On a New Genus *and* Species *of* Zoanthina malacodermata (Panceria spongiosa, sp. n.). By Angelo Andres, Ph.D. (With Plate XVI.)

This new kind of polyp was found in Port Natal, like the allied species *Xanthus viridis*, Kr., and *Pales Cliftonii*, Gr. It has a cylindrical shape, and is four centim. in length and six millim. in diameter (Pl. XVI, fig. 1).

The basis is not muscular, but permanently fixed to the ground, and often spreads out to produce the buds, from which the "blastozoïtes"[1] arise; after the complete development of these the extended portion or cœnenchyma disappears, and the blastozoïtes remain isolated. The surface of the body is completely naked, with shallow transverse wrinkles (Pales). The tentacles (fig. 2) are disposed in two concentric rows; they are alternate to each other, alike, short, simple, conical; their total number is forty-two, half on each row, and, perhaps, originated after the series 6, 12, 24.[2] I have not been able to find either the *bourses marginales* or the *ampulles integumentaires* of Hollard.[3]

Splitting the animal longitudinally, we find a short, conico-cylindrical stomach (fig. 2, *s*), the surface of which is wrinkled in very numerous folds;[4] they are longitudinal, parallel, and divided into five or six superposed rows by transverse annular furrows. In the superior portion, however, no folds are present, so that you may almost infer the morphological division into pharyngeal and gastric region, as Quatrefages did in the Edwardsia.[5] The mesenteric septa are, of course, equal in number to the tentacles; they do not present that pore which in the Actinozoa is considered homologous to the circular canal of Hydroid-medusæ.[6] Not every one bears a filament, but only a few; perhaps twelve on an average. The superior or straight portion of the filaments (fig. 2, *b*) is regular, while the inferior or convoluted (fig. 2, *f*) is more

[1] Lacaze-Duthiers, "Mém. sur les Antipathaires" ('Ann. sc. nat.,' 5, ii).

[2] Hollard, "Monographie anat. du g. Actinia" ('Ann. sc. nat.,' 3, xv). Hollard, 'Études sur l'organisation des Actinies,' 1848. Haime et Milne-Edward, "Sur les Polypiers," &c. ('Ann. sc. nat.,' 3, ix). Lacaze-Duthiers, 'Comptes Rendus,' 1873, &c. C. Semper, 'Zeitschr. d. wiss. Zoologie,' xxii.

[3] Loc. cit.

[4] Conf. Agassiz, 'Contribut. nat. hist. United States.' 'Gosse, 'Actinologia Britannica.'

[5] Quatrefages, "Mém. sur les Edwarsies" ('Ann. sc. nat.,' 2, xviii).

[6] Allmann, "Homolog. Relations of Cœlent." ('Trans. R. S. of Edinburgh,' xxvi).

or less developed in the various septa of the same individual. Hanging in pairs upon the superior portion of every filament are the well-developed, transversely furrowed "branchia-like organs,"[1] or "liver-organ."[2]

Towards the base of the animal the mesenteries run together (fig. 2, *m*) and form an anastomosing, spongy tissue. As the behaviour of the mesenteric folds is, perhaps, the most striking character of the polyp, I add drawings of six transverse sections. Near the tentacles in the pharyngeal region every septum is attached to the wall of the alimentary tube (fig. 3); but in the proper gastric region only a few preserve their attachment (fig. 4).[3] In the so-called branchial region the difference in size persists; the largest septa bear the filaments and the branchiæ, so that their sections appear arrow-shaped; all the septa enlarge at their base and show a tendency to ramification (fig. 5). In correspondence to the convoluted filaments this tendency increases, and some of the branches anastomose together (fig. 6). Farther down the anastomoses become very frequent, till the lumen disappears and a spongy, trabecular tissue alone remains (fig. 8). Moreover, this spongy character extends into the cœnenchyma (see above), so that the buds or zooids are in relation with the body of the mother through a real system of enteric canals, and thus there is in this polyp a point of connection (an analogy, if not a homology) between Zoantharia, Alcyonaria, and Antipatharia.

The histological structure of this polyp is closely similar to that of the other Zoanthinæ.[4] There is a cuticle, a subcuticle, a cellular layer, a layer of connective tissue, a muscular layer, and a mucous layer.

The cuticle is an exceedingly thin, structureless membrane (fig. 9, *a*).

