

have been transitory parasites of man. Where abundant, as in old groceries or warehouses, they have been known to give rise to a temporary, though often violent dermal irritation on employees handling the infected products, without the evil having been traced in all cases to any single species. Such a complaint is the "grocers' itch" of England. Since these are the most frequent pseudo-parasites with which the physician has to deal, extreme caution should be exercised in associating etiologically any species which belongs in this group with a case of disease in which it has been discovered.

Aleurobius farinae (De Geer). (The Flour Mite) = *Tyroglyphus farinae* Gervais. First pair of legs in male much heavier with spur on second joint. White, tip of legs pale violet. Length: male 0.33 mm., female 0.55 mm. Cosmopolitan on flour, fruit, tobacco, cheese, and other organic material in process of alteration by age. This species is much more abundant than the following even in cheese, and has frequently been described as that species in spite of evident differences. It was observed by Moniez as the cause of a cutaneous eruption on workmen unloading Russian wheat at Lille.

Tyroglyphus siro (L.) (The Cheese Mite) = *Acarus siro*, *A. lactis*, *A. dysenteriae* L. Last pair of legs with both claw and sucker, with terminal joint short and with proximal sucker close to proximal end of terminal joint. Length 0.6 mm. Found on decomposing substances like the last, but rarer. This is the cheese mite reported by various authors from dysenteric stools and from urine. Its occurrence was undoubtedly accidental, and its harmless nature may be adjudged from the quantity taken daily in cheese everywhere and the absence in medical works of any records of consequent diseases. Yet Zürn records that in certain districts where mites are raised to impart a peculiar flavor to the cheese, a gastric or intestinal catarrh is prevalent among consumers of the cheese which he attributes to the effect of the mites. As this species is abundant in old linseed meal, its reported occurrence in poulticed wounds is easily explained. In cantharides it is also abundant, and in vanilla, where its presence has been associated with the vanilla complaint, a dermal eruption frequent among workers handling this product. The famous *Acarus dysenteriae* of Linnaeus, which was found abundantly in stools of one of his scholars and traced back to the wooden vessel from which the young man drank, was probably this species. It has, however, been reported but once since then from dysenteric stools, those of infants in Prague, and the etiological relation may certainly be called in question.

Tyroglyphus longior (Fig. 253), which is similar in habit to the last species, though less abundant, is easily distinguished by its larger size and more rapid movement. It enjoyed transient fame in 1837 as having been produced (!) by the electrical experiments of Cross on weak chemical solutions.

The mummification of bodies in caves has been shown by recent investigations of Mégnin to be due, in some cases at least, not to chemical or atmospheric influences, but to the work of *Tyroglyphus infestans*, which is abundant in such localities. The external appearance of the body and organs of the mummy was well preserved, but microscopical examination showed the tissue to be filled

with incalculable myriads of the mite in all stages of development.

Gamasidae (Beetle Mites).—Skin leathery, reinforced by chitinous plates; mandibles chelate, maxillae filiform; six-jointed legs terminated by two somewhat concealed hooks. Stigmata lateral, between legs of second and fourth pair, with peritreme directed anteriorly. Without eyes.

The Gamasidae are abundant small mites, often free or semi-parasitic, in the latter case found on insects especially. Certain species occur on the fowl, but are often very troublesome to man. Of the large number of forms which belong in the family only two need especial mention here.

Dermanyssus gallinae (de Geer) (The Poultry Mite). Body pyriform, slightly flattened; in the male 0.6 by 0.32 mm., in the female 0.7 to 0.75 by 0.4 mm. Color varies from white to dark red according to the contents of the alimentary canal. Legs stout, rather short. Peritreme extends as far as the base of the second pair of legs.

These mites (Fig. 254) swarm in the crevices of poultry houses and in the refuse of the floor, even living in the dung. At night they emerge from their hiding-places and suck the blood of the birds. Under circumstances

they increase to such an extent as to become a veritable pest, even to man himself. Many cases are on record in which both children and adults have been subject to repeated attacks of the mites, which give rise to an itching eruption of the skin. Naturally such instances are observed among persons having to handle fowl or to resort frequently to ill-kept poultry houses. Küchenmeister, Railliet, and others record details of cases on the Continent; I have found none for this country.

