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des Präsidenten: **Dr. D. H. Scott.** *des Vice-Präsidenten:* **Prof. Dr. Wm. Trelease.** *des Secretärs:* **Dr. J. P. Lotsy.**

und der Redactions-Commissions-Mitglieder:

Prof. Dr. Wm. Trelease, Dr. C. Bonaventura, A. D. Cotton, Prof. Dr. C. Wehmer und **Dr C. H. Ostenfeld.**

von zahlreichen Specialredacteuren in den verschiedenen Ländern.

Dr. J. P. Lotsy, Chefredacteur.

No. 10.	Abonnement für das halbe Jahr 15 Mark durch alle Buchhandlungen und Postanstalten.	1914.

Alle für die Redaction bestimmten Sendungen sind zu richten an: Redaction des Botanischen Centralblattes, Haarlem (Holland), Spaarne 17.

Coulter, J. M., C. R. Barnes and **H. C. Cowles.** A Textbook of Botany for Colleges and Universities. Vol. II. Ecology. (8°. p. 485—964. New York. 1912.)

This volume by Henny C. Cowles treats of that phase of ecology which may be called morphological and physiological ecology, or the ecology of plant structure and behavior. It treats only incidentally of physiographic ecology, or the ecology of vegetation, known also as antecology and synecology. In the introduction in referring to the terms used, the author emphasizes his point of view by mentioning the terms to be avoided. Among such he includes words like adaptation, adjustment, accomodation and regulation, as purposive words, and he replaces such usage by the expression advantageous reactions. He makes the attempt to use words that are applicable in physica and in chemistry, because ecology more than any other phase of biology has suffered from the unrestricted use of anthropomorphic similes and teleological fantasies.

Chapter I deals with roots and rhizoids under the captions soil roots and root hairs, water and air roots, rhizoids. Chapter II discusses leaves with reference to chlorophyll and food manufacture, structure and arrangement of chlorenchyma, relation of leaves to light, air chambers and stomata, protection from excessive transpiration, variations in form, absorption, secretion and excretion, accumulation of water and food, miscellaneous structure and relations. In a similar detailed manner, the following chapters treat of stems (chap. III), saprophytism and parasitism, symbiosis (chap. IV), reproduction and dispersal (chap. V), germination (chap. VI), plant association

(chap. VII), adaptation (chap. VIII). Throughout the volume is illustrated with textfigures, which help to illumine the text.

Harshberger.

Dorsey, M. T., Variation in the Floral Structure of *Vitis.* (Bull. Torr. Bot. Club XXXIX. p. 37—52 with 3 pl. 1912.)

The author discusses the general floral habits of *Vitis* and the variations in flower types and in the number and structure of the various parts of the flower. He finds that *Vitis* is dioecious, polygamodioecious, or perfect. The flower forms, which occur, are the staminata, and the perfect 1) with upright and 2) with reflexed stamens. In *Vitis,* the flower forms resemble those of the closely related genera, *Cissus, Ampelopsis,* and *Parthenocissus.* The typical grape flower is 5-merous, although about 30 percent show a variation from this plan. The number of stamens per flower varies from 3 to 9 and the dehiscence of the corolla seems to be a result of drying. An increase in the number of stamens is associated with an increase in the number of carpels. The staminate flowers have rudimentary pistils, in which the stigmas and ovules are abortive.

Harshberger.

Atkins, W. R. G., Oxydases and their Inhibitors in Plant Tissues. (Sci. Proc. Roy. Dublin Soc. XIV. p. 144—156. 1913.)

In earlier work on osmotic pressures in plants, the brown colour of the sap expressed from many tissues was noticed, an effect due to the action of oxydases, but in some cases the sap was light in colour and no oxydases could be detected. Other investigators have shown that tannin and sugars hinder the action of oxydase on the usual reagents employed for the detection of the enzyme, but though in some cases tannin was found by the writer in undarkened sap, some cases remained which are now investigated. The writer finds that while plants yielding a brown sap always give the direct oxydase reaction, those yielding light-coloured sap either give the indirect reaction or contain tannin or some reducing agent. In *Iris germanica* the presence of a strong reducing agent prevents the detection of oxydase in certain tissues, but this agent may be removed by prolonged dialysis and the presence of oxydase may then be demonstrated. Other cases are cited, affording fresh evidence for the view that oxydases are universally present in plant tissues. The colours of the perianth leaves of six varieties of *Iris* are shown to be due to the presence or absence of a yellow plastid pigment and an anthocyan pigment which is formed by the action of the epidermal peroxydase on a chromogen; this production of pigment may be inhibited by the presence of the reducing substance of *Iris* leaf-sap. F. Cavers.

Briggs, L. J. and **H. L. Shantz.** The Water Requirement of Plants. Part I. Investigations in the Great Plains in 1910 and 1911. Part II. A Review of the Literature. (Bull. 284 and 285 U. S. Bureau of Plant Industry. 1913.)

The term "water requirement" is used in this paper to indicate the ratio of the weight of water absorbed by a plant during its growth of the weight of the drymatter produced. The investigation had for its

object the dermination of the differences in water requirement exhibited by the more important crop plants and some of their varieties with a view to determining those which are most efficient in the use of water under the semi arid conditions existing in the Great Plains. The experimental plants were grown in large pots having a capacity of about 115 Kilos of soil. The pots were provided with tight covers, with openings for the plants, the space between the cover and the stem of the plant being sealed with wax. The loss of water was thus limited to that occurring from the transpiration of the plants. Water was added, adequate aeration was provided and the plants were grown under screens to prevent injury from hailstones. The results are given in 21 tables. The second bulletin gives a review of the literature and is more than a bibliography as the results obtained by previous workers are given in some detail. Harshberger.

