

into the cæcum, and finally that any remaining inflammation may subside completely before the abdomen is opened. It is interesting to note that when inflammation has been excessive, an operation undertaken a number of weeks afterward will find the adhesions thin and weak. It may be expedient to wait even longer, but such a waiting should be permitted only when the patient is directly under the eye of the surgeon, who can intervene at any moment, should another attack occur.

As the steps of the operation have already been described, it will not be necessary to go over this ground a second time. I will simply add that in these chronic cases, especially if the inflammatory attacks have been of a somewhat severe character, it is often a difficult matter to find the appendix, or, if we do find it, to recognize at what point its free end lies. In such cases, the shortest way is probably to divide the appendix across, between two pairs of artery forceps, and then to work each end free from adhesions. In this way there will be no special difficulty in reaching the point where the appendix springs from the cæcum. Whenever this can be done we should cover raw surfaces over with peritoneum.

L. McLane Tiffany.

**APYONIM.**—This is a yellow, crystalline powder, introduced as a substitute for auromine (yellow pyoktanin) in ophthalmic practice. It is slightly soluble in water, freely in alcohol, and it is used in one-per-cent. aqueous solution as an antiseptic and stimulant in conjunctival disease, and in purulent keratitis.

W. A. Bastedo.

**AQUIFOLIACEÆ** or **ILICINEÆ.**—(The Ilex or Holly family.) A family of three genera and some two hundred species, chiefly of North and South America. It is chiefly notable for the presence of an appreciable amount of caffeine in the leaves of at least two species, on account of which they have been used as beverages (see *Maté* and *Cassine*). Other species have been used as bitter tonics and alteratives (see *Alder*, *Black*, and *Holly*).

H. H. Rusby.

**ARACEÆ** or **AROIDEÆ.**—(The Arum family.) A large family, of more than one hundred genera, growing mostly in the tropics of both hemispheres. Many species, as the cultivated *calla*, are highly ornamental. *Calocasia* produces an important starch-yielding corm, *monstera*, an edible fruit. Many of the tropical species are known as poisons, but their constituents and actions are little known. It is remarkable that a few northern species in the genera *spathyema*, *acorus*, *arum*, and *arisæma*, should represent about all the medicinal contributions of the family, and more active agents may be expected to be made known in it in future.

H. H. Rusby.

**ARACHNIDA.**\*—In the branch or phylum Arthropoda, characterized by bilateral symmetry, by metameric segmentation of a heteronomous type, and by the possession of jointed appendages, typically a single pair for each metamere of the body, may be distinguished five great groups: the Crustacea, including crabs, lobsters, water fleas, etc.; the Onychophora, including but a single genus, *Peripatus*; the Myriapoda, including millipedes, centipeds, etc.; the Insecta, including the true insects; and the Arachnida or Arachnoidea. The latter may be defined as air-breathing arthropods, characterized by the fusion of head and thorax into a single region, the cephalothorax, which is without antennæ, but bears two pairs of appendages more or less closely connected with the mouth, and four pairs of walking legs. The abdomen, which may or may not be segmented, is usually distinct from the cephalothorax, though in the mites it is fused with it.

The class Arachnida is subdivided by various authorities into from seven to nine orders, among which are the

\*A general discussion of parasitism and its effects will be found under the heading *Parasites*.

Scorpionida or true scorpions, the Pseudoscorpionida or book-scorpions, the Phalangida or "Daddy Long-legs," the Araneida or true spiders, the Acarida or mites, and the Linguatulida.

The true scorpions have the power to inflict a painful wound by the sting located at the tip of the abdomen. In the case of large tropical species the effect of the sting may even cause the death of small children, but only in the most exceptional cases does it seriously affect an adult. There is injected at the time a quantity of poison from a gland in the last joint of the abdomen; its action is in general to irritate nerve centres while at the same time producing paralysis of motor nerves. The sting of the smaller species found in the United States is harmless, giving rise to a slight irritation, which lasts at most seven or eight days. Mr. Herbert H. Smith, the well-known collector in South and Central America and the West Indies, after enumerating symptoms and results in a number of carefully observed instances, says: "Probably death might result in some cases, as (if reports are true) it does, rarely, from bee stings. . . . My wife was stung by a small one; the wound was exceedingly painful. By the advice of a servant, she held the finger for an hour in hot sweet oil, mixed with an equal measure of laudanum. There was no swelling and three hours after all pain had left her."

