

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 peritonium.

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, centipedes, 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

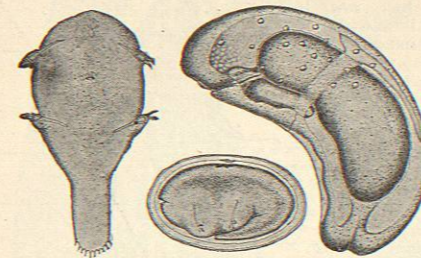


FIG. 244.—Linguatula rhinaria; Stages of Development. (After Leuckart.) a. Egg with embryo; b. free embryo; c. nymph or pupa. Magnified.

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

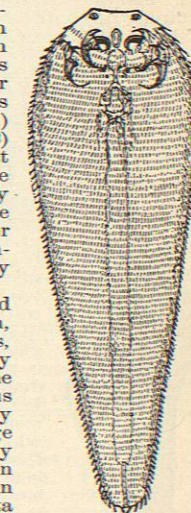


FIG. 245.—Linguatula denticulata, Larva of L. rhinaria. (After Leuckart.) Magnified.