Brush, W. D., The Formation of Mechanical Tissue in the Tendrils of *Passiflora caerulea* as influenced by tension and contact. (Botanical Gazette. LIII. p. 453—477. 1912.)

A histological study of tendrils of *Passiflora caerulea* under tension and not under tension, and in contact with substances and not in contact led to some conclusions. Tendrils which have been subjected to contact or tension are stronger than those not subjected. The increased strength is due to increase in number and thickness of xylem cells in case of contact, and to a thickening of the walls of pith cells in case of tension. Contact is the more important factor, but the strength is greatly increased by the addition of the tension factor. Charles J. Chamberlain (Chicago).

Dixon, H. H. and **W. R. G. Atkins.** Osmotic Pressures in Plants. III. The Osmotic Pressure and Electrical Conductivity of Yeast, Beer, and Wort. (Notes Bot. School Trinity Coll. Dublin. II. p. 173—176. 1913.)

The authors point out that in view of the rapid metabolism of the yeast-cell as regards carbohydrates, a study of the osmotic equilibrium between it and the solution which it ferments is of interest. Paine showed that alcohol penetrates the yeast-cell readily, a state of equilibrium being soon reached in which the ratio of alcohol in the cell to that outside is a constant, deviating only slightly from 0.85; while salts penetrate to a small extent, the ratio between the internal concentrations being no more than 0.1—0.25 except in the case of poisonous substances. The authors find that pressed yeast gives much higher values for osmotic pressure and electrical conductivity than does wort, but during fermentation the osmotic pressure increases considerably until that of the beer approaches that of the pressed yeast. When yeast is allowed to stand for 6—24 hours after separation there is great diminution of osmotic pressure, which may fall below that of the beer from which it was removed. This diminution of pressure is under ordinary circumstances made good by the diffusion inwards of sugar from the wort, hence this carbohydrate must be able to pass freely into the yeast cell while the alcohol produced passes out, maintaining a constant ratio. F. Cavers.

Fuller, G. D., Evaporation and the Stratification of Vegetation. (Botanical Gazette. LIV. p. 424—426. with 1 fig. Nov. 1912.)

The study was made in an undisturbed climax, mesophytic, beech-maple forest about 45 miles southeast of Chicago, near the village of Otis. Ind. The results are platted graphically for three different strata in the forest. He found, that if the average rate of evaporation at the stations upon the forest floor be taken as unity, the proportional evaporating power of the air in the three strata will be found to be nearly 1.84 : 1.00 : 0.80 for the season.

Harshberger.

Gager, C. Stuart, Ingrowing Sprouts of *Solanum tuberosum*. (Botanical Gazette. LIV. p. 515—523. 1 pl. 6 fig. Dec. 1912.)

The author finds that ingrowing sprouts of the potato make their way through the tissue of the tuber not by enzymatic digestion of a channel in the tissue, but by mechanical pressure which goes with growth in length. The growth force is not sufficient to pierce the skin. He found that new tubers were found on such ingrown sprouts and he concludes, that their formation is a function of external conditions plus the genotypical constitution of the species.

Harshberger.

Ganong, W. F., The Living Plant: a Description and Interpretation of its Functions and Structure. (London: Constable and Company. 478 pp. 178 fig. Price 15 sh. net. 1913.)

This book is intended primarily for general readers, though containing much that is of interest and value for the botanist and especially for the teacher of the physiology of plants. The author incorporates the results of recent research in plant physiology, and gives a number of original and ingenious diagrams and "schemes" to illustrate the main processes in plant life and the various relations between the plant and its environment. F. Cavers.

Henry, T. A., The Plant Alkaloids. (London: J. and A. Churchill. VII. 466. Price 18 sh. net. 1913.)

The author brings together the chief historical, chemical, physical and physiological facts known concerning the vegetable alkaloids. These bodies are arranged in nine groups, one of these including "alkaloids of unknown constitution." General questions — such as the correlation of the chemical constitution of alkaloids with their action on the animal system, the mode of formation of alkaloids in the plant, and their function in the plant — are only dealt with briefly. F. Cavers.

Blanchard, F. N., Two new species of *Stigonema*. (Rhodora. XV. p. 192—200. pl. 105. November 1913.)

Following the description of two new species of *Stigonema* (*S. anomalum* Blanchard and *S. medium* Blanchard), both from Chebacco Pond, Essex, Massachusetts, the writer discusses the characters of these and related forms in a comparative way and concludes that *Hapalosiphon, Sirosiphon,* and *Fischerella* are best regarded as subgenera of *Stigonema, Sirosiphon* containing those

species which are currently known as *Stigonema*. The main characters of the three subgenera are shown in a full-page table. Both of the new species are figured. Maxon.

Davis, B. M., A biological survey of the waters of Woods Hole and vicinity. Part 1, section 2, botanical. Part 2, section 4, a catalogue of the marine flora of Woods Hole and vicinity. (Bull. Bureau of Fisheries, U. S. Department of Commerce and Labor. XXXI, 1911, in two parts. Washington, 1913.)

An outgrowth of the work for nearly a generation, now, conducted in connection with the laboratories of the Fish Commission and the Marine Biological Laboratory.

The botanical section of the first volume comprises pages 443 to 544, inclusive, with nos. 228 to 274 inclusive of a series of distributional charts of the waters of Vineyard Sound and Buzzard's Bay; and consists of chapters devoted to an introduction, an analysis of factors affecting the local distribution of algae, an analysis of characteristic algal associations and formations, a report on the algae of one harbor reef, "Spindle Rocks", and an account of the distribution of algae in the deeper waters of Buzzards Bay and Vineyard Sound.