Among the spiders also there are those that are able to pierce the human skin by the action of the jaws or chelicere which also contain the orifices of a pair of poison glands. The effect of a spider's bite on an adult has, however, been much exaggerated; of itself the bite produces at most a slight dermal swelling which soon disappears. The large hairy theraphosids, popularly known as tarantulas, are not to be called dangerous. Their bite is painful, but the inflammation, though often violent, subsides rapidly. On the other hand, several cases on record of death from spider's bite have been traced to a small spider (*Latrodectus mactans*) which is related to supposedly poisonous species in other countries of the world, and it is not unlikely that the spiders of this genus secrete a more powerful fluid than others. The condition of the patient, his susceptibility to poison, and other important facts are not on record in these cases, and it may happen that the chance introduction of extraneous matter through the bite has given rise to the more serious and rarely to the fatal results noted. There are no spiders in this country of which it may positively be affirmed that they are venomous, though certain South American species enjoy an evil reputation which is undoubtedly well founded.

**Order LINGUATULIDA.**—The highly modified forms included in this group have a certain superficial resemblance to tapeworms, from which, however, they differ radically in structure. Their closest affinities are doubtless to be found among the arachnids of which they are here considered as an order.

The body (Fig. 243) is elongate, cylindrical or flattened; the anterior end (cephalothorax) is more or less clearly marked off from the rest (abdomen), which is subdivided by annulations variable in number and distinctness. At the blunter, anterior end the mouth is located on the ventral surface and provided on either side with two protractile hooks, contained in sheaths or pockets. These hooks represent the mouth parts of other arachnids,



FIG. 243.—Linguatula rhinaria, female. Natural size. (After Braun.)

while other appendages are entirely lacking. There is no special respiratory apparatus, and the so-called stigmata are but the orifices of dermal glands. At the posterior end may be found the anal opening. The linguatules are of separate sexes, the males being much the smaller. The female genital pore is located

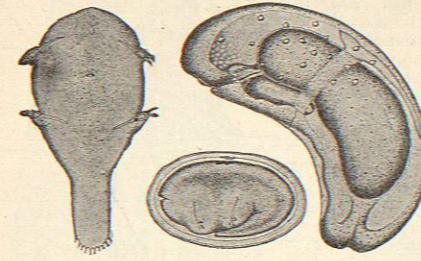


FIG. 244.—Linguatula rhinaria; Stages of Development. (After Leuckart.) a. Egg with embryo; b. free embryo; c. nymph or pupa. Magnified.

near the anus, the male on the ventral surface near the anterior end of the abdomen. The adults live in the nasal cavities and lungs of mammals or reptiles, and the eggs, produced here in large numbers, must be imported by chance into a suitable secondary host in which they give rise to tetrapod, acariform embryos (Fig. 244, b) that metamorphose into a second stage (nymph, Fig. 244, c), manifesting the main features of the adult. By a migration usually semi-passive, this form reaches the primary host and attains full development in it.

**Linguatula Fröhlich.**—Body flattened, with arched dorsum and crenated margins. Body cavity extending into the lateral regions of the rings (pectinate).

**Linguatula rhinaria Pilger = Pentastoma tenuoides Rud.**—Larva = *P. denticulatum* Rud. and *P. serratum* Fröhlich.—Body lanceolate, attenuated posteriorly; head rounded, annuli circa 90, hooks acuminate, enlarged toward the base, with basal joint elongated proximad. Female 80–100 mm. long, 8–10 mm. broad anteriorly, 2 mm. posteriorly. Male 18–20 mm. long by 3 mm. broad, decreasing to 0.5 mm.

The adult inhabits the nasal cavities of many mammals, particularly the carnivora, among which the dog is perhaps most commonly infested. The larva occurs in the viscera of the herbivorous mammals. The masses of eggs containing well-developed embryos are deposited by the adult female in the nasal mucus and distributed over grass, etc., with which they are swallowed chiefly by rabbits, but even, as on salads, by man himself. Hatched in the stomach the larva penetrates the intestinal wall and encyst in liver or mesentery, where after several ecdyses covering a period of from five to six months, they reach the second stage, characterized by the rows of retrorse spines on each annulus. From the liver they may, as some maintain, wander out actively and if eaten by a dog reach the nasal cavities directly; or they may await the consumption of the flesh by some carnivorous form, in which case they are set free in the stomach and wander through the tissue to the lung and thence by the air passages to their final location. Some authorities deny the possibility of the larva deserting its cyst and wandering out, and maintain that the transmission is always passive.

Rare instances of the occurrence of the adult in man are on record, probably due to the consumption of poorly cooked flesh (mutton) containing the larvæ. The larva (Fig. 245) has been reported frequently as a human parasite, chiefly from Germany and Austria. Most commonly found in the liver, it has also been met with in other viscera. Here it occurs in sharply defined yellow tumors, embedded in the substance of the liver or protruding somewhat from its surface. The tough capsule contains caseous or calcareous contents, and

varies in diameter from about 1 cm. to the size of a pea. The capsules are less frequently found scattered irregularly over the surface of the peritoneum. The parasite is probably innocuous, as its presence has not been suspected previous to autopsies, at which Zenker found it in Dresden 9 times in 168 cases, Heschl at Vienna 5 times in 20; Klebs at Basel, however, only twice in 1,914 cases. I have found no records of its presence in man in this country, although it has been reported rarely from other hosts (rabbit and cattle).

