

act of the procedure is at an end. But not so its consequences. At that spot we observe a small hemorrhagic point which is surrounded by a pale raised areola (urticaria efflorescence), where the individual now feels considerable itching which he endeavors to allay by scratching. But relief is not attained until the vessels of the papillary body at the site of the wheal have been depleted of blood, *i. e.*, have been scratched open. Thus there appear on the surface of the wheal one or more drops of blood which, soon drying, form small crusts.

In order to satisfy the extensive itching produced by numerous lice, there will be formed erythema, wheals, and excoriations even where the skin has not been injured by the lice. For it is unquestionable that we are not always able to locate correctly the itching caused by lice, whence the patient scratches likewise on parts distant from the points of attack, thus producing the disproportionately large number of efflorescences.

If we inspect such a skin more closely, we find, in case some time has elapsed since the last attack by lice, on some circumscribed spot, recent and older blood crusts of roundish irregular form, isolated or in a certain linear arrangement. The latter form is produced by the patient, in order to scratch effectually, setting down the thumb as a fixed point, and digging long bloody streaks with the other four fingers.

DIAGNOSIS.—The marks become important for the diagnosis only by their localization. For the attentive observer must be struck at first sight that the scratch effects in pediculosis mainly occupy those regions of the skin which correspond to the folds of the clothing. This concurrence is so regular that where clothes lice are present, the attacked portions of the skin change every time with the kind of clothing worn, and often it is the establishment of this fact which leads to the discovery of the object at fault.

Should this condition continue for months, the clinical picture acquires a different aspect, not only in so far that the scratch effects are spread diffusely over the whole body, but in the mean time the secondary efflorescences—pustules, eczemas, furuncles, and utaneous ulcers—have multiplied materially and left traces in the form of all sorts of cicatrices and pigment spots. On a skin thus treated, therefore, we may observe all possible transitions from the simplest erythema to the most advanced form of inflammatory destruction and retrogression. The latter may even predominate to such an extent that nearly the whole skin looks brown or black.

Moreover, if we take into consideration that such people belong to the poorest classes, we will understand that persons suffering thus are liable to other bodily ailments and generally fall a prey to invalidism. Recently I had in my ward a patient affected with various species of lice, who, although no other disease could be demonstrated in him, and in spite of the fact that he enjoyed a, for him, luxurious (hospital) care, after two and a half months' stay in the hospital, had been unable to recover sufficiently from his marasmus to be capable of standing even a few minutes. Such cases of supposititious "genuine phthiriasis" might indeed terminate fatally, but it is questionable whether in such a case there is any plausible reason for ascribing the unfavorable termination to the presence of the lice or whether we must not rather assume that the neglected mode of life is the sole cause.

The TREATMENT consists in keeping the body clean (bathing and washing), and the removal on dermatological principles of the irritative conditions. In order to guard against a possible return of the affection, the clothing, etc., must be most carefully cleansed by washing, or by keeping it at the heat of boiling water for forty-eight hours.

II. Phthiriasis inguinalis s. pubis, *Pediculus pubis* (Linné), Morpion, Crab Louse.

The crab louse is distinguished from the last described species by the broader head,

which is joined to the thorax by a neck-like prolongation. The abdomen has a heart shape and is provided with eight segments, the first three being very small and only indicated by the stigmata. The first pair of feet is comparatively delicate and has a small claw at its end. The other two become stronger towards the tarsus and end in a sort of sting which, turned inwards, becomes a forceps with the tarsus. The male is 0.8 to 1.0 mm. long and 0.5 to 0.7 mm. broad and thus from one to one and a half mm. smaller than the female. The pear shaped eggs, ten to fifteen in number, are fastened by means of a sheath of chitin in the lowest possible part of the hair. From these the young emerge after from six to seven days and become capable of reproduction in two weeks.

The crab louse occurs most frequently on the *mons veneris* and generally spreads thence over the neighboring regions, downwards over the thighs and legs, upwards over the abdomen, chest, axillæ, beard, and the eye-lashes. But it is not impossible that they may be first met with on one of the regions mentioned (in children on the eye-lashes). This depends on the mode of transmission. Coition offers the most frequent opportunity, but the infection may be communicated also by the clothing, linen, bedding, etc.