The botanical section of the second volume includes pages 795 to 833 inclusive, devoted to a catalogue of the marine flora of the region, — limited to algae except for a note on the distribution of *Zostera* in the deeper waters. Trelease.

Howe, M. A., Phycological studies, V. Some marine algae of Lower California, Mexico. (Bull. Torrey Bot. Club. XXXVIII. p. 489—514. pl, 27—34. November, 1911; issued December 1, 1911.)

Several small collections of marine algae brought together from Lower California, Mexico, afford a basis for the present paper, in which 27 species are enumerated. The following are described as new: *Dictyota Vivesii* Howe, *Scindia latifrons* Howe, *Anatheca dichotoma* Howe, *Gracilaria Vivesii* Howe, *Fauchea Sefferi* Howe, *Fauchea* (?) *mollis* Howe, *Halymenia actinophysa* Howe, and *Cladophora MacDougalii* Howe. These are all illustrated. One new "combination" also appears: *Codium decorticatum* (Woodw.) Howe (*Ulva decorticata* Woodw.) Maxon.

Griggs, R. F., The Development and Cytology of *Rhodochytrium*. (Botanical Gazette. LIII. p. 127—173. 1912.)

After a cytological study of the life history, Griggs concludes that, in spite of some superficial resemblances, *Rhodochytrium* is not related to any known Archimycete, but rather to the *Protococcoideae* through *Phyllobium*. Cytological resemblances between *Rhodochytrium* and *Synchytrium* suggest that *Synchytrium* also was derived from protococcoid ancestors.

Charles J. Chamberlain (Chicago).

Grove, W. B., The British Rust Fungi (*Uredinales*). Their

Biology and Classification. (Cambridge University Press, 1913. Demi 8°. 412 pp. 290 textill. Price 14 sh.)

The present volume provides the student with an up-to-date account of the British *Uredineae,* and may thus be said to replace Plowright's "Monograph" which has for many years been out of date.

The work is divided into two parts, general and systematic. The former is largely biological. The life-histories of various types of rusts are given, and there are chapters on sexuality, nuclear division, specialization, immunity, phylogeny and classification. The description in the second part are based on those of the Sydows "Monographia Uredinearum" and the nomenclature is that of the International Rules. The species are arranged in the order of the families and genera on which they are parasitic. The principal synonomy is supplied and practically all species are figured. Critical work has shown that several species, have had to be excluded from the British flora, but many others have been recently recorded for the first time. There is one novelty *Puccinia secalina* a biologic species of *P. dispersa.* A. D. Cotton.

Brooks, F. T., Silver Leaf Disease. (Journ. Board Agric. XX. 8. p. 682—690. 1913.)

A general account of Silver Leaf disease in Britain and also the methods of treatment. Although Silver Leaf is a manifestation of ill health now known to be due to various causes, the author is able to state that from the fruit grower's point of view *Stereum purpureum* is undoubtedly the principal agent. A. D. Cotton.

Fink, B., The nature and classification of lichens: II. The lichen and its algal host. (Mycologia V. p. 97—166. May, 1913.)

This is the second and concluding portion of an elaborate review of the subjects indicated in the title. The summary and conclusions reached by the author are stated as follows:

1. There has hitherto been no agreement regarding the nature of the lichen, and the only thing about the problem generally believed by botanists is that the green and blue-green cells in lichens are algae.

2. Due probably to clinging to traditional phraseology, most botanists are not able to express themselves consistently with respect to any view that they may hold relative to the nature and the proper treatment of lichens.

3. The text-book statements about lichens are rarely coherent, excepting those that cling to an entirely traditional and erroneous position.

4. The fundamental problem concerns the nature of lichens, and this must be settled before we can hope to agree regarding the classification of these plants.

5. Due to peculiar ideas about the relation of the lichen to its algal host, this problem of relationship has become the main part of the consideration of the nature of the lichen. It is therefore treated at length in this paper.

6. Recent researches prove that all hypotheses of mutualism

between the lichen and the symbiotic alga are erroneous, and that the lichen is a fungus pure and simple.

7. The following are the main arguments against mutualism. Lichens commonly grow where there are free algae of the same species as those parasitized by these lichens. The spores of the lichens germinate and attack the free algae as other fungi attack their hosts. Lichens perform like other fungi on culture media and may be made to produce their reproductive organs on these media. Their development on such media does not differ from that reached when growing with their algal hosts more than other fungi vary from their usual appearance when grown on culture media. Lichen spores also attack the algal hosts, when the spores and the algae are introduced into cultures together; and the resulting lichen is normal and sometimes fructifies in the cultures. Algal hosts extracted from lichen thalli grow in cultures like free algae of the same species grow on similar culture media. Some lichens live for years in their substrata outside the relation with their algal hosts. The researches of Elenkin and Danilov prove that lichen hyphae absorb food from the algal host cells, which are killed by severe parasitism or more probably by parasitism and saprophytism combined. The relation of the Lichen to its substratum proves that higher lichens can take comparatively little food from it and must depend more than lower Lichens upon the algal hosts; and this shows that the parasitism of the lichen upon the algal host has become more severe in the evolution of higher lichens. Finally, the algae parasitized by lichens are in a disadvantageous position with reference to carbon assimilation.

8. The following are the main arguments for the fungal nature of lichens. Lichens are like other fungi with respect to vegetative structure and fruiting bodies. The bridges which connect lichens with other fungi are not few but many. Since it is thoroughly demonstrated that the lichen is parasitic, or partly parasitic and partly saprophytic on the alga, there is no longer even a poor excuse for a "consortium" or an "individualism" hypothesis.

