

mature female is yellowish white, 8 to 10 cm. long and 0.3 cm. broad. The male is half that size. Head rounded, oral opening circular, without papillæ. Posterior extremity of the body pointed, with anal opening. Uterine tubes filled with numerous eggs measuring 12 to 30 micromillimetres. Hatched embryos 0.2 to 0.3 mm. long.

Wucherer (1866), in Brazil, first had his attention directed to this filaria, having found in the urine of a hæmaturic patient active "worms" (embryos) of a "species hitherto not described." Subsequently the same embryos were discovered in chylous urine. In 1872, Lewis succeeded in finding the filaria in this early stage in the blood, and in the tissue juices. And as the persons infested with them suffered at the same time either from chyluria, or from elephantiasis arabum, or from lymphæctasia of the scrotum, he began to suspect that the affections named might bear a causal relation to the occurrence of the parasite. This supposition gained in probability when Cobbold (1877) was enabled to report, through communications by Bancroft, that he had found in Australia, in a lymphatic abscess of the arm one filaria, and soon after in a hydrocele of the spermatic cord four sexually mature filariæ. In the same year, too, Lewis discovered a mature worm in the blood coagulum of an Indian (Bengal) operated on for elephantiasis scroti, so too Silva Aranjó (in hæmaturia) and Santos (in lymphatic abscess on the arm).

To Manson belongs the merit of having discovered that the filaria embryos are taken from the human blood into the body of the female mosquito, where they undergo their development, and by the death of the mosquitoes in stagnant and marshy water are set free as mature filariæ. Manson assumes moreover that with the ingestion of such water the mature animals get into the human organism, and by reason of the inflammation and obliteration they cause in the lymphatic channels and organs, according to the locality, give rise to either elephantiasis arabum, chyluria, chylous hydrocele or other related affections. Only isolated voices (Tilb. Fox, Genet) have been raised against this view. In reply to these, Manson (1881) has demonstrated in a case of elephantiasis nævoid. scroti that from the absence of the filaria embryos in the blood, the diminution of the lymph corpuscles in the vessels, and the presence of embryos in the chylous fluid, we may conclude with good reason that it is the mature filariæ which cause the obliteration in the lymph channels around the glands (inguinal). From the numerous investigations carried out with great perseverance and ingenuity, he even goes so far in his deduction as to trace to the same cause, besides the lactifluous form, also the ordinary typical elephantiasis arabum of the tropics which commence with affection of the lymph-vessels and intermittent fever.

Although these deductions cannot be accepted in their totality, it must always be recognized that Manson, Lewis, and others were the first to point out that there is a causal connection between the presence of filaria sanguinis hominis and a number of cases of endemic elephantiasis, chyluria, etc.

f. Craw-craw.—Within the last few years, some cases of cutaneous disease have become known which, by reason of the microscopic results obtained, show undoubtedly that they are caused by nematodes.

O. Neill,¹ in 1875, observed in negroes on the west coast of Africa a papulo-vesiculo-pustular eruption, called *craw-craw* by the natives, which made upon him the impression of an old scabies, owing to the violent itching and the localization of the efflorescences (fingers and extensor sides of the forearm). Hence he was not a little surprised to discover in the scraped epidermis covering the nodules, and in the sero-purulent fluid ex-

¹ Lancet, 1875, No. 20, February, with Illustrations.

pressed from the depth, several actively moving worms, 0.2 mm. long and 0.01 mm. broad, which in their appearance were said to be filaria. Two years later, Silva Aranjó in Brazil treated a case of *craw-craw* associated with chyluria and elephantiasis arabum. S. Aranjó states that he has found embryos and one mature filaria (dead) in the urine and in the lactiform fluid, but makes no mention of any discovery in the skin.

