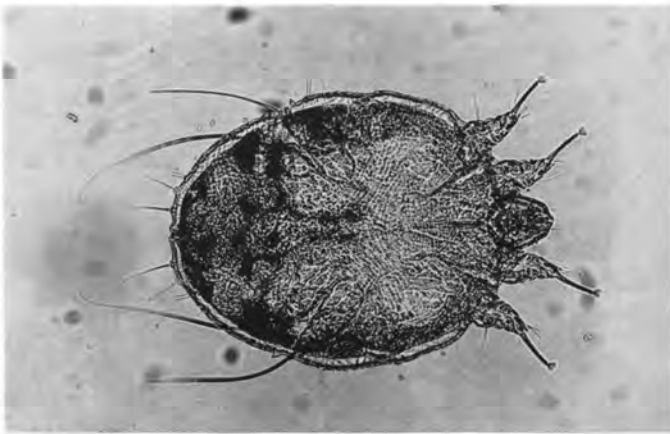


FIG. 207—Adult female *Sarcoptes scabiei* var. *bovis*, the sarcoptic mange mite of cattle. x 130.

SWINE



FIG. 208—Sarcoptic mange lesion on the hind quarter of a pig.

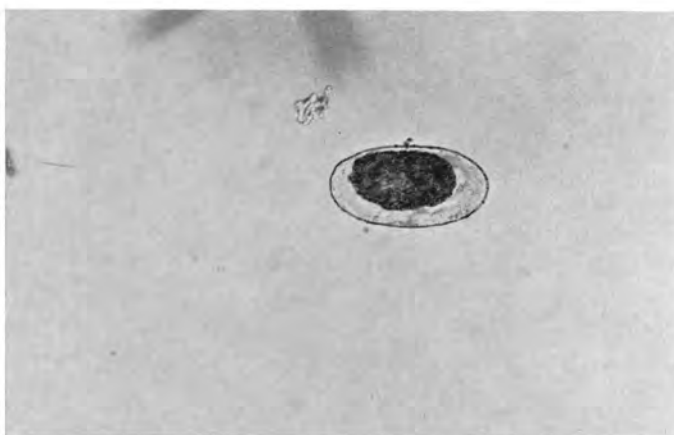


FIG. 209—Ovum of *Sarcoptes scabiei* var. *suis*, the sarcoptic mange mite of swine. x 100.

SWINE

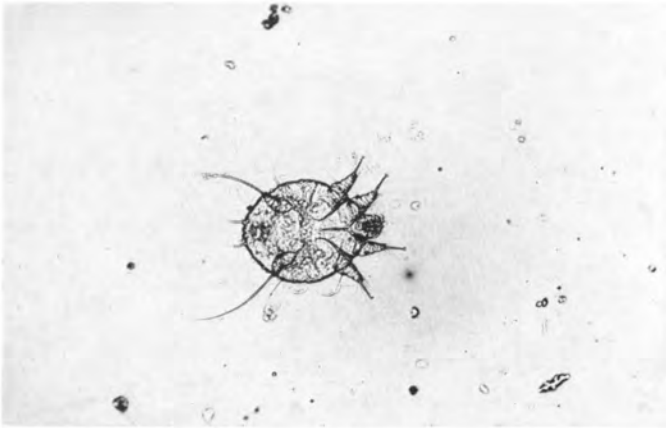


FIG. 210—Larval *Sarcoptes scabiei* var. *suis*, the sarcoptic mange mite of swine. x 100.

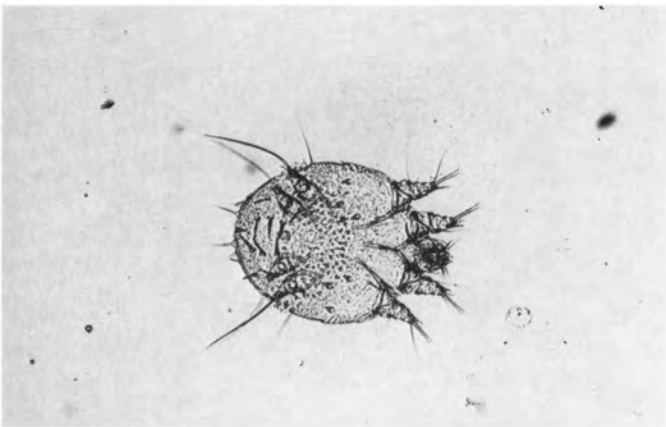


FIG. 211—Nymph of *Sarcoptes scabiei* var. *suis*, the sarcoptic mange mite of swine. x 100.

SWINE

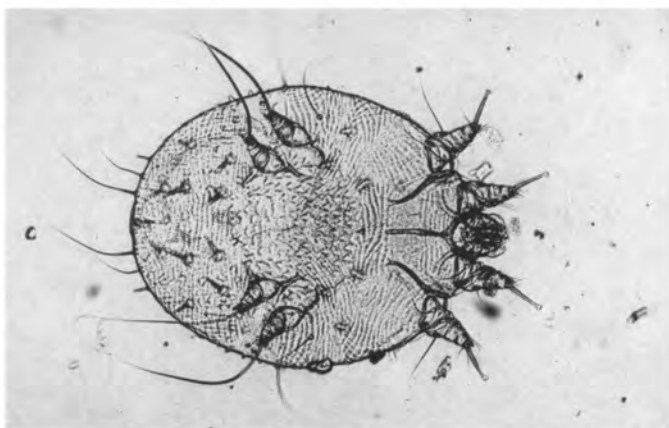


FIG. 212—Adult female *Sarcoptes scabiei* var. *suis*, the sarcoptic mange mite of swine. x 100.