**Porocephalus.**—Body cylindrical; body cavity continuous.

**Porocephalus moniliformis** Diesing.—Larva = *Pentastomum constrictum* von Siebold. Annuli about 20, separated from one another by a wide interval. Female 70–95 mm. in length, 6–7 mm. broad, male 13–17 mm. in length.

The adult is very incompletely known; it occurs in the African pythons. The larva has been reported from monkeys and the giraffe. It has also been found several times at autopsies of negroes in Egypt and even of English soldiers in African colonies. Since it was found encysted in the liver, and death resulted from peritonitis, there is room for the belief of some authorities that the parasites could not have been the cause, but were merely accidentally present in these cases.

**Order ACARIDA.**—The mites are throughout of small size, even the largest ticks attaining a length of only half an inch and the majority being but a fraction of this. The body is circular or oval in outline, with flattened ventral surface and arched dorsal. Ordinarily it manifests no separation into parts, though in some forms a distinct groove makes two regions distinguishable. While the skin is commonly marked by transverse striations or folds, traces of metameric segmentation are only rarely to be found. The chitinous covering is frequently provided with plates or shields, and bristles are characteristically present. A small projection (rostrum or capitulum) carries the mouth parts, which are often more or less fused into a beak and modified for biting, piercing, or sucking. As mouth parts are distinguished (1) the mandibles or chelicere; (2) maxillipeds or pedipalpi, the most prominent part of which are the maxillary palps, jointed, highly mobile structures, located at the sides of the mandibles. The lower lip (hypostome), anterior and inferior to the maxilla, is ordinarily fused to their bases.

The four pairs of legs, composed of from three to eight joints each, are terminated by claws, bristles, or suckers of various sorts. They may be attached directly to the skin or reinforced by a chitinous framework (epimeres) which may join to form a median ventral ridge (sternum). A special respiratory (tracheal) system is lacking in most parasites, though present in some; it opens by paired stigmata with sieve-plate coverings (peritremes) the location of which is characteristic for various groups. Eyes are also usually wanting in the parasitic forms.

The separate sexes may be distinguished generally by difference in size; in some forms a marked sexual dimorphism exists. The genital orifice is surrounded by the epandrium and in the female as the epigynum. The vulva serves as birth opening, whereas a special copulatory orifice occurs at the posterior end of the abdomen. The acarida are usually oviparous, and from

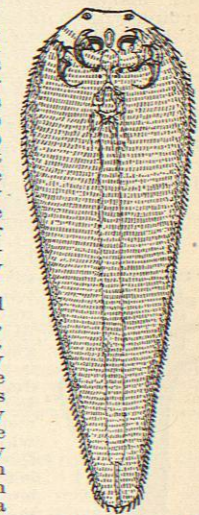


FIG. 245.—Linguatula denticulata, Larva of L. rhinaria. (After Leuckart.) Magnified.

the egg emerges a hexapod larva which metamorphoses into an octopod nymph, and finally by the development of the sexual organs becomes adult. This metamorphosis is accompanied by a variable number of moults, and in the Sarcoptidae by histolysis and complete regeneration of the animal at each ecdysis.

The following table, taken from Railliet, will be convenient in recognizing the various sub-orders and families:

Body elongated, vermiform.	No tracheae. Legs with epimeres.	Two pairs of legs. Palpi unarmed. Mandibles styliform.	Phytoptidae.
		Four pairs of legs. Palpi unciniate. Mandibles styliform.	Demodicidae.
Body compressed. Acarina.	No tracheae. Legs with epimeres. Tracheae opening in the anterior portion of the body, atrophied in the aquatic forms.	Palpi joined at base, unarmed. Mandibles chelate.	Sarcoptidae.
		Palpi free, unarmed, antenniform. Mandibles chelate.	Bdellidae.
		Palpi free, armed (rapae).	Marine: Halacaridae. Freshwater: Hydrachnidae. Terrestrial: Trombididae.
		Palpi free fusiform, mandibles chelate.	Oribatidae.
		Palpi free, filiform or valvate. Mandibles, pseudo-chelate.	Ixodidae.
Tracheae opening in the posterior portion of the body, at the base of the legs, sometimes atrophied.	Palpi free, filiform. Mandibles chelate.	Gamasidae.	