Although the phthirius, like the other lice, injures the skin only when feeding, the symptoms are much more intense. If the patient be questioned about the manner of scratching, we are told that, as soon as the itching appears, the necessity to insert the nails deeply becomes irresistible. The result of these efforts finally is an extensive eczema appearing in the form of papules, vesicles, or pustules. In particularly stubborn cases the eczema may extend over large surfaces or degenerate into a dermatitis.

Maculæ ceruleæ.—We must here make mention of another quite interesting symptom of phthirius, the *maculæ ceruleæ* or *taches ombrées* of the French. In persons of both sexes infested with phthirii we not rarely observe steel gray spots, the size of the little finger nail, which fade but slightly under pressure, occur generally according to the locality of the lice, cause no disturbance, disappear after a few days, and cease altogether with the destruction of the animals.

In 1868, Mourson demonstrated that there was a causal connection between phthirius and the *taches ombrées*. In 1880 and 1882 Duguet published the results of his investigations, according to which the spots are due to the evacuation of the contents of the salivary gland, situated on the thorax, under the epidermis, and are not connected with any further alteration of the skin.

TREATMENT.—Since the employment of mercury in medical practice, it is the custom to use unguentum cinereum—popularly known as "blue ointment"—against crab lice. And it cannot be denied that two frictions of a piece the size of a bean each suffice to kill the animal. But it is equally certain that if the necessary caution be neglected, the ointment will produce a stubborn artificial eczema, more especially because the patient is generally unable to establish the death of the animals, and is likely to continue frictions on account of the itching, now due to the eczema. I therefore advise to use from the start either petroleum, some ethereal oil, Peru balsam alone or in combination with petroleum. In order to dispose of the young subsequently hatched, it is necessary to repeat the procedure several times at intervals of eight to fourteen days.

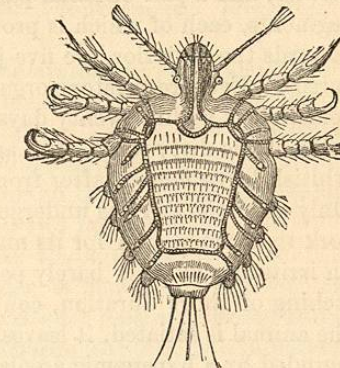


Fig. 55.—Crab Louse.

PULEX IRRITANS. THE FLEA OF MAN.

The flea possesses a laterally compressed body and has a brownish red color. The male is 2 to 5 mm. long and 1 to 2 mm. broad. The female, on an average, is twice that size. The oral parts are arranged for sucking and consist of a pair of serrated soft mandibles, a single tongue suitable for stinging, a lower labium forming a sheath for the former, and a pair of labial palpi with four joints each. The thorax is divided into three segments, each of which is provided with a pair of legs. The latter increase in length towards the posterior, are five-jointed and have very strong femurs, with two claws on the tarsus. Eyes, respiratory organs, and genital apparatus are distinctly developed. The female lays within twenty days the same number of eggs into fissures in the flooring, the folds of the dirty wash, etc., and from these the footless, worm-like, fourteen-segmented whitish larvæ emerge after from six to eight days. The nymph is inclosed in a cocoon. Only after the flea has undergone its metamorphosis into the fully mature insect does it seek the human skin for its nutrition. Its bite, with which it at the same time injects an irritating fluid, is barely perceived at the moment. Gradually there is felt a local itching of short duration, conjoined with wheals in persons with delicate skin. When the animal is satiated, it leaves the skin and we perceive a small hemorrhagic point surrounded by a hyperæmic areola. The latter disappears in a few minutes, while the exudation of blood continues for several hours. In neglected persons the flea bites may be present in such large numbers that for an instant, especially when a febrile condition co-exists, they may simulate the picture of morbilli, scarlatina, etc.

The human flea may change to the dog and back again to its original host. But the dog flea never preys permanently upon man.

