

*TRYPANOSTOMA WHEATLEYI*.—Testa lævi, pyramidata, tenui, dilute rubiginosa, vel fasciata vel efasciata; spira exserta, acuminata; suturis regulariter impressis; anfractibus instar denis; planulatis, ad apicem carinatis; apertura parviuscula, rhomboidea, intus albida; labro acuto, sigmoideo; columella ad basim parum incrassata et valde contorta.

*Hab.*—Coosa River, Alabama, Dr. Showalter.

*TRYPANOSTOMA TEREBRALE*.—Testa lævi, pyramidata, tenui, olivacea, vel vittata vel evittata; spira valde exserta; suturis valde impressis; anfractibus instar duodenis, planulatis, ad apicem carinatis; apertura parviuscula, rhomboidea, intus albida vel vittata; labro acuto, sinuoso; columella impressa et valde contorta.

*Hab.*—Jackson Co., Alabama, Dr. W. Spillman.

*LITHASIA PURPUREA*.—Testa lævi, curta, subcylindræa, subcrassa, tenebroso-purpurea; spira brevissima; suturis valde impressis; anfractibus instar quinis, convexiusculis; apertura grandi, rhomboidea, intus saturale purpurea; labro acuto, vix sinuoso; columella impressa, superne incrassata.

*Hab.*—Cahawba River, at Centreville, Bibb Co., Ala., Dr. Showalter.

*LITHASIA CURTA*.—Testa granulata, curta, solida, luteo-olivacea, plerumque bifasciata; spira brevi; suturis irregulariter impressis; anfractibus instar quinis, planulatis; apertura subgrandi, rhomboidea, intus albida; labro acuto, subsinuoso; columella inferne et superne incrassata.

*Hab.*—North Alabama, Prof. Tuomey and Dr. Spillman; Tuscumbia, B. Pybus.

*SCHIZOSTOMA WHEATLEYI*.—Testa striata, subfusiformi, subtenui, luteola, imperforata, vittata; spira obtuso-conoidea; suturis irregulariter impressis; anfractibus instar senis, vittatis, ultimo grandi; fissura obliqua brevique; apertura parviuscula, ovata, intus alba et vittata; labro subcrenulato; columella alba, incrassata et contorta.

*Hab.*—Coosa River, Dr. Showalter.

*ANCULOSA DOWNIEI*.—Testa plicata et obsolete striata, subglobosa, crassa, tenebroso-oliva, maculata; spira vix prominulis, plicatis; suturis impressis; anfractibus vix ternis, ultimo grandi et ventricosi; apertura grandi, subrotunda, intus fusco-maculata; labro acuto; columella impressa et incrassata.

*Hab.*—Connesauga Creek, Georgia, Maj. T. C. Downie; Coosa River, Alabama, Dr. Showalter.

### Variations in *EPIGÆA REPENS*.

BY THOMAS MEEHAN.

There are yet many botanists who regard variations as accidents. They speak of a normal form as something essential; and departures from their idea of a type, they refer to external causes, independent of any inherent power of change in the plant itself. Hence, when a change of form occurs to them, it is usually referred to shade, to sunlight, to an unusual season, situation, or some geological peculiarity of the soil. Cultivation is denounced as interfering with botanical science; introducing and originating innumerable forms, defying the skill of the botanist to classify or arrange. My experience in plant culture, and as an observer of plants in a state of nature, leads to the conclusion that there is no greater power to vary in the one case than in the other; that there is as much variation in the perfectly wild plant, as in those under the best gardener's skill. To illustrate this I gathered a great number of specimens of *Antennaria plantaginifolia*, which, though I do not believe has a greater average power of variation than any other plant, affords a good example for the following reasons: The small seeds I believe require a clear surface of



ground to vegetate, and young plants therefore never appear in a meadow or grassy place. In such positions plants only exist that had a footing in advance of the grass. They then propagate exclusively by runners. After being two or three years in this situation they form patches of one or several square feet each. Now it is not easy to appreciate a minute difference between one single specimen and another; but when a score or more of specimens of one are matched against a similar number of the other, the minutiae make an aggregate which is readily estimated. So we shall find in the case of a two or three year old meadow, filled with this plant, that not only are *no two patches alike*, but that the eye convinces us of the fact on the first glance over the field. Plain as the differences thus presented were, I found, however, some difficulty in describing them in language; and besides being a diœcious plant there might be brought in the objection of intercrossing between allied species of this or neighboring genera, if not of the individuals of the opposite sexes themselves, to account for so many forms. I therefore chose *Epigæa*, as belonging to a natural order exclusively hermaphrodite; containing only one natural species; not very closely allied to any of the neighboring genera, *Andromeda*, *Clethra*, *Gaultheria*, &c.; none of which, at any rate, flower at the same time with it.