**Demodicidae** (the Follicle Mites).—Small, elongated mites; anterior region undivided, in adult with rostrum and four pairs of short legs; the posterior transversely striated, without appendages. Tracheae, stigmata, and eyes wanting. No marked sexual dimorphism. Oviparous. Larva without legs or with three pairs of tubercles, nymph with four pairs of rudimentary legs. Parasites of hair follicles and sebaceous glands of mammalia. Only a single genus with several species.

*Demodex folliculorum* (G. Simon).—*D. foll. var. hominis* auct.; *Statozoon foll.* E. Wilson. Rostrum short, anterior region of body approximately one-third of total length. Egg cordiform. Male 0.3 mm. long, 0.4 mm. broad; female 0.38 mm. by 0.045 mm.

This form, which presents a characteristic appearance (Fig. 246), is a common parasite of the sebaceous glands of the human skin. It is easily discovered in the sebum from the glands of the nose, lips, and forehead; also in the ceruminous and Meibomian glands, and from the abdominal and pubic regions. Normally the mites rest in the gland, head inward (Fig. 247), and but a few are present in each gland; occasional increase in numbers is said to give rise to stoppage of the duct and from five to twenty may be found in a comedo plug. The statements of some authors, according to which these parasites occur in two-thirds of the persons examined, are held by other investigators to be far beyond the usual percentage of infection. Precise data are lacking. Henle, who discovered this species in 1841, obtained living specimens of the mite from a cadaver six days after death. In spite of the fact that this species is difficult to distinguish from related forms of the dog, cat, and other domestic animals, with a single doubtful exception, no case of infection transmitted in either direction is on record, and all efforts to accomplish this experimentally have failed.

Although *D. canis* gives rise in the dog to a serious dermal disease (Fig. 247) which is rather difficult to

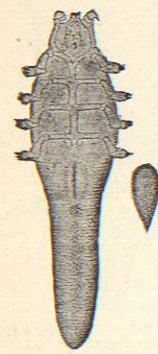


FIG. 246.—*Demodex canis*. Ventral view of female and of egg.  $\times 100$  diameters. (After Mègnin.)

handle, no similar difficulty is reported for man with *D. folliculorum*, even in the case of those individuals habitually regardless of personal cleanliness; and an etiological relation between these mites and acne, as maintained by various observers, has not been satisfactorily demonstrated.

**Sarcoptidae**.—Small, pale mites, with soft body, not elongated, separated into two regions by a more or less distinct transverse groove. Mandibles chelate, maxillary palpi styliform. Four pairs of five-jointed legs with epimera, in two groups corresponding to the regions of the body, terminal joints (tarsi) with one or two claws, a sucker, or both, or with long bristle. Tracheae wanting. Sexual dimorphism general. Metamorphosis with hexapod larva and two nymphs, often complicated by the appearance of a hypopial nymph.

Of the seven sub-families only the Sarcoptinae or itch mites, and the Tyroglyphine or cheese mites, are of importance here.

**Sarcoptinae** (the Itch Mites).—Parasitic mites with transversely striated integument, with campanulate pedunculate tarsal sucker, often atrophied and replaced by bristles on the third and fourth pairs of legs. Vulva transverse. Found in the skin of mammals and birds, where they produce the various forms of scab and itch.

**Sarcoptes** (the Itch Mite of Mammals).—Body round or slightly oval. Rostrum short, and thick; posterior feet entirely or nearly hidden by the body. Tarsal suckers with long, simple peduncle; in female on the first and second pairs of legs, in the male also on the fourth pair. Anus terminal.

Some authors distinguish but a single species with numerous varieties; it seems better, however, in spite of the often insignificant and in part inconstant specific differences thus far known, to follow the later authorities in regarding these forms as different species, even though physiological characters must still be used in part for

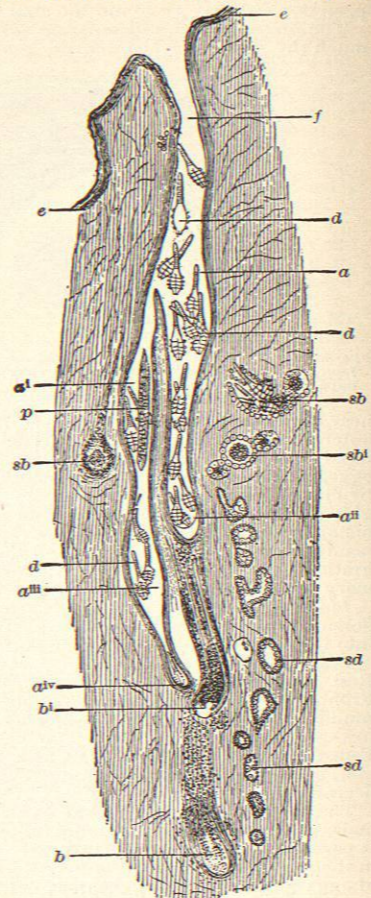


FIG. 247.—Transsection of Skin of Dog, Showing *Demodex canis* in Position in Hair Follicle and also in Sebaceous Gland. (After Laulanic, from Neumann.) e, Epidermis; f, hair follicle containing two hairs, p, the bulbs of which can be distinguished at b and b'; at the points, a, a', a'', a''' and a'', the follicle has undergone dilatation, by reason of the accumulation of the follicle mites; d, sb, sebaceous glands, one of which (sb') contains the mites; sd, sudoriferous glands.  $\times 40$  diameters.