II. TEMPORARY PARASITES.

1. *Animals Parasitical in a Mature Condition.*

a. Sarcoptes scabiei communis.—Under this head are comprised all the mites which burrow and the females of which live in canals. Hence the *Sarcoptes scabiei hominis* really belongs among them. This has been treated of separate from the other species (*S. equi, suis, ovis, canis, lupi, vulpis, etc.*) in deference to its parasitical character towards man. For although sarcoptologists are unanimous that both anatomically and physiologically there are only quite immaterial differences between the several species—and physicians and veterinarians are well aware that, when transferred, the mites of *Sarcoptes* major burrow under the epidermis, the females construct canals, lay eggs, from which young are hatched, in short that there ensues an itch spread over the whole body—still experience has shown that the mites are unable to adapt themselves definitively, and that such an itch is always of limited duration (never beyond six to eight weeks) and that therefore spontaneous recovery is the uniform result. Hence all the mites named cannot be looked upon as true parasites of the human skin, but only as such as are liable to produce temporary scabies.

This is true in a still greater degree of the mites of *sarcoptes minor*. These when transferred produce only a local eczematous eruption lasting several days which terminates within three or four days with the death of the animal.

b. In the family of the *Gamasidæ* there are two species of *dermanyssus* which show a certain predilection to pass from birds to man. These are *D. gallinæ* and *D. avium*. They

have a soft skin, breathe by means of tracheæ, and have no eyes. The mandibles in the male are changed into a lancet-like dagger, in the female into a delicate stiletto. The legs are hairy and end in two claws and a sucking disk. *D. gallinæ* is smaller and of a yellowish color, while *D. avium* is grayish.

Both species are numerous in fowls, birds, in their nests and in dove-cotes, whence they escape by night into human habitations in order to attack man during sleep and when gorged with blood to return at dawn into their hiding places. In one of my patients *D. gallinæ* had caused a diffuse eczema lasting about four weeks. The eruption always heals spontaneously.

c. Ixodes, Ticks.—This family comprises a considerable number of periodical parasites which are spread over every region of the globe. The flattened body provided with a firm dorsal shield, and great bloodthirstiness, are common to all. The barbed maxillæ are changed into a long proboscis which incloses the protrudible maxillary palpi with serrated terminal segments curved like a claw. They breathe through tracheæ and possess large salivary poison glands (?). Each of the eight legs ends in two hooked claws.

Ixodes ricinus (wood beetle) is spread over nearly the whole temperate zone. The male is up to 3 mm. in length and half as broad, the female is generally twice that size. This tick is found in woods, on pines and bushes, where it waits for passing men and animals in order to attack them. The animals are in the habit of boring the proboscis imperceptibly into the skin and gorge themselves to such an extent that they swell to the size of a castor seed; they then let go, drop to the ground and remain there until they repeat the operation. But if it is a female, the numerous eggs are first safely deposited in an appropriate place, a few days after which it dies.

The injury inflicted by the tick is hardly perceived at first, the troublesome sensation ensuing when the animal is gorged. Subsequently there remains usually a small wheal-like or circumscribed papular inflammation. If the animal be removed forcibly, the proboscis tears off and remains in the wound, causing violent pain.

In order to render the wound as harmless as possible, we must either wait until it has gorged itself and drops off, or paint its body with oil of turpentine, etc., whereby it either perishes (closure of the stigmas) or spontaneously retracts the proboscis. With us there occur, besides, *ixodes redivius* and *argas reflexus* which occasionally trouble man.

Of the species of *argas* occurring in the tropics should be specially mentioned: 1. *Argas persicus* (Persia and Egypt), and 2. *Argas americanus, chincha* (Colombia). By their bite both cause rather intense persistent pain, and the latter is even said to be fatal to strangers. But they become a veritable plague when they get into the houses because it is almost impossible to eradicate them and they bleed men at will, attacking them during sleep.

The literature of the ticks has been recently most carefully compiled by Megnin in the *Journal de l'Anatomie et de la Physiol.*, 1882, No. 4, to which I refer.

d. Cimex lectularius, Acanthia lectularia, the bed-bug.—The body has an oval form, is wingless, brownish red, 5 mm. long and 3 mm. broad. Mandibles and maxillæ joined into a tubular sucking apparatus, surrounded by the lower labium. Tongue, as a stinging apparatus, inclosed in the sheath. Glandulæ odoriferæ on the metathorax.

