

GENERAL NOTES.

BOTANY.

ON THE FERTILIZATION OF SYMPLOCARPUS FÆTIDUS.—Belonging to the Aroidæ, and possessing at once an odor unpleasant to man, and a spathe of a brownish or reddish-purple color, the "skunk cabbage" would probably be taken at first sight as a good example of what Müller calls a loathsome flower—a flower which by its color and odor repels all insects save carrion-loving flies and beetles, and whose fertilization, if dependent upon insects at all, must depend upon those of this kind. From the partly closed spathe it might be further inferred that this is a good example of a plant in process of transition from the state of a completely open loathsome flower, like *Calla palustris*, to that of one in which the spathe has been so modified by natural selection as to be converted into what Müller would call a kettle trap, as is the case with *Arum maculatum*, the object of such a trap being to detain any insects which enter the spathe until they shall have performed the office of fertilization for which they were enticed into it. If a few of the largest spathes are secured in the first warm days of spring they will probably be found already in bloom, and a moment's inspection will show us that the flowers clustered on the stalked globose spadix are proterogynous; for while the delicate stigmas of some are protruded from the floral envelopes, their stamens are still enclosed and immature. It will also be found that the flowers which are open are those situated near the top of the spadix. These flowers, then, are ready to be fertilized, but pollen for their fertilization must be brought from another spadix. In the course of a week or two, for the rapidity of development depends in large part on the warmth of the season, the aspect of our spadix will have entirely changed, for the stigmas of the upper flowers will be withered and the stamens of these same flowers will now protrude from their envelopes and shed their pollen. Meantime the stigmas of the lower flowers have matured, and some can evidently be fertilized by the mere falling of pollen from the upper flowers without any extraneous aid, for pollen is shed in such quantities that it covers the bottom of the spathe.

On the first warm and sunny day we repair to a sheltered swampy place where we find our plant, and proceed to look for the little flies that we expect to find in the spathes, whither they should be attracted by the color and odor, and by the shelter offered; but no flies appear. While we are looking a hive-bee alights on a spathe and enters it. Approaching, we see her busily engaged in collecting pollen, meantime creeping back and forth over the surface of the spadix, which, as well as her body, is thoroughly covered with the yellow dust. Other observations show that each spathe is daily visited by scores of hive-bees,

some of which are unable to escape from the spathes and die there. A little later in the season a small bug (Hemipter) may be found in small numbers on the spadices, and they are usually well dusted with pollen. Occasionally a slug or the slimy trail of one is found within a spathe, and usually they pass over the spadix. A couple of weeks after finding the first bee the spathes will be found swarming with the minute black flies that were sought in vain earlier in the season, and their number is attested not only by the hundreds of them which can be seen, but also by the many small but very fat spiders whose webs bar the entrance to three-fourths of the spathes. During the present spring a few specimens of a small scavenger-beetle (*Ips fasciatus*) have been captured within the spathes of this plant. What they were after I can scarcely say, but they may have been visiting spathe after spathe in search of one with a decaying spadix, for the prolonged cold and wet weather caused many to decay, or they may have been in search of flower-food.

Considering these facts, it appears that with us hive-bees are not deterred by the odor of the flowers from visiting them and collecting their pollen, and that their visits are so frequent as to render them the chief agents in securing the cross-fertilization of the flowers, at least very early in the season. Later a few bugs and beetles may be of some use in transferring pollen, as also in a slight degree the spiders which take up their abode within or at the entrance of the spathes. Slugs and snails enter as agents for the transfer of pollen in a few cases, as might be expected from what Delpino has shown with regard to their habits in visiting plants related to this. Finally, other and more attractive flowers opening, the bees appear to cease visiting those of this species, and countless small flies take their place, compensating for their small size by their great numbers.—*William Trelease.*

BOTANICAL NEWS.—To the *Bulletin* of the Torrey Botanical Club, Mr. N. L. Britton contributes notes on the relative age and dimensions of a number of different trees. Dr. G. Engelmann farther notices the differences between *Vitis riparia* and *cordifolia*. The death of Dr. Rugel, in Tennessee, an excellent botanical collector, is announced.—Vol. VI, Botany of Lt. Wheeler's Report upon U. S. Geographical Surveys west of the 100th meridian, consists of "Reports upon the botanical collections made in portions of Nevada, Utah, California, Colorado, New Mexico and Arizona, during the years 1871-75," by Dr. J. T. Rothrock, who has been aided by Messrs. Engelmann, Porter, Watson, Bebb, Vasey, Boott, Eaton, James and Tuckerman. Fifty new species are described and mostly figured. The catalogue is preceded by chapters on the botany of the Colorado district, the New Mexican district, and on Economic Botany. Prof. Eaton's report on the Ferns of the South-west relates to all the ferns hitherto discovered in the regions of the United States lying

west of the 105th degree of west longitude, and south of the 40th parallel.—In the *Botanical Gazette* for July, Mary C. Reynolds notices at length certain Floridian ferns. E. T. Smith notices a new form of *Trillium grandiflorum* from Michigan. A writer over the initials C. R. B. calls attention to the neglected botany of West Virginia.—Fritz Müller questions, in *Nature*, whether many of the varieties of bananas have not been produced by bud-variation.—In the *Mittheilungen* of the Natural History Society of Bern, Herr Frankhauser contributes a paper on the most important conditions of shape in the leaf of phanerogamic plants, and a second one on the principal laws of growth in Floridæ, and Dr. Pertz notices some luminous bacteria.—In an important memoir on the ovule of plants, Prof. Warming discusses the early development of the leaf or "ovular mamelon," the genesis of the nucleus and the formation of the integuments of the mamelon. According to a reviewer in *Nature* he demonstrates that the theory of Brogniart as to the morphological significance of the ovule is the true and solely admissible one, and he reasons very conclusively against the views of Bronn, Eichler and Strasburger, who would regard the ovule as a bud, while in reality, as he says, "the ovule is the homologue of a sporangium."—Mr. L. Lesquereux contributes an article on Cordaites bearing fruit (with a plate) to the Proceedings of the American Philosophical Society.

ZOOLOGY.¹

DOES THE FOX SNAKE "MIMIC" THE RATTLESNAKE?—On May 24th a fact came under my observation which until then was unknown to me; it may, however, not be new to other readers of the NATURALIST.

While examining an exposure of lower magnesian limestone in the glen at the Junction mill, my attention was called to a large spotted snake lying upon the stump of a fallen tree, where it was stretched at full length basking in the sun over the stream. Before I could reach the spot the snake had apparently suspected danger and had retreated to a clump of grass near the foot of a tree where, by diligent search, it was at last discovered. Desiring to obtain the specimen alive, if possible, I placed my foot upon the body of the snake near the middle, when, to my surprise, there followed a buzzing sound that caused me to spring backward, thinking I had encountered a rattlesnake.

A blow from a stick disabled the snake but did not stop the buzzing sound, which was repeated several times, and the motion of the tail was distinctly observed by myself and my friend, Mr. F. F. Watson. The terminal inch and a half of the tail alone participated in the vibration, and was thrown rapidly from side to

¹The departments of Ornithology and Mammalogy are conducted by Dr. ELLIOTT COVES, U. S. A.