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

Bailey, I. W. and W. W. Tupper. Size variation in tracheary cells: I. A comparison between the secondary xylems of Vascular Cryptogams, Gymnosperms and Angiosperms. (Proc. Amer. Acad. Arts & Sc. LIV. p. 149—204. f. 1—6. Sept. 1918.)

No absolute correlation between body size and cell size is found. In the main, the tracheary elements of secondary wood are found to be largest in vascular cryptogams, shortest in typical dicotyledons, and intermediate in gymnosperms — of which the aberrant *Gnetales* simulate angiosperms in their vessels. An extensive tabulation of data is given. Trelease.

Brown, M. M., The development of the embryo-sac and of the embryo in *Phaseolus vulgaris*. (Bull. Torrey Botan. Club. XLIV. p. 535—544. Pl. 25, 26. 1917.)

The author studied in several varieties of *Phaseolus* the development of the macrospores, the embryosac, the embryo and the endosperm. No difference between the different varieties was found. As the only description of the embryo-sac or embryo of *Phaseolus*, known to the author, is that by Guignard in the year 1881, the results of the researches are dealt with in this review as the author summarizes them at the end of her paper.

A large hypodermal cell is early differentiated in the ovule; this either functions as the macrospore mother cell or possibly divides once, one of its daughter cells being the macrospore mother cell.

The fully grown macrospore mother cell lies in either the third or fourth layer from the micropylar end of the nucellus.

An axial row of three macrospores is formed, the innermost of which develops into the embryo-sac.

The nucellus is entirely destroyed at the micropylar end and along the sides by the development of the embryo-sac; the nucellar tissue at the base of the sac takes on a peculiar structure and persists for some time, but finally is itself gradually absorbed by the embryo sac.

The polar nuclei begin to approach each other soon after the eight-nucleate stage of the embryo-sac is reached and remain close together for some time just below the egg; then their fusion takes place.

The three antipodal cells disappear at about the time of fertilization.

The synergids form a conspicuous filiform apparatus.

The pro-embryo consists of a filament of three cells; the two basal cells form the suspensor and the terminal cell develops into the embryo proper.

The dermatogen is cut off when the embryo proper consists of about sixteen cells. When the suspensor consists of four rows of about seven or eight cells each, the two tiers of cells at its base become swollen and conspicuously elongated.

The primary endosperm nucleus usually divides before the first division of the egg; two of the daughter nuclei resulting from the first two divisions place themselves on either side of the young embryo; and in succeeding divisions the endosperm nuclei place themselves in the peripheral region of the embryo sac.

The divisions of the endosperm nuclei may be simultaneous, or nuclei in all stages of division may be found at the same time, from resting nuclei at one end of the endosperm to late telophases at the opposite end.

Endosperm cells are formed in the region immediately about the embryo, but are later absorbed. Jongmans.

Ikeno, S. Etude génétique sur les arêtes d'une race de l'Orge à six rangs. (Bot. Mag. Tokyo. XXXI, p. 263—267. Pl. II, III. 1 fig. 1917.)

Une race japonaise de l'*Hordeum sativum hexastichum*, connu par le nom vulgaire „Kinukawa" a tous ses épillets très grèlement aristés, bien que les arêtes de ceux appartenant au rang moyen soient quelque peu plus longues que celles appartenant au rang latéral.

Pour étudier l'hérédité de ces arêtes, M. Ikeno a fait un croisement de cette race avec une autre aussi bien à six rangs, appelée vulgairement: „Nogenasi", où les arêtes font en général défaut.