The subcuticle (fig. 9, *b*) is also thin, 0·020 mm., and homogeneous.

Kölliker thinks that this layer has in the Zoanthinæ no individuated importance, and that it apparently belongs to the cuticula.[5] In this polyp, however, it is quite distinct from the cuticle; and, to speak accurately, neither this nor that layer should be called either subcuticula or cuticula;

[1] Dana, "Zoophytes" ('United States Exploring Expedition 1838-42').
[2] Lesueur, "Observations," &c. ('Journ. Acad. Nat. Sc. Philadelphia,' i, 1817).
[3] Conf. Dana, loc. cit., plate 30, fig. 3 *d*, how different.
[4] See Kölliker, 'Die Bindesubstanz der Cœlenteraten.'
[5] Kölliker, loc. cit.

the subcuticle is in this polyp undoubtedly only a continuation of the mesodermic connective tissue, while the cuticle may be considered simply as a differentiation or hardening of its external surface.

The cellular layer (fig. 9 *c*) or ectoderm has its elements gathered together in conspicuous groups of thirty to fifty cells each. These groups are entirely surrounded by the connective tissue, which on the surface towards the cells differentiates a peculiar membrane, like the cuticula of the external surface. The elements are granulations and cells. The former are various in size, and perhaps of pigmentary nature. The latter present three forms, which seem to be only three different stages of a single, identical element, viz. A (fig. 10, *a*), round, apparently isolated cells, with highly refracting nucleus and membrane; B (fig. 10, *b*), similar cells, with a prolongation towards the inner side of the group; C (fig. 10, *c*), nematocysts of ellipsoidal shape, perpendicular to the external surface of the animal, containing a spirally wound filament; they are like the nematocysts of the seventh kind of Haime,[1] or of the fourth of Möbins.[2] The similarity of these groups of elements scattered on the whole surface of the body with the heaps of "Körner, Zapfen, Kugeln," described by Rötheken in the *bourses marginales* as eyes,[3] is very striking; and this may, perhaps, add a new argument against his hypothesis to those already urged by Ludwig.[4]

The connective tissue (fig. 9, *d*) is gelatinous (Kölliker), and presents cells, canals, and fibres.

Of the cells (*a*) some are very distinct masses of protoplasm, with a clear nucleus and nucleolus (fig. 11); (*b*) some are only isolated nuclei with one or two nucleoli, and with more or less slight traces of protoplasm (fig. 12); (*c*) some appear as irregular, finely granular bodies, with crystalline spicules of carbonate of lime, and usually adherent to a fibre (fig. 13); (*d*) some present only a relatively large mass of the same salt and no trace of protoplasm, or only a very trifling one (fig. 14). All these crystals are not so peculiarly shaped as in other Zoanthinæ;[5] still they are homologous with them and with the sclerites of Antipatha-

[1] J. Haime, "Mém. sur le Cérianthe" ('Ann. sc. nat.,' 4, i).
[2] K. Möbins, "Bau und Entwick. der Nesselkapseln" ('Abh. nat. Vereins Hamburg,' v).
[3] Schneider und Rötheken, 'S. B. oberhess. Ges.,' 1871.
[4] Hubert Ludwig, 'Nachrichten d. k. Ges. d. Wiss. Universität Göttingen,' 1875, No. 18.
[5] Kölliker, loc. cit.

ridæ.[1] (*e*) Some show an irregular outline, occasionally a nucleus, and always intercommunicating prolongations (fig. 15). Thus we have a system of canals (fig. 16) excavated through the whole internal moiety of the mesoderm, the mesentery, as well as the body wall, and which are continuous from the parent to the buds; in the spongy region the canals become larger and larger, and get a mucous layer; the whole system communicates through very small openings with the gastro-mesenteric cavity.[2]

Here I again call attention to the close relation of this polyp with Antipatharia and Alcyonaria. Though this touches very near the two important questions of phlebenterism and of the origin of the cœlome, their discussion is not my present task.

The fibres are of three kinds—(*a*) thick, highly refracting fibres, which are sometimes single (fig. 17), sometimes in bundles (fig. 17), and in this case they have a transverse, circular arrangement; (*b*) thin, almost invisible fibres, which, like the former, may be single or form bundles; in one case they are straight or wavy, simple or bifid (fig. 18), in the other always simple (fig. 18); (*c*) the third kind is of pseudo-fibres, viz. of weak, refracting, convoluted forms, which occur in the median portion of the mesoderm (fig. 19).