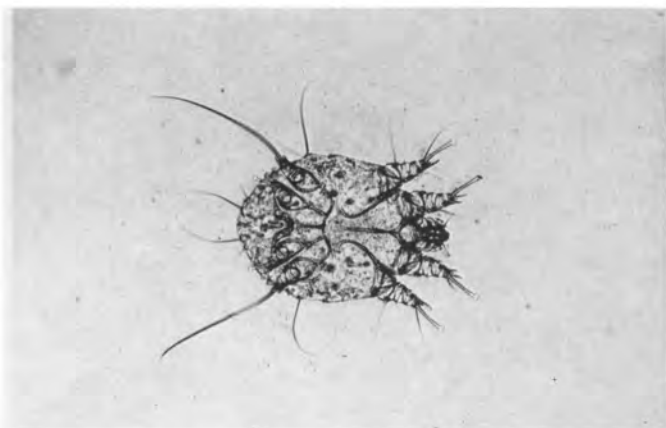


FIG. 213—Adult male *Sarcoptes scabiei* var. *suis*, the sarcoptic mange mite of swine. x 100.

DOG

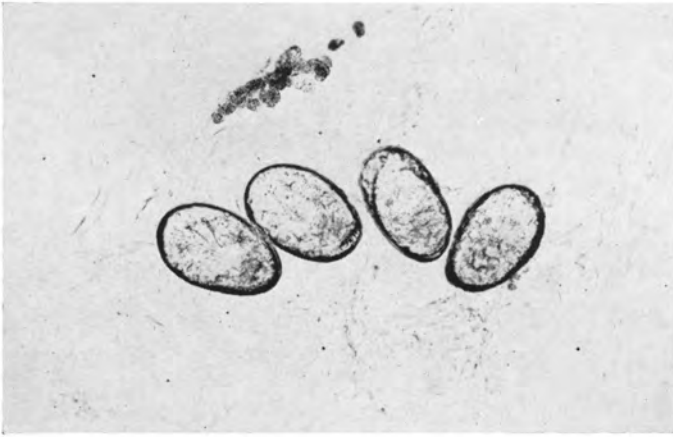


FIG. 214—Ova of *Sarcoptes scabiei* var. *canis*, the sarcoptic mange mite of dogs. x 100.

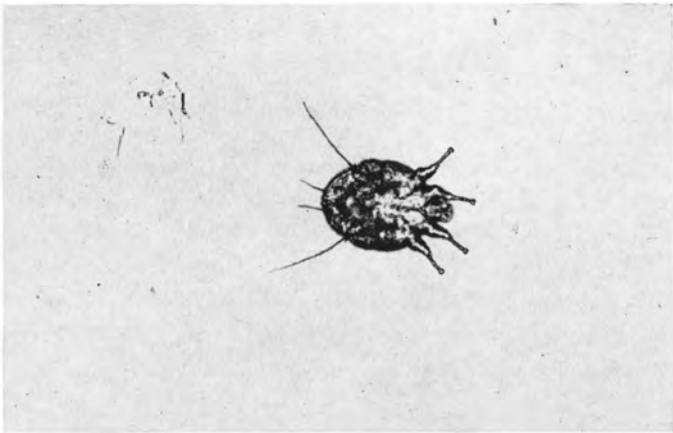


FIG. 215—Larval *Sarcoptes scabiei* var. *canis*, the sarcoptic mange mite of dogs. x 100.

DOG

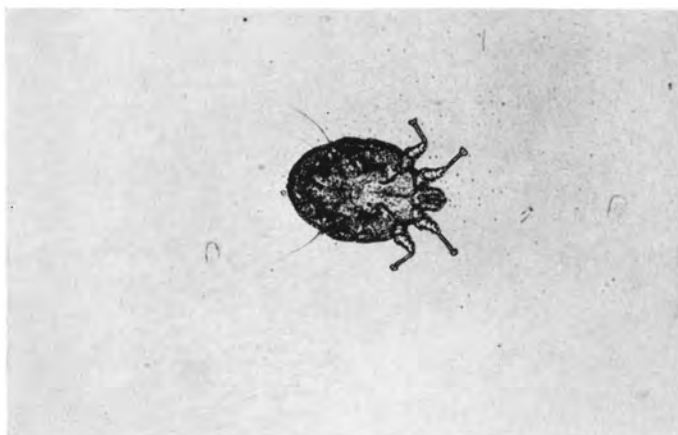


FIG. 216—Nymph of *Sarcoptes scabiei* var. *canis*, the sarcoptic mange mite of dogs. x 100.

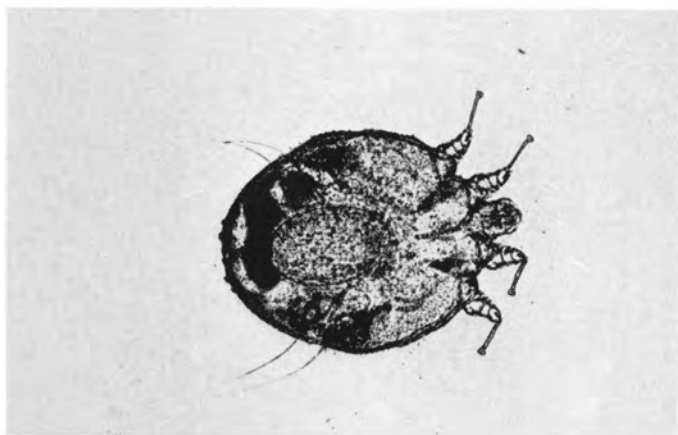


FIG. 217—Adult female *Sarcoptes scabiei* var. *canis*, the sarcoptic mange mite of dogs. x 100.

DOG

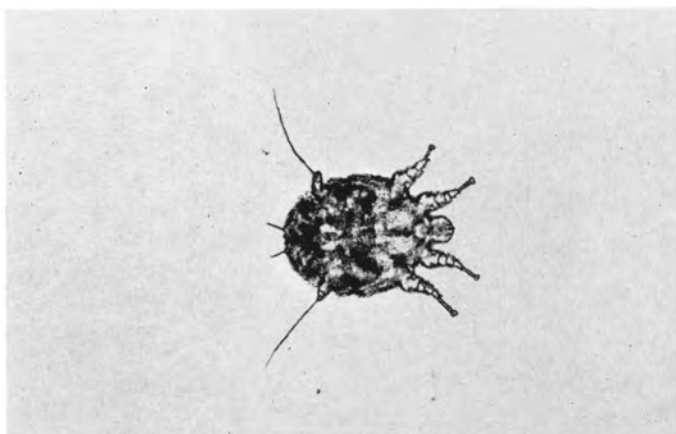


FIG. 218—Adult male *Sarcptes scabiei* var. *canis*, the sarcoptic mange mite of dogs. x 100.