Les résultats de ses expériences ont été résumés par l'auteur comme suit: On a affaire à trois facteurs A, E, I, dont les deux premiers sont renfermés dans le parent aristé Kinukawa et le dernier se trouve dans le parent mutique Nogenasi. Même sans aucun de ces trois facteurs les arêtes moyennes et latérales courtes peuvent être développées, mais en présence de l'un des deux facteurs, soit A, soit E, les arêtes sont plus longues et en présence simultanée de tous les deux elles peuvent croître jusqu' à une

longueur beaucoup plus grande. I, le facteur d'empêchement, en état homozygote, agit par supprimer la production des arêtes latérales, mais il n'est pas suffisamment puissant pour pouvoir empêcher absolument le développement des arêtes moyennes, d'où l'on pourra comprendre la raison pourquoi même dans le parent mutique Nogenasi quelques arêtes moyennes courtes peuvent se produire. Quand le facteur d'empêchement est en état hétérozygote, on voit que la conduite des arêtes latérales est très variable même dans un épi. La grande diversité de longueur des arêtes est principalement due à la combinaison diverse des deux facteurs A et E.

Jongmans.

Brown, W. H. and G. W. Heise. The application of photochemical temperature coefficients to the velocity of Carbon dioxide assimilation. (Philippine Journ. Sc. C. Bot. XII. p. 1—24. 3 Fig. 1917.)

The authors have undertaken a series of experiments for the further investigation of the question of the temperature coefficients of photosynthesis. They give in the present paper a discussion of the literature on the subject and analyze the work of Van Amstel, on *Elodea*, of Kreuzler, on *Rubus fruticosus*, of Prjanischnikow, on *Typha*, of Lubimenkow, of Matthaei, on Cherry Laurel (*Prunus laurocerasus*), of Blackman and Matthaei, on *Helianthus*. After a general discussion of the results of this analysis they publish the following conclusions:

The result of the work on carbon dioxide assimilation, here discussed, show temperature coefficients of from 1.00 and 1.40 over long ranges of temperatures which are favorable for this process. They are much smaller than those for most vital phenomena, which at similar temperatures are generally held to be of the order of magnitude required by the van 't Hoff principle.

These coefficients are of the same order of magnitude as photochemical coefficients, which is not surprising in view of the fact that carbon dioxide assimilation is effected by light. Jongmans.

Brown, W. H. and G. W. Heise. The relation between light intensity and Carbon dioxide assimilation. (Philippine Journ. Sc. C. Bot. XII. p. 85—97. 2 Fig. 1917.)

The authors bring here a review of the literature on the subject. The published work on photosynthesis does not warrant the generally accepted conclusion that carbon dioxide assimilation in plants is proportional to the light intensity. Instead they indicate a progressively smaller augmentation of the rate of assimilation for each increase in light intensity. This decrease in the rate of augmentation continues until a point is reached at which further increase in light produces no measurable increase in assimilation.

Jongmans.

Goodspeed, T. H., Notes on the germination of tobacco seed. III. (Univ. California Publ. in Bot. V. p. 451—455 Apr. 3, 1919.)

A reexamination of the relation of light and darkness to germination showing "no doubt that the seed of five representative

types of *N. Tabacum* and of five varieties of *N. rustica* will germinate readily in darkness." Trelease.

Hooker, H. D., Mechanics of movement in *Drosera rotundifolia*. (Bull. Torrey Bot. Club. XLIV, p. 389—403. 1917.)

The osmotic concentration in cells of *Drosera rotundifolia* tentacles was measured by plasmolysis in potassium nitrate and glucose solutions. Measurements were made on straight, bending, bent and unbending tentacles. The osmotic concentration in the cells on the abaxial side of the stalk, in the growing region, was found to diminish during bending; no change was observed on the adaxial side. The decrease in osmotic concentration is accounted for by the increase in volume of the cells, and is therefore considered an effect and not a cause of their elongation. There is no indication that changes in permeability occur.

The elongation is produced by a decrease in the elasticity of the cell-walls, and is later fixed by growth. The movement of tentacles is therefore brought about by the same mechanism found in geotropically reacting organs, where a decrease has been observed in the osmotic concentration in the cells whose growth causes bending.