9. The parasitism of Lichens on algae is peculiar in that the unicellular or the filamentous hosts are usually enclosed by the parasite, which may carry more or less food material to its host. The host inside of the parasite is placed in a disadvantageous position with reference to carbon assimilation and may depend, for its carbon supply, more or less upon material brought from the substratum by the parasite. Some algal individuals not yet parasitized may be found in most lichen thalli.

10. The lichen is a fungus which lives during all or part of its life in a parasitic relation with the algal host and also sustains a relation with an organic or an inorganic substratum. The definition may need modification later to recognize Elenkin's hypothesis, in part or fully. Maxon.

Hasse, H. E., Additions to the lichen flora of southern California. VIII. (The Bryologist. XVI. p. 1—2. January, 1913.)

Includes description of *Maronea constans* var. *sublecideina* A. Zahlbr., var. nov., from the Santa Monica range; and *Dermatocarpon* (*Endopyrenium*) *Zahlbruckneri* Hasse, sp. nov., also from the Santa Monica range, California. Maxon.

Andrews, A. Le Roy, Notes on North American *Sphagnum*, IV. (The Bryologist. XVI. p. 20—24. March, 1913.)

The present instalment deals with the section *Malacosphagnum* and includes critical notes upon *Sphagnum compactum* DC. and *S. strictum* Sullivant. Maxon.

Andrews, A. Le Roy, *Sphagnaceae* [of North America]. (North American Flora. XV. p. 1—31. June 14, 1913.)

A systematic treatment of the genus *Sphagnum* as represented in North America. The author recognizes as specifically distinct only 39 species from this area, reducing to synonymy a large number which have been described in recent years. For example, 36 specific synonyms are cited under *S. subsecundum* Nees. Maxon.

Black, C. A., The morphology of *Riccia Frostii* Austin. (Ann. of Bot. XXVII. 107. p. 511—532. 2 pl. London, July 1913.)

The author gives an account of the structure of the thallus, the development of the sexual organs, the sporophyte, sporogenesis, development of the spore, the spermogenous cell, the diagonal division, the development of the sperm. The air-chambers of the thallus originate by the upward growth of adjacent filaments surrounding a depression at their junction; and when mature they are of various sizes and are separated by unilamellate plates of green tissue. The plants are dioicous; and the reproductive organs are not definitely grouped. In the spore-mother-cell the nucleus gradually decreases in size during the successive mitoses; no centrosomes or centrospheres were found. The spore contains a very small nucleus surrounded by food material, principally oil. It has 2 protective coverings; and later the endospore is formed. The sculpturing of the exospore is an irregular system of ridges. The final division in spermogenous tissue is placed diagonally in the cell; no cell-wall was found between the resulting triangular walls. The blepharoplast arises from sharply differentiated protoplasm in an angle of the cell; the blepharoplast elongates as a cord and becomes closely applied to the transformed nucleus, and terminates in a thickened end from which arise two cilia. The number of chromosomes is eight for the gametophyte, and sixteen for the sporophyte. An instance of an abnormal sporophyte, invaded by bacteria, is described. A. Gepp.

Britton, E. G., *Archidiaceae, Bruchiaceae, Ditrichaceae, Bryoxiphiaceae, Seligeriaceae* [of North America]. (North American Flora. XV. p. 45—75. June 14, 1913.)

A systematic descriptive treatment of the North American species of mosses of the 5 families mentioned. One new "combination" appears: *Ditrichum heteromallum* (Hedw.) E. G. Britton (*Weisia heteromalla* Hedw.). No new species are described. Maxon.

Britton, E. G. and **J. T. Emerson.** *Andreaeaceae* (of North America]. (North American Flora. XV. p. 35—39. June 14, 1913.)

A systematic treatment of the 9 species of mosses of the genus *Andreaea* known to occur in North America. One of these (*A. turgescens* Schimp.) is known only from Mexico. All the others were described originally from European specimens. Maxon.

Dixon, H. N., Miscellanea Bryologica. I. (Journ. of Bot. LI. 608. p. 244—247. August 1913.)

The author shows that the rare New Zealand moss, *Tetraphidopsis novae-seelandiae* Broth. & Dixon is identical with the older plant *Meteorium pusillum* Hook. f. et Wils. And he describes the male inflorescence of the species. Another New Zealand moss, *Ditrichum brachycarpum* Hpe., has a confused synonymy, which the author makes clear. The third moss discussed is *Weisia Welwitschii* Schimp., which has been reduced as a synonym of *Campylostelium strictum* Solms by Limpricht and others. That is an error. The two species are perfectly distinct in the structure of leaves, theca and peristome; and the latter is silicicolous, the former calcicolous. A. Gepp.

Dixon, H. N., Miscellanea Bryologica. II. (Journ. of Bot. LI. 611. p. 324—330. November 1913.)

The author gives the history of *Ditrichum flexifolium* (Hook.). and reveals a number of species from Africa, India, Australasia and South America, which are mere synonyms of it, and must be reduced. He also publishes critical notes on some half dozen species of *Thuidium* from Australasia and Oceania, adding a diagnosis of *T. orientale* Mitt. sp. nov. from Penang. Finally he records *Astomum Levieri* as occurring in N. Africa.

A. Gepp.

Dixon, H. N., Studies in the Bryology of New Zealand, with special reference to the herbarium of Robert Brown, of Christchurch, New Zealand. (New Zealand Inst. Bull. N°. 3. 29 pp. 4 pl. Wellington, N. Z. 30th June 1913.)