Dermanyssus hirundinis (Hermann) (The Swallow Mite). Decidedly larger

than the preceding, reaching a length of 1 mm. Peritreme extends barely to the third pair of legs.

This species, which normally attacks the swallow, has been known to pass from the nests under the eaves into sleeping-rooms and to attack the occupants of the room, giving rise to severe itching.

Trombididae (The Harvest Mites). Soft-skinned, velvety, often highly colored mites, with tracheae opening at the base of the rostrum or on the cephalothorax, and usually with eyes. Sucking rostrum with styliform mandibles and unciniate palpi. Legs six-jointed, terminated by a double hook together with a small sucker.

Of the large number of terrestrial mites included in this family only a few species are parasitic, but some of these, though only occasionally attacking man, are yet among his most disagreeable chance parasites. Doubtless many other species than these noted here may be found to attack him in one place or another: it is desirable that accurate data regarding all such species be on record. According to Joly and others, these mites are the passive carriers of infectious agents, but Nuttall doubts this and thinks the cutaneous affections produced by their presence on the skin are due to irritating secretions of the mites. The effect Mégnin produced by binding on the skin the dead bodies of one of the most toxic species tends to support this view. To secondary bacterial infection brought about by scratching the skin and to reduced vitality of the latter referable to the mites, are to be attributed the extreme effects manifested

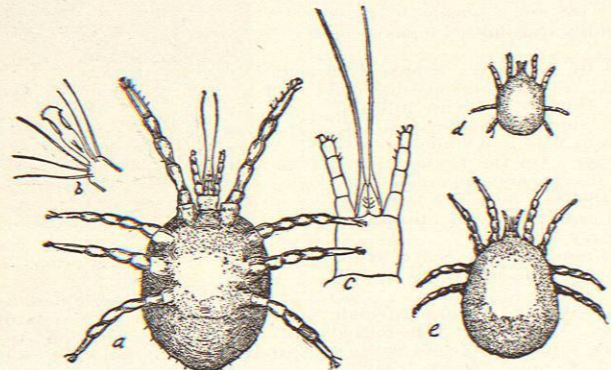


FIG. 254.—*Dermanyssus gallinae*. a, Adult; b, tarsus; c, mouth parts; d, e, young. Magnified. (After Osborn.)

in the formation in some cases of ulcerous and running sores.

Pediculoides ventricosus (Newport) = *Heteropus ventricosus* Newport. Male 0.12 by 0.08 mm., oval, with six pairs of bristles and a pyriform plate on the dorsal surface. Female cylindrical, 0.2 by 0.07 mm., with four pairs of bristles. When gravid with posterior region inflated to a sphere filled with developing eggs, nearly 2 mm. in diameter, viviparous.

This form lives parasitic on insect larvæ, particularly those of grain. Numerous cases of accidental parasitism on grain shavellers, or those otherwise engaged in handling it, are reported from different parts of France and Germany. The bite of the mite produces insufferable itching and excites a considerable cutaneous inflammation.

Similar troubles have been produced by *Tarsonemus inlectus* Karpelles from Bulgarian grain and *Pygmephorus uncinatus* (Flemming) from Russian wheat.

Chelytus eruditus (Schränk). Pale, rarely reddish in color, with bifid hook on the palpi. Length, 0.8 mm.

This mite occurs at times in old books or among dusty rags, but more commonly in stables, chicken or pigeon houses, in old feed bins and in tobacco store-houses, or wherever mites are abundant. In spite of its predacious habits, it has not been known to attack man, and its presence in fecal matter and in pus collected from the ear, as reported in various medical works, was undoubtedly due to accidental introduction. When St. Peter's in London was restored, this form swarmed in myriads over workmen engaged in repairing the ancient tombs.

Leptus irritans Riley. Color brick or blood red; legs terminating in two stiff hairs. Mandibles tridentate at end. Length, 0.24 mm. (Fig. 255, C). Adult unknown.

