Proceedings of the Iowa Academy of Science

Volume 51 | Annual Issue Article 55

1945

Studies on Iowa Spiders

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STUDIES ON IOWA SPIDERS[1]

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The spiders reported in this paper were collected by Professor H. E. Jaques and his students in the summer of 1940. From this collection twenty-five species and fifteen genera representing seven different families have been determined. Of the one hundred and twenty-eight individuals reported, there are sixty-three males, sixty-three females, and two immature. These spiders came from twenty-nine counties; their geographical distribution is indicated in Plate 1. All determinations were checked by W. J. Gertsch of the American Museum of Natural History, New York City, and it is a pleasure for the authors to acknowledge their appreciation of Dr. Gertsch's assistance.

It is believed that this report includes many of the more common species of Iowa spiders and, therefore, should be of special assistance to high school teachers and pupils interested in the identification of these interesting animals. The families as well as the species are briefly described. Furthermore, several simple figures, a brief glossary of terms, and a bibliography are included for the benefit of beginning students of spiders.

FAMILY LYCOSIDAE

The Lycosidae, often seen hunting and chasing their prey, are large spiders. Commonly known as the wolf spiders, the Lycosidae have eyes arranged in three rows, the posterior lateral eyes being situated far behind the posterior median eyes; the first row consists of four small eyes and the posterior rows each of two large eyes (Plate 2, fig. 1). The trochanters of the legs are notched, and the lorum of the pedicle is composed of two pieces of which the posterior one is notched to receive the anterior one (Plate 2, fig. 2). The spider possesses six spinnerets, and tarsi which have three claws.

LYCOSA HELLUO Walckenaer

The body is dull yellow or greenish brown in color. There is a yellow stripe down the middle of the cephalothorax, which is narrower between the eyes than on the thoracic portion. There is also a narrow light band on each lateral margin of the thorax. The markings of the abdomen are indistinct. Two females and one immature, Worth County; one female, Lyon County; one male, Taylor County.

FAMILY LINYPHIIDAE

The sheet-web weavers, which for the most part are small in size, lead a secluded life and rarely attract attention. They are three-

[1]Contributions from the Science Laboratories of Coe College No. 15 N. S. Aided by a grant from the American Association for the Advancement of Science through the Iowa Academy of Science.

clawed, eight-eyed spiders, but they differ from nearly all argiopids in that they have dissimilar eyes and lack the lateral condyle of the chelicerae.

LINYPHIA MARGINATA C. Koch

This spider is about one-sixth of an inch in length. The cephalothorax is yellowish brown with a light stripe margining each side. The abdomen is yellowish white. In the mid-portion of its dorsal surface is an irregular dark band consisting of three broad parts united by narrower portions. At the tip of the abdomen there is a spot which is also connected to this band by a narrow line. There are also several dark stripes on the sides of the abdomen, and these are usually more distinct in the male. One female, Delaware County.

PITYOHYPHANTES COSTATA Hentz

This species is easily recognized by its characteristic markings. The cephalothorax is light yellow, narrowly margined with black, with a median dark line on the thorax, and two closely parallel lines on the head. Dorsally the abdomen is yellowish with a dark brown or reddish herring bone stripe extending its full length. The length of the body is one-fifth inch.

The web of this spider is a netted hammock-like sheet, which is often quadrangular in outline, but the shape depends largely on the nature of the support. The web may contain a curled leaf which is used as a retreat by the spider, but if there is no leaf available, a tent of silk may be built to serve this purpose.

One female, Hancock County.

FAMILY THERIDIIDAE

The Theridiidae, commonly known as the comb-footed spiders, possess on the tarsi of the fourth pair of legs a distinct comb (Plate 2, fig. 3) consisting of strong, curved, and toothed setae. This comb may be considerably reduced in some forms. These spiders have eight eyes, which are heterogeneous in color, and three tarsal claws.

THERIDION FRONDEUM Hentz

This tiny spider, often attracting attention because of its conspicuous colors, is white with black markings. The cephalothorax is a yellowish white, having a median longitudinal black band which may be narrow and line-like, or wide enough to cover the greater part of the cephalothorax. In the specimen identified, the band is very wide. The markings of the abdomen vary, but in the particular variety found in this study, the center of the basal part of the abdomen is black. The female and the male are about one eighth of an inch long, although the female may be slightly larger. The front legs of both male and female are long, from one-third to two-fifths inch in length. One female, Dickinson County; one male, Lyon County.