The author points out the exceeding difficulty which besets the study of the mosses of New Zealand. This is due to the creation of a multitude of new species by C. Müller, W. Colenso, and Robert Brown. Of most of these new species it is impossible to obtain authentic specimens; and the majority of them have not been figured at all, or quite inadequately. R. Brown's descriptions are brief and insufficient, and his type-specimens have been destroyed for the most part. The present series of papers is intended to bring together, so far as is possible, the species hitherto recorded for New Zealand. The first paper is a revision of *Dicranoloma,* with a key to the 16 species. Descriptions of the following new species are given: *D. platycaulon* (C. M.), *D. grossialare* (C. M.), *D. chrysodrepaneum* (C. M), *D. cylindropyxis* (C. M.), *D. plurisetum* (C. M.). All the species are figured: and full synonymy and critical notes are supplied. A. Gepp.

Evans, A. W., Revised list of New England *Hepaticae.* (Rhodora. XV. p. 21—28. February 1913.)

A complete list, embodying the corrections and additions of the past 10 years, of the species of *Ricciaceae, Marchantiaceae, Metzgeriaceae, Jungermanniaceae,* and *Anthocerotaceae* known to occur in the six New England states. These number 177 species, as against 123 species in the list of 1903, a gain of 54 species or nearly 44 per cent. Those records which are additions to the flora are listed separately, as well as others which are reductions to synonymy or other changes of names. Maxon.

Frye, T. C., The *Polytrichaceae* of Western North America. (Proc. Washington Acad. Sci. XII. p. 271—328.textfig. 1—30 August 15, 1910.)

Of the 10 genera of mosses comprising the family *Polytrichaceae* 7 are represented in western North America, by 27 species. These are described and elaborately illustrated by text figures in the present paper. One new "combination" apears: *Oligotrichum incurvum latifolium* (*Oligotrichum hercynicum latifolium* C. Müll. and Kindb.). Maxon.

Beer, R., Studies in Spore Development. III. The Premeiotic and Meiotic Nuclear Divisions of *Equisetum arvense.* (Ann. Bot. XXVII. 108. p. 643—659. pl. 51—53. 1913.)

The author of this paper published a preliminary account of the development of the spores of *Equisetum* in 1909 (New Phytol. Vol. VIII, p. 261). Since that time E. Hannig has made a detailed study of the same subject and has confirmed the author's results regarding the origin of the much disputed "middle coat" of the spore wall. As this is the case, the author considers it unnecessary to publish his results upon the spore wall in greater detail, and confines himself in the present paper to the nuclear divisions associated with spore development which were not dealt with by Hannig in his memoir.

The more important of the conclusions reached may be indicated very briefly as follows:

In the premeiotic divisions a spireme which is discontinuous from the first is developed from the nuclear reticulum by the gradual withdrawal of branches and anastomotic connexions. In the process of formation of the daughter nuclei the chromosomes open out and their substance becomes distributed along numerous branches which develop between them. It appears to be entirely by these means and without any indications of internal vacuolisation that the reticulum of the resting nucleus develops from the chromosomes. In the case of the meiotic divisions the whole process of the transformation of the spireme segments into the heterotype chromosomes can be followed so continuously that there can be but little doubt regarding the relation of one structure to the other. Each spireme segment consists of two univalent chromosomes arranged end to end, and each such pair develops, by concentration, into one of the bivalent chromosomes of the heterotype division. The number of chromosomes is about 115.

Agnes Arber (Cambridge).

Blake, S. F., Forms of *Ophioglossum vulgatum* in eastern North America. (Rhodora. XV. p. 86—88. fig. 1. May 19, 1913.)

In discussing the breadth of variation in *Ophioglossum vulgatum* the following two extreme forms are recognized: f. *pseudopodum* Blake and f. *lanceolatum* (Clute) Blake. The former, here described as new, is figured. Maxon.

Christensen, C., *Polypodium speluncae* L. A question of nomenclature. (Amer. Fern Journ. III. p. 1—4. January, 1913.)

The name *Polypodium speluncae* was given by Linnaeus in 1753 to plants from India and Bermuda which were supposed to

represent the same species. The Indian plant is a species of *Microlepia* and has been known latterly as *M. speluncae*. The Bermuda plant, however, is a *Dryopteris* and was regarded by Underwood as the type of *P. speluncae*. Christensen dissents from this view and regards the Indian plant as the type of the Linnaean species.
Maxon.

Copeland, E. B., Fern genera new to the Philippines. (Phil. Journ. Sci. C. Bot. III. p. 301—302. October, 1908.)

Brainea and *Balantium* are here reported from the Philippines. Two new "combinations" are made for species of the latter genus: *Balantium Copelandi* Christ. (*Dicksonia Copelandi* Christ.); and *B. dubium* (R. Br.) Copeland (*Davallia dubia* R. Br.).
Maxon.

Copeland, E. B., New species of *Cyathea*. (Phil. Journ. Sci. C. Bot. III. p. 353—357 December, 1908.)

The following new species are described: *Cyathea* (*Alsophila*) *atropurpurea* Copel., from Mount Halcon, Mindoro; *C. mitrata* Copel., from Mindanao; *C.* (*Alsophila*) *Fenicis* Copel., from Ins. Batanes; *C. Foxworthyi* Copel., from Luzou; *C. chinensis* Copel., from Yunnan; *C. Mearnsii* Copel., from Luzou; and *C.* (*Alsophila*) *Curranii* Copel., from Luzon. The 3 genera *Hemitelia, Alsophila,* and *Cyathea,* though usually regarded as distinct, are merged by the author under the last-mentioned name. Maxon.