Its usual resorts are old furniture and neglected apartments. It is remarkable how, aided by its sensory apparatus (sight or smell?), it deliberately moves along, for instance, on the ceiling of the room, to the desired spot so as to drop directly upon the scented object. Its bite is affected by first inserting its sting into skin, and then, in order to ob-

tain a larger quantity of blood with greater facility, by evacuating its voluminous poison gland, provoking a reaction connected with hyperæmia. The consequences are that, besides the slight lesion, large wheals form which itch greatly and are not easily distinguished from commencing prurigo.

e. Pulex penetrans (Sarcopsylla Westwood, Genus Rhynchoprion Oken).—The sand flea, called by the inhabitants chique pique, nigra, etc., occurs from the 29th degree of South to the 30th degree of North latitude, especially in Brazil and Guiana, and is said to be met with also in some parts of Africa.

The body is egg-shaped, broader and only half as large as the human flea, of a brownish red color with a white spot on the back. In its organization it differs but slightly from the other animals of the same family. *Pulex penetrans* becomes notable only by its mode of life. For while the male strives to reach any accessible mammals so as to obtain its nourishment after the manner of its kind, the fecundated female waits in the sand for such animals as offer sufficient amount of blood during the whole time of ovulation. But man, too, is one of its favorite objects. Children playing in the sand may be attacked by it on any part, while in adults it generally bores into the nail bed of the toes, penetrating to its third abdominal ring. The first bite is hardly felt by the attacked person, only gradually as the insect gorges itself and the sac-like dilated abdomen swells to the size of a pea, the spot becomes ever more painful by the tension thus produced. Meantime the female expels the eggs from the posterior free part of the abdomen, shrinks to its former size, drops off, and dies. Under normal conditions, the lesion which it has caused heals in a few days without medical aid, in the absence of injurious influences. It becomes serious when not kept clean, if many fleas are close together (three hundred) or if, with a view to forcible removal, the insect with its eggs is pressed inwards, because the numerous larvæ present in the skin may subsequently give rise to grave complications. In neglected and stubborn cases there occur not rarely extensive and deep phlegmons running into gangrene, causing partly considerable losses of tissue, partly necessitating amputations at various points; sometimes even the life of the patient may be seriously jeopardized.

In order to protect one's self from the sand flea, sound shoes should be worn, and the feet be carefully inspected morning and evening. People with sweaty feet are spared by the sand flea. If the flea has attached itself, one must either wait until it falls, or lift it out with a red hot needle so that no eggs remain in the wound. The treatment of the wound is to be managed on general surgical principles.

f. Tabanidæ, Gadflies.—Large flies with broad emerald green body and depressed head. Proboscis projecting with six (female) or four (male) stilettoes. Mandibles present only in the female. Generally females infest the larger domestic animals, but inflict upon man also painful injuries.

g. Culex pipiens, Gnat.—Proboscis long, projecting, with four stinging-bristles and five-jointed palpi. Only the females sting, during which act they instil a caustic fluid into the wound. They generally spare animals, but prefer to attack man and by their bite cause rather violent itching and the formation of wheals.

In connection herewith should be mentioned some other species of Simulia (*C. columbacensis* on the lower Danube) and the mosquito (*Simul pertinax*), especially plentiful in hot regions, which are particularly annoying to strangers.

h. Hirudinea.—Leuckart was the first to include the leeches among the parasites. A considerable number of these, at least during some stage (like *H. medicinalis*, if it is

to reach full sexual maturity), is forced to lead an ectoparasitical mode of life on warm-blooded animals and occasionally also on man.

Altogether there are known thus far some twenty species of leeches which temporarily prey on man. All of them are distinguished by their elongated body tapering at both ends, by their rings (70–90), and by having at the margin of the head a sucking disk and at the posterior pole of the body an abdominal plate. The oral opening is in front and more ventral. It is limited by a projecting screen resembling a sucking disk, and in the so-called oral cavity there are arranged in form of an isosceles triangle three closely adjoining muscular fibres, *i. e.*, maxillary plates, each of which has up to eighty teeth, and resembles a circular saw. Posteriorly follows the pharynx which can be partially protruded, and then the stomach with eleven pair of lateral diverticula.