Although at first we would feel inclined to accept for both *craw-craw* affections some kind of filaria as the incitor of the disease, we shall hesitate when we bear in mind that Nielly¹ (1882) had an opportunity of observing in Brest a fourteen-year-old boy who had never been outside of the limits of France, with completely analogous morbid symptoms, and here, too, scabies was at first suspected. Nielly has found in the contents of the vesiculo-pustular efflorescences several nematodes, up to 0.333 mm. long and 0.13 mm. broad, even sexually mature females. He is inclined to consider them one of the numerous species of the genus *Leptodera*, fam. *Anguillulidæ*, but thinks that he cannot fully disprove the view (Corre) that they are a kind of filaria.

In my opinion, Nielly's statements, especially the occurrence of the disease in France, the natural-historical description of the fully developed, sexually mature animals, and the complete cure of the patient after some baths, as well as the fact that these anguillulæ in general have a particular predilection for a parasitical life on the skin, make it appear very probable that both here and in the cases mentioned by O. Neill a species of *leptodera* (the animal having really not been examined at all) has produced the cutaneous disease, and this, moreover, under the influence of external circumstances.

g. Oxyuris vermicularis.—The mature female is 10 mm. long, the male only half that size. The posterior part of the body of the female is like an awl, that of the male tumid. This worm lives only in the intestinal tract, and inhabits the various portions of it, commencing with the stomach (in the shape of ova), according to its phase of development. The fecundated female always keeps beyond the cæcum, and in proportion as the time for oviposition approaches, descends as far as the rectum. The eggs are deposited usually in the fæces, but it happens, too, that the female slips out of the anal opening, causing violent itching, and then lays the eggs in the neighborhood of the anus. In a boy aged thirteen who suffered from *oxyuris vermicularis* and was affected with a neglected eczema intertrigo on the genito-crural folds, Michelson found on the scraped epidermis eggs containing tadpole-like embryos, 0.05 mm. long and 0.016 mm. broad, as well as hatched embryos of the extended form. He correctly explains the cause of this interesting discovery by stating that the boy had himself effected the transmission to the eczematous spots through the shirt-tail soiled with the fæces.

h. The Larvæ of Diptera.—Even to-day we are unable to name all the larvæ living parasitically on man. But in the extensive families of muscidæ and cæstridæ there is hardly any species whose larvæ have not been found in wounds and injuries. However, the animals effect an entrance in various ways, and the manner in which they reach the wounds depends rather on the characters of the families and species.

α. A considerable part of the muscidæ (flesh, house, stable, dung, and other flies) possess defective maxillæ and a proboscis with fleshy end lobes. These insects, therefore, are unable to injure the skin, and are forced to nourish themselves with the secretions, etc. In the same way, their larvæ (maggots) have only rudimentary oral apparatus. Consequently, the pregnant females seek to place their eggs and larvæ in situations where they easily find the conditions for their future development. Among these must be in-

¹ Gazette Hebdomad., 1882, Nos. 15 and 18, pp. 244 and 298.

cluded neglected wounds. The hospital physician not rarely has the opportunity of seeing a number of them in wounds, for instance, of the scalp. The impression obtained hereby from the active motions of the animals is peculiar and at the same time disquieting. It is obvious that considerable diffuse irritative conditions of the skin, increase of the inflammation, with resulting erysipelas and phlegmons, may ensue under these circumstances.

Altogether different is the procedure of those œstridæ (*Dermatobia noxalis*, Cuterebra, and *Hypoderma*) and muscidæ (*Lucilia Cæsar* in America, *Stomoxys calcitrans* in Africa, *Sarcophila Wohlfarti* in Russia, etc.) which place their ova or larvæ under the skin by means of their stinging apparatus. Although they also use raw surfaces for this purpose, they employ their implements with equal frequency for inflicting fresh wounds. In this way are produced those frequently very painful furuncular inflammations which continue until the larvæ escape. At times these tumors even undergo suppuration and gangrenous disintegration which may lead to loss of the limb, etc.

But it is not necessary that the mother animal itself should always bring its offspring under the skin. Sometimes the hatched larva works its way unaided from the epidermis into the various depths of the skin. Thus, for instance, it is known of the larvæ of the genus *Hypoderma* that the thread-like body bores into the opening of the follicle and thence advances into the cutis, causing various forms of destruction.