Frye, T. C. and **M. M. Jackson.** The ferns of Washington. (Amer. Fern Journ. III. p. 65—83. pl. 1—4. September, 1913.)

This is the first instalment of an extended paper describing the species of *Pteridophyta* known to occur in the state of Washington. In the present part the families *Equisetaceae, Isoetaceae, Lycopodiaceae* and *Selaginellaceae* are treated, the families being described and the species briefly described and illustrated. One new "combination" appears: *Selaginella rupestris densa* (Rydb.) Frye and Jackson (*Selaginella densa* Rydb.). Maxon.

Jennings, O. E., Notes on the pteridophytes on the north shore of Lake Superior, (Amer. Fern Journ. III. p. 38—48. April, 1913.)

Notes are given upon the distribution of 35 *Pteridophyta* listed from this region, based principally upon the writer's collections. One new "combination" appears: *Dryopteris dilatata* forma *anadenia* (Robinson) Jennings (*Aspidium spinulosum* var. *dilatatum* forma *anadenium* Robinson). Maxon.

Bailey, F. M., Comprehensive Catalogue of Queensland Plants. (Queensland Governtment 8⁰. 879. pp. 16 col. pl. 976 fig. 1912.)

The present work forms a second edition of the well known Catalogus of Indigenous Plants of Queensland published in 1890. Since then a vast number of new plants have been discovered and described so that the present catalogue contains over 4200 Phane-

rogams and more than 3600 Cryptogams. Two new species: *Aristoleca trilocularis* and *Sarcochilus minutiflos* are described. The coloured plates are useful and the large number of figures, many of which are of dissections, illustrate all groups of plants including fungi and algae. A. D. Cotton.

Bews, J. W., An ecological Survey of the Midlands of Natal, with special reference to the Pietermaritzburg District. (Reprint, Ann. Natal Museum II Pt. 4. 485—545. 1 map. 7 pl. 1914.)

The author has already published a general account of the vegetation of Natal (Bot. Cent. 120. p. 52). The present contribution is a more detailed survey of an area of 450 square miles. A map is provided (scale about 1 : 100,000) which shows the chief plant formations, geological substrata, and topographic features; it is the first detailed map of this area.

Regional factors are throughout recognised as important in determining the distribution of vegetation, these include topographic, edaphic, climatic and the influence of man.

The primary division of the plant formations is into High Veld and Low Veld. Natal rises by a series of terraces intersected by the main river valleys, hence each terrace has parts at a higher level — High Veld —, and parts at low levels — Low Veld. The high veld receives the greatest precipitation, the temperature is more equable, and although the soils are deep and well-aerated they are poor in nutritive salts. The low veld is much drier, with great extremes of temperature, the soil is a compact clay badly aerated but rich chemically. All ecological factors tend to impoverish the high veld and to enrich the low veld. *Anthistaria imberbis* is dominant over much of the veld, a tall form on high veld, and a rarely flowering form on the low veld. Associations of several species of *Andropogon* and other grasses occur as sub-dominants under special conditions.

The Bush formation is associated with the high veld on south-eastern slopes with much moisture and shelter from hot winds. This is a formation intermediate between sclerophyllous woodland and tropical rain-forest. It has been much destroyed by human influence and by fire, so that in many parts vestiges only remain, and these are gradually replaced by *Andropogon* and other grass associations. The Thorn Veld formation occurs within the low veld zone; *Acacia* spp. and other trees have umbrella-form, more or less thorn development, and thick bark so that they are adapted to withstand invasion by grass-fires.

The Rocky Hillside formation presents many facies on the slopes of both high and low veld.

The Vlei or marsh formation is also distributed without respect to altitude, and like the last is regarded as a collection of unstable plant formations in contrast to the more stable types of veld, bush and thorn. There is a considerable range of associations according to degree of wetness and stagnancy. Streams and river-banks furnish another series of unstable plant formations.

Each of the seven formations is described in considerable detail with exhaustive lists of characteristic plants. The effects of human interference on each is also discussed, and incidentally the memoir contains much information on the agriculture of Natal, and the

plantations of "wattle" (*Acacia mollissima*), "blue gum" (*Eucalyptus*) and pines (*Pinus insignis* and *P. pinaster*). The plates are full-page photographs of landscapes typical of the plant formations; they are excellently reproduced and extremely useful. The memoir as a whole is a valuable addition to plant-geography. W. G. Smith.

Brainerd, E., Notes on new or rare violets of northeastern America. (Rhodora. XV. p. 112—115. June 1913.)

Contains as new: *Viola cucullata prionosepala* (*V. prionosepala* Greene), *V. cucullata microtilis, V. fimbriatula* × *triloba* (*V. fimbriatula* × *palmata* Robinson), *V. fimbriatula* × *palmata, V. cucullata* × *triloba* (*V. cucullata* × *palmata* Rhodora), *V. cucullata* × *palmata, V. sagittata* × *triloba,* (*V. palmata* × *sagittata* Rhodora), and *V. palmata* × *sagittata.* Trelease.

Brown, W. H., The Relation of *Rafflesia Manillana* to its Host. (Philip. Journ. Sci. C. Bot. VII. p. 209–224. 10 pl. 1912.)

Rafflesia manillana is parasitic on the roots of a species of *Cissus.* The male and female flowers are similar in shape and color, and from 15 to 20 cm in diameter. The base of the flower is embedded in a vase-shaped mass of tissue formed from the root of the host. Pollination is probably performed by insects. The ovules are small and numerous with an embryosac of the usual 8-nucleate type.