FAMILY ARGIOPIDAE

These spiders, best known of all groups of spiders, are most easily recognized by the type of web they weave, and they are known as the

true orb weavers. They are three-clawed, sedentary spiders, with eight, usually homogeneous, eyes. The lateral condyles of the chelicerae, while usually present, are sometimes lacking or rudimentary.

NEOSCONA ARABESCA (Walckenaer)

Rarely exceeding one-third inch in length, this particular spider is usually a mottled brown, or brown and red, with white or light yellow markings. The web, built on low bushes, is nearly a complete orb, perpendicular to the ground, and the spider usually rests in the middle of it. One female, Lyon County; one female, Benton County; one male, Dickinson County.

MICRATHENA GRACILIS (Walckenaer)

The abdomen of this spider possesses five pairs of spines; the first is near the base, the second about midway the length of the abdomen; and the other three pairs are located at the caudal end. The cephalothorax is a reddish brown, and it has three dark stripes. The abdomen is spotted with white, yellow, and brown, although this color pattern may vary greatly. One female, Jones County.

MICRATHENA SAGITTATA (Walckenaer)

This spider is easily recognized by the shape of the abdomen, which is narrow in front and terminated behind by two large spreading spines. The abdomen is white or bright yellow spotted with black, bearing two additional pairs of spines, one near the base, and the other between these and the large caudal spines. In the female these spines are black at the tip and bright red at the base. The cephalothorax is yellowish brown with white edges. The male has an abdomen posteriorly widened and bearing slight humps in place of the spines possessed by the female. Three males, two females, Jones County; two males, Clayton County; one female, Louisa County; one male, Butler County; one male, Dubuque County.

NEOSCONA MINIMA Cambridge

The straight second tibia of the male will distinguish this spider from *Neoscona arabesca* (Walckenaer) to which it is very closely allied in other respects. Two males, Dickinson County.

TETRAGNATHA ELONGATA Walckenaer

This is the largest of our common species of Tetragnatha, the full-grown adult females sometimes being one-half inch in length. The lateral eyes of each side are not as far apart as the anterior and posterior median eyes. The chelicerae of the male are longer than the cephalothorax while those of the female are a little shorter than the cephalothorax. The abdomen of the male is slender while that of the female is usually swollen in the basal third. The general color of the abdomen is gray with a broken median gray strip. One male, Johnson County.

TETRAGNATHA LABORIOSA Hentz

The long slender abdomen of this spider is a little less than three times as long as the cephalothorax in the female. The lateral eyes

of this spider are widely separated, and they are about the same distance apart as the anterior and posterior median eyes. As in other species of this genus, the chelicerae are without lateral condyles. The spider is of a yellowish color; the abdomen is silvery white with median gray markings on the dorsal surface and with dark stripes on the ventral surface. Six males, nine females, Lyon County; one male, Butler County; three males, four females, Mahaska County; one male, Sioux County; three males, Clayton County; one male, Winneshiek County; one male, one female, Buchanan County; four males, five females, Warren County; one male, one female, Winnebago County; one male, Marion County; one male, Jones County; one female, Dickinson County.

TETRAGNATHA MUNDA Chamberlin and Gertsch

The male of this species is about one-tenth inch long. The legs, palpi, chelicerae, and cephalothorax are dull orange. The abdomen above and below is bright yellow with darker reticulations. The posterior eyes are equidistant and slightly recurved. The anterior eyes are distinctly recurved; the median eyes are closer to each other than to the lateral eyes, while the anterior and posterior lateral eyes and two yellow stripes on the ventral surface. The legs, palpi, chelicera has six teeth of varying size, while the lower margin has five small teeth.

The female about two-tenths inch in length has a reddish abdomen with a central and two lateral yellow stripes on the dorsal surface and two yellow stripes of the ventral surface. The legs, palpi, chelicerae, and cephalothorax are dull orange, and the spines of the femur, patella, and tibia are on black spots, giving the legs a rather speckled appearance. The upper and lower margins of the furrows of the chelicerae each have seven teeth. One female, Johnson County; one male, Wright County; one male, Lyon County.