Similarities between hydrotropic reactions and autotropic unbending of tentacles and of geotropically bent roots indicate that the growth on the concave side which brings about the unbending is a response to changes resulting from the difference in osmotic concentration present during bending. As in hydrotropic reactions, growth takes place on the side with the higher osmotic concentration. Jongmans.

Berry, E. W., A middle Eocene *Goniopteris*. (Bull. Torrey Bot. Club. XLIV, p. 331—335. Pl. 22. 1917.)

The author describes *G. claiborniana* from the Eocene of Columbia, Louisiana, Yegua formation. It occurs also in the sandy clays of the Lisbon formation near Newton, Mississippi. It shows a peculiar venation by which it is distinguished from all other tertiary species described as *Goniopteris*, *Lastrea* and *Phegopteris*. In other characters the new species resembles *Lastrea stiriaca* Heer. The author brings some remarks, especially on venation, on some other forms of this group of tertiary ferns. Jongmans.

Gail, F. W., Some experiments with *Fucus* to determine the factors controlling its vertical distribution. (Pub. Puget Sound Biol. Sta. Univ. Wash. II, p. 139—149. Dec. 1918.)

The conclusion is reached that light is a controlling factor in determining the lower limit of *Fucus*. W. B. McDougall.

Fairman, C. E., New or noteworthy Ascomycetes and lower fungi from New Mexico. (Mycologia. X, p. 239—264. Sept. 1918.)

Contains as new: *Eutypella Brunaudiana Ribis-aurei*, *Diatrype Standleyi*, *Didymella nigrescens* Dearn. & Fairm., *D. Eurotia*, *Apiosporella cornina*, *Rhabdospora dumetorum*, *Leptosphaeria nigricans*

Grindeliae, *L. Quamoclidii*, *L. Coleosanthi*, *Gibberidia arthrophyta*, *Pyrenophora Leucelenes*, *Hendersonia Leucelenes*, *Microdiplodia Leucelenes*, *Teichospora Cercocarpi* (*Strickeria* Earle), *Phyllachora Blepharoneuri*, *Hysterium Standleyanum*, *Patellea oreophila*, *Phoma Estrelti*, *P. Sidalceae*, *Dothiorella phomopsis*, *Placosphaeria decipiens* Dearn. & Fairm., *Coniothyrium sepium*, *C. olivaceum Salsolae*, *C. olivaceum Thermopsisidis*, *Ascochyta Boutelonae*, *Microdiplodia galiicola*, *M. Anogiae*, *Ascochyta agropyrina*, *Stegonospora Humuli-americi*, *Hendersonia Standleyi*, *H. Eriogoni*, *H. Petalostemonis*, *H. subcultriformis*, *Cryptostictis utensis*, *Camarosporium Estrelti*, *C. yuccae-sedum*, *Rhabdospora gauracea*, and *Arthrobotryum pestalozzioides* Dearn. & Fairm. Trelease.

Fairman, C. E., Notes on new species of fungi from various localities. II. (*Mycologia*. X. p. 164—167. May 1918.)

Phoma verbascicarpa, *Phomopsis ericaceana*, *Sphaeropsis wistariana*, *S. Diervillae*, *Camarosporium wistarianum*, *Rhabdospora translucens*, *Microdiplodia Diervillae*, *Hendersonia hortilecta*, *Dictyochora Gambellii*, and *Platystomum phyllogenum*. Trelease.

Fitzpatrick, H. M., The life history and parasitism of *Eocronartium muscicola*. (*Phytopathology*. VIII. p. 197—218. 4 f. 1 pl. 1918.)

Contains as new: *Eocronartium muscicola* (*Clavaria muscicola* Pers.). Trelease.

Graff, P. W., Philippine Basidiomycetes. III. (*Bull. Torrey Bot. Club*. XLV. p. 451—469. pl. 15. Nov. 1918.)

Contains as new: *Polystictus tabacinus barbatus* (*Cycloporcellus barbatus* Murr.) and *P. tabacinus substygius* (*Fomes substygius* B. & Br.). Trelease.