their distinction. They apparently do not interbreed, and certainly are permanent only on the appropriate host from which in some cases they cannot be transferred to any other, even for a short time, though usually such

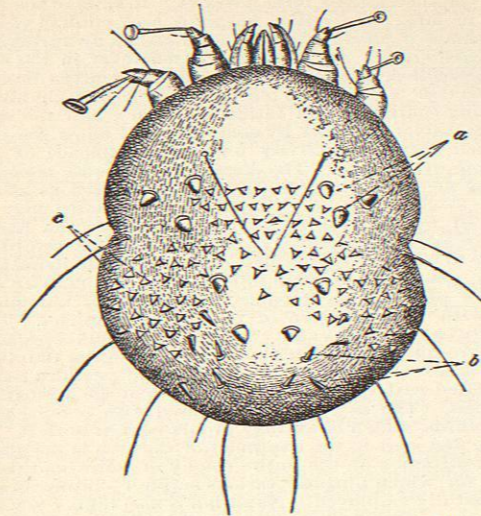


FIG. 248.—*Sarcoptes scabiei*, female, in Dorsal Aspect. (After Canestrini.)  $\times 130$  diameters. a, b, c, Scales.

transfer results in temporary existence without the disease reaching a serious stage and often disappearing spontaneously.

*Sarcoptes scabiei* (de Geer) (the Human Itch).—*Acarus siro*, *A. excrucians*, Linn.; *Acarus scabiei* de Geer; *Sarcoptes hominis* Hering; *S. sc. var. hominis* Mègnin. Dorsal scales pointed, longer than broad. Anterior projections of epandrium short, scarcely reaching the epimeres. Posterior spines long, pointed. Male (Fig. 249) 0.2-0.24 mm. long, 0.15-0.2 mm. broad, female (Fig. 248) 0.3 to 0.45 mm. long, 0.25 to 0.35 mm. broad.

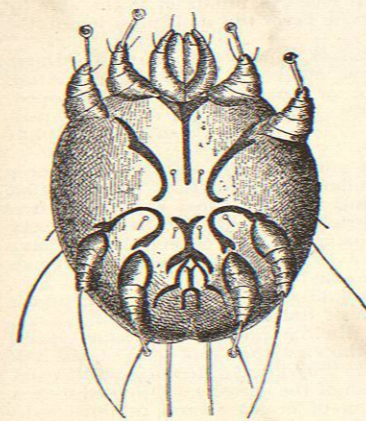


FIG. 249.—*Sarcoptes scabiei*, male, from Ventral Surface.  $\times 200$  diameters. (After Canestrini.)

first to state clearly the existence of a minute characteristic animal which could be removed from the skin and "cracked" on the finger nail. The galleries bored in the skin were discovered in the fourteenth century, and the mite described and figured clearly in the seventeenth, while in a letter to the famous Italian anatomist Redi, in

1687, Bonomo and Cestoni gave a precise description and figures of the mites and their eggs, inferring correctly that the animals were of separate sexes and were the actual cause of the disease, so that a cure depended upon their complete destruction. Others of prominence in dermatology, however, attributed the trouble rather to "destructive juices," either denying the existence of the mites or their relation to the itch, or holding that a poison was inoculated into the blood by their bite. Early in this century the French Academy offered a prize for the rediscovery of the mite, whereupon a certain Dr.

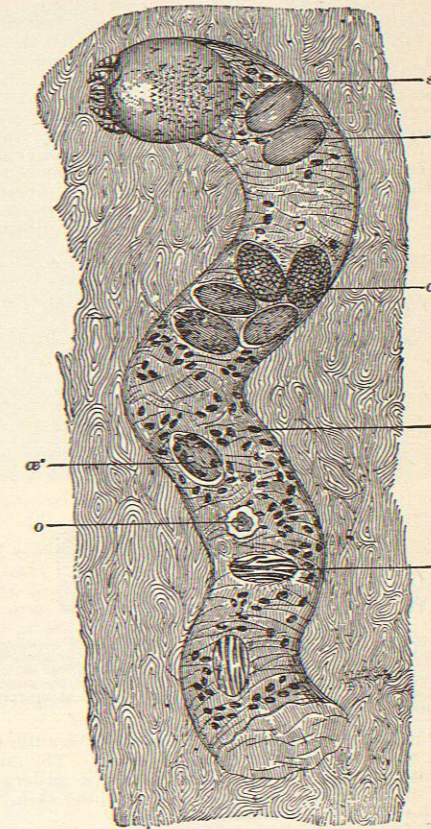


FIG. 250.—*Sarcoptes scabiei*. Impregnated female (s) in cuniculus. (After Railliet; semi-diagrammatic figure adapted from Gerlach.) oe, oe', oe'', Eggs, those farther away from the mite being older; c, an empty egg shell; o, orifice through which a larva has escaped; e, excrementa.

