"Pupil diamond-shaped, horizontal.

"The colour and rugose character of the skin of this frog is evidently a means of protecting it from birds and other enemies, the whole upper surface being such a close copy of the bark of a tree that it is very hard to detect one when resting upon it.

"This species also lives in holes in trees, and the note produced by it is not so loud as that of *Phrynella*, and has a more metallic ring in it.

"My specimens were obtained at an elevation of 4000 ft. on the hills of Larut, Perak."

Mr. Boulenger has directed my attention to the fact that this species resembles closely a frog from Padang, shortly noticed and rudely figured under the name of *Hyla leprosa* by Schlegel, in a popular work, 'Handb. der Dierk.' ii. p. 55, pl. iv. fig. 68. Tschudi considered it the type of a distinct genus, *Theloderma* (Class. Batr. 1839, pp. 32, 73); and more recently it was more fully described by Horst (Notes Leid. Mus. v. p. 237). The two latter authors agree in ascribing to the frog a tongue cordate behind, but terminating in a single appendage. If this form of tongue is really characteristic of the Padang frog, the latter would have to be referred to a genus distinct from *Polypedates*; but if it be merely caused by some accident, our specimen may prove to be identical with that in the Leyden Museum. In either case the creation of a synonym will be avoided by adopting here the same specific name.

Megalophrys longipes, Blgr.

Megalophrys longipes, Blgr. Proc. Zool. Soc. 1885, p. 850, pl. lv.

This species is rare and local, Mr. Wray having succeeded in obtaining three specimens only, of which one was captured at an elevation of 4400 feet.

MISCELLANEOUS.

Observation on Multiplication in Amœbæ. By Lillie E. Holman.

On the 4th of July, 1886, I was examining the forms of life contained in a Holman life-slide which had been filled for several hours. It contained different Infusoria, and, among other animals, specimens of *Æolosoma*. But it seemed for some time as if there were no *Amœbæ* in the slide, until I discovered a small one near the channel. In shape it seemed like an elongated triangle, and was rather torpid, or, at least, moved but little. While I was examining it, it moved up closer to the line of the channel, and another *Amœba*, about twice the size of the first one, came gliding on the scene. It moved up very close to the other, and in a few

moments I noticed that it looked as if it were trying to swallow the smaller *Amœba* in the same manner that it does its ordinary prey. As I had watched many *Amœbæ*, and had never seen anything like this, and as I knew that they did not prey on each other, and the question of their conjugation was a very doubtful one, I dismissed the idea of the larger absorbing the smaller, and concluded it was merely the fact that they were in too tight a place to allow of their passing each other which gave them this appearance. I watched them constantly for about half an hour, in the course of which time I became convinced that something unusual was going on.

The larger *Amœba* had entirely surrounded the smaller one, which, however, did not seem to lose its vitality. First it seemed to be under the endosarc of the larger, and then above it. Sometimes it would project a pseudopod out from beyond the ectosarc of the larger animal. All the time it was distinctly visible in its own individuality, if one may so call it, and did not at all seem to be trying to escape. I called Mr. Holman's attention to the singularity of their behaviour, and expressed my belief that it was a case of either cannibalism or conjugation. He expressed his disbelief in either of these cases, and observing that the water in the slide was evaporating, we allowed a little to creep in under the closed edge of the cover-glass. This seemed to relieve the large *Amœba* from the constrained position and flat contour which it had assumed, and it immediately began to put out pseudopods and move away; and the smaller one moved off with it, evidently engulfed in the larger one, and quiescent in that position.

The small *Amœba* occupied a position in the upper part of the larger one. As this last moved on it seemed to push the small one in an opposite direction from that which its granules were taking till it reached about the centre of its body. Then it commenced an evident effort to expel the smaller one. It reached out its pseudopods in every direction, gradually expelling the smaller one, until it was completely discharged. The smaller one by this time assumed an almost spherical shape.

At last the large *Amœba* ceased moving, and began to expel refuse matter, as is common with them. It had anchored itself near some other refuse matter, probably vegetable, and really looked as if it was using it as a sort of grapple for the purpose of ridding itself of the rejected smaller *Amœba*. It was successful, for in a few moments it moved away to the upper part of the field, leaving the round ball, looking in every respect like an encysted *Amœba*, near the little group of refuse. It went on in the field, and we followed it for some time, when it became quiet, and we went back to the encysted one. I watched it to see what would happen next, for it seemed as if there must be some strange sequel to our remarkable observation; and the watching was not in vain. The flat disk began by a sort of contractile movement to throw out particles or granules, as if it were laying eggs. I can think of no other expression, although the particles, while approximate in size, had no regularity of shape. This continued till the *Amœba* again assumed its clear and transparent appearance, and at last, seeming

to fully regain its activity, put out a pseudopod and moved in the field, leaving behind it a group of the particles or granules. Only for a little while, however, did it move; in a few moments it lost its animation, seemed to become transparent, and at last faded into one of those disks which seem to be merely the shells of once active forms. I did not see it move again.

This observation was carried on continuously during two hours and a half, and every stage watched most closely. I was at a loss what to call it, if not a clear case of conjugation and separation.

The most convincing proof to my mind that this was a proceeding which was for a purpose was given when, two nights after, this slide, which was laid carefully aside for future examination, was found to be full of young *Amœbæ*. They literally swarmed; I counted in the field at one time twenty-four of uniform size, while I have no hesitation in saying that there were between one and two hundred in the slide, which had before held but two. The worn-out disk was recognized, and also what seemed to be the remains of the larger *Amœba*.—*Proc. Acad. Nat. Sci. Philad.*, Oct. 26, 1886, p. 346.

On the Byssal Organ of the Lamellibranchiata.

By M. Ludwig Reichel.

My researches upon the byssal organ have led me to the following results, which differ from previous statements.

From the observations of Réaumur and A. Müller it is generally regarded as proved that bivalve Mollusca which have once been attached by a byssus are thereby prevented from changing their place throughout their lives, unless they are torn away accidentally by external force. The animals can, however, temporarily regain their power of free movement, although not by tearing or separating the byssus-threads as the two naturalists referred to thought possible, but by throwing off the whole of the byssus, *i. e.* with stem and root, when the organ is replaced by a new formation. This casting of the byssus is a process exactly analogous to the change of skin in the Arthropoda. In *Dreissena polymorpha* such a change of the byssus takes place regularly at the commencement of the cold season. In summer the animals are seated close to the surface of the water, so that they are easily reached by the hand from the bank; towards the end of autumn, however, they retire into the deep water, leaving their byssus behind them.

As regards the formation of the byssus, it is almost universally regarded as the secretion of special glands. I cannot adopt this opinion, any more than that supported by von Nathusius-Königsborn, that the byssus grows forth out of the tissues of the body of the animal. The byssus rather originates as a cuticular formation, the stem with the roots in the byssal cavity and the threads in the pedal groove. Thus in those Lamellibranchiata which are provided with a byssus the underside of the foot is traversed by a rather deep longitudinal groove, which opens at the base of the foot into a cavity, the so-called byssal cavity. In the opinion of those who adopt the theory of secretion the foot and the walls of the byssal