On the 19th of April I gathered specimens from sixteen different plants on the Wissahickon, without taking any pains to make any particular selection of varieties. The following descriptions show their variations:

1. Tube of the corolla half inch long, contracted in the middle; segments of the corolla broadly ovate, one-third the length of the tube, incurved, pure white. Scales of the calyx two-thirds the length of the tube, narrowly lanceolate, interior ones white and membranaceous with a crimson base.

2. Tube half inch, regularly cylindrical; segments half as long as the tube, triangularly ovate, light rose, incurved. Scales one-third the length of the tube, white, coriaceous.

3. Tube quarter inch, thick (one-eighth wide), cylindrical; segments rather longer than the tube, triangularly ovate, incurved, deep rosy pink. Scales three-fourths the length of the tube, rosy red, with white margins.

4. Tube nearly half inch, contracted at the summit; segments very short, scarcely one-sixteenth of an inch, forming nearly five ovate repand teeth, purplish white. Scales greenish white, simply acute.

5. Tube quarter inch long, one-eighth wide; segments lanceolate, erect, two-thirds as long as the tube, rosy purple. Scales brown, not margined, drawn out to a long fine point.

6. Tube quarter inch, cylindrical; segments oblong ovate, recurved, as long as the tube. One of the anthers slightly petaloid. Scales prolonged into almost an awn.

7. Tube much narrowed at the summit, quarter inch long; segments less than one-sixteenth of an inch long, pale purple. Scales greenish brown, very narrow.

8. Tube near half inch, contracted in the middle; segments quarter inch, linear lanceolate, bright rose. Scales half the length of the tube, broadly ovate, membranaceous, simply sharp pointed.

9. Tube half inch, cylindrical; segments quarter inch, of which there are but *three* broadly ovate, white.

10. Tube nearly three-quarters inch, cylindrical; segments quarter inch, narrowly ovate. Scales as long as the tube, linear lanceolate, pale green.

11. Tube less than quarter inch, and shorter than the luxuriant foliaceous, mucronate scales. Segments of the corolla two-thirds as long as the tube, broadly ovate, pure white.

12. Tube quarter inch, increasing slightly in width upwardly (funnel-shaped), one-eighth thick at the top of the tube; segments short, ovate, reflexed, light pink. Scales longer than the tube, green, white margined.

13. Tube quarter inch, much contracted in the middle; segments quarter

[May

inch, broad ovate. Scales half the length of the tube, brown, with white margins.

14. Tube under half inch, thick, perfectly cylindrical; segments quarter inch, broad linear, and rounded at the apex, waxy white. Scales quarter inch long, brown, with membranaceous margins.

15. Tube full three-quarters inch, cylindrical; segments quarter inch, triangularly ovate, pale rose. Scales half inch, narrow and drawn out to an awn-like point.

16. Tube half inch, cylindrical. Scales less than one-sixteenth of an inch, broad ovate, green, and barely pointed.

On again examining No. 12, after making these notes, I was surprised to find no trace of stamens, but with the pistil perfect; and on examining the other specimens I found three out of the fifteen were pistillate also. Another remarkable fact was that all these pistils had the fine cleft stigmas strongly recurved, exposing a glutinous surface; while the hermaphrodite ones kept the apex of the pistils closed. The ovaries of the pistillate forms were also evidently better developed than those in the hermaphrodite condition, and the inference was that the plant was *practically dioecious*.

On the third of May I returned to the locality and found this hypothesis in all probability correct. The pistillate plants were in proportion about one-third that of the hermaphrodite, and could be readily distinguished after the flower had faded by the recurved stigmas above noted. All the plants that had shed their corollas were pistillate; the apparently hermaphrodite plants having their corollas dry on the receptacles from which it was not easy to separate them—the scales of the calyx and a part of the stem coming away with them. This is so well known a feature of impregnation in the development of a fruit, that I need not dwell much on the importance of this fact, as showing the fertility of the pistillate, and the sterility of the opposite form.