III. ACCIDENTAL PARASITES.

Dermatodectes (Gerlach), *Psoroptes* (Gervais), *Dermatokoptes* (Fürstenberg), and *Symbiotes* or *Chorioptes Dermatophagus*. Both species of mites are larger than those of *sarcoptes*, but are of the same shape. These mites are characterized by the scissor-shaped maxillary palpi and the long legs. The male of *Dermatodectes* has at the ends of the legs pedunculated sucking disks, the female long bristles on the fourth pair of feet. *Symbiotes* possesses inflated-looking sucking disks on short stems, and thicker but shorter maxillæ. *Dermatodectes* burrows as far as the cutis, while *Symbiotes* remains on the corneous layer.

The mites of *Dermatodectes* and *Symbiotes* are unable to maintain themselves permanently in the skin, but perish in from three to five days. They cause by their presence an eczema in the form of nodules and pustules and are easily found after scraping the dried contents, *i. e.*, the crusts.

Leptus autumnalis. *Harvest bug*.—It is not certain thus far whether it is the six-legged larva of *Trombidium holosericum* (Hermann)—the common red earth mite—or that of *Tetranychus*. But at all events it belongs to the family of the *Trombidæ*. Normally its body is oval (with Hartn. eye-piece II., obj. VII.) 0.35–58 mm. long and 0.32 mm. broad, and is divided on the ventral surface into cephalothorax and abdomen by a transverse furrow. The oral parts consist of a short conico-cylindrical, retractible sucking proboscis which is formed by a fusion of two maxillæ. Laterally from this are two strong, five-jointed palpi which can be rolled up and bear powerful hooked claws. Two large hatchet-like mandibles moreover assist the function of the proboscis. On the surface of the cephalothorax is a cuirass-like shield which bears two stigmata guarded by bristles and laterally from these two simple eyes. On the lower surface are the triangular epimeres with three pair of legs. Each of the latter is six-jointed and has two claws on the tarsus. The abdomen is large, broad, and slightly striped. Sexual parts have not been found thus far in *Leptus*.

SYMPTOMS AND COURSE.—In the hot season, especially during July and August, we not rarely have occasion to observe the occurrence of an eruption associated with violent itching in persons who are around gooseberry, elder, and other bushes. The affected skin, owing to the scratching, looks diffusely red and has on its surface a considerable number of bright-red nodules and wheals up to the size of a pin's head. Sometimes the affection spreads from the parts first involved over the greater portion of the body. In more intense cases a slight febrile movement is generally associated with it.

If we inspect the several efflorescences more closely, we can almost without exception

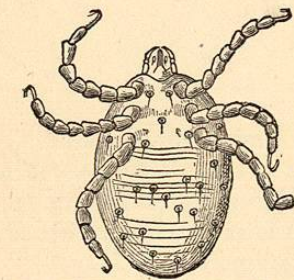


FIG. 56.—*Leptus autumnalis* (harvest bug).

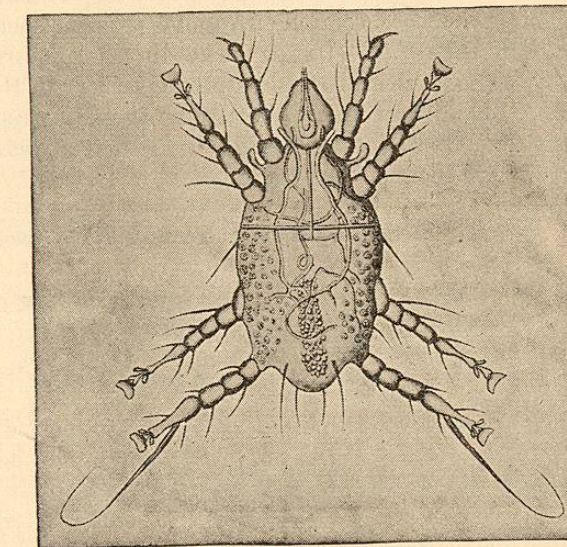


FIG. 57.

perceive near its centre a slight elevation which is conspicuous by its yellowish red color. When we seek to lift it off with the point of a needle or to scrape it away, we can often see with the naked eye an actively moving reddish animalcule.