FAMILY THOMISIDAE

In general, the body of the Thomisidae, or crab spiders, is short and broad, but in *Tibellus*, the body is long and slender. In the more typical forms, the first and second pairs of legs are stouter and longer than the third and fourth pairs, while the third pair of legs is directed forward, much as the first and second pairs. There are two tarsal claws. The eight, small, dark eyes are arranged in two, usually recurved, rows. The lower margin of the furrow of the chelicera is indistinct and unarmed, while the upper margin may have one or two teeth.

MISUMENOPS ASPERATUS (Hentz)

The female of this species, about one-fourth inch in length, is light yellow or greenish in color and has dull red markings. There is a median light red band on the basal half of the abdomen, and there are two rows of spots on the posterior half with a band on each side; there is also a brownish stripe on each side of the cephalothorax. The male, about one-half as long as the female, resembles the female in

color and markings, and possesses a large palpus with a long coiled embolus. One female, one male, Warren County; one female, Winneshiek County; one male, Johnson County; one male, Monaska County.

MISUMENOPS CELER (Hentz)

The male of this species is about one-tenth inch long. It has red bands on the first and second tibia, metatarsi, and tarsi, but otherwise it is light yellow with black or dark brown spots at the base of the abdominal spines. Two males, Sioux County; one male, Lyon County; one male, Clay County.

PHILODROMUS AUREOLUS Olivier

The females of this species measure a little less than two-tenths inch in length, while the males are about one-tenth inch long. There is a light-colored central stripe about as wide as the eye group and extending from the anterior eyes to the posterior margin of the cephalothorax on the dorsal surface of the cephalothorax. The lateral portion of the cephalothorax is reddish brown and there is a little yellow along the margin. Slightly lobed at its base, the abdomen is light yellow with a reddish brown lanceolate stripe at the base and with much of the remaining area and the sides a darker brown. All of the underparts are light colored. The legs have some of the reddish-brown color, and this is intensified at the distal ends of many of the segments. One female, Woodbury County; three females, two males, Monona County; one male, one female, Lyon County.

TIBELLUS DUTTONI Hentz

The body of this spider is long and slender, the cephalothorax being much longer than wide and the abdomen long and nearly cylindrical. The body is light gray or yellow in color and there are three longitudinal brown stripes extending the entire length of the spider. There is a pair of small black spots on the abdomen located posteriorly. The space between the posterior median eyes is considerably less than the space between one of them and the posterior lateral eye of the same side. The second legs are more than five times as long as the cephalothorax. One male, Cass County; one female, Warren County.

TIBELLUS OBLONGUS (Walckenaer)

The body of this species is less slender than that of *Tibellus duttoni*, and the legs are somewhat shorter, the second ones being not quite five times as long as the cephalothorax. The space between the posterior median eyes is only a little less than that between one of them and the posterior lateral eye of the same side. Three females, Buchanan County; one immature, Jones County.

XYSTICUS FEROX (Hentz)

The female is about one-fourth inch long while the male is about one-fifth inch long. Yellowish in the middle and reddish brown on the sides, the cephalothorax has a median black spot with a larger one on each side at its posterior end. The abdomen is brownish gray dorsally and smoky white on the sides, having several small black spots

on the anterior dorsal surface. There are three pairs of transverse black bars on the posterior dorsal surface of the abdomen. One female, Clayton County; one female, Greene County; one female, Adair County.

XYSTICUS GULOSUS Keyserling

The female is about one-fourth inch in length. It is grayish in color and largely covered with minute brown specks. There is a faint light area in the middle portion of the cephalothorax, and the part of the cephalothorax which is nearest the abdomen is distinctly light colored. One female, Jones County.

XYSTICUS TRIGUTTATUS Keyserling

The female is about one-fifth inch long with a brownish-yellow cephalothorax and white abdomen. There are three black spots near the posterior end of the carapace. From the middle one of these, there is a white band which extends on each side toward the eyes, and which is wide behind and narrow in front. Each posterior median eye is located on a black spot in a white eye-space. There are irregular dark markings on each side of the carapace. The abdomen is white, and there are a pair of black spots near the base and three or four pairs of broken transverse stripes on the posterior half.