Sucking is accomplished thus by the leech: The sucking disk situated around the oral cavity is closely applied to the skin, then by lifting it a vacuum is produced which causes a pronounced hyperæmia in the capillary vessels. By a twisting motion with the serrated maxillary plates the wound is inflicted. Then the pharynx pumps the blood into the stomach, and continues to do so until the animal is gorged, when it drops spontaneously. If immediately afterward we rub gently along the body, a part of the blood can be evacuated without any damage to the animal; otherwise its digestion lasts nine to ten months. Besides, observations have been made that leeches have remained alive even two years without taking nourishment.

The parasitic nature of the true leeches has been used for medicinal purposes since the time of Hippocrates. The most suitable is considered to be *H. officinalis*—the Hungarian leech exported to the whole of Europe—and next in order comes *H. medicinalis*, the German leech. Besides, on either side of the ocean almost every strip of country has its own leech.

All the leeches of this category inflict upon man wounds which under ordinary conditions are borne without ill effects. But there are Hirudinea which at times attack man in such numbers that, besides the danger of profuse suppuration, there is that of anæmia. Moreover, there are in tropical countries species of leeches which by their poisonous bite inflict wounds endangering life.

2. Animals parasitical in an immature Condition.

a. Cysticercus cellulosæ cutis.—The occurrence of the hydatid of *Tænia solium* in the subcutaneous connective tissue of man was demonstrated many years ago (Rokitansky). Küchenmeister and Zürn give the proportion of infection of the skin by this *Cysticercus* as compared with other organs at five per cent, but I believe that this number is too low. A more accurate calculation could properly be made in northern regions, where proportionately more pork is eaten uncorncorned and half raw, and where, by reason of the more frequent occurrence of *Tænia solium*, an auto-inoculation with the eggs of the proglottides is more easily effected. To these causative factors is due the fact that in North Germany the presence of this hydatid in the most variable organs has been earlier and more frequently observed than elsewhere.

The cysticercus in the subcutaneous connective tissue usually reaches only the size of a pea, and hence the swellings caused by it have the same dimensions. But some are met with the size of a walnut, and again others below the usual size, about that of a lentil. These variations depend on whether the cysticercus is living, on the size reached by its caudal vesicle, and on the state of the reactive inflammation of the surroundings. When the animal has perished, the connective tissue envelope shrinks to a minimum, and the

palpating fingers will find only a small deep-seated nodule. But if the animal is still living, the eye appreciates either a small roundish or a larger oval tumor covered with normal skin, having a firm elastic feel, and displaceable on the underlying tissues. Judging from the findings thus far, cysticercus of the skin is rarely isolated, but almost without exception is met with in large numbers. It is most frequent on the back, next on the lateral parts of the trunk, and on the extremities. Often while the old tumors continue, additional ones form for some time. In the beginning they cause no inconvenience, but become painful when they exceed a certain size and are frequently exposed to pressure.

The final result (often after two or three years) of cysticerci of the skin is obliteration, calcification, rarely abscess formation.

DIAGNOSIS.—The recognition of the tumor can occasionally be of considerable importance. Often we shall be enabled thereby to explain other important morbid symptoms (Chiari's case of cerebral affection). If we bear in mind, as Bergmann emphasizes with justice, that cysticerci are multiple and that each tumor contains only one animal, it will not be difficult to distinguish it from echinococcus of the skin. In syphilitic gumma the skin usually has an altered appearance, cannot easily be lifted in folds, the tumor on an average is larger, and moreover the history will furnish sufficient information for diagnosis in general. Lipoma is characterized by its continued growth, the uneven rough surface, together with the firm feel. Sarcomata and carcinomata occur in older cachectic individuals, enlarge and increase rapidly, are often painful, and never become smaller.

Although it is possible to diagnose cysticerci of the skin by careful examination of the seat of the affection and by exclusion of the tumors occurring in combination, it will be most advisable either to make an exploratory puncture or to extirpate one of the tumors. In the former case the diagnosis will be placed beyond doubt by the hooklets of the scolex head escaping with the serous contents, and in the latter, by the recognition of the animal.