This is the larval form of some unknown, probably plant-feeding species which under temptation adopts a habit as fatal for itself as it is uncomfortable for man. Brushed from grass or shrubbery on to human clothing, it finds its way to the skin into which it burrows until entirely buried. The resultant irritation varies considerably with the individual and in some cases produces extreme torture. The inflammation gives rise to a large red blotch with paler spots and spreads rapidly when the body is scratched in consequence of the itching.

This mite occurs over much of the eastern, central, and southern portion of this country, extending in the Mississippi valley as far north as central Iowa and being very abundant in parts of Indiana, Illinois, and Ohio, even as far north as the islands in Lake Erie. In Washington it is abundant from June throughout the summer, and farther south the season is longer. Osborn speaks

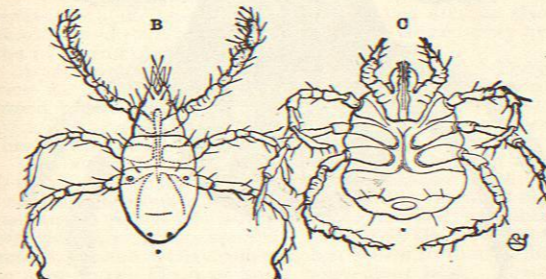


FIG. 255.—B, *Leptus americanus*. Greatly enlarged. (After Riley.) C, *Leptus irritans*. Greatly enlarged. (After Riley.) (In B and C the dots underneath indicate the natural size.)

of the same species as annoying in Southern Mexico in January. Those who are susceptible to the pest are accustomed, on returning from field excursions, to resort at once to a hot bath with strong soap, or to the use of a wash of dilute carbolic acid to kill the mites before they

become embedded in the skin. Dilute alcohol is also recommended. At this time it is also possible by close scrutiny to recognize the mites in the centre of the inflamed area and to remove them individually, doing away thus with the subsequent discomfort to a large extent.

It is interesting to note that the invasion of the human skin causes the death of the mite and prevents its reaching maturity, a perverted habit being thus fatal to the species. As a result the adult form is not known, but assumed as possibly one of the genus *Trombidium*.

Leptus americanus Riley (Fig. 255, B) is an associated form, the effects of which are very similar. The Continental species is *L. autumnalis* Shaw. Similar forms are known from all regions; among these that known as *Talsahuate* in Mexico, and the *Colorado* of Cuba deserve mention.

Tetranychus molestissimus Weyenber from Uruguay and Argentine, which lives normally on an aster, is of like evil repute.

The case of *Tydeus molestus* Moniez, a blind, rose-colored mite of the family Bdellidae or snouted mites, which was discovered on a large estate in Belgium where it first made its appearance in 1864 after an importation of Peruvian guano, illustrates the chance introduction of an undesirable species. Each year it appears at mid-summer and remains until frost, so abundant that it constitutes a veritable pest. It throws itself on man passing through the grass or shrubbery and produces an insupportable itching, lasting several days.

Ixodidae (Ticks).—The Ixodidae are large mites possessing a tough leathery skin to which the six-jointed legs are attached directly. Their bodies are flattened in youth, but become more or less spherical with age. The rostrum or capitulum (Fig. 256) comprises (1) a flattened maxillo-labial hypostome; (2) two elongated mandibles inflated at the base but flattened toward the tip; (3) two maxillary palpi. The lower face of hypostome and the terminal joint of the mandibles are supplied with recurved spines or hooks. The two stigmata are located near the base of the fourth pair of legs. The larva are hexapod, the nymphs octopod. The adults manifest striking sexual dimorphism.

The ticks are temporary parasites of the land-living allantoic vertebrates, among which the hosts are chosen often largely by chance. No one of them is regularly parasitic on man, but almost any of them may be upon occasion, and those species most frequently reported are so largely by virtue of their greater frequency in general or by reason of circumstances favoring their attachment in the particular instance rather than that they possess any characteristic affinity for this host.