Fromme, F. D. and E. T. J. Murray. Angular leafspot of tobacco, an undescribed bacterial disease. (*Journ. Agr. Res.* XVI. p. 219—228. pl. 25—27. Feb. 24, 1919.)

Includes description of the causative organism, *Bacterium angulatum*. Trelease.

Galloway, B. T., Giant crown galls from the Florida everglades. (*Phytopathology*. IX. p. 207—208. pl. 10. May 1919.)

Referring to the influence of *Bacterium tumefaciens*.

Trelease.

Giddings, N. J. and A. Berg. A comparison of the late blights of tomato and potato: a preliminary report. (*Phytopathology*. IX. p. 209—210. pl. 11. May 1919.)

Referring to *Phytophthora infestans*.

Trelease.

Gilbert, W. W. and M. W. Gardner. Seed treatment control and overwintering of Cucumber angular leaf-spot. (*Phytopathology*. VIII. p. 229—233. 1 d. 1918.)

Referring to the disease caused by *Bacterium lacrymans*.

Trelease.

Brotherus, V. F., The mosses of Amboina. (Philippine Journ. Sc. C. Bot. XII. p. 73—80. 1917.)

In this paper we find the results of the examination of the mosses collected by the late Dr. Robinson in Amboina. In the list are included those species secured in Amboina by earlier collections. New species: *Endotrichella alaris*, near *E. elegans* (Doz. et Molk.) Fleisch., but avidely different by the structure of the leaves; *E. Robinsonii*, near *E. compressa* (Mitt.) Broth. *Vesicularia amboinensis*, near *V. scaturiginum* (Brid.) Broth. *Rhacopilum amboinense*, near *R. spectabile* Reinw. and Hornsch. but differs by its smaller form and by the form, margination and nervation of the leaves.

Jongmans.

Evans, A. W., Notes on the Genus *Herberta*, with a revision of the species known from Europe, Canada and the United States. (Bull. Torrey Bot. Club. XLIV. p. 191—222. f. 1—29, and pl. 8. Apr. 1917.)

Contains as new: *Herberta Sendtneri* (Nees), *H. Hutchinsiae* (*H. adunca Hutchinsiae* Schiffn.), and *H. tenuis*.

Trelease.

Evans, A. W., The American species of *Marchantia*. (Trans. Connecticut Acad. Arts & Sc. XXI. p. 201—313. f. 1—20. Mar. 1917.)

Nine species are admitted, of which *Marchantia breviloba* is described as new.

Trelease.

Copeland, E. B., New species and a new genus of Borneo ferns, chiefly from the Kinabalu collections of Mrs. Clement and Mr. Topping. (Philippine Journ. Sc. C. Bot. XII. p. 45—65. 1917.)

Trichomanes brooksii, appears to be near to *T. Hosei* Bak.; *Hymenophyllum Foxworthyi*, clearly distinguished by the opaque margin and *Trichomanes*-like sorus; *H. clemensiae*, distinguished by color and pubescence; *H. Hosei*, distinguished by the broad, flat wing of the rachis, *H. perfissum*; *H. Clemensiae*; *H. Toppingii*, distinguished by its broad and close segments; *H. purpureorhachis*; *Humata kinabaluensis*; *Nephrolepis* (?), *marginalis*; *Cyathea capitata*, near *C. Brunonis*; *C. pseudobrunonis*; *C. fuscopaleata*, perhaps nearest to *C. articulata*, from which it differs in the narrower pinnae and closer venation and sori, as well as in the paleae; *C. kinabaluensis*, nearly related to *C. arthropoda*, from which it differs in its darker axes and relatively narrower pinnae with more nearly parallel sides, as well as in the long paleae; *C. Toppingii*; *C. elliptica*; *C. mollis*; *C. kemberangana*, probably a near relative of *C. Ridleyi* (Baker), but with lighter axes and stalked pinnules; *C. paleacea*, very distinct from any species hitherto known to the author, nearest perhaps to *C. dulitensis* Baker; *C. rigida*, possibly a much more ample form of *C. paleacea*; *C. longipes*; *C. megalosora*; *Dryopteris inconspicua*, characterized by the dwarfed lowest pinnae and peculiar pubescence of costae and veins; *D. kinabaluensis*; *D. linearis*; *D. Toppingii*; *D. lithophylla*; *Mesochlaena Toppingii*; *Tectaria murudensis*; *Athyrium clemensiae*; *A. atropurpureum*; *A. atosquamosum*, like *A. meyenianum* and *A. Blumei*; *Polypodium kinabaluense*; *P. Brooksii*; *P. calcipunctatum*; *P. multisorum*; *P. murudense*; *P. brachypodium*,