The vegetative portion of the parasite consists for the most part of rows of cells, also of strands, plates and irregular masses of tissue. The rows of cells occur in the xylem, medullary rays, cambium, phloem and sclerenchyma of the host and apparently grow, and multiply in all of these tissues, except perhaps the sclerenchyma and seems to have little power of conduction and probably do but slight damage to the host. Layers of cork-like cells are produced in the host around the parasite. These may cut off the food supply of the host and cause its death.

The presence of the parasite causes an excessive growth of both the xylem and bark of the host in the region around the parasite and also a spreading apart of the xylem rays. The growing point of *Rafflesia* forms long before the shoot breaks through the bark of the host. The vascular bundles of the parasite are concentric and end in the general region of the cambium of the root. Some of the xylem and sieve tubes are connected directly with the corresponding elements of the host. As the parasite grows, it cracks the bark of *Cissus* and appears at the surface. Harshberger.

Coker, W. C., The Plant Life of Hartsville, S. C. (Pee Dee Hist. Soc. 129 pp. pl. 15. 1912.)

A detailed study of the vegetation of the immediate vicinity of the town where the author was born. He discusses the history of exploration, the climate, the topography and geology, the soils. Under vegetation, he describes the flora of the sandhills, uplands forests, flatwoods, savannes, bays and swamps, deeper swamps lakes and ponds, trees (nature and cultivated) and gives in conclusion a list of 628 species of pteridophytes, native and naturalized with a statistical summary. Harshberger.

Collins, F. S., Three plants with extension of range. (Rhodora. XV. p. 169—172. Sept. 1913.)

Referring to *Panicum Bicknellii, Potentilla tridentata,* and *Juncus bufonius halophilus.* Trelease.

Cowles, H. C., The American Phytogeographic Excursion. (August and September 1913. Second Announcement, June 17, 1913; First Section, New York to Lincoln; Second Section, Lincoln to Salt Lake City; Third Section, Salt Lake City to San Francisco; Fourth Section, San Francisco to Cannel; Fifth Section, Cannel to New York.)

Each one of the section programs gives the time of leaving and arriving at the stopping places, the itinerary, the railroad and hotel accomodations, the botanists of different parts of United States designated as leaders, and the papers published on the different local floras. A brief, but comprehensive sketch, of the vegetation and the most interesting plants of such region, add much to the value of the five programs. Harshberger.

Dachnowski, A., The Nature of the Absorption and Tolerance of Plants in Bogs. (Botanical Gazette. LIV. p. 503—513. Dec. 1913.)

This study is a continuation of similar ones which have preceded. The author finds that the character of the obligate bacterial flora and the nature of the organic compounds produced form very important factors in the relative fertility of peat sorts, in the causes of vegetation succession, in the distributional and genetic relationship of associations, and in the characteristic xeromorphy of both ancient and modern bog vegetation. Other facts of similar import are emphasized in a paper in which the transpiration data of various species is tabulated. Harshberger.

Fernald, M. L., The indigenous varieties of *Prunella vulgaris* in North America. (Rhodora. XV. p 179—186. Oct. 1913.)

The following are differentiated: 1) *P. vulgaris,* with a f. *albiflora,* 2) *P. vulgaris* var. *hispida,* 3) *P. vulgaris* var. *lanceolata* with ff. *candida, iodocalyx* and *rhodantha,* 4) *P. vulgaris* var. *aleutica,* 5) *P. vulgaris* var. *calvescens,* and 6) *P. vulgaris* var. *atropurpurea,* of which the forms of var. *lanceolata* and the following varieties are differentiated as new. Trelease.

Harper, R. M., A Botanical Cross Section of northern Mississippi, with Notes on the Influence of Soil on Vegetation. (Bull. Torrey Bot. Club. XL. p. 377—399. 3 pl. Aug. 1913.)

The vegetation of the Cretaceous prairie region, the Pontatoc Ridge, the post oak flatwoods, the eocene sea hills, the yellow loam region, the Cleff region, the Yozoo delta, the banks of the Mississippi is considered in detail with lists of trees, shrubs and herbs. The author finds that *Pinus palustris, Taxodium imbricarium, Tillandsia, Orchidaceae, Myrica cerifera, Magnolia* (all species), *Ericaceae* are absent from the region covered in his travels. The absence of

the cypress, magnolia and other bog plants is correlated with the seasonal distribution of the rainfall, where 30.3 per cent of the normal annual precipitation comes from June to September and 41.9 per cent from May to October, making all streams and the groundwater too high in spring and low in fall, which fluctuation is not favorable to bog plants, that thrive under more uniform conditions. Harper concludes that the lime-loving trees have certain characters in common. They are deciduous (except the ceder); they have durable dark-colored heart-wood, thin leaves and large seeds. He suggests that potash is an influential ingredient and that it is more or less antagonistic to evergreens. Harshberger.

Harper, R. M., Five Hundred Miles through the Appalachian Valley. (Torrey XIII. p. 241—245. Oct. 1913.)

This paper gives the result of car window observations between Woodstock, Alabama and Roanoke Virginia in the Appalachian Valley. The trees, shrubs, vines and herbs noted in a distance of 500 miles are listed in the order of their relative frequency and a few notes are added of the more noteworthy. plants. Harshberger.

Harshberger, J. W., The Excursion of the International Phytogeographers about New York City. (Bull. Amer. Geogr. Soc. XLV. p. 847. Nov. 1913.)

An account of the trips taken to the Hempstead Plain of Long Island, the pine barrens of New Jersey the plains and savannes of New Jersey, to Columbia University and the New York Botanical Garden. Harshberger.

Blanck, E., Die Beschaffenheit der sogenannten Bodenzeolithe. (Fühl. Landw. Zeit. LXII. p. 560—581. 1913.)

In dieser Abhandlung gibt Verf. eine historische Uebersicht über die Entwicklung unserer Kenntnis von den die Absorptionskraft der Ackererde teilweise bedingenden „Bodenzeolithen." Mit Zeolithen in mineralogischem Sinne haben diese Stoffe nichts zu tun, man würde daher in Zukunft besser nur von „adsorptionsfähigen Gelgemengen" reden (wobei Adsorption im Sinne van Bemmelens ist). Rippel (Augustenberg).

Braun, M., Die technische Gewinnung von Zellulose aus Holz mit besonderer Berücksichtigung der Ablaugenverwertung. (Inaug. Diss. Hamburg, 1913.)

Verf. wendet folgendes Verfahren an: Dämpfen von möglichst Rinden- und Kern-freiem Holz erst mit verdünntem Alkali, dann mit verdünnter Säure, schliesslich Behandeln mit Eau de Javelle. Die Ausbeute ergab bis zu rund 50% reine Zellulose, ist also der durch das Sulfit-Verfahren erhaltenen Ausbeute gleichwertig. Die Ablaugen lassen sich auf Futtermittel verarbeiten. Anhangsweise kommt Verf. auf die Verholzung zu sprechen. Er vertritt die Anschauung, dass es sich um keine chemische Verbindung der Zellulose mit Ligninsubstanzen handelt, sondern um eine rein mechanische Inkrustation, da sich einerseits der Holzstoff entfernen lässt andererseits die Zellulose (durch Behandeln mit 72%iger

Schwefelsäure), ohne dass beide Male die Membranstruktur mikroskopische Veränderungen erleidet. Rippel (Augustenberg).

Hosséus, C. C., Hüte aus Pflanzenstoffen. (Beih. Bot. Centr. 2. Abt. XXX. p. 79—87. 1913.)

Zum Flechten von Hüten werden folgende Pflanzen benutzt: Von Gramineen- *Saccharum officinarum* L. (auf Tahiti und Samoa); *Macrochloa tenacissima* Kth. (in Spanien, Portugal, auf den Balearen und an der afrikanischen Nordküste); *Cynosurus cristatus* Linn. (in Northumberland); *Gynerium saccharoides* H. et Bonp. (auf Dominica, in Westindien, Monagas); *Triticum tenax* (in Kensington); *T. vulgare* var. *aestivum* (Portugal, Oberitalien, Japan, China); *Bambusa arundinacea* Retz (Java, Philippinen, Japan, Bally-Inseln, Indien, Formosa, N.-W.-Borneo, China usw.). Von den Palmen: *Phoenix dactylifera* L. (Arabien, China); *Copernicia cerifera* Humb. (Brasilien); *Livistona australis* Mart. (Neu-Süd-Wales); *Thrinax argentea* Lodd. (Cuba, Honduras bis Brasilien; die gespaltenen Blätter werden auch nach Europa zur Hutfabrikation exportiert); *Chamaerops humilis* L. (Sizilien, Arabien, Marokko, Malaga); *Hyphaene* sp. (Natal); *Lodoicea Sechellarum* Lab. (Seychellen); *Borassus flabelliformis* (Indien); *Raphia pedunculata* (Madagascar; sie werden auch nach Europa exportiert); *Calamus*-Art (Manila, Borneo, Britische Kolonien).

Lakon (Hohenheim).

Krahe, I. A., Lehrbuch der rationellen Korbweidenkultur. 6. Aufl. von F. König. (Limburg a. L. 1913. 283 pp.)

Wenn von einem derartigen Speziallehrbuch eine sechste Auflage nötig wird, ist seine Brauchbarkeit reichlich erwiesen; der Bearbeiter der Neuausgabe, ein Mann der Praxis, hat unter Mitarbeit einiger anderer Kenner das Buch einer zeitgemässen Umarbeit unterzogen und nur die klassischen „Krahe'schen Versuche mit Korbweidenkulturen" sind fast wortgetreu erhalten geblieben; sonst werden erläutert die Korbweidenkultur und -flechterei in volkswirtschaftlicher Beziehung, die Korbweidenkultur in der Roer-Wurm Niederung und ihr derzeitiger Stand in Deutschland, die Korbwaarenindustrie in Lichtenfels, welche Kosten macht eine Anlage, welche Rente gewährt sie, wie wird ihr Ertrag verwertet, in welchem Boden und Klima kommen Korbweiden fort und wieviel Jahre bleiben die Anlagen ertragreich, welche Sorten soll man pflanzen, Bearbeitung des Bodens, Pflanzung, Düngung, Ernte und weitere Behandlung der Korbweiden, Bandstockbetrieb, Zwischenkulturen mit Kanadapappeln, Verwertung der Weidenrinde, Statistik der Korbmacher, Flechter und des auswärtigen Handels von 1907—11; der botanische Teil nimmt naturgemäss nur einen kleinen Raum ein; auf 5 Tafeln in Farbendruck sind die wichtigsten Kulturarten abgebildet und mit kurzen Beschreibungen versehen, 2 weitere Tafeln mit Text geben die hauptsächlichsten Krankheiten und Feinde der Weidenkulturen wieder, und 5 bringen Geräte und Instrumente die bei der Kultur und Bearbeitung gebraucht werden, ein Anhang giebt eine kurzgefasste Anleitung zur Korbweidenkultur.

Töpffer.

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