

was placed the air was caused to stream inwardly through the stomata and out of the petiole continuously for two and one-half hours without renewing the vacuum.

AN UNUSUAL IRIS.

F. M. ANDREWS, Indiana University.

Two years ago I transplanted the rhizomes of some Irises to a rather damp location. All were the common large blue flag (*Iris versicolor*). The rhizomes sent up the aerial parts and produced 60 flowers of which three were unusually large, being 12 cm. long and nearly as broad, whereas the usual length is 5 to 8 cm. This represents an increase in size of at least one third. The inner segments were pure yellow and only about one-half the length and breadth of the sepals. Ordinarily the flowers of this species are colored yellow, green or white toward the center¹. The petals were marked in places by purple dots which recalled to a degree the appearance of the flower of *Belamcanda chinensis*. The rhizomes from which these three flowers above mentioned came bore in every other instance blue flowers of the normal size and color.

SECOND BLOOMING OF SNOWBALL BUSH IN THE SAME YEAR.

F. M. ANDREWS, Indiana University.

On September 4, 1922, the writer noticed an account of a snowball bush which was in bloom for the second time that year. The plant was at the home of H. P. Carpenter of Elwood, Indiana, who, upon request, very kindly forwarded to me a cluster of the flowers and a branch with some leaves so that a study of the specimen could be made. He wrote that "the first time it was in bloom the bush was literally covered with blossoms, but the last time there were only a few, probably a dozen or more". This agrees with some other plants which have bloomed more than once in a season and to which the author has previously made reference¹. The second blooming was conspicuous in specimens that were more or less diseased, due apparently to the attack of fungi or other injury. Injury may easily be caused by the attacks also of insects of various kinds and the snowball is at times injured to a high degree by this means.

The characteristics of the specimens at hand agree with *Viburnum opulus* or what is sometimes called the guelder rose or snowball. The flowers are white and are borne in a long peduncled cyme about 6 cm. in diameter. This however, falls far short of the usual size of the normal cyme clusters of *V. opulus* which often average 12 cm. in diameter.

¹ Gray, Asa. New Manual of Botany Seventh Edition.

¹ Andrews, F. M. Proceedings of the Indiana Academy of Science 1905, pp. 187-188; 1909, pp. 373-374; 1911, pp. 279-281.

Therefore, it is to be observed, that, during the second anthesis the number of clusters was greatly reduced, and the size of the individual cymes was much less.

Ordinarily *V. opulus* blooms in the early summer so that in this case about two months or more must have elapsed between the first and the second anthesis. Certain other species of this genus may be "forced" to bloom by the addition of heat during cold weather.

Regarding the second blooming of plants in the same season we have various suggestions as to its cause. If branches of certain plants are allowed to project into a warm greenhouse during the winter, these branches will develop transpiring leaves although the remainder of the plant may be outside in low temperature. This shows that water is still absorbed by the roots and passed through the stem.² Some plants under such conditions are unable to absorb water from a frozen soil and hence wilt.² Kerner³ observed that a root of a Clematis plant growing in cold air and frozen developed leafy stems when a branch was conducted into a hothouse. The food substances made in the summer were available for use as soon as deposited². He says further: "The same must indeed be the case in those plants which bloom normally in the spring, but yet often in years characterized by particularly mild autumns, burst open in October, the buds destined for the next spring thus sending out fresh leafy shoots and blossoms twice in the same year—for example,—many apple and horse chestnuts, violets and strawberries, many primulas, gentians and anemones." So in the case of the second blooming of the snowball here discussed, a rather high temperature might have influenced the plant to renew fruiting activity. Reference to the local weather bureau records shows that the temperature ran high during the second blooming of this plant. This influence of temperature on the second blooming of plants is upheld by an account by Darwin and Shrubbs entitled "Records of Autumnal or Second Flowerings of Plants". They enumerate 75 such plants in England and further state: "It can hardly be doubted that these second flowerings are connected with relatively high temperatures"⁴.

Recently an account of an eight to nine year old cherry tree near Bloomington, in full bloom for the second time in the same season, came to the notice of the writer. Here again the high temperature prevailing during the second blooming of this tree indicates strongly the close connection between high temperature and the second seasonal blooming of plants.

² Pfeffer, W. Physiology of Plants. English Edition Vol. 1, p. 231.

³ Kerner, H. and Oliver, T. W. English Edition. Vol. 1, p. 564.

⁴ Darwin, Frances and Shrubbs, A. Records of Autumnal or Second Flowerings of Plants. The New Phytologist 1922. Vol. 21, p. 48.