to this and other species many notes are added on relationships and nomenclature; *P. occultivenium*, near *P. rupestre* Bl.; *P. albidopaleatum*, near *P. triquetrum* Bl.; *P. ithycarpum*; *Cyclophorus borneensis*; *Oreogrammitis Clemensiae* nov. gen. nov. spec., differs from *Scleroglossum* in the very essential feature of its strictly superficial, or even slightly elevated sori; in its characters it stands between *Scleroglossum* and *Polypodium*, and possibly illustrated the origin of the former; *Scleroglossum angustissimum*, an unmistakable *Scleroglossum*, but with more the form and size of a *Monogramma*.
Jongmans.

Copeland, E. B., The genus *Christiopteris*. (Philippine Journ. Sc. C. Bot. XII. p. 331—336. 1917.)

This paper contains a review of the genus *Christiopteris* and of the species belonging to it. As a new member of the genus is proposed *C. varians* (*Acrostichum varians* Mett., *Leptochilus varians* Fournier). There is a considerable number of ferns, all of which can be regarded almost with certainty as descendants of a common group less remote than their common ancestor with other *Polypodiaceae*. To this group Bower has given the name of *Dipterideae*, the author prefers that of *Matonieae*. Different members of this group have peculiar characters such as the tendency to dichotomy; drynaroid venation; harsh hair-like paleae; thin, marginal walls of paleae; reddish color of paleae; peculiar teeth on the paleae; round, elongate or indefinite collections of sporangia not reaching the margin; annulus of about 14 cells; bilateral spores; diploidesmic venation beneath the hymenium; and a peculiar hypodermis underlying the upper epidermis. Different groups of species and of genera have maintained different collections of these characters. It seems to the author, that the number of characters exhibited by *Platyserium*, *Cheiropleura*, *Christiopteris*, *Hymenolepis*, *Drymoglossum*, *Cyclophorus*, *Photinopteris*, *Aglaomorpha*, *Merinthosorus*, *Dendroconche*, and the palaeotropic *Polypodia* with anastomosing veins, and *Dipteris*, *Matonia*, and *Phanerosorus* amply justifies regarding these as a group distinct from the other very large group of *Polypodiaceae* which are descendants of an old group now best represented by *Balantium*, *Dicksonia*, *Dennstaedtia*, *Cystodium*, and *Cyathea*.
Jongmans.

Eseltine, G. P. van, The allies of *Selaginella rupestris* in the southeastern United States. (Contr. U. S. Nat. Herb. XX. p. 159—172. pl. 15—22, textfigures 63—70. 1918.)

Contains as new: *Selaginella Riddellii* and *S. humifusa*.

Trelease.

Farwell, O. A., The genus *Hippochaete* in North America, north of Mexico. (Mem. N. Y. Bot. Gard. VI. p. 461—472. Aug. 31, 1916.)