Gales palmed off cheese mites on a learned jury, pocketing both the medals and the prize! Finally, in 1834, Renucci demonstrated in Paris the method by which Corsican women were accustomed to remove the mite on the point of a needle from the end of its tunnel, and thus established its actual presence in the disease. The male was discovered by Krämer in 1845, and the pathology of the disease established upon unimpeachable experimental and clinical evidence particularly by Hebra.

The mite appears to the naked eye white and glistening, and was aptly described by Bonimo as like a little bladder of water. Viewed under the microscope there is seen a tortoise-shaped head with a pair of short, heavy legs on either side, which have a framework of chitinous bands like the garters of an Italian bandit. The third and fourth pairs of legs are concealed under the posterior

margin of the body. The male is much smaller than the female and has the fourth pair of legs terminated by a sucker instead of the bristle which is on the fourth pair in the female. There is also on the ventral surface of the male a complicated chitinous framework wanting in the female.

The human itch mite lives in the skin in which the female tunnels an irregular winding passage, where she passes her entire existence (Fig. 250). These burrows vary in length from a few millimetres to two or more centimetres and are excavated preferably where the skin is thin, as between the fingers, in elbow or knee joint, on mammae or penis. The gallery, directed first downward through the stratum corneum, is extended through the softer cells of the Malpighian layer just above the papillae. Eggs and fecal matter fill the most of this tunnel, at the inner end of which may be found the female. The male is much rarer; its existence is passed on the surface of the skin, hiding under scales and in furrows. After an incubation of only a few days there emerges from the egg a hexapod larva, which bores through the roof of the tunnel and gains the surface of the skin, where after three or four moults and the acquirement of a fourth pair of legs the development of

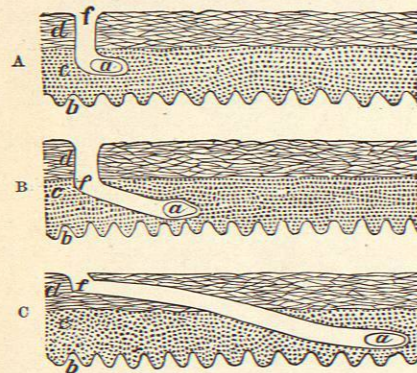


FIG. 251.—Acarian Furrows. a, Position of mite: A, the mite has gone down beneath the epidermis; B, the mite has commenced to dig a longitudinal burrow, and the place (c) where it was in A, has by the growth of cells come up nearer to the surface; C, the point (c) has come up to the surface, while the mite has gone along farther with its burrow. (After Jeffries.)

the sexual organs is completed. Copulation is followed by the last moult on the part of the female. The latter now pregnant, begins the construction of a gallery in the epidermis (Fig. 251) and once buried in the skin, the recurved dorsal spines prevent her escape.

This species is probably distributed over the entire world; it is very common on the Continent and among the poor in England where it constitutes 8 per cent. of dermatological cases in hospital practice and 3 per cent. in private practice. It is much rarer in the United States and is most frequent in the East; in New York Bulkley had 2 per cent. in the hospital and one-fourth of one per cent. in private practice. In Boston White noted an increase from 9 cases in 1880 to 165 in 1888. Of 318,500 cases recorded by the United States Dermatological Association within a period of a little over twenty-one years (from July, 1877, to January, 1898), it was found in 3.66 per cent. of the total number. Although rare under ordinary circumstances, it increases rapidly under conditions of crowding; thus in 1893, the year of the Chicago Exposition, 901 cases were reported in the United States, while in 1895 the total was only 383 cases. Where such crowding is combined with faulty sanitary conditions, it becomes epidemic in a severe form. Thus during the Civil War, the "army itch," "Jackson's itch," and "seven years' itch," which are merely aggravated forms of the disease, followed the movements of the troops.

The disease is produced by the transfer of the parasite by actual contact from an infected person to one not infected. Such infection must transport both sexes, or at least pregnant females, and under such conditions that they can successfully form burrows. In spite of the fact that in large continental hospitals and clinics, yearly thousands of cases are treated and handled by nurses and students without any precautions whatever in the way of disinfection, no trouble is experienced from the disease.