Naturally abundant in woods and among underbrush the ticks attach themselves to such animals as pass, either reptiles, birds, or mammals. For the larvæ and nymphs this is most commonly but the means of dispersion, but with the impregnated female the parasitism becomes more definite. With the rostrum implanted in the skin and anchored by the recurved teeth, the tick gorges itself with the blood of the host until the leathery body has swollen to the size of a castor bean, which it strongly resembles. Once fully satiated the female releases her hold and falls to the ground, where she deposits her eggs and perishes. If, however, the effort be made to remove the female by force, only the greatest care prevents leaving the rostrum embedded in the flesh of

the host, and at best a portion of the skin comes away with the tick.

A drop of turpentine, benzoin, petroleum, or even melted butter or oil placed on the head of the tick will often succeed in causing it to loosen its hold and fall from the host. Or it may be torn or cut away, in which case the rostrum is left in the skin to be set free shortly

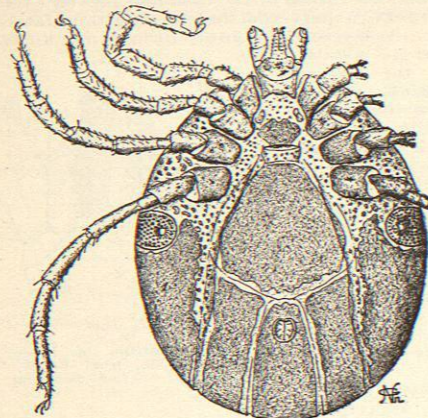


FIG. 257.—*Ixodes hexagonus*, Male, in Ventral Aspect. $\times 13$. (After Neumann.)

by suppuration. It is worth mentioning that dipping is now extensively practised to free cattle from the ticks which are the means of infection in Texas fever, though the method is still in the experimental stage.

The species which have been found upon man have not been reported with desirable accuracy. Among woodchoppers and others of similar habits, I am informed that the presence of ticks is by no means a rarity, though it rarely becomes a matter of medical record since the animal falls off or is removed by simple means in a brief time without noticeable sequelae. In a few cases, however, dangerous symptoms manifest themselves, demanding the attention of the physician. These complications may well be due, as Railliet suggests, to the inoculation of infectious agents. Thus he says that Guadeloupe ticks carry "a sort of glanders," due to a specific micro-organism, and Blanchard believes that the bacilli of anthrax and tetanus may be also transported in this way. Nuttall, however, regards the evidence as unsatisfactory.

The two sub-families Ixodinae and Argasinae may be distinguished easily by the position of the rostrum, which is terminal in the former and, at least in the adult, below the anterior margin of the body in the latter.

Ixodes ricinus L. (The Castor Bean Tick) = *I. ricinus* L. Male: brown oval, larger posteriorly, 2.5 mm. long by 1.5 mm. broad. Female: 4 mm. long and 3 mm. broad, or when gorged 10 to 11 mm. long by 6 to 7 mm. broad, ashen gray tending to brown or yellow.

The marked sexual dimorphism manifested by this species was the reason that the male and female were originally described as different species. It is common in Europe and throughout the southern United States from Maryland to Kansas and California. As host it apparently prefers sheep, goat, or beef, less often horse, dog, cat, and even man. Numerous cases of septicæmia apparently resulting from the bite of this species are recorded by European authors. In Norway emphasis is laid on the importance of not tearing off the head of a tick that has begun to bore itself into the skin. This is undoubtedly a wise precaution, and the tick may be removed without damage to the skin by the use of butter, oil, gasoline, or turpentine as mentioned above.

Ixodes hexagonus Leach (The European Dog Tick). In color, form, and size much like the preceding, this form may be distinguished by the shorter rostrum (Fig. 257)

and by the tarsi which are also shorter and inflated toward the end. The male (Fig. 257) of this species is also larger, measuring 3.5 to 4 mm. by 2 to 2.5 mm.

This, the common dog tick of Europe, occurs over the entire region east of the Rocky Mountains, where it is reported from a large number of hosts. Blanchard cites cases in which it has even penetrated below the human skin.