Contains as new: *Hippochaete ramosissima* (*Equisetum ramosissimum* Desf.), *H. hyemalis* (*E. hyemale* L.), *H. hyemalis californica* (*E. hyemale californicum* Milde), *H. hyemalis Jesupi* (*E. variegatum Jesupi* A. A. Eaton), *H. hyemalis alaskana* (*E. variegatum alaskanum* A. A. Eaton), *H. variegata* (*E. variegatum* Schleich.), *H. variegata anceps* (*E. variegatum anceps* Milde), *H. scirpoides* (*E. scirpoides*

Michx.), *H. prealta* (*E. prealtum* Raf.), *H. prealta affinis* (*E. robustum affine* Engelm.), *H. prealta Suksdorfi* (*E. hiemale Suksdorfi* A. A. Eaton), *H. prealta intermedia* (*E. hiemale intermedia* A. A. Eaton)-*H. prealta scabrella* (*E. laevigatum scabrellum* Engelm.), *H. laevigata* (*E. laevigatum* A. Br.), *H. laevigata Eatonii* (*E. hiemale intermedium* p. p., A. A. Eaton), *H. laevigatum Funstoni* (*E. Funstoni* A. A. Eaton), *H. laevigata polystachya* (*E. Funstoni polystachyum* A. A. Eaton), and *H. Nelsoni* (*E. variegatum Nelsoni* A. A. Eaton).
 Trelease.

Fernald, M. L., Some North American representatives of *Braya humilis*. (*Rhodora*. XX. p. 201—203. Dec. 1918.)

Contains as new: *Braya Richardsonii* (*Pilosella Richardsonii* Rydberg).
 Trelease.

Fernald, M. L., The American representatives of *Equisetum sylvaticum*. (*Rhodora*. XX. p. 129—131. July 1918.)

Contains as new: *Equisetum sylvaticum* var. *pauciramosum* f. *multiramosum*.
 Trelease.

Adams, J. F., *Keithia* on *Chamaecyparis thyoides*. (*Torreyia*. VIII. [18]. p. 157—160. f. 1—2. Aug. 1918.)

Contains as new: *Keithia Chamaecyparissi*.
 Trelease.

Brown, W. H., The rate of growth of *Podocarpus imbricatus* at the top of Mount Banahao, Luzon, Philippine Islands. (*Philippine Journ. Sc. C. Bot.* XII. p. 317—329, Pl. 17, 2 Fig. 1917.)

The author brings some details on the occurrence of *Podocarpus imbricatus* Bl. in general and especially on the Mount Banahao. The vegetation of that mountain is described and climate, rainfall and temperature are tabulated. The rate of growth of *Podocarpus* can only be determined by making periodical measurements of the girth of the same trunks, as no annual growth rings have been observed in the wood. *P. imbricatus* at the top of Mount Banahao shows a very slow rate of growth, a tree 60 centimeters in diameter being about 500 years old. The rate of growth is very much slower than that of dominant trees at lower elevations in the Philippines and of pines in the United States.
 Jongmans.

Brown, W. H., E. D. Merrill and H. S. Yates. The revegetation of Volcano Island, Luzon, Philippine Islands, since the eruption of Taal Volcano in 1911. (*Philippine Journ. Sc. C. Botany*, XII. p. 177—248. 16 Pl., 2 Textfig. 1917.)

The paper contains a general description of Volcano Island and of its former vegetation. In the year 1911 the vegetation has been destructed almost totally by an eruption. The new vegetation is described in details and compared with Krakatau, and special attention is paid to the distribution of the species and their method of distribution. The end of the paper consists of an annotated list of the species of Pteridophytes and Spermatophytes found on the

island since the eruption. The results of the paper are summarized as follows:

The vegetation of Volcano Island before the eruption of 1911 consisted of a mixture of grass and small trees, which covered all parts of the island except the slopes of the main crater and Mount Tabaro and the dry stream beds.

The eruption of 1911 completely destroyed the vegetation over most parts of the island, while in the extreme northern part a few bamboos, bananas, trees, and possibly some grass escaped.

