February, 1897, there occurred a long spell of hot weather, lasting from the 7th to the 18th with maximum temperatures between 82.6° on the 7th and 107.3° on the 10th, or over 100° on five days and over 90° on ten consecutive days. On the morning of February 8th the temperature at the Adelaide Observatory at three feet below the surface was 71.5°; at five feet, 68.6°; and at eight feet, 67.5°. On the morning of the 18th the readings were 73.6°; 69.3° and 68.4° respectively, showing a gradual increase during the intervening period, the increase being 2.1° in the ten days at three feet, 0.7° at five feet and 0.9° at eight feet. These observations show clearly 'that it requires a very long continuance of heat to materially affect the thermometers ten feet only below the surface.'

R. DeC. Ward.

BOTANICAL NOTES.

THE POWDERY MILDEWS.

A NOTABLE contribution to the literature of fungology has appeared in Mr. Ernest S. Salmon's 'Monograph of the Erysiphaceæ,' published as Volume XI. of the Memoirs of the Torrey Botanical Club. It constitutes a thick octavo pamphlet of nearly three hundred pages, and nine plates of one hundred and seventy-five figures. The paper opens with a couple of pages of remarks on the limits of the family, eight or nine pages on morphology and life history, a few pages devoted to the history of the study of the group, the connection between host and parasite, and distribution of the species. The family is restricted to the six genera *Sphaerotheca*, *Podosphaera*, *Uncinula*, *Microsphaera*, *Erysiphe* and *Phyllactinia*. All the known species in the world are included, and it speaks well for the conservatism of the author that although he examined the material in the most important collections in Europe and America, he has found it necessary to describe but two new species and two new varieties. Such conservatism and self-denial are most commendable and encouraging, and may well serve as a model for other monographers, who too often find new species every time they turn over their material.

So conservative has been the writer of this monograph that under his treatment the grea number of specific names in the family is reduced to but sixty species and varieties. Thus, while *Erysiphe* has had one hundred and sixty-five species and varietal names associated with it, there are here but nine; so the fifty-eight names under *Microsphaera*, are reduced to nineteen; the twenty-four under *Podosphaera* to five; the twenty-one under *Sphaerotheca* to six; the thirty-eight under *Uncinula*, to twenty; and the nine under *Phyllactinia*, to one. Of course it is not to be supposed that Mr. Salmon made all these reductions; to a large extent they had been made already by other students of the family, but it is greatly to his credit that with such an opportunity he did not give us a greatly increased list.

According to this monograph the accepted names of some of the more common of the Powdery Mildews are as follows: Cherry Mildew, *Podosphaera oxycanthae;* Rose Mildew, *Sphaerotheca pannosa;* Gooseberry Mildew, *Sphaerotheca mors-uvæ;* Willow Mildew, *Uncinula salicis;* Grape Mildew, *Uncinula necator;* Lilac Mildew, *Microsphæra alni;* Pea Mildew, *Erysiphe polygoni;* Sunflower Mildew, *Erysiphe cichoracearum.*

PLANT BREEDING.

From a paper by H. J. Webber and E. A. Bessey on 'The Progress of Plant Breeding in the United States,' recently published in the Year-book of the Department of Agriculture, the scientific botanist may learn much which may well surprise him as to what has been accomplished in the work of plant breeding. That man can bring about definite results by the careful breeding of animals is more or less well known, but that plants may be bred with as definite an object in view, and as successfully, is not yet a matter of common knowledge.

It is only during the latter half of the present century that much progress has been made in plant breeding proper, the earlier efforts at the improvement of plants having been through the selection of seeds of the most desirable plants for further cultivation. Downing, Hovey, Wilder and some other far-seeing horticulturists of the earlier days continually urged the breeding ('crossing') of the better varieties of fruits

in order to combine the qualities and characteristics of the kinds so treated. This advice eventually bore fruit, and to-day the florist plans to bring about a definite result by securing offspring from the union of two plants, whose form, color, odor or other qualities he may wish to intensify or modify. Among fruits the grape, raspberry and strawberry have been much modified by careful breeding. The tomato illustrates what may be done by the skillful breeder, as practically all the improvement which it has undergone is due to carefully planned hybridization, followed by as careful selection. In like manner the cereals, maize and wheat, have been improved in recent years by the crossing of selected varieties.

THE BUTTERCUP FAMILY.

UNDER the title 'A Taxonomic Study of North American Ranunculaceæ,' Dr. C. K. Davis, of the State Normal School, St. Cloud, Minn., publishes a privately printed pamphlet of one hundred and seventy-three octavo pages describing the genera and species of the North American Ranunculaceae, native and introduced. The studies (entirely taxonomic) on which the pamphlet is based were made in Cornell University, where the author had access to the admirable collection of cultivated plants known as 'Cornell Garden Herbarium,' as well as of materials and books in the National Herbarium, the Herbarium of the New York Botanical Garden, and the Gray Herbarium of Harvard University. The result is an arrangement of the family differing considerably from that of either Bentham and Hooker in their 'Genera Plantarum,' or of Prantl in Engler and Prantl's 'Natürlichen Pflanzenfamilien,' although much more like the latter than the former. Dr. Davis proposes to divide the family (which for some reason not given he calls an 'order') into five tribes, which he arranges in the following sequence: I. *Crossosomeae;* II. *Pæonieae;* III. *Helleboreae;* IV. *Clematideae;* V. *Anemoneae.* The genus *Crossosoma* of Nuttall, referred by Bentham and Hooker to the Dilleniaceae, and by Engler and Prantl made the type of a separate family, Crossosomataceæ, is here included in the Ranunculaceæ. The two species and one variety occur in Southern California, Arizona, and Northern Mexico. In the *Helleboreae* the name *Cammarum* of Hill (*Brit. Herb.*, 1756) is substituted for Salisbury's name, *Eranthis* (1807), in accordance with the suggestion made by Professor Greene in *Pittonia*, April, 1897.

The work is quite uneven, some portions (notably those first published in the 'Minnesota Botanical Studies') being much more scientifically treated than others which were first printed in horticultural magazines. The pages falling under the latter category are printed in different type, often in poor type, marring the appearance of the book, and giving it a 'patchwork' appearance. However, in spite of its unfortunate printing it is worthy of a place in the library of every working botanist.

RED CEDAR DISEASES.

DR. VON SCKRENK, of the Shaw School of Botany and Special Agent of the Division of Vegetable Physiology and Pathology of the United States Department of Agriculture, describes (in Bulletin 21, of the Division) two fungi which produce diseases of the wood of the Red Cedar (*Juniperus virginiana*), known respectively as 'white rot' and 'red rot.' The first ultimately causes long holes, lined with the brilliant white remains of the decayed tissues, to appear in the wood at intervals of a few inches. This disease is found to be due to a species of *Polyporus* (Fomes) related to, if not identical with, *P. fomentarius*, and for which the author proposes the name *P. juniperinus*. It occurs in Kentucky and Tennessee. The 'red rot' is said to be more common than the preceding, and is more widely distributed, occurring in Missouri, Arkansas, Kentucky, Tennessee, Virginia and New York. It produces large holes in the wood, but these are brown within, and are lined with the brown, cubically cracked remains of the decayed wood. This is found to be due to another species of *Polyporus*, viz., *P. carneus*, a small, woody, flesh-colored polypore, which grows in the holes at the bases of the fallen branches. A number of photographs, excellently reproduced, illustrate this valuable paper.

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