CAT, FOX, RABBIT

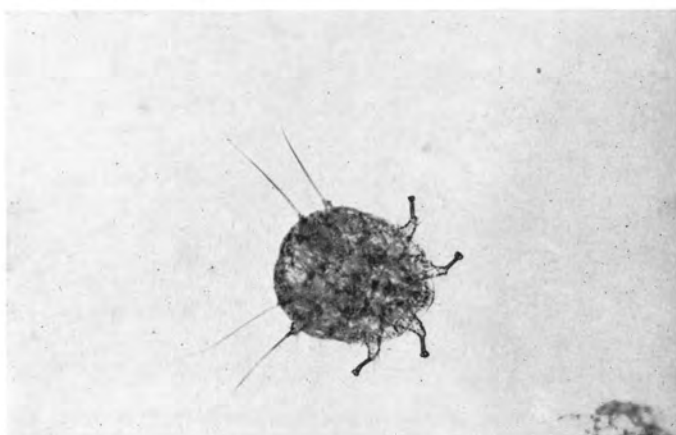


FIG. 219—Adult female *Notoedres cati*, the notoedric mange mite of cats, foxes, and rabbits. x 100.

CAT, FOX, RABBIT

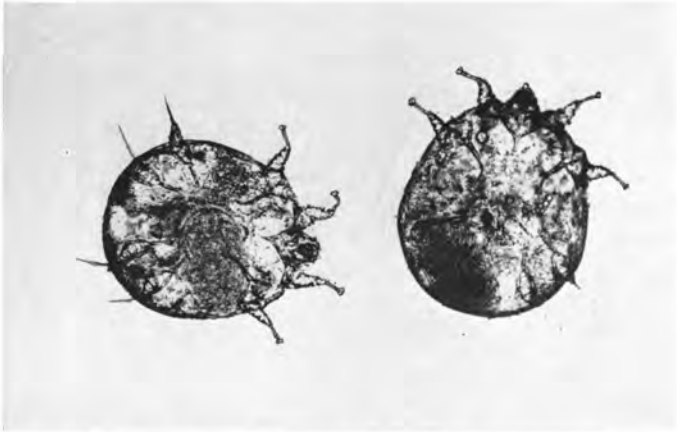


FIG. 220—Adult female **Notoedres cati**, the notoedric mange mite of cats, foxes, and rabbits. x 110.

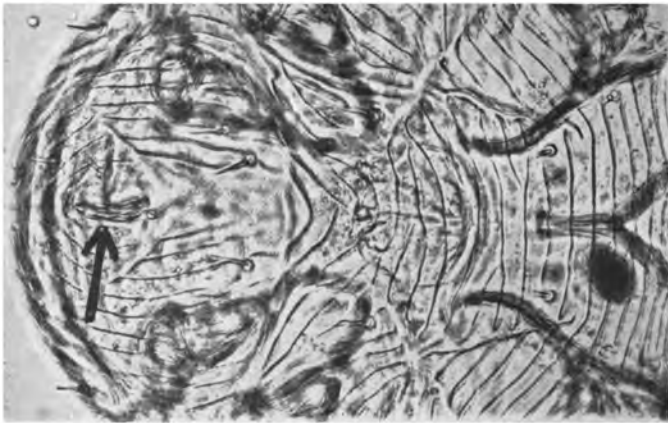


FIG. 221—Posterior dorsal abdomen of **Notoedres cati**, the notoedric mange mite of cats, foxes, and rabbits. The arrow shows the slitlike anus, located dorsally rather than terminally as in the genus *Sarcoptes*. x 410.

FOX

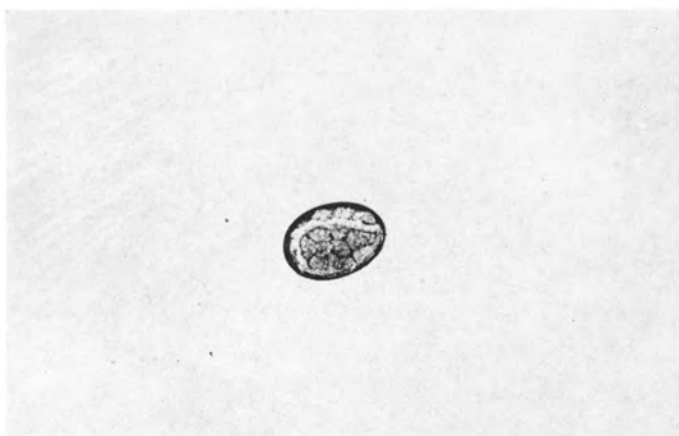


FIG. 222—Ovum of **Notoedres** sp., a notoedric mange mite of foxes. x 110.

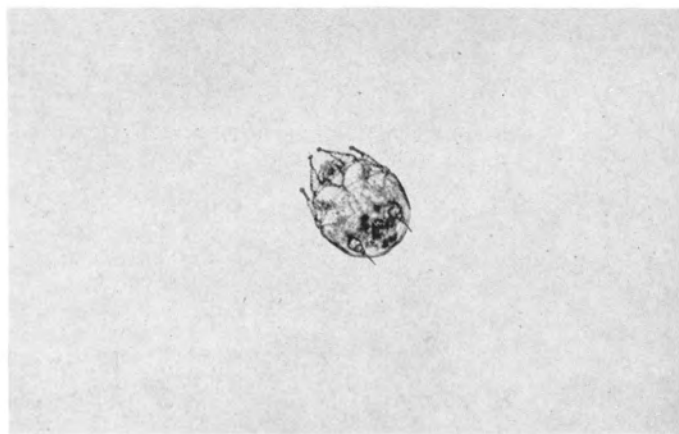


FIG. 223—Larva of **Notoedres** sp., a notoedric mange mite of foxes. x 110.