b. Echinococcus cutis.—In dermatological works this parasite is nowhere mentioned: although it has thus far been found often enough in the human skin. According to Davaine's report, among 366 cases of echinococcus he has found the latter thirty times in the muscles and the subcutaneous connective tissue. It is said to occur far more frequently in the female sex than in the male. Echinococcus of the skin causes the patient no other disturbances but a disagreeable sensation of heaviness and tension. The parasite usually dies after some length of time (one to two years) and after it has attained larger dimensions; and, while the contents of the vesicles become turbid, fatty, or changed into a pultaceous mass, the connective-tissue envelope undergoes atrophy, calcification. Its superficial seat, the projection without alteration of the skin, the peculiar fluctuation, and the scintillation of the transmitted light materially facilitate the diagnosis. Here, too, exploratory puncture will furnish the best information. If the presence of echinococcus has been determined, extirpation of the tumor will be the most rational procedure for its removal.

c. Distoma hepaticum. Large liver fluke.—Küchenmeister and Zürn (l. c.) report on three well authenticated cases (Giesker, Fox, and Carrière) of incapsulated rediae (embryos with mouth and intestines) of these animals in the subcutaneous connective tissue. According to this source, distoma is said to have been observed in a woman in the neighborhood of Zurich and in two sailors who had formerly lived in tropical countries. The site differed (once each on the lower extremities, the trunk, and the region of the ear), and equally variable were the symptoms. Sometimes continuous pain was

present so that it was thought there was an abscess, and again the enlargement of the tumor was borne without any inconvenience. In all the cases the diagnosis was made *à posteriori, i. e.*, by the demonstration of the distoma.

d. FILARIA MEDINENSIS (GMELIN), MEDINA OR GUINEA WORM.

Body filiform cylindrical, with gradually tapering posterior extremity. The male thus far unknown, female yellowish white, 60 to 80 cm. long, 0.5 to 1.7 cm. thick (Leuckart). Small triangular oral opening surrounded by four small papillæ. Within the uterus several (six to eight) millions of embryos measuring 0.6 to 0.7 mm.

The Medina worm occurs endemically in tropical regions, but only in some strips of country (India, Guiana, Egypt, Brazil, etc.). In Europe and elsewhere it is met with in persons who have returned there after infection. Thus far it has been met with most frequently in man and in dogs, through other animals are not exempt. It is found relatively most frequently in the subcutaneous connective tissue of the lower extremities, of the scrotum, back, as well as that of the conjunctiva, under the tongue, in the heart and in the vessels. Pruner has found a worm in a negro under the liver.

In Africa I have had repeated opportunity to see the bubonic affection produced by the filaria in negroes and have learned on inquiry the opinion current there that the animal in marshy regions bores into the lower extremities of barefoot persons. But this statement is opposed by the fact that the worm occurs also on such parts of the skin where it could not penetrate from the ground, and on the other hand it occurs likewise in persons whose feet are always covered. Hence it is most probable that it reaches the stomach and thence the circulation, to be deposited in the connective tissue surrounding the organs or in the subcutaneous connective tissue of the skin. It cannot be definitely decided whether transportation by the negroes, in view of the pronounced localization of the disease in circumscribed districts, regions, etc., plays an equally important rôle.

When the Medina worm has settled at one place and developed to maturity, it aims to reach the surface. The symptoms manifested in such a case are the following: At a circumscribed spot, where the infested person has felt for some months a certain heaviness, the skin bulges out and gradually becomes red, painful, and slight fluctuation is demonstrable. If the process be left to itself, there finally ensues a perforation the size of a millet seed from which the punctiform head of the animal protrudes from time to time. Thenceforth the opening enlarges to the time when the animal with its brood of embryos leaves the inflammatory spot. When this has taken place, the inflammatory symptoms abate, the swelling diminishes, and after a few weeks an irregular cicatrix up to the size of a hazelnut is formed. However, owing to the frequent occurrence of these swellings, the inhabitants and the physicians of these regions are familiar with the symptoms and therefore they generally commence the treatment in time. They endeavor to seize the end of the animal and then with gentle traction they wind it on a wooden rod, taking care lest it break off. Hence when resistance is encountered on traction, the procedure is interrupted, and the rod with the rolled up portion of the worm is left at the opening of the wound, until the removal is finally effected, sometimes after several days. The process, from the immigration to the expulsion of the animal, may last from six to eighteen months. At times one person may harbor several animals, in which case the process may last two years.

e. Filaria Sanguinis Hominis.—According to Lewis and Cobbold, the sexually