The muscular layer (fig. 9, *e*) is well developed and presents spindle-shaped mono- or binucleated elements (fig. 20); it is more or less conspicuous, everywhere interposed between connective tissue and endoderm.

The mucous layer (fig. 9, *f*), or endoderm, consists of cells very irregularly heaped together. These cells are loosely connected, and therefore preserve their round shape; their nuclei, and often their nucleoli too, are strongly refracting; nematocysts occur only on the mesenteric filaments; ciliated cells I did not see.

In the lower portion of the body fundamental gelatinous substance and calcareous deposits predominate. Above, on the contrary, the sclerites almost disappear, and the gelatinous substance becomes thickly crossed by muscular and connective fibres of every kind. In the tentacles the ectoderm cells are no longer sunk in groups into the mesoderm, but form a uniform external layer, preserving, however, the three forms already described; the mesoderm is reduced, but the relative quantity of muscular fibres is increased. In the stomach the wall protrudes towards the cavity with appen-

[1] Lacaze-Duthiers, loc. cit.

[2] Conf. Kölliker, 'Actes soc. Helv. sc. nat.,' Génève, 1865.

dices, dendritic in form, not brush-like; at the pyloric ridge there is a distinct muscular sphincter. The branchia-like organs are, histologically, mere outgrowths of the mesenteric folds, as these are of the body-wall. I did not see the canals, which, according to Dana, exist on every transverse stripe. The filaments present no lumen;[1] they have a very thick layer of round cells and of nematocysts; the latter have a regular radiating arrangement, and seem quite similar to each other and to those of the body-wall and tentacles. The three specimens I have examined contained neither ova nor spermatozoa.

From all these characters it appears clearly that this polyp belongs to the group of the *Zoanthina malacodermata*, and therefore is akin to the genera *Polythoa, Zoanthus, Mammillifera, Pales, Isaura, Orinia*. I have only been able to examine specimens of the first four genera,[2] yet have no hesitation in asserting that the subject of the present description is a decidedly new genus, at least so long as the already established allied genera retain that rank.

That the reader may judge, I expose the characters of the whole group—dichotomously, for brevity's sake:

A. Cœnenchyma involving the whole polyp.—*Polythoa*.[3]

B. Cœnenchyma basilar only.

a. Persistent—adult individuals in colonies.

α. Regular—colonies of numerous individuals.

* Expanded, flat.—*Mamillifera*.[4]

** Slender, cylindrical.—*Zoanthus*.[5]

β. Irregular—colonies of few individuals.—*Pales*.[6]

b. Not persistent—adult individuals isolated.

a'. Tentacles in two cycles.

* Peristome without velum.—*Panceria*.

* * Peristome with velum.—*Isaurus*.[7]

[1] Conf. Leuckart, 'Beiträge zur Kentniss der wirbellosen Thiere;' and Della Chiaje, Rapp, Blainville, Cuvier, &c.

[2] I am very much obliged to Prof. Owen and Dr. Günther, who gave me opportunity to observe the specimens of the British Museum.

[3] Dana, loc. cit. Polythoa . . . polypis latere coadunatis; genus with the ancient Mamillifera and Corticifera of Lesueur. Gray s. i. Polythoa . . . . base subcylindrical, creeping (!).

[4] Lesueur, loc. cit. Dechassaing e Michelotti, s. i. Lamouroux ('Exposit. méthodique des genres de l'ordre des polypiers,' Paris, 1821).

[5] Gray, s. i. Dechassaing e Michelotti, s. i.

[6] Gray, 'Proceed. Zool. Soc. London,' 1867; new genus.

[7] Lavigny, "Polypes d'Egypte," Audouin's 'Expl.' Gray, 'Spic. Zool.' Lamouroux, loc. cit.

β'. Tentacles in a single cycle.—*Orinia*.[1]

I propose the generic name of Panceria in compliment to the distinguished Professor Panceri, of the University of Naples. The following are the characters:

Panceria, g. n.—Cœnecium in juventute tantum existens, saxis adnatum, tenue, parvum, expansum. Polypi liberi, erecti; pariete corporis crassa; tentarulis biserialibus; peristomo parvo, veloque carente; lamellis mesentericis inferne lobatis, varioque modo coalescentibus.