The presence of eyes distinguishes sufficiently the genus *Amblyomma*, which includes a large number of species, from *Ixodes*, as the absence of adanal plates separates the former from *Hyalomma*, a genus not yet reported in this country; to this genus belongs the African or Senegal tick, common in tropical regions, especially of Africa, and introduced on cattle into sub-tropical lands adjacent thereto, where it has been frequently reported on man as the cause of intense fevers; probably the tick was only the agency in transporting the infection.

Amblyomma americanum Koch (The Lone Star Tick) = *Ixodes unpunctata* Packard. Male: body brownish red, oval, much elongated posteriorly, 3 mm. long, 2.5 mm. broad. Female (young) colored like the male with a white spot on the back of the living animal. Length 4.5 mm., breadth 3 mm., increasing in gravid females to 8 by 12 mm. (Fig. 258).

This characteristic American species occurs from Labrador to Florida and Texas and is known from South America as well. It is common on cattle in the southern part of the United States, and is reported from other domesticated as well as wild species. Packard reports a case in which a specimen had penetrated into the arm of a young girl, forming there a tumor. It is said to be very annoying to man in the warmer portions of the country, and a correspondent in Texas writes that he removed several females from his own children in one evening.

Dermacentor americanus (L.) (The American Dog Tick) = *Ixodes americanus* Gervais, *I. naponensis* and *I. albi-*

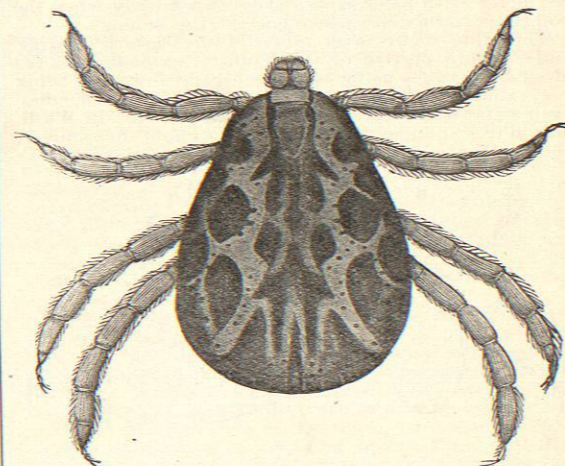


FIG. 259.—*Dermacentor americanus*, Dorsal view of male. $\times 10$. (After Osborn.)

pictus Packard. The body and margins of the legs are marked by silver-white lines and blotches. When gorged, the female measures as much as 14 mm. in length by 9 mm. in breadth.

This most common dog tick (Fig. 259) is reported from almost every State in the Union as well as from Labrador,



FIG. 258.—*Amblyomma americanum* Koch, Adult female. (Original.)

Alaska, and Mexico. The dog, cattle, and man are its most regular hosts, though a number of others are on record.

Rhipicephalus annulatus (Say) = *Ixodes bovis* Riley; *Boophilus bovis* Curtice. Female: body elliptical, slightly constricted at the middle, up to 13 mm. long by 7.5 mm. broad. Reddish-brown with two longitudinal impressions above the constriction and one below it. Rostrum very short. Male, oval, 2.15 to 2.35 mm. long by 1.3 mm. broad.

This most common of cattle ticks in the Southern States deserves mention here by virtue of its rôle in Texas-fever epidemics among cattle. It has been conclusively demonstrated that this form acts as agent in transmitting the organism which causes Texas fever, and this so-called "romance of pathology" is now an established fact. This tick is abundant south of the Maryland-Kansas line and throughout Mexico and Central America; even in Australia, Asia, and especially Africa its presence is also recorded. In Guadeloupe it goes under the name of the "Creole tick" as against the "Senegal tick" (*Hyalomma aegyptium*) previously mentioned.

Although I have found no record of the parasitism of this tick on man, a correspondent in Texas writes that it does attach itself, though rarely, to the human skin, in which situation he has seen it a half-dozen times in the last ten years. Similar occurrences, though infrequent, may be expected in regions where the species is abundant. The bite of *Hyalomma aegyptium*, the Senegal tick, may cause severe local effects in man, attributed by some to the entrance of pathogenic germs. Such results are of course most probable in tropical and sub-tropical regions, and may also at times follow the bite of this species.