CHICKEN

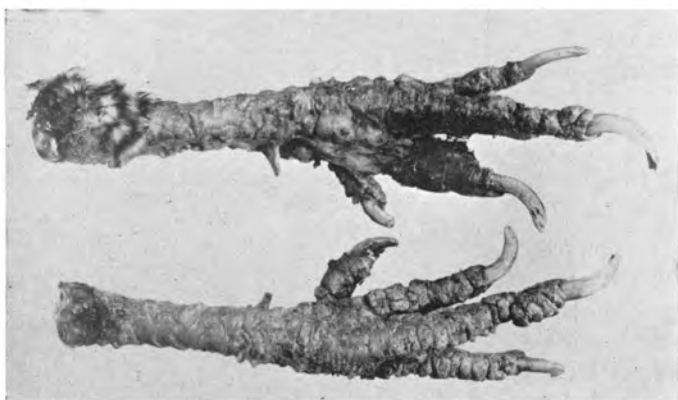


FIG. 224—Lesions of scaly-leg of poultry, caused by *Cnemidocoptes mutans*.

CHICKEN

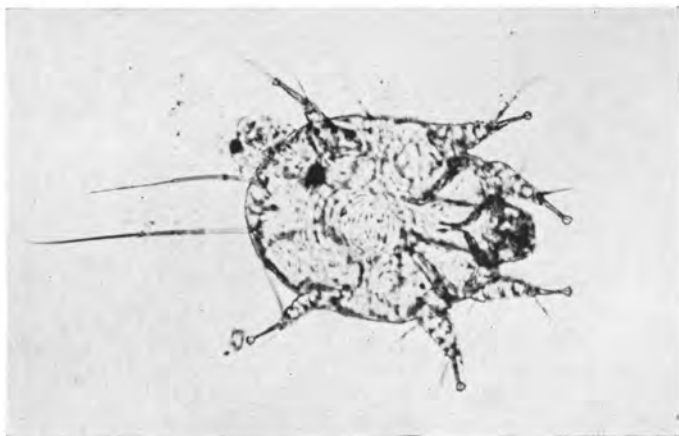


FIG. 225—Larva of *Cnemidocoptes mutans*, the scaly-leg mite of poultry. x 200.

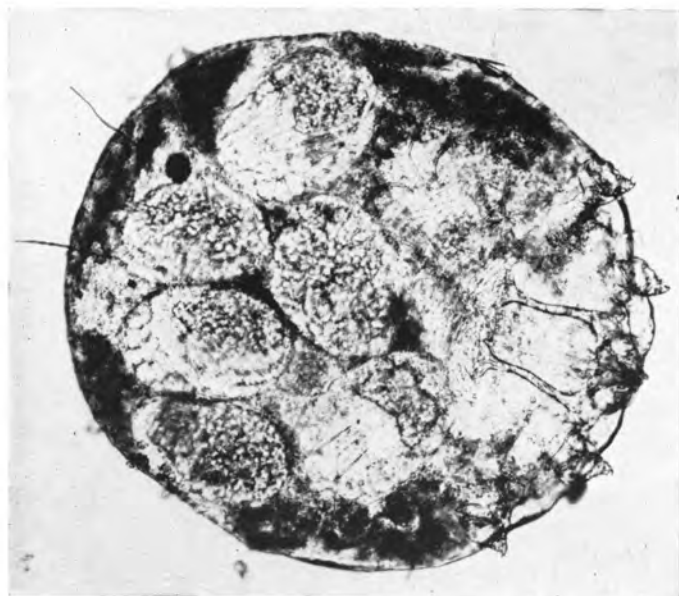


FIG. 226—Adult female *Cnemidocoptes mutans*, the scaly-leg mite of poultry. x 145.

CATTLE

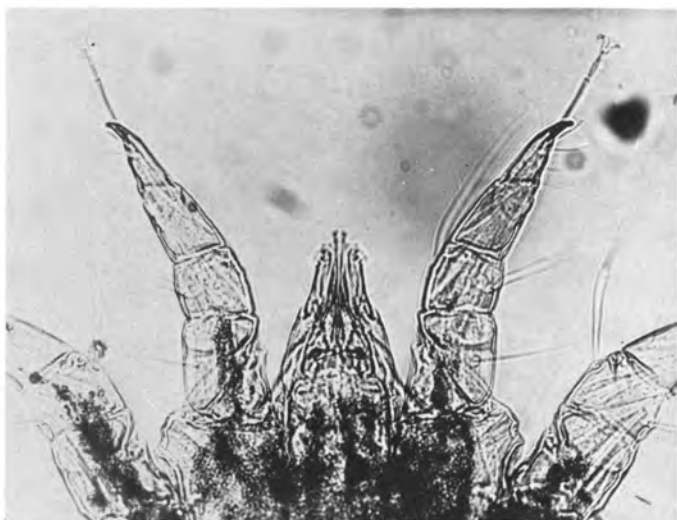


FIG. 227—Leg detail of *Psoroptes equi* var. *bovis*. The suckers are on long jointed pedicles. x 188.

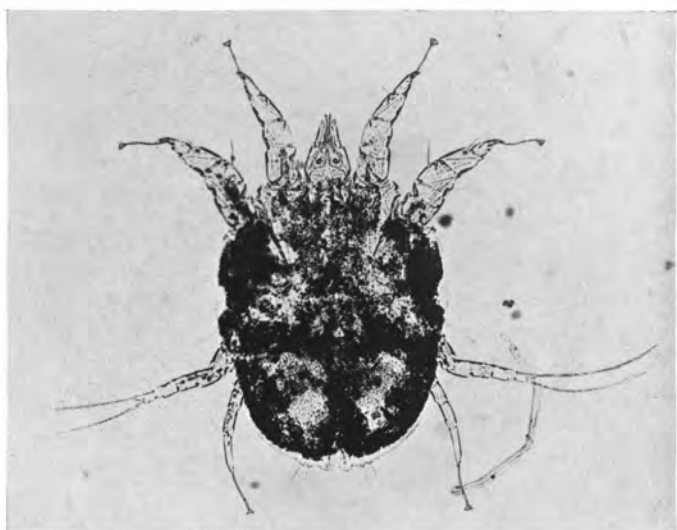


FIG. 228—Adult female *Psoroptes equi* var. *bovis*, the psoroptic or scab mite of cattle. x 80.