Somewhat smaller, the male measures one-sixth inch long. The cephalothorax is dark brown with a lighter median area. The femora of the first two legs is dark brown, and the abdomen is white with heavy brown markings. One male, Lyon County; one female, Jones County; one male, Warren County; one male, Fremont County; five males, Dickinson County; one male, Hancock County; one male, three females, Clay County; one female, Cass County.

FAMILY PISAURIDAE

Because of the care oftentimes exerted by the female in building a web just before the spiderlings are ready to emerge from the egg, the Pisauridae are commonly known as the nursery-web weavers. These spiders have eight eyes, all dark in color, but differing in size. In the apical margin of the lower side of the trochanters of the legs (Plate 2, fig. 4) is a semi-circular and bordered notch. There are three tarsal claws. In all forms in our fauna the two pieces of the lorum of the pedicle are either united by an anterior piece which is furnished with a notch behind into which a projection of the posterior piece of the lorum (Plate 2, fig. 5a) fits, or by a transverse suture (Plate 2, fig. 5b).

DOLOMEDES TENEBROSUS Hentz

The markings of this spider were faded and indistinct, but it was apparently greenish-gray in color. It was identified mainly on the basis of the epigynum, which is almost as long as it is wide. The guide is broad in front, does not extend to the hind part of the organ, and does not narrow greatly posteriorly. One female, Fremont County.

DOLOMEDES TRITON (Walckenaer)

This spider, rather large in size, is dark greenish gray in color, and has a white band on each side which extends the entire length of

the body. There are two rows of white spots on the dorsal surface of the abdomen, and six dark dots on the sternum, one near the base of each coxa. One male, one female, Page County; two females, Hancock County.

FAMILY SALTICIDAE

Commonly known as the jumping spider, the Salticidae are of medium or small size. They have a short body and stout legs furnished with two tarsal claws. The members of this family can be easily recognized by their characteristic size and the relative size of the eyes (Plate 2, fig. 6a and 6b). The eyes occupy the whole length of the head-part of the cephalothorax and limit a quadrilateral area, the ocular quadrangle. The body of these spiders is usually covered with hair or scales; and while many species are brightly colored, their appearance may be changed when they are placed in alcohol. Some members of this family not found in this investigation have bodies which are long and ant-like in appearance.

PHIDIPPUS AUDAX (Hentz)

This spider varies from one-third to one-half inch in length. In the male the cephalothorax and abdomen are black with many long white hairs. At the base of the abdomen is a white band; and dorso-medially on the abdomen is a large, triangular, white spot, with two pairs of white bars posterior to it. In front of the large white spot there is a pair of indistinct white spots, and in back of it, there is a metallic band. One female, Buchanan County.

METAPHIDIPPUS MARGINATUS (Walckenaer)

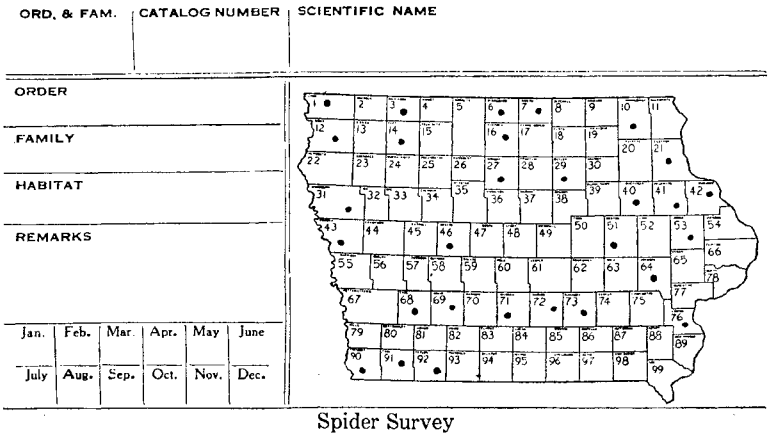
The male of this species is about one-fourth inch long and is yellow brown or bronze brown marked with white. There is a white band on each side of the cephalothorax, and this extends back nearly to the abdomen. There is also a white band around the edge of the abdomen. One male, Dickinson County.

PHIDIPPUS CLARUS (Keyserling)

The male of this species measures about three-tenths of an inch in length. The cephalothorax is black. A longitudinal black band, the margins of which are notched by three pairs of red or white spots, is centrally located on the abdomen. There are also a basal white band and oblique white bands on the sides. One male, Jones County; three females, Buchanan County.