The sub-family of the Argasinae includes ticks which are parasitic on warm-blooded vertebrates, more particularly on birds, but which are frequent accidental parasites of man and occasionally the cause of serious inconvenience at least. The common European form, *Argas*

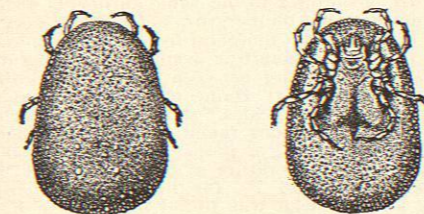


FIG. 260.—*Argas americanus*; Dorsal and Ventral Aspects. Enlarged. (After Marx.)

reflexus, which lives in pigeon roosts but attacks also chickens and even man, is represented in this country by the following closely related species:

Argas americanus Packard (The Chicken Tick). Body very flat and thin, oval, 4 to 6 mm. long, 2.5 to 3.5 mm. broad, brownish-red uniformly tinted, integument pitted, with the pits larger near the middle, becoming smaller toward the edges.

This tick (Fig. 260) attacks especially chickens and turkeys. It is probably the "Argas chinche," said by Goudot to be abundant in Colombia and to resemble the bedbug in habits as in appearance; there it torments especially the human species. It lives in the chinks of woodwork and walls, from which it sallies forth at night to feast on the blood of some convenient host. These mites are very hardy and have been known to live in abandoned dove cotes from eight to forty-eight months without food. The bite of the European form (*A. reflexus*) undoubtedly causes serious consequences at times, chiefly in the case of infants and children, or of individuals highly susceptible to urticaria factitia, causing oedema of the part or even of the entire body, together with intense pruritus lasting several days. For a record of the cases and details see Brandes. Records of the

American species are scanty, but it is said to attack sleeping men and animals, producing in the former dermal irritation of a grave character.

The *Argas persicus*, or Miana bug, is an Eastern species of some reputation which is said to molest travellers in Persia, and the bite is believed to be accompanied at times by serious consequences. The general report, according to which the bite of these ticks is especially dangerous during the hot months, may find its justification in the transmission by this means of some tropical disease germ, as has been demonstrated in the case of Texas fever. The acute symptoms which may be manifested at any season are believed to be due to a poisonous saliva, and the experiment of Mégnin on a specimen kept in confinement for four years certainly does not demonstrate the harmless character of the tick. "Bacteria may of course gain access to the wounds inflicted, which are possibly more prone to infection in consequence of the injurious influences of the secretions of the Argas. Depending on the character of the organisms introduced, the later symptoms will naturally vary" (Nuttall). *Argas sanchezi* of California and Mexico, which is very closely related to *A. persicus*, does not enjoy a similar reputation.

Ornithodoros turicata, found in the Gulf States and in Mexico, and *O. talaje* of Central and South America, are forms not well known, which encroach upon our southern borders. The first is parasitic upon the pig and man. Its bite is painful and may produce dangerous symptoms. Henry B. Ward.

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ARAGON, BATHS OF.—These baths are located in the Aragon Hacienda, municipality of Guadalupe Hidalgo. The situation is 4 km. from the Guadalupe Hidalgo and is accessible by the electric railway line between Mexico and Guadalupe.

According to an analysis by Prof. G. Mendoza the water is composed as follows:

ONE UNITED STATES GALLON CONTAINS:

Solids.	Grains.
Iron bicarbonate.....	3.32
Sodium bicarbonate.....	3.42
Potassium bicarbonate.....	0.37
Calcium bicarbonate.....	0.15
Magnesium bicarbonate.....	0.16
Sodium chloride.....	0.38
Silica.....	5.68
Free chromic acid (?).....	4.52
Total.....	18.50

The water is heavily charged with carbonic-acid gas. It has a temperature of 77° F. and a density of 1.021. It may be classified as a carbonated chalybeate water, and possesses strong tonic properties. It has been found very useful in anæmia, chlorosis, and kindred disorders.

N. J. Ponce de Léon.