SHEEP

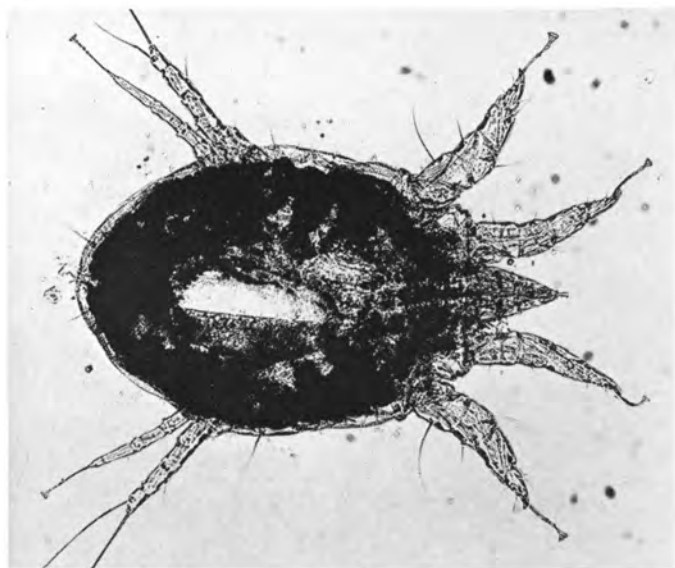


FIG. 229—Ovigerous female *Psoroptes equi* var. *ovis*, the scab mite of sheep. x 90.

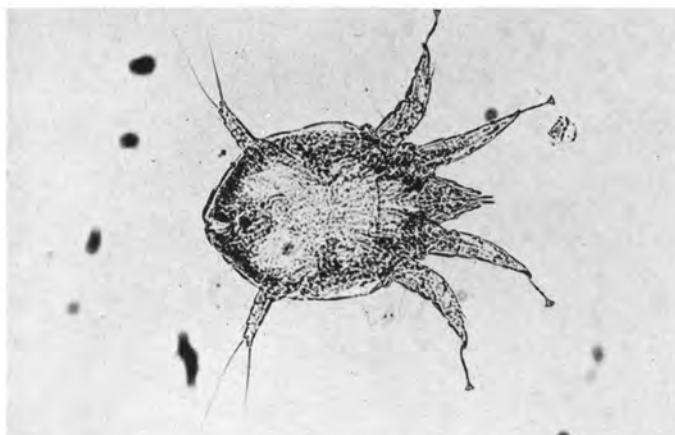


FIG. 230—Larval *Psoroptes equi* var. *ovis*, the scab mite of sheep. x 130.

SHEEP

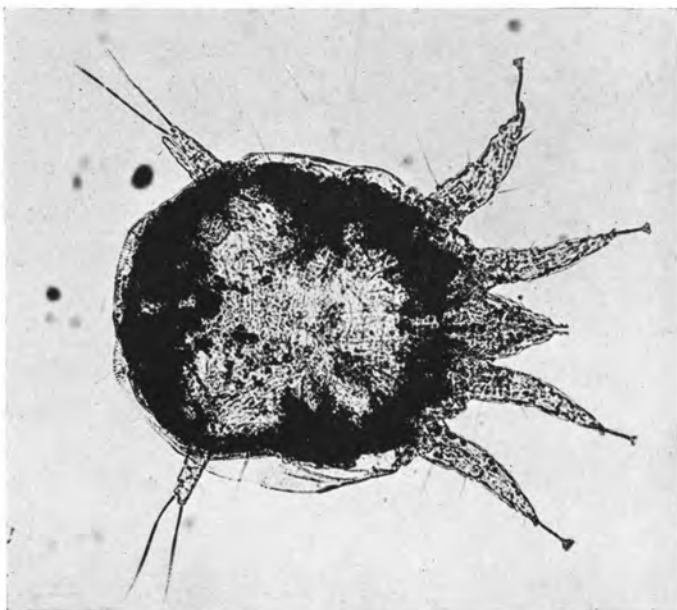


FIG. 231—Pubescent female *Psoroptes equi* var. *ovis*, the scab mite of sheep. The posterior pairs of legs are shortened until after copulation. x 120.

RABBIT

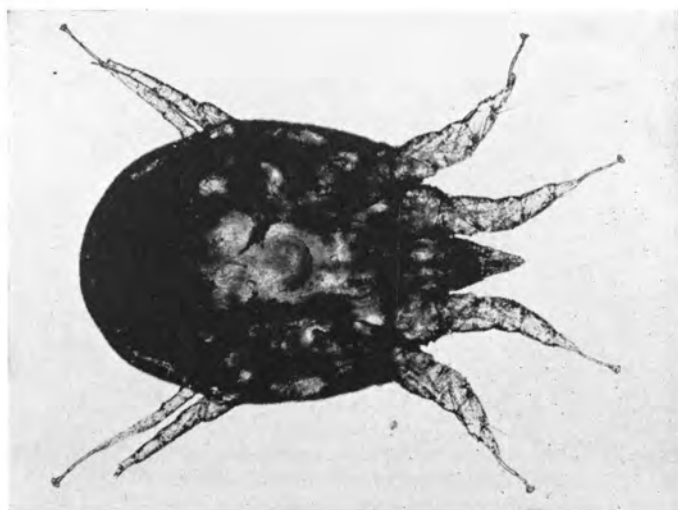


FIG. 232—Adult female *Psoroptes equi* var. *cuniculi*, an ear scab mite of rabbits. x 75.

