accompanies the connective extended from the branchial ganglion to one of the buccal ganglia during its passage through the gastro-genital mass; the object of this arrangement appears to be the prevention of the dragging (*tiraillement*) of the nerve when the organ is distended with eggs.

Another remarkable arrangement is to be seen in the passage of the last portion of the intestine through the heart. At the entrance of the intestine into the ventricle there are muscular bundles starting from the wall of the latter and inserted perpendicularly into the wall of the digestive tube; at the moment of contraction these bundles must, by their shortening, tend to draw apart the walls of the intestine, which would otherwise be compressed during the systole, and thus the course of the fæcal matters will not be interrupted.

In these large mollusks the difference between the arteries and veins is very easily seen: the former have a very distinct double epithelial and fibrous wall, whilst the latter are simple sinuses hollowed out in the tissues. All the blood is compelled to traverse an organ of hæmatosis (branchiæ or mantle) before returning to the heart.

The proper temperature of the animal, compared with that of the bottom at which it lives, appeared to be rather high. The temperature registered by thermometers sunk at the point inhabited by the animals was about 63°·5 F. (17°·5 C.); the average temperature of the *Tridacnæ* was 68°·5 F. (20° C.).—*Comptes Rendus*, Oct. 9, 1865, p. 601.

Remarks on the Protective Sheath and on the Formation of the Stem of the Root. By M. R. Caspary.

In preceding memoirs M. Caspary has indicated a layer of very closely approximated cells, placed in a single series in thickness, which exists in stems, roots, and leaves, the vascular system of which it envelopes and protects. He has given it the name of the *protective sheath*, although in certain cases (in *Berberis*, for example) this layer is ruptured during growth, and consequently does not serve to protect the organs which it envelopes. In describing this protective sheath, M. Caspary indicated upon the lateral walls of its cells some darker spots or streaks, which he thought were formed by very small pores. He now again maintains the existence of these spots or streaks; but he has ascertained that they are due to foldings of the walls of the cells, and not to pores. He has observed these folds in the protective sheath of *Ficaria ranunculoides*, Roth, *Elodea canadensis*, Mich., *Brasena peltata*, Peret, and *Charlwoodia rubra*, Planch. When the cells of the protective sheath become thickened, the folds gradually disappear. M. Caspary attributes this change to the elongation of the walls of the cells—an elongation of which he has convinced himself by direct measurements.

Several authors (especially M. Karsten) have regarded this protective sheath as a lignified residue of the layer of cambium which has produced the other parts of the stem; but M. Caspary combats

this opinion. He declares himself also against the opinion which derives all the parts of the stem from a single layer of cambium existing in the terminal bud. According to him, the entire terminal bud is formed of cambium, and already contains the mother cells of all the kinds of tissue which will subsequently form the various parts of the stem.—*Jahrb. für Wiss. Bot.* 1864; *Bibl. Univ.* 1865, *Bull. Sci.* p. 87.

Graduation from "Individual Peculiarities" to Species in Insects.

The following are the concluding paragraphs of a paper by Dr. B. D. Walsh "*On Phytophagic Varieties and Phytophagic Species.*" The name *phytophagic* is given to those otherwise identical insects which differ, as varieties or species, according to the species of plant they feed upon. "When certain unimportant characters in the insect are correlated with the food-plant, while at the same time there is no sufficient reason to doubt that the two varieties freely intercross," the forms are called *phytophagic varieties.* When, from the lack of intermediate forms, intercrossing may be inferred not to take place, they are called *phytophagic species.* Dr. Walsh sums up his conclusions thus:—

"From the facts referred to above, and those recorded by me elsewhere, we may construct the following almost unbroken series, from the first dawnings of the Phytophagic Variety to the full development of the Phytophagic Species:—

"1st. Difference of food, even when the food-plant belongs to widely distinct botanical families, is accompanied by no difference whatever either in the larva, pupa, or imago state: *Attacus Cecropia,* Linn.; *Dryocampa imperialis,* Drury; *Lachnus Caryæ,* Harris (Proc. Ent. Soc. Phil. vol. i. p. 303); and hundreds of other species.

"2nd. Difference of food is accompanied by a marked difference in the colour of the silk-producing secretions: *Bombyx Mori,* Linn., the common silkworm.

"3rd. Difference of food is accompanied by a tendency toward the obliteration of the normal dark markings in the imago: *Haltica alternata,* Illig.

"4th. Difference of food is accompanied by marked, but not perfectly constant, colorational differences in the larva, but none whatever in the ♂ ♀ imago: *Datana Ministra,* Drury.

"5th. Difference of food is accompanied by a marked and perfectly constant difference in the size of the imago: *Chrysomela scalaris,* Lec.

"6th. Difference of food is accompanied by a marked difference in the chemical properties of gall-producing secretions, the external characters of the ♂ ♀ imago remaining identical: *Cynips q. spongifica,* O. S., and *C. q. inanis,* O. S.

"7th. Difference of food is accompanied by a slight but constant change in the coloration of the abdomen of the ♂ ♀ imago, and by a very slight change in the chemical properties of the gall-producing secretions, the galls of the two insects, though typically somewhat distinct, being connected by intermediate grades in the case of the latter: *Cynips q. punctata,* Basset, and *C. q. Podagræ,* Walsh.