Panceria spongiosa, sp. n.—Port Natal. Length, four centim.; diameter, six millim.; tentacles forty-two; peristome smooth.

The specimens examined were placed at my disposal by the generosity of my respected teacher, Professor Leuckart, of Leipsic, who also suggested their investigation.

CONTRIBUTIONS *to the* PHYSIOLOGY *of* VISION *and of the* SENSATION *of* COLOUR. By Professor FRANZ BOLL, Rome. ('Monatsbericht d. k. Akad. d. Wissensch. zu Berlin,' 11th January and 15th February, 1877.)

I.

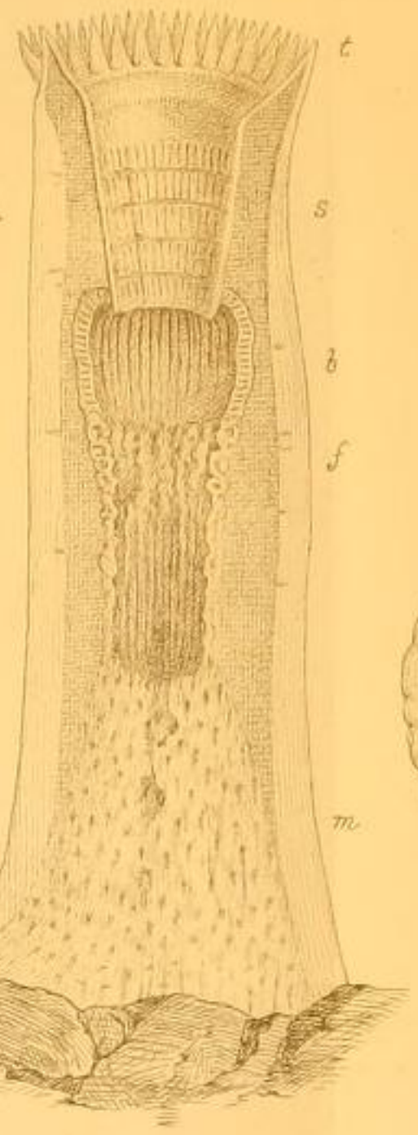
EXPERIMENTS on the colour of the retina[2] in frogs, and the changes produced in it by white and coloured light, have yielded the following results:

[1] Dechassaing e Michelotti, 'Mem. Acad. Torino,' xix; new genus.

[2] In my first communication 'On the Anatomy and Physiology of the Retina' (this Journal, April, 1877) I mentioned various earlier observations on the red colour of the retinal elements in Invertebrata. But it had escaped me that Leydig, nearly a quarter of a century ago, had also observed the red colour of the retina in frogs and other Amphibia; and that even the satiny lustre of the dying retina of the frog had not escaped him. His observations are to be found in 'Müller's Archiv für Anatomie und Physiologie,' 1853, p. 8; in his 'Lehrbuch der Histologie des Menschen und der Thiere' (Frankfort, 1857, pp. 238 and 250), and in his paper "Das Auge der Gliederthiere" (Tübingen, 1864, p. 23). That these observations have attracted so little attention, and have remained barren so far as the doctrine of vision is concerned, is explained by the fact that, in the first place, Leydig does not recognise the red colour of the retina as a general character of this membrane, but believes that he has described only a peculiarity of certain retinæ, such as are the coloured oil-drops in the retina of other animals; and that, secondly, the relation of the red pigment to the illumination of the retina has altogether escaped him.

Fig. 1.

Fig. 2.



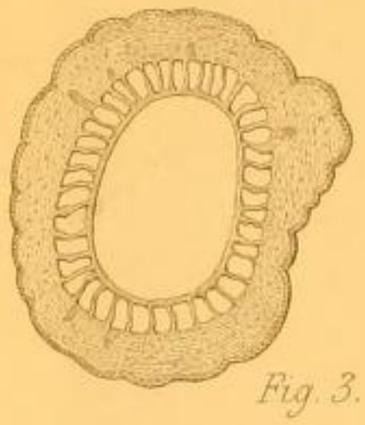


Fig. 3.