Infection is easily and most commonly brought about by long-continued and intimate contact, and the nocturnal habits assigned by some to these mites are due to their increased activity under the influence of the warmth of the bed. The disease is also most common among men and of such classes and occupations as are wont to sleep together. A transient infection may be induced by the transfer of this species to the horse, dog, or ape, but the cat is apparently immune toward it.

The itch mite excites at first only a moderate irritation, which gradually grows in intensity and becomes an extensive pruritus, accompanied by eczematous inflammation with the formation of papules and vesicles. The malady increases in severity with duration, and especially as the result of scratching, until it may acquire the character of a severe eczema, the vesicles and pustules being associated with extreme excoriations and the formation of crusts. The itch may be confused with eczema and pediculosis, which latter may in fact coexist with it.

The first step in the treatment of the itch is the absolute destruction of the entire colony of mites and their eggs, for which purpose various sulphur ointments are successfully employed. Naphthol is also highly recommended. In severe cases some eczema remains to be treated after the destruction of the mites.

It is important to record here from Nuttall the view of Joly that the itch mites may serve at times as carriers of lepra bacilli. In parts of Norway where much leprosy exists, these mites are also abundant, and, together with pediculi, they are usually found among the poorer classes in Algeria, from which the greatest number of lepers come. "In the Soudan the sarcoptes occur on almost all the dogs [most probably not the *S. scabiei*—W.], and often attack the natives amongst whom there are numerous lepers. It seems to me that the possibility of this mode of transfer cannot be denied, and it is also conceivable that the pathological changes produced in the skin by the parasites may even favor the multiplication of the lepra bacilli."

*Sarcoptes scabiei crustosa* (Fürstb.) (Norway Itch Mites).—*S. scabiei* var. *lupi* Mégnin. Dorsal scales obtuse. Anterior projections of epiandrium well developed, reaching the epimeres. Posterior spines long, pointed, easily bent. Male 0.17 by 0.15 mm.; female 0.41 by 0.34 mm.

This form, though much like the preceding, produces such radically dissimilar effects on the human skin that we are forced to regard it as a distinct species. It was first discovered in Christiania, whence the name Norway itch, by which it is commonly known, though cases have been reported in most European nations and one from this country (Indianapolis) by Hessler.

The malady is easily distinguished from the common itch by the formation of coarse crusts, which, however, do not usually make their appearance for some years. This gives color to the view that this form of the itch finds its explanation in individual differences on the part of the host rather than of the parasite. Opposed to this view is the formation of crusts several millimetres in thickness and several centimetres in extent, the enormous numbers of mites found in the midst of these masses, and the attacks of the mites on face and scalp where the common itch mite does not occur. This species is apparently transmitted with great ease, and its attacks do not readily yield to treatment. Mégnin's idea that it is identical with the sarcoptes of the wolf is entirely untenable.

The case reported by Hessler apparently belongs here, though the author did not differentiate the parasite

found from the ordinary itch mite. The patient was partially paralyzed and entirely helpless—hence we may infer absence of the ordinary scratching; its sequelae are apparently entirely wanting. The body of the patient was literally covered with thick, yellowish-white, leathery scales, the largest measuring 25 mm. in diameter and nearly 3 mm. thick; these scales consisted merely of proliferated epithelial cells, and bloody or serous crusts were not present. They were, however, produced by moderate friction. In the scales on the body the author estimates the number of egg cases and eggs as seven million of which one-half to three-fourths were empty, and the number of mites as two million of which only a small fraction were living.

The following forms, normally parasitic on other hosts, may be transmitted accidentally or experimentally to man and give rise to an itch, rarely severe and usually transitory. No doubt other forms yet undescribed will fall in this same category. Besides man, only the most common host is given for each species.

*S. archenia*. Male 0.24 by 0.18 mm.; female 0.34 by 0.26 mm. On the llama; transmitted to attendants, requiring treatment to dislodge.

*S. canis*. Male 0.19 to 0.23 by 0.16 to 0.18 mm.; female 0.3 to 0.45 by 0.23 to 0.35 mm. On the dog; frequently transmitted to man, variable in severity.

*S. caprae*. Male 0.243 by 0.188 mm.; female, 0.345 by 0.342 mm. On the goat; readily transmitted to man; induces an itch of great severity.

*S. dromedarii*. Male 0.29 by 0.18 mm.; female, 0.36 by 0.33 mm. On the camel; readily transmissible and severe; in Egypt almost all camel drivers are affected; the Senegal negroes call the complaint *larbisch*.

*S. equi*. Male 0.22 to 0.28 by 0.15 to 0.2 mm.; female 0.45 to 0.5 by 0.31 to 0.37 mm. On the horse; rare on man, transitory and usually disappears spontaneously.