I engaged friends to furnish me specimens from other places. Dr. James Darrach finds them, as I have above described, in another locality on the Wissahickon. Miss Anderson sends me ten specimens from Edge Hill, Montgomery County, Pa., amongst which two are purely pistillate, the rest varying much as in the Wissahickon specimens. Mr. Isaac Burk finds pistillate plants abound at Mount Ephraim, New Jersey, but there are abortive filaments without anthers, and he sends me one specimen of this character. Mr. Charles E. Smith sends me a dozen or so specimens from Haddonfield, hermaphrodite, and so exactly alike that they probably all come from one plant. Mr. E. Diefenbaugh sends ten specimens from another place in New Jersey, all with anthers, but varying from nearly no filaments to filaments three-eighths of an inch long; varying also in the proportionate lengths of scales, tubes and segments; but not near as much as in the Wissahickon specimens. Prof. Cope sends samples from Delaware County, Pa. These are varied like the Wissahickon ones; and Mr. Cope remarks to me that the pistillate forms are so distinctly characterized, by the vasiform recurved corollas and other characters, that he can readily distinguish them as he walks along.

Has this peculiarity of *Epigæa repens* been overlooked by the many botanists who must have critically examined it heretofore? Or has the plant reached a stage of development when germs of new forms spring actively into life?

In a paper on *Lopezia*, published in the last volume of the Proceedings, I showed that the sexual organs of that genus were admirably arranged to prevent the pollen of a flower falling on its own stigma. This behavior of *Epigæa* adds another to the list of plants, now so extensive, known to have an abhorrence of self-fertilization. It may not be out of place to hazard a reason for this course:

There would seem to be two distinct principles in relation to form going along together with the life of a species. The tendency of the one force is to preserve the existing form; the other to modify, and extend it to newer channels. The first we represent by the term *inheritance*, the other we understand

as *variation*. Inheritance struggles to have the plant fertilize itself with its own pollen; whilst the efforts of variation are towards an intermixture of races or even neighboring individuals, rather than with members of the one brood or family. May it not be possible that at some time in their past history all species of plants have been hermaphrodite? that Diœcism is a later triumph of variation, its final victory in the struggle with inheritance? There are some difficulties in the way of such a theory, as there are with most of these theories; but it seems clear from this case of *Epigæa* that cultivation has not so much to do with changes as it gets credit for, and we may readily believe that, independently of external circumstances, there is a period of youth and a period of old age *in form* as well as *in substance*, and that we may therefore look for a continual creation of new forms by a process of vital development, just as rationally as for the continued succession of new individuals.

The discovery of diœcism in *Epigæa* is interesting from the fact that it is probably the first instance known in true *Ericacææ*. In the *Ericale* suborder of *Francoacææ*, abortive stamens are characteristic of the family, and in the *Pyrolacææ* antherless filaments have been recorded.

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### Monœcism in *LUZULA CAMPESTRIS*.

BY THOMAS MEEHAN.

The recent discovery, that many plants structurally hermaphrodite are practically monœcious or diœcious, in consequence of the flower being so arranged as to prevent self-impregnation, is so interesting that every additional fact bearing on the subject has a value.

*Luzula campestris*, D. C., adds another to the list. The three stigmas are protruded through the apex of the flower bud some days before the sepals open and expose the anthers. In the specimens I marked for observations, six days elapsed before the flower opened, after the pistils had been protruded to be operated on by the pollen of other flowers. This was in a cloudy week, and probably the exact time might vary with the weather. In all cases the stigmas wither away before the flower opens.

After fertilization the stigmas generally twist around one another, and after the anthers have shed their pollen they twist in the same way, withering up in a very short time. An interesting fact in *Luzula* is the slight adhesion at the articulation of the subpedicels with the main flower stalk,—the gentlest force being sufficient to draw them out of their sheaths. It is perhaps owing to this weakness that the pedicels are often drooping when in fruit.

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June 2d, 1868.

MR. VAUX, Vice-President, in the Chair.

Twenty-five members present.

The following papers were presented for publication:

“Description of seven new species of *Unio* from North Carolina.”

By Isaac Lea.

“Descriptions of two new species of *Unionidæ* from Equador.”

By Isaac Lea.

“New *Unionidæ*, *Melanidæ*, &c., chiefly of the United States.”

By Isaac Lea.

“On *Agaphelus*, a genus of toothless *Cetacea*.” By Edw. D. Cope.

Dr. Leidy called attention to some specimens of Sombrero Guano containing about 90 per cent. of phosphate of lime. This substance

[June,