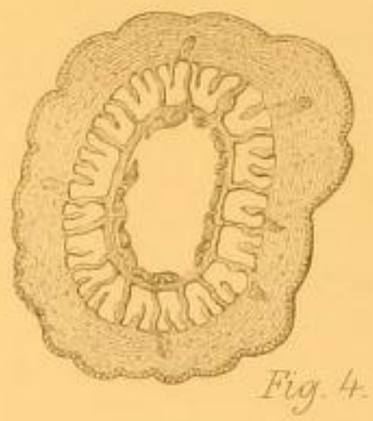


Fig. 4.

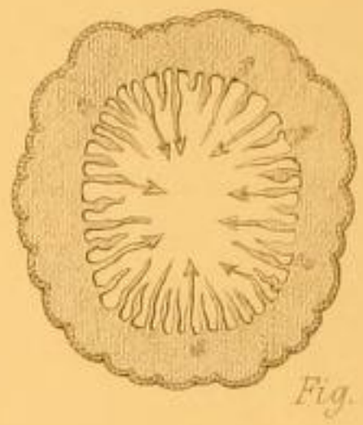


Fig. 5.

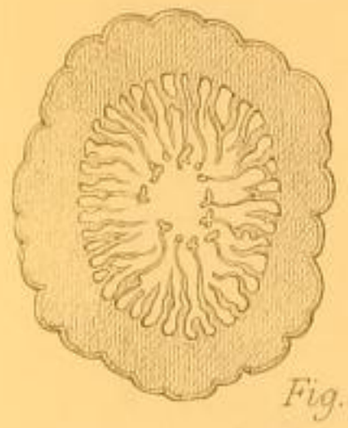


Fig. 6.

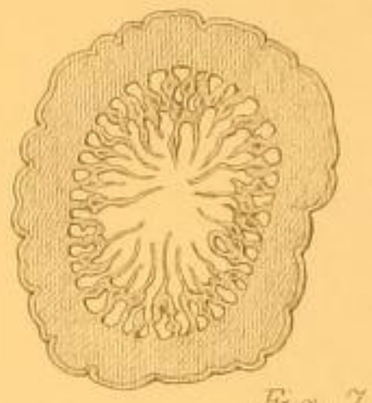


Fig. 7.

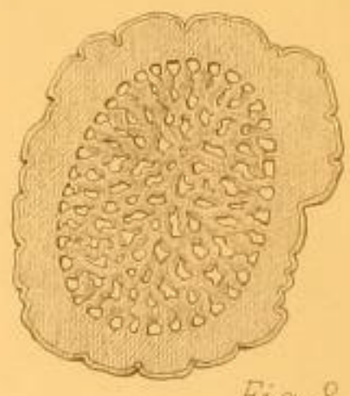


Fig. 8.

Fig. 11.

Fig. 9.

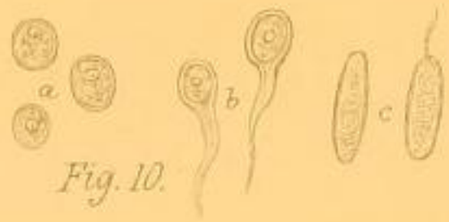


Fig. 10.

Fig. 12.

Fig. 14.