In the revegetation of the island a single species of grass, *Saccharum spontaneum*, is so much the most prominent of all the invaders that it gives character to the whole vegetation. Except in the northern part of the island, it occurs as scattered clumps. Besides *Saccharum* the other most conspicuous elements are scattered trees.

The revegetation is proceeding slowly owing, probably, to adverse environmental conditions, the most prominent of which are the presence of excessive amounts of sulphates in the soil; the lack of weathering of soil particles; the scarcity or absence of humus; the scarcity of nitrogen; the low waterholding capacity of the soil; and erosion.

Two hundred ninety-two species of plants have been found on Volcano Island since the eruption. These represent 232 genera and 66 families.

Most of the species of plants on Volcano Island are those of wide geographic distribution. Ninety-six, or 36 per cent, are found in the tropics of both hemispheres, while an additional one hundred fifty, or 51 per cent, are found in other parts of the Indo-Malayan regions as well as in the Philippines.

Very few of the species of plants on Volcano Island have found favorable habitats over any considerable area, as only 13 are common and widely distributed.

Birds seem to have been the most important agency in bringing different species to Volcano Island, as 54 per cent of the total on the island could have been carried to it by this means.

Jongmans.

Brown, W. H. and H. S. Yates. The rate of growth of some trees on the Gedeh, Java. (Philippine Journ. Sc. C. Bot. XII. p. 305—311. 1917.)

The writers made a number of measurements on Koorders' labeled trees on the Gedeh. The rates of growth of these trees, in the limited number of cases measured, would indicate that these trees grow about as rapidly as the dominant trees in the Philippines, *Shorea robusta* in India, and hardwoods in the central hardwood regions of the United States.

Jongmans.

Butters, F. K., Taxonomic and geographic studies in North American ferns. I. The genus *Athyrium* and the North American ferns allied to *A. Filix femina*. II. *Botrychium virginianum* and its american varieties. (Contr. Gray Herb. Harvard University. N. S. LI. Rhodora. XIX. p. 170—216. Pl. 123. 6 Textfig. 1917.)

The first part of this paper, treating on *Athyrium*, is divided

into several sections. In the first section a general description of the genus is given in comparison with other genera like *Diplazium* and *Asplenium*. The other sections deal with forms which belong to *A. Filix-femina* or are allied to this species.

In the eastern United States and Canada there are two distinct species of *Athyrium*, neither of which is conspecific with *A. Filix-femina* of Europe. One of these two species *A. asplenioides* (Michx.) Desv. is prevailing southern in its distribution, the other *A. angustum* (Willd.) Presl, is prevailing northern. The species are fully discussed and compared with the European species. A key to their determination is added, annotated with details on synonymy and distribution. In *A. asplenioides* (Michx.) Desv. two forms can be distinguished: f. *typicum* and f. *subtripinnatum* form. nov.; *A. angustum* is divided into f. *typicum*, var. *elatius* nov. comb. (*Asplenium elatius* Link), var. *rubellum* nov. comb. (*A. filix-foemina rubellum* Gilbert), var. *laurentianum* var. nov., forma *confertum* forma nov., forma *laciniatum* forma nov., forma *elegans* nov. comb. (*Ath. filix-foemina elegans* Gilbert).

The lady ferns of Alaska, Western Canada and the North-western States are conspecific with the European plant, but, in some cases, differ from the common European forms of *A. Filix-femina* in certain minor points, and are then best regarded as a geographical variety of that species, which is distinguished as var. *sitchense* Ruprecht.

The lady ferns of California, the Basin Region, and the Southern Rocky Mountains differ more markedly from the European plant, but are not clearly distinct from the more northern form, and therefore are best considered as a second, and much more aberrant geographical variety of *A. Filix-femina*. It is named: var. *californicum* var. nov.

A boreal and high alpine fern is found in eastern Quebec and in the alpine areas of western North America. This is a clearly distinct geographical variety of the old world *A. alpestre* and is named: var. *americanum* var. nov.

