

observed with the theoretical figure is remarkably close; in fact Mr. Adams states that "the mirror may accordingly be regarded as essentially perfect to within the limit defined in this way." A similar set of tests made by Mr. Knox-Shaw on the old thirty-inch Common mirror *in situ* in the telescope. He found that the mirror was uncorrected by about twice as much as was the Ritchey mirror at the time of the first series of tests mentioned above. From tests of the astigmatism he concludes that the position of the telescope has an appreciable effect on the figure of the mirror as has been suspected to be the case.

#### PLANT-LIFE AT THE SNOW-LINE.<sup>1</sup>

MR. JOSIAS BRAUN'S exhaustive account of the vegetation at the snow-line in the south-eastern (Rhætian-Lepontine) Alps forms a valuable contribution to our knowledge of the plant-ecology of the Swiss Alps. The area includes, roughly speaking, the country from the St. Gothard to the Engadine. The text consists of two parts. The first is a consideration of the vegetation in relation to external conditions, with a detailed description of the plant-associations. The zone under consideration is defined as that in which the summer heat just suffices to melt the annual heavy snow-fall on level areas; its altitude ranges from 2960 metres on the Bernina chain to 2650 metres in the St. Gothard group. It lies above the region of close turf, and forms a part of the open rock region. Within it the author distinguishes three secondary zones: (1) the "Pionierasengurtel," the isolated outposts, so to say, of the turf-flora, forming patches in wind-sheltered places or on sunny spots; (2) the "Dicotyledonous zone," characterised mainly by cushion-forming Dicotyledonous plants; and (3) the "Thallophyte-zone" of rock-inhabiting lichens. The principal natural formations in the first zone are the Curvuletum, of which *Carex curvula* is a characteristic component, and the Elynetum, in which *Elyna myosuroides* predominates. Here, too, are found the last traces of the influence of man and his domesticated animals, indicated by luxuriance of *Poa alpina*. The last chapter of the first part deals with the fauna of the area, which comprises ninety-one species, mainly insects and spiders.

The second part comprises a systematic account of the flora. This includes two ferns, *Cystopteris fragilis* and *Asplenium viride*, *Botrychium lunaria*, *Lycopodium selago*, *Juniperus communis* var. *montana*, and 219 angiospermous flowering plants. The latter represent twenty-nine families, those most in evidence being, in order of numerical preponderance, Compositæ, Gramineæ, Caryophyllaceæ, Saxifragaceæ, Cruciferae, Rosaceæ, Leguminosæ, Gentianaceæ, and Primulaceæ, which together contain two-thirds of the whole flora. The proportion of Monocotyledons to Dicotyledons is slightly less than at lower levels, namely, 1:4.3 as compared with 1:3.6. There are nine woody plants: Juniper, three Willows, *Empetrum nigrum*, *Loiseleuria* (*Azalea procumbens*), and three species of *Vaccinium*. The best represented genera are *Saxifraga*, sixteen species; *Gentiana*, ten species; *Carex*, nine species; *Festuca*, *Draba*, and *Cerastium*, each with six species; and *Alchemilla* and *Primula* each with five. A comparison with the Arctic flora of the west coast of Greenland, between N. lat. 69° and 71°, which contains approximately the same number of flowering plants, shows considerable agreement between the two. There is, however, a much greater proportion of marsh plants in the Arctic flora, while in the Alpine the

families Compositæ, Primulaceæ, Gentianaceæ, and Leguminosæ are more richly represented.

The author groups the snow-flora of this district of the Alps under five main headings: (1) an endemic-Alpine element, peculiar to the Alps, comprising twenty-nine species (13 per cent.); (2) a European-Alpine element with ninety-five species (42.4 per cent.); (3) a Eurasiatic element with fourteen species (6.2 per cent.), which occur also in Central Asia, but do not reach the polar circle; (4) an Arctic-Alpine element with seventy-one species (31.7 per cent.); (5) a ubiquitous element, fifteen species (6.7 per cent.), of more widely distributed plants in lower levels.

#### RECENT WORK ON ENTOMOLOGY.

THE American representatives of the minute homopterous insects commonly known as jumping plant-lice (Psyllidæ) form the subject of an elaborate memoir by Mr. D. L. Crawford, published as Bulletin No. 85 (168 pp.) of the U.S. National Museum. These widely-spread insects frequent trees and shrubs, where, from their active habits, they are difficult to capture without the aid of a net. When disturbed, they throw themselves into the air by means of their powerful hind-legs, and when once launched, are able to propel themselves some considerable distance by rapidly vibrating the wings, although they are not endowed with the power of prolonged flight.

Mr. Crawford found the current classification of the group—largely based on wing-venation—to be altogether untrustworthy, closely related species being in many instances placed in different genera. A more satisfactory basis for classification is afforded by the structure of the head; and from this and other features the author proposes a new taxonomic scheme, with the description of many new species.

Cicalas and other Homoptera collected during the second expedition of the Duke Adolf Friedrich of Mecklenburg are described by Dr. L. Melichar in Lief. 5 of Band i. of *Ergebnisse der Zweiten Deutschen Zentral-Afrika-Expedition, 1910-11*. The collection included 184 specimens, referable to 65 species, of which 18 appeared to be new, some of these likewise representing three new genera types.

In the first article of Lief. 4 of the publication just quoted, Prof. Y. Sjöstedt records the white ants observed and obtained during the expedition. Special interest attaches to photographs of the interior of a nest of *Termites natalensis*, showing, not only a "fungus-garden," but also the royal cells, of which one contains the monstrous, overgrown queen, and a second, in close proximity, the diminutive king.

In connection with the above may be noticed the description, by Mr. S. Hozawa, in *Annot. Zool. Japon*, vol. viii., parts 3 and 4, of a new species of termite-eating beetle from Formosa. It belongs to the tenebrionid genus, *Zielas*, previously known only by a single species from Annam, of which the habits have not been observed, although, from its affinity to termitophilous genera, it has been assumed to feed on white ants. The elongated eyes, degenerate hind-wings, and sluggish movements of the Formosan species are doubtless connected with its mode of life.

Three issues of the Journal of the College of Agriculture, Tohoku Imperial University, Sapporo, Japan, are to hand, two of which (vol. v., parts 6 and 7) are devoted to various groups of Japanese insects, with descriptions of a number of new species and genera, while the third (vol. vi., part 1) contains further observations on reduplication in silkworms.

Pine timber in a district in Montana, between the Swan and Clearwater rivers, is seriously menaced by

<sup>1</sup> Nouveaux Mémoires de la Société Helvétique des Sciences Naturelles, vol. xviii. Pp. vii+347+map+4 plates.