*S. leonis*. Male 0.25 by 0.18 mm.; female, 0.45 by 0.35 mm. On the lion; easily transmitted to man; disappears spontaneously in thirty to forty days.

*S. ovis*. Male 0.23 by 0.16 mm.; female, 0.314 by 0.3 mm. On the sheep; very rarely transmitted to man, if indeed at all.

*S. suis*. Male 0.25 to 0.35 by 0.19 to 0.3 mm.; female 0.35 to 0.5 by 0.29 to 0.39 mm. On the pig; transmitted to man, sometimes disappears, sometimes grows worse.

*S. vulpis*. Male 0.245 by 0.185 mm.; female 0.442 by 0.315 mm. On the fox; its transmission to man rests on doubtful evidence.

*S. wombati*. Species not described in detail; forms a crustaceous itch on the wombat; readily transmitted to

0.15 by 0.12 to 0.125 mm.; female (Fig. 252, A, B) 0.21 to 0.23 by 0.16 to 0.175 mm.

This, the itch mite of the cat, attacks on its normal host the skin of the head and ears, and induces a serious,

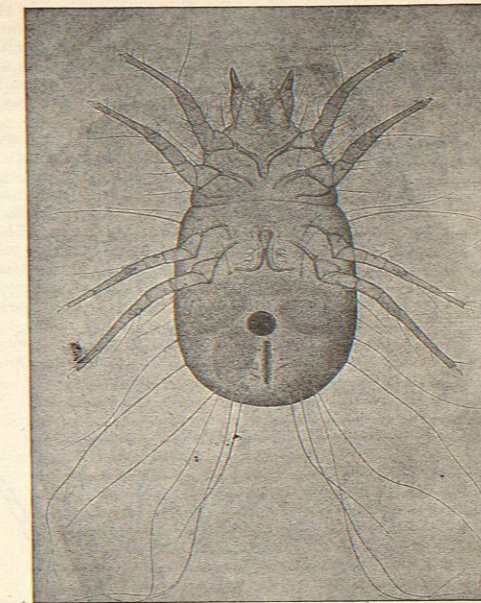


FIG. 253.—Tyroglyphus longior, Female, in Ventral Aspect. (After Mégnin.) Magnified.

often highly epizootic malady with a termination usually fatal. This species is of importance here because of its easy transmission to man. On the latter it produces a limited itch which disappears spontaneously at the end of from ten to twenty days. It occurs on cats in Lincoln, Nebr., and doubtless elsewhere; no cases of transmitted infection are, however, on record here.

The other genera and species of itch mites common to domesticated animals are not known to be transmissible to man.

Sub-family Tyroglyphinae (Cheese Mites).—

Minute forms with soft body, without eyes or tracheae. Integument never uniformly striated, but smooth and granulated or irregularly verrucose. Last leg with claw and usually also with foliate, non-pedunculate vesicle.

These mites (Fig. 253) live in dry or slowly decaying materials (flour, sugar, cheese, anatomical preparations, etc.).

From their minute size and abundant occurrence they are liable to be introduced on to or even into the human body, and may even make the passage of the alimentary canal without being entirely destroyed. From their presence on the body or in fecal matter under circumstances of disease they have been often reported as *corpora delicta*. In rare instances certain species

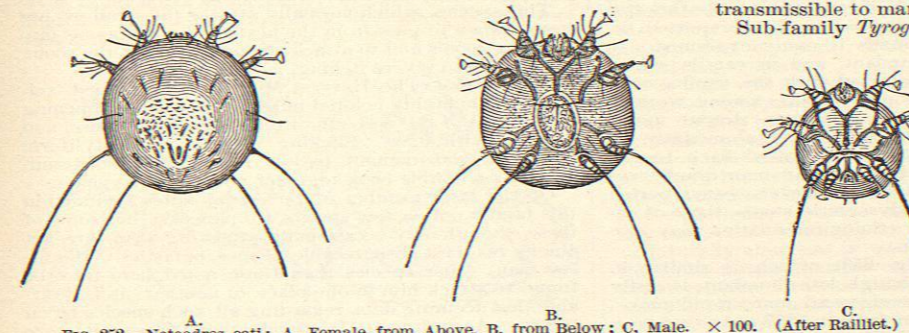


FIG. 252.—Notoedres cati: A, Female, from Above, B, from Below; C, Male. × 100. (After Railliet.)

man; produces a type of itch intense and unlike the ordinary form; yields readily to treatment.

*Notoedres cati* (Hering. = *Sarcoptes minor* Fürstb. Tarsal suckers with long, unjointed pedicle: in the female on the first and second pairs of legs, in the male also on the fourth. Anus dorsal, near posterior margin of abdomen. Dorsal scales obtuse. Male (Fig. 252, C) 0.14 to