TUTELINA ELEGANS (Hentz)

This spider is from one-sixth to one-fourth inch long. It is bronze-green in color and covered with brilliant iridescent scales. The legs are yellow with a black longitudinal line on their dorsal surface. The femur of the first pair of legs is almost entirely black. There is a white band around the lower margin of the cephalothorax, but this band was poorly developed in the specimen identified. Although the abdomen of the male is unmarked, that of the female has a basal white band. One female, Sioux County.



Spider Survey

Fig. 1

Glossary

ABDOMEN. The division of the spider's body which is posterior to the pedicel. It is usually sac-like and lacking segmentation.

CALAMISTRUM. One or two rows of curved, stiff hairs on the dorsal surface of the posterior metatarsi of certain spiders. It is used in combing out the broad band of silk produced by the cribellum.

CARAPACE. The hard integument of which the dorsal wall of the cephalothorax is composed.

CEPHALOTHORAX. The body of a spider is divided into two regions, the cephalothorax and the abdomen. The anterior division is known as the cephalothorax. Usually it is unsegmented, although the head and thorax may be separated by a furrow, known as the cervical groove. The posterior division is known as the abdomen.

CHELICERAE. Situated anterior to the mouth, the chelicerae are the first pair of appendages borne by the cephalothorax. The chelicerae consist of two segments; a large basal segment and a small terminal claw-like one, which is called the fang. When it is closed against the basal segment, the terminal segment fits into a groove, known as the furrow, which quite frequently bears a number of teeth.

CLAW. See Tarsal claw.

COMB. A series of serrated, curved setae on the fourth tarsi of the Theridiidae. Used to throw silk over the entangled prey.

COXA. The basal segment of the leg by means of which it is articulated with the body.

CRIBELLUM. An organ of sieve-like appearance situated just in front of the true spinnerets, usually considered as a source of the hackled band of certain kinds of webs. It is considered a modification of the spinnerets.

EMBOLUS. The part of a male palpus which contains the ejaculatory duct of the receptaculum seminis.

EPIGYNUM. A more or less complicated apparatus associated with the common opening of the ovaries to the outside of the body. It is located near the anterior border of the ventral surface of the abdomen. The epigynum varies greatly in form in different species, therefore it often affords the most distinctive characteristics for recognizing species. It is not fully developed until the spider reaches maturity. A few spiders do not possess an epigynum, for example, the *Tetragnatha*.

EYES. The eyes of all spiders are simple and resemble the ocelli of insects. Some of these eyes are pearly white and are called nocturnal eyes, while others lack the pearly luster and are termed diurnal eyes. The terms "nocturnal" and "diurnal" are of doubtful propriety. Spiders may have all of one type, then are said to have homogeneous eyes; or they may have both types and then are said to have heterogeneous eyes.

FEMUR. A large segment of the spider leg or pedipalp. It is located between the trochanter and patella; that is, from the proximal end the leg is divided into coxa, trochanter, femur, patella, tibia, metatarsus and tarsus.

GUIDE. A median, longitudinal, ridge-like elevation on the ventral surface of the epigynum.

LATERAL CONDYLE. A distinct articular structure located on the dorsolateral surface of the basal segment of the chelicerae.

LORUM. A slender, longitudinal sclerite in the dorsal wall of the pedicel.

METATARSUS. Next to the terminal segment of the spider leg. Not present in the pedipalp.

PEDICEL. A slender stalk which joins the thorax to the abdomen. The pedicel is usually concealed from above by the convexity of the part immediately following it.

PEDIPALP. The second pair of appendages borne by the cephalothorax. They are always more or less leg-like in form. In adult males the tarsi of the pedipalps are modified into remarkable copulatory organs.

SCOPULA. A brush of hairs on the maxillary lobes is termed a maxillary scopula. A similar brush of hairs may occur on the chelicerae. In many spiders pads or brushes of hair occur on the metatarsi and tarsi.

SETAE or HAIRS. Structures that give to these animals a hairy appearance. The hairs may be simple shafts or plumose or scale-like in form. The extremely slender and very flexible type are commonly

called hairs and the stiffer ones commonly termed setae; the two are morphologically the same, and they grade by degrees into each other.

