

known by his book entitled *Java, seine Gestalt, Pflanzendecke und innere Bauart*, published in 1852, though the first Dutch edition appeared in 1849. The sketches of the Javan vegetation here presented are among the best descriptions of tropical plant life.—HENRY C. COWLES.

Carbohydrates and glucosides.—Another of the monographs on biochemistry, under preparation by English workers, has just appeared.⁵ It deals with the monosaccharides, disaccharides, and the more common natural and synthesized glucosides, and forms an invaluable critical consideration of our present knowledge of these physiologically important substances. The seven chapter headings give a good idea of the scope of the work: glucose; the chemical properties of glucose; the hexoses and pentoses; the disaccharides; the relation between configuration and properties; hydrolysis and synthesis; natural and synthetic glucosides. A bibliography of 18 pages adds much to the value of the book.—WILLIAM CROCKER.

Vegetationsbilder.—The island of Juan Fernandez has a vegetation remarkable for the large number of endemic species, which give a peculiar interest to the six plates of KARSTEN AND SCHENCK's well-known work⁶ recently issued as a part of the eighth series. Among the species illustrated are *Boehmeria excelsa*, *Arthropteris aliescandens*, *Gunnera peltata*, *Dendroseris pinnata*, and *Robinsonia gayana*. The photographs and brief descriptive text are by CARL SKOTTSBERG. The vegetation of the Swabian Mountains is also shown in six excellent plates after photographs by OTTO FENCHT, who also contributes the descriptive text.—GEO. D. FULLER.

NOTES FOR STUDENTS

Cytology and taxonomy of Endomycetes.—GUILLIERMOND⁷ has given an account of his further studies on *Eremascus fertilis*, discovered by Mlle STOPPEL;⁸ *Endomyces fibuliger*, discovered by LINDNER;⁹ *Saccharomycopsis capsularis*,

⁵ ARMSTRONG, FRANKLAND E., *The simple carbohydrates and the glucosides*. pp. vii + 112. London: Longmans, Green & Co. 1910.

⁶ KARSTEN, G., AND SCHENCK, H., *Vegetationsbilder*. Series VIII. parts 2, 3. Text and pls. 7-18. 4to. Jena: Gustav Fischer. 1910. M 4 per part.

⁷ GUILLIERMOND, M. A., *Recherches cytologiques et taxonomiques sur les Endomycétées*. Rev. Gén. Bot. 21:353-391, 401-419. pls. 12-19. 1909.

———, *Sur la reproduction sexuelle de l'Endomyces magnusii* Ludwig. Compt. Rend. Acad. Sci. 148:941. 1909.

———, *Quelques remarques sur l'Eremascus fertilis* Stoppel et sur ses rapports avec l'*Endomyces fibuliger* Lindner. Compt. Rend. Soc. Biol. 66:925-926. 1909.

⁸ STOPPEL, ROSE, *Eremascus fertilis*, nov. spec. Flora 97:332-346. 1907.

⁹ LINDNER, P., *Endomyces fibuliger*, n. sp., ein neuer Gärungspilz und Erzeuger des fol. Kreidekrankheit des Brotes. Wochenschr. f. Brauerei 24:no. 36.

discovered by SCHIONNING;¹⁰ and *Endomyces magnusii*, discovered by LUDWIG.¹¹

Eremascus fertilis is described as having a branched, septate mycelium, the cells of which are two to four-nucleate. The cells which are about to produce the gametes become uninucleate by putting in septa. Isogamous conjugation results from the fusion of the contents of lateral diverticula from adjoining cells. At the point of fusion an eight-spored ascus is formed, in which spore formation is like that in the yeasts. Later parthenogenetic asci are formed, which after the usual nuclear divisions contain four or more spores, some of which may abort. The nuclei of the vegetative cells are so small that their divisions could not be observed. *Endomyces fibuliger* differs from *Eremascus fertilis* in having uninucleate cells, yeastlike conidia which bud off from the cells of the mycelium, and no fusion of the contents of the diverticula. The asci are always parthenogenetically formed in the faster growing protuberance. The author thinks that we have here the remains of an ancestral conjugation absolutely identical with that in *Eremascus fertilis*. *Saccharomycopsis capsularis* differs from *Endomyces fibuliger* in that the cells of the mycelium may become asci or these may bud off from the mycelial cells. *Endomyces magnusii* differs from the preceding forms in having no yeast-like conidia, but the cells of the mycelium readily separate to form oidia. Asci result from the fusion of the contents of uninucleate oogones and antheridia, which are formed at the ends of closely or distantly related hyphae. About one-fourth of the asci arise parthenogenetically. The author holds that this form is related to the Schizosaccharomycetes through its oidia.