TREATMENT.—The nature of the affection having been ascertained, it is the first duty of the physician to search for the source of the transmission so as to guard against further invasions. In such a case, then, as the mites do not increase and soon perish, the process barely lasts a few days; while otherwise diseases of several weeks' duration may occur.

Kriptoptes monunguiculosis (*Acarus hordei*) is the name I have given to the larva of a mite which is rather frequent in barley and is apt to annoy the mowers, the laborers occupied with loading, etc. The creature is of an oblong oval form, yellowish white color, and on the average 0.022 mm. long (Fig. 57). The oral parts consist of a protrudible tubular boring apparatus which is inclosed by serrated mandibles. On each side of this are the five jointed palpi. There are four pair of feet, two on the cephalothorax and two on the abdomen, which are articulated to the epimeres. The tarsus of the first pair of feet terminates in a hooked claw, while the other three bear sucking disks on stems. Between the first and the second pair of feet are the oval swinging clubs which indicate the larval condition. The tracheal system clearly developed. Sexual parts entirely absent.

The slightest cutaneous disease caused by the larvæ consists in an eruption of urticaria. The efflorescences show a special tendency to locate around the mouths of the follicles. If we carefully try to lift the epidermis in the neighborhood of the mouths of the follicles, the animalcules are almost without exception found beneath. Where the skin is sensitive and the irritation intense we observe a rapid transition of the urticarial eruption into a very itchy eczema, and a painful dermatitis. In such a case the skin becomes bright red, its temperature increases, and sometimes slight febrile movement is present. The inflammatory symptoms of the skin having reached their height after three or four days, and no fresh causes being superadded, they remain stationary for a short time, and then involution ensues, scratch effects and pigment spots being left behind.

Clothilia inquilina.—Under the heading "Eine Invasion von Holzläusen" Virchow¹ reports that the teacher at Parstein near Oderberg in Neumark was much annoyed by the appearance of an insect which spread from the living rooms over all the objects, clothing, etc., that were in them. Gestäcker states that it was an orthopter from the family Psocidæ, book-lice, the *Clothilia inquilina* of Heyden.

¹ Archiv für pathol. Anatomie und Physiologie, Bd. 54, p. 283.

THE NEW-FORMATIONS OF THE SKIN.

BY

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INTRODUCTION.

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THE new-formations of the skin comprise those circumscribed, usually tumor-like structures which arise in the manner of embryonal organization; certain cells dividing and differentiating according to the same laws as those manifested in the formation of the tissues and organs of the body.

Especially during the process of division the cell manifests itself as a complicated organism, there being unfolded in it a plan-like plot of threads formed from the nuclear substance which in the first place leads to a strict partition of every formed nuclear portion. In the same way, the fecundated ovum likewise divides; portions of the parental organism are appropriated to each embryonal cell, and thus its qualities become hereditary in the offspring.

The organism would become normal if external influences or the heredity of abnormalities which originally come from without did not disturb its development. External conditions will modify the course of the cell more or less; there arise abnormalities which in part are probably equalized, eliminated, or made subservient to the purposes of the organism, but in part may endow the further development of the organism and its offspring with noxious peculiarities.

Thus we can artificially produce abnormalities which become hereditary (Brown-Séquard) and give rise to malformations by artificial influences on ovum and embryo (Dareste, Gerlach).

According to these reflections, we are justified in assuming that tumors likewise originally owe their existence to external influences, of the nature of which, however, only hypotheses are in our possession.

We can assert positively only that tumors may form in every stage of development or of retrogression of the organism, and that often the causative factors are laid by the parents in the plan of the new organism, which not rarely may remain hidden until the appearance of the tumor. Finally we must assume that in intra-uterine or extra-ute-