SPINNERETS. The elongated tubes usually situated near the posterior end on the ventral side of the abdomen just in front of the anus.

SPIRACLES. Breathing pores on the ventral surface of the abdomen. The anterior spiracles, usually one pair but sometimes two pairs, termed "lung-slits," lead to the lung books near the anterior end of the abdomen. The posterior spiracle or tracheal spiracle usually lies just anterior to the spinnerets, but sometimes near the middle of the surface of the abdomen.

STERNUM. The middle portion of the ventral surface of the thorax. It occupies the entire space between the two rows of legs.

TARSAL CLAWS. Claws occurring at the distal end of the tarsus of each leg. There may be either two or three claws, and in the former case, a pad of specialized hairs, the empodium, may be present.

TARSUS. The segment of the spider leg just distal to the metatarsus, or the most distal segment of the pedipalp, which is extremely modified in the male spider.

TIBIA. The segment of a leg that lies between the patella and metatarsus. Also the segment of a pedipalp that lies between the patella and tarsus.

TROCHANTER. The segment of an appendage that lies between the coxa and femur.

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CEDAR RAPIDS, IOWA

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KEY TO PLATE I

Figure 1. Eye pattern of the Lycosidae viewed from the front. a.l., anterior lateral eyes; a.m., anterior median eyes; p.l., posterior lateral eyes; p.m., posterior median eyes.

Figure 2. Lorum of the Lycosa.

Figure 3. Comb of *Theridion tepidariorum.*

Figure 4. Trochanter of a hind leg of Dolomedes.

Figure 5. (a) Lorum of Dolomedes. (b) Lorum of Pisaurina.

Figure 6. (a) Eye pattern of Salticidae as seen from above. (b) eye pattern of Salticidae as seen from the front. a.l., anterior lateral eyes; a.m., anterior median eyes; p.l., posterior lateral eyes; p.m., posterior median eyes.

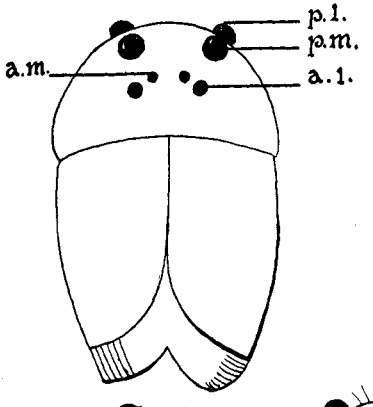

Fig. 1.

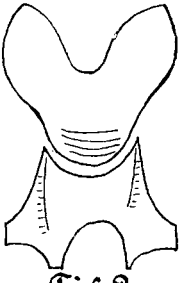

Fig. 2.

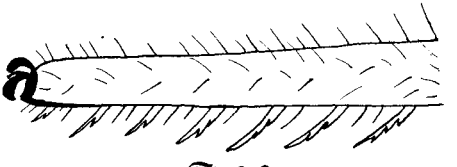

Fig. 3.

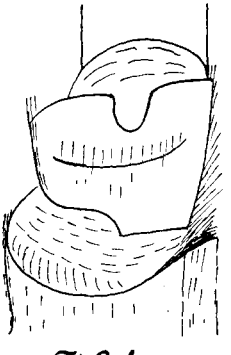

Fig. 4.

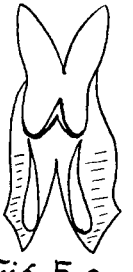

Fig. 5. a

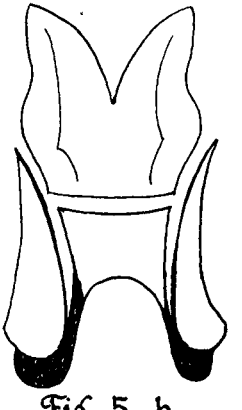

Fig. 5. b.

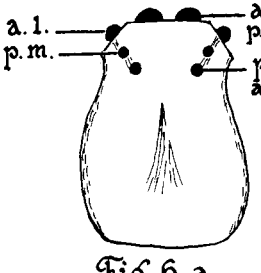

Fig. 6. a.

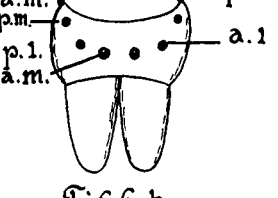

Fig. 6. b.

Plate 1