According to VAN TIEGHEM'S¹² classification, the family Eremascaceae includes *Eremascus*, *Endomyces*, *Saccharomyces*, *Podocapsa*, *Olinea*, *Protomyces*, *Ascoidea*, and *Dipodascus*. GUILLIERMOND would place the last of these genera in a separate group because in these the asci arise as plurinucleate structures and form many (a variable number) spores. He would group the yeasts, *Eremascus*, and *Endomyces* together.

DANGEARD¹³ thought that the gametes of *Eremascus* were multinucleate and has placed this genus with *Dipodascus*, but the author holds that STOPPEL'S work and his own show that *Eremascus* and *Endomyces* should be in the same group. The author criticizes ENGLER and PRANTL'S description of *Eremascus*, and says that it is no longer valid because isogamous conjugation with twisting of gametes is not present in all species. He would retain the genus *Eremascus*, including *E. fertilis* and *E. albus*, and characterize it by the absence of conidia

¹⁰ SCHIONNING, H., Nouveau genre de la famille des Saccharomycetes. C. R. des travaux du lab. Carlsberg 6:93-113. 1903.

¹¹ LUDWIG, F., Ueber Alkoholgärung und Schleimfluss lebender Bäume. Ber. Deutsch. Bot. Gesell. 4: Gen. Versammlungs-Heft. XVII-XXVII. 1886.

¹² VAN TIEGHEM, PH., Eléments de botanique. 1908.

¹³ DANGEARD, P. A., L'origine du périthèce chez les ascomycètes. Le Botaniste 9 and 10:1906.

and by the presence of eight-spored asci derived from an isogamous conjugation. According to ENGLER and PRANTL, *Olinea* also differs from *Endomyces* in the number of its spores, but this is not an essential character, because in two species of *Endomyces* there are four to eight spores.

On account of the great resemblance between *Endomyces fibuliger* and *Saccharomyces capsularis*, the latter is placed by the author in the genus *Endomyces*, which differs from the yeasts in the great differentiation of its mycelium and by having its asci arise almost always from the ends of mycelial branches and not from conidia. The genus *Endomyces* is characterized by a tendency of the mycelium to form conidia or oidia and by the asci arising from the ends of mycelial branches.

The yeasts are thought to be descended from a form similar to *Eremascus fertilis*. From it there are two main lines, one of which again branches to give rise to *Saccharomyces*, *Zygosaccharomyces*, and *Endomyces fibuliger* and *E. capsularis*; while the other main branch gives rise to *Schizosaccharomyces*, *Endomyces magnusii*, and *E. diciptens*.—FREDA M. BACHMAN.

Vegetation of the Faeröes.—Several years ago Professor WARMING and his colleagues projected a systematic study of the flora of the Faeröes from various points of view, and there have been published in a special serial devoted to the purpose papers dealing with plant lists of various groups, floristic treatises, and the like. For ecologists the most important paper of the series thus far is one by OSTENFELD¹⁴ on the plant associations and their life conditions, representing a translation of an earlier Danish paper, published in 1906. After reviewing the literature and noting that the best previous account of the vegetation is in ROSTRUP's work published in 1870, OSTENFELD considers the climatic and edaphic factors in some detail. The climate is decidedly insular, the rainfall and humidity being high and the winter temperature so frequently above 0° that the snow cover is not permanent; the average number of rainless days is 85, while only 18 days per annum are clear. The abundance of sheep is responsible for a high degree of modification in the vegetation covering. In a chapter on the biological features the plants are classified according to their biological type (in the sense of RAUNKIAER), duration of life, type of vegetative propagation, and altitudinal distribution. There are no trees on the islands and there is a striking dominance of perennial herbs; only one autophytic species of the natural land vegetation (*Koenigia islandica*) is an annual. Thirty-six species have never been known to produce viable seeds; this is partly due to climate and partly to the absence of such important pollinating insects as bees and butterflies.

The body of the work deals with the plant formations, which are closely related to one another and separable with difficulty; the author regards this as a feature of an insular climate, which seems reasonable to the reviewer, who has

¹⁴ OSTENFELD, C. H., The land vegetation of the Faeröes, with special reference to the higher plants. Botany of the Faeröes 3:867-1026. figs. 31. 1908.