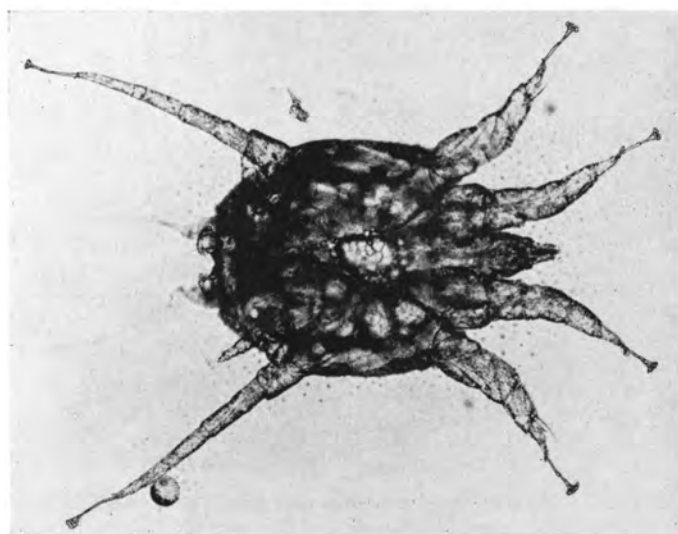


FIG. 233—Adult male *Psoroptes equi* var. *cuniculi*, an ear scab mite of rabbits. x 75.

HORSE



FIG. 234—Adult male (left) and female (right) *Chorioptes equi*, the chorioptic mange mite of horses. x 90.

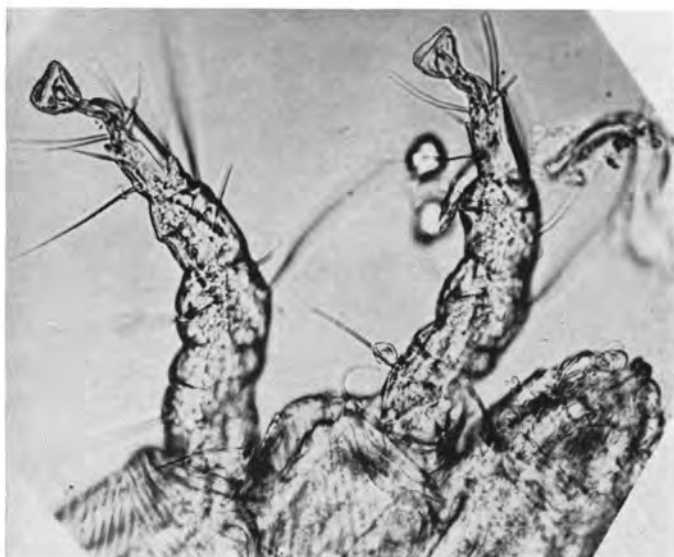


FIG. 235—Leg detail of *Chorioptes equi*. The suckers are on short, unjointed pedicels. x 350.

CATTLE

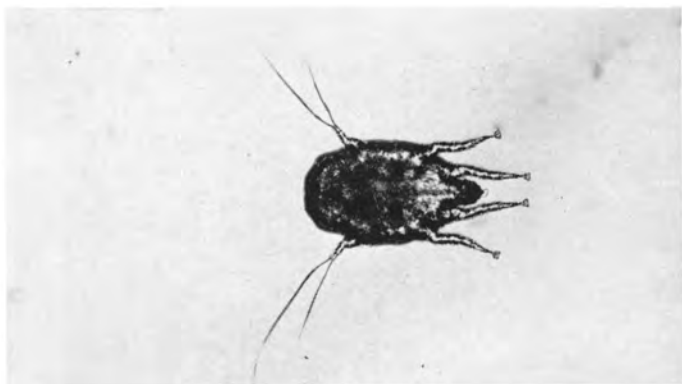


FIG. 236—Larva of **Chorioptes bovis**, the chorioptic mange mite of cattle. Note that there are only three pairs of legs in the larval stage of mites. x 100.

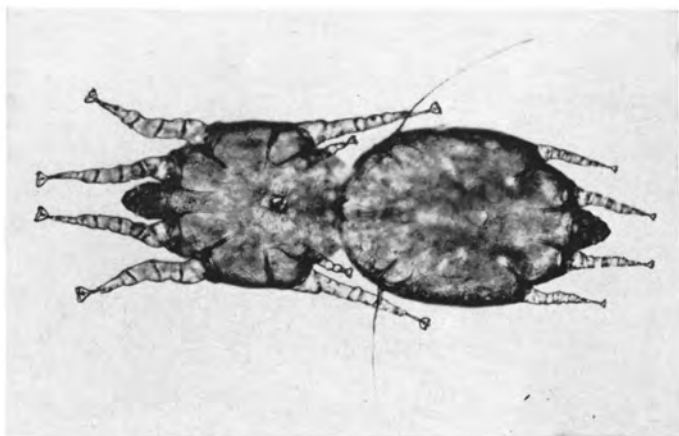


FIG. 237—**Chorioptes bovis**, the chorioptic mange mite of cattle, in copulation. x 100.

CATTLE

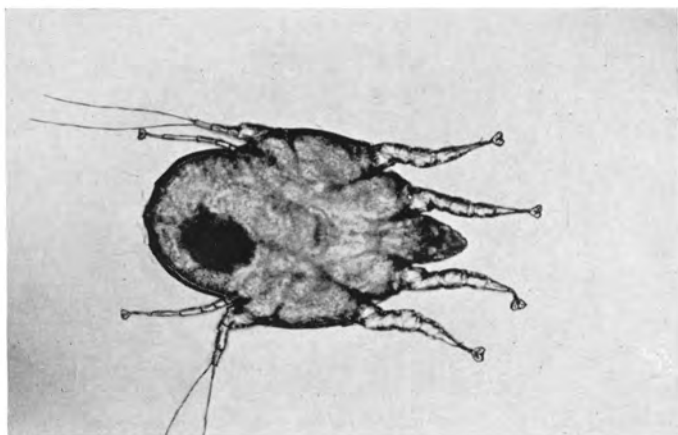


FIG. 238—Adult female **Chorioptes bovis**, the chorioptic mange mite of cattle. x 100.

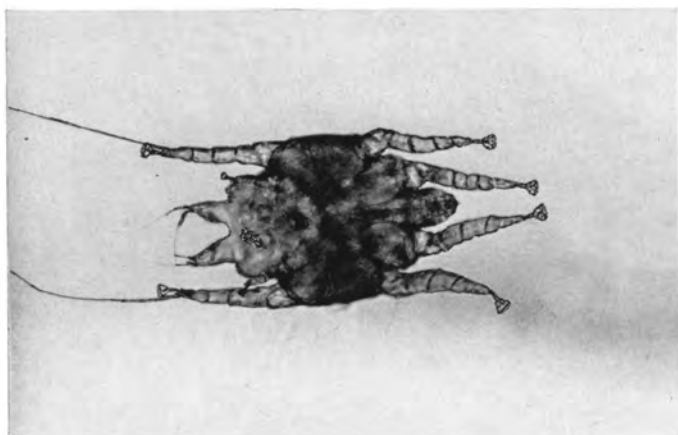


FIG. 239—Adult male **Chorioptes bovis**, the chorioptic mange mite of cattle. x 100.

DOG, FOX, CAT

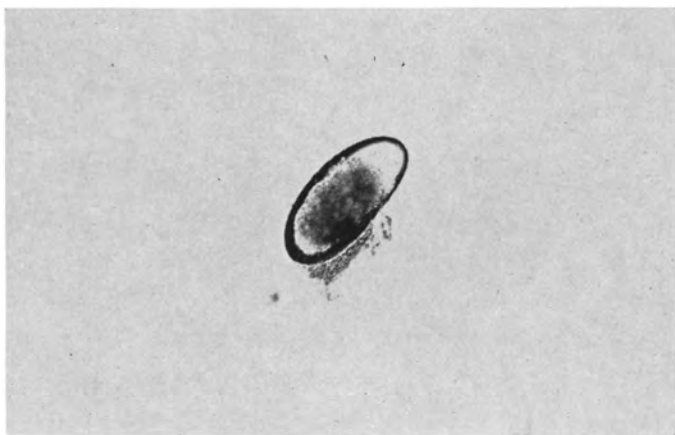


FIG. 240—Ovum of *Otodectes cynotis*, the ear mange mite of dogs, foxes, and cats. x 100.



FIG. 241—Larva of *Otodectes cynotis*, the ear mange mite of dogs, foxes, and cats. x 100.

DOG, FOX, CAT



FIG. 242—Adult female *Otodectes cynotis*, the ear mange mite of dogs, foxes, and cats. x 100.

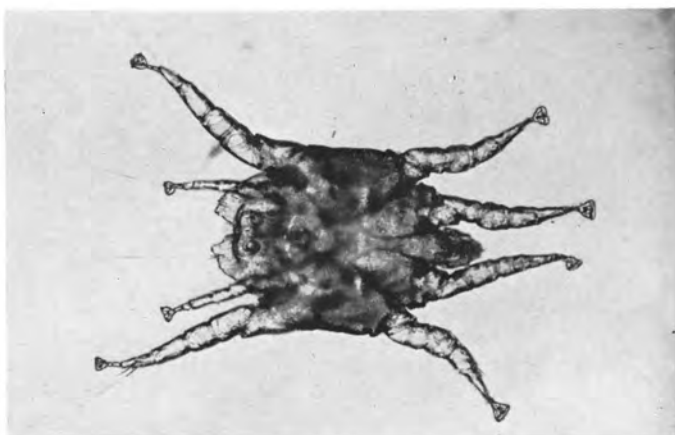


FIG. 243—Adult male *Otodectes cynotis*, the ear mange mite of dogs, foxes, and cats. x 100.

DOG



FIG. 244—Adults and an ovum (right) of *Demodex canis*, the demodectic mange mite of dogs. x 100.

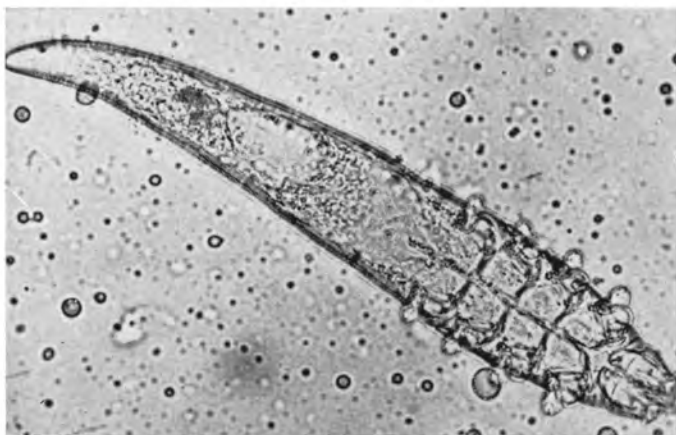


FIG. 245—Adult female *Demodex canis*, the demodectic mange mite of dogs. x 410.

POULTRY

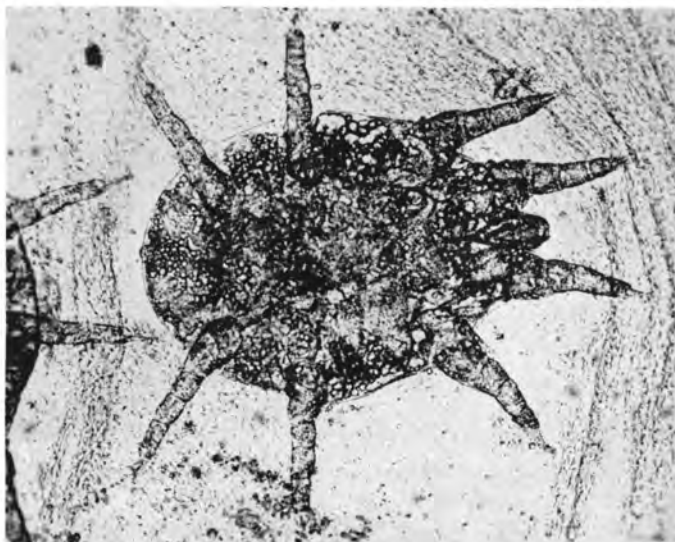


FIG. 246—Adult female *Cytodites nudus*, the air-sac mite of poultry. A portion of an air-sac appears in the background. x 100.

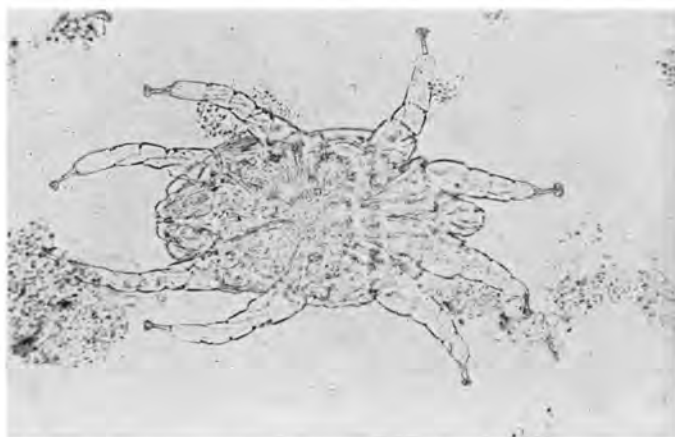


FIG. 247—Adult male *Cytodites nudus*, the air-sac mite of poultry. x 100.

MAMMALS, POULTRY

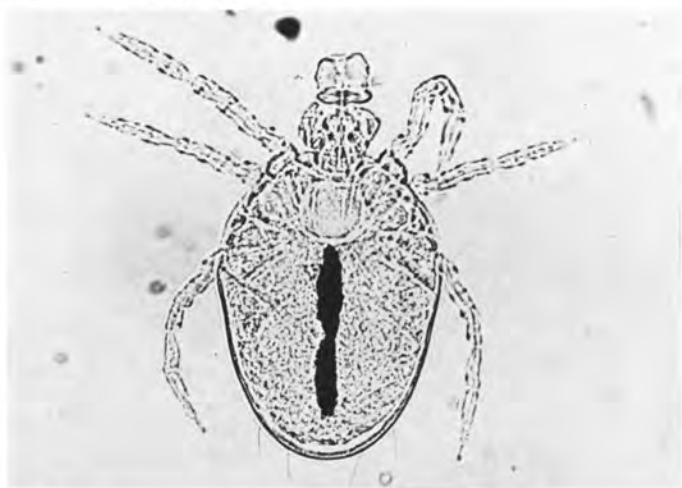


FIG. 248—Larva of *Eutrombicula alfreddugési*, the chigger mite of mammals and poultry. x 130.

PIGEON

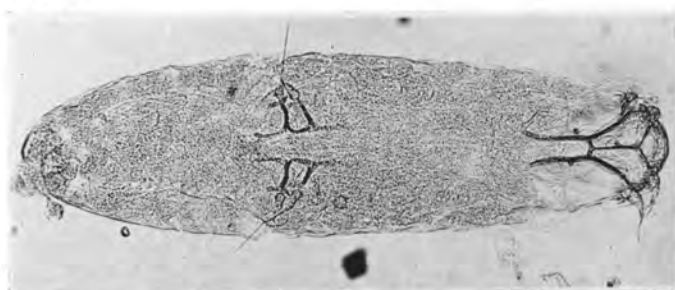


FIG. 249—*Falculifer rostratus*, nymph, from subcutis of a pigeon. x 60.

POULTRY

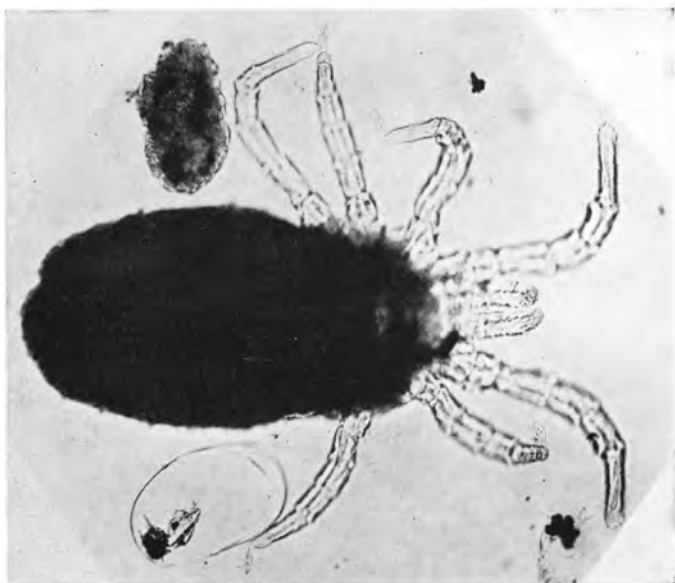


FIG. 250—Adult female *Dermanyssus gallinae*, the common red mite of poultry. x 65.



FIG. 251—Adult female *Bdellonyssus sylviae*, the northern feather mite of poultry. x 75.

CATTLE

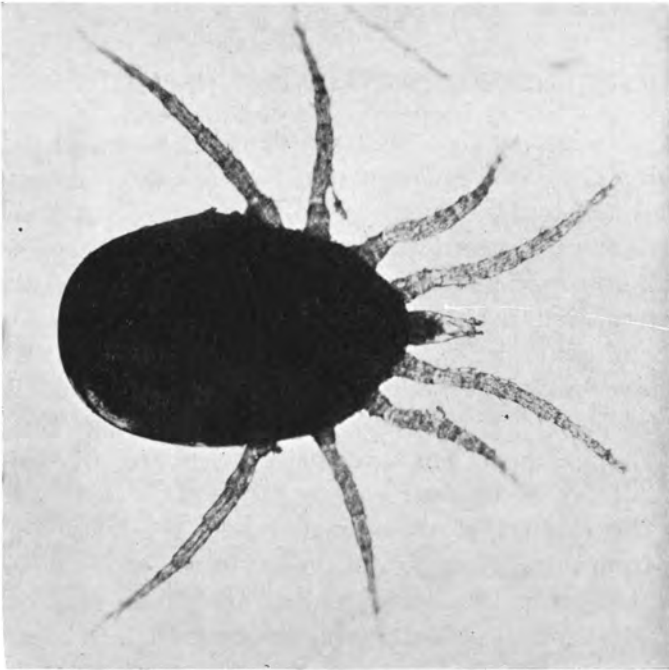


FIG. 252—Adult female *Raillietia auris*, a rarely reported ear mite of cattle. From the tympanic membrane of a steer at Ames, Iowa, March 10, 1925. x 35.

DOG



FIG. 253—*Pneumonyssus caninum*, the frontal sinus mite of dogs. Adults and larvae are seen; also an ovum at the lower left. Note the millimeter scale below the mites. x 7.