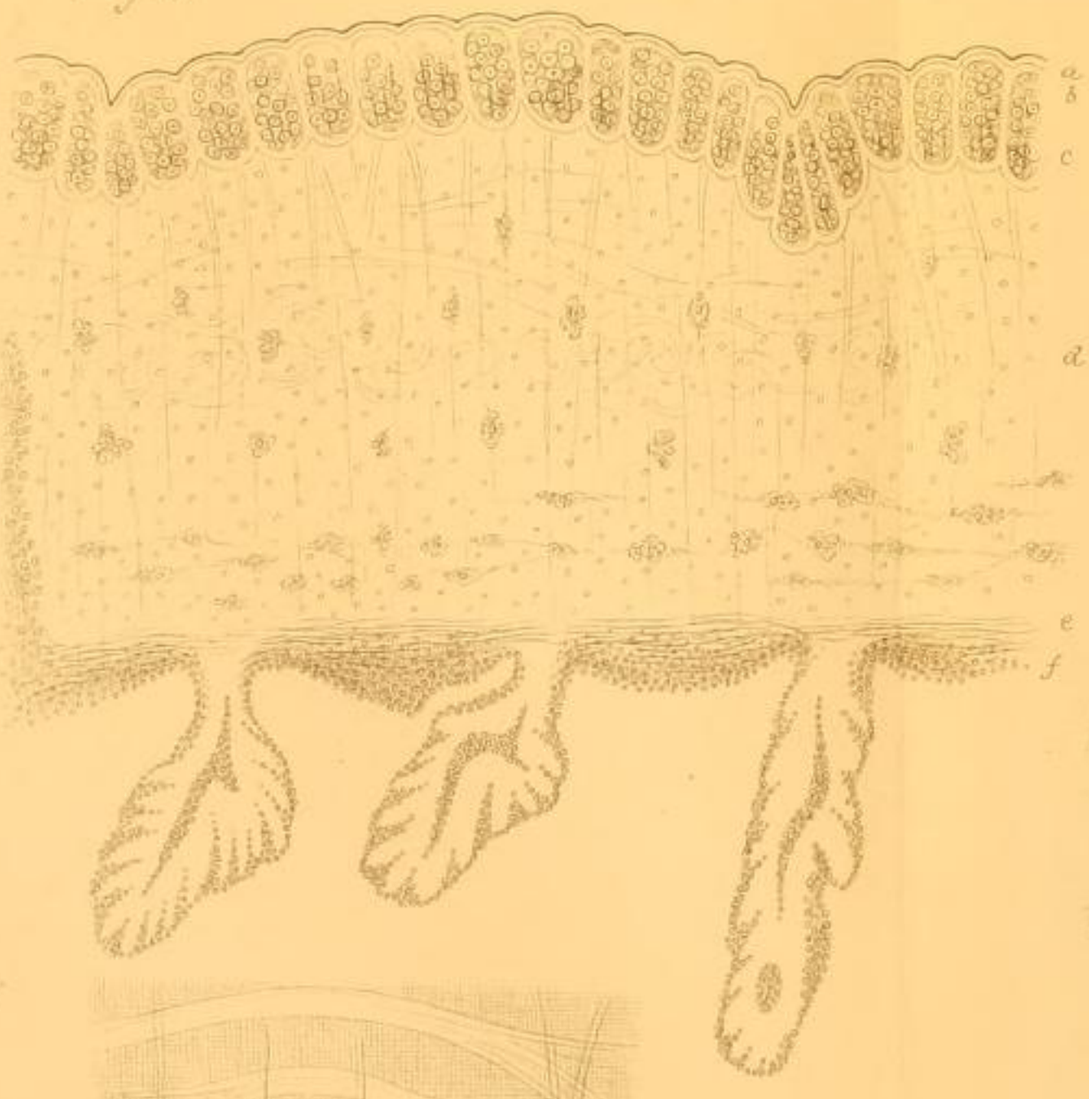


Fig. 13.

Fig. 15.

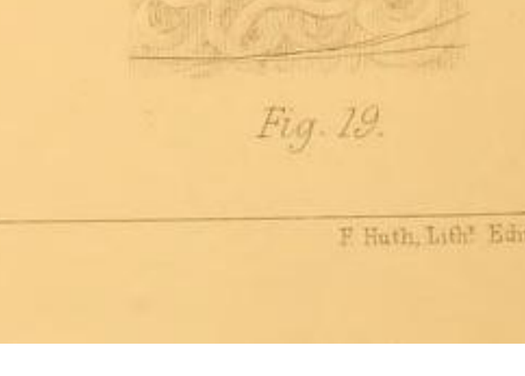


Fig. 18.

Fig. 16.

Fig. 19.

Fig. 17.

Fig. 20.

F. Huth, Lith. Edin.

EXPLANATION OF PLATE XVI,

Illustrating Dr. Angelo Andres' paper on a New Genus and Species of *Zoanthina Malacodermata* (*Panceria spongiosa*, sp. n.).

Fig. 1.—*Panceria spongiosa*, sp. n., natural size.

Fig. 2.—Longitudinal section × 2—*t*, tentacles; *s*, stomach; *b*, branchia-like organs; *f*, convoluted filaments; *m*, anastomosing mesenteries; α, β, γ, δ, ε, ζ, places corresponding to the sections of following figures.

Fig. 3—8.—Transverse sections at points α—ζ of foregoing figures.

Fig. 9.—Portion of section δ much enlarged—*a*, cuticle; *b*, subcuticle; *c*, ectoderm; *d*, connective tissue; *e*, muscular layer; *f*, endoderm.

Fig. 10.—Cells of ectoderm (610 diam.).

Fig. 11—20.—Various elements of mesoderm (610 diam.).

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