The second part contains a general description of *Botrychium virginianum* and its American varieties, with descriptions of new forms, and notes on distribution and synonymy. A key to the determination of these forms is added at the end. Following forms are mentioned: *B. virginianum* var. *laurentianum* var. nov. (Labrador, Newfoundland, Quebec, Maine, Michigan), var. *intermedium* var. nov. (Nova Scotia, Maine, Vermont, Massachusetts, Connecticut, New York, Illinois, Missouri; it occupies a region south of that of the former; var. *europaeum* Ångström (Quebec, New Brunswick, New Hampshire, Vermont, New York, Ontario, Montana, British Columbia); a variety occurring in the far western States is var. *occidentale* var. nov. (Montana, Idaho, Oregon, California); var. *meridionale* var. nov. occurs in Mexico (Chiapas and in the San Migueleto mountains, valley of San Luis Potosi). Another Mexican plant belonging to this group is *B. cicutarium* (Savigny) Sw. (Santo Domingo, Mexico, Guatemala, and reported also from Jamaica and Panama). Some notes on the general distribution of the different forms of *Botrychium* belonging to or related with *B. virginianum*, are added. The *Botrychium virginianum* group presents the most complicated arrays of forms in eastern North America,

and it seems probable that the latter region is the center of distribution of this group of plants. Jongmans.

Farwell, O. A., *Bromelica* (Thurber): a new genus of grasses. (Rhodora. XXI. p. 76—78. Apr. 1919.)

Segregated from *Bromus* by its free glabrous grain. The following new names are noted: *Bromelica striata* (*Avena* Michx.), *B. Smithii* (*Avena* Porter), *B. aristata* (*Melica* Thurber), *B. subulata* (*Festuca* Bong.), *B. Harfordii* (*Melica* Bolander), *B. Harfordii minor* (*Melica* Vasey), *B. Geyeri* (*Melica* Munro), and *B. Geyeri Howellii* (*Melica bromoides Howellii* Scribn.). Trelease.

Farwell, O. A., New species and varieties from Michigan. (Ann. Rep. Mich. Acad. Sci. XIX. p. 247—249. 1917.)

Scirpus occidentalis congestus, *Carex canescens heterostachya*, *Juncus bufonius ranarius* (*J. ranarius* Song. & Perr.), *Corallorhiza maculata intermedia*, *Arabis laevigata heterophylla*, *Tiarella cordifolia bracteata*, *Viola canadensis pubens*, *V. conspersa Masonii*, *V. rostrata elongata*, *Scutellaria lateriflora albiflora*, *Mimulus alatus Chandleri*, *Veronica Anagallis-aquatica glandulosa*, *Pedicularis lanceolata hirsuta*, *Aster novae-angliae monocephala*, *Heliopsis scabra intermedia*, and *Lactuca canadensis albocaerulea*. Trelease.

Farwell, O. A., Notes on the Michigan Flora. (Rep. Michigan Acad. Sci. XX. p. 161—195. 1918.)

Contains as new: *Holcus Durra aegyptiacus* (*Andropogon Sorghum aegyptiacus* Koern.), *H. saccharatus technicus* (*Andropogon* Koern.), *Muhlenbergia ambigua filiformis* (*Agrostis filiformis* Muhl.), *M. diffusa* (*Agrostis* Muhl.), *Panicularia nervata filiformis*, *P. nervata purpurascens*, *Carex Deweyana stricta*, *Juncus tenuis uniflorus*, *J. interior Billingtonii*, *Juncoides pilosus michiganense*, *J. pilosum saltuense* (*Luzula saltuense* Fern.), *Polygonatum boreale multiflorum*, *P. melleum*, *Asarum canadense ambiguum* (*A. reflexum ambiguum* Bickn.), *Amaranthus hybridus sanguineus* (*A. hypochondriacus* L.), *A. hybridus densus* (*A. paniculatus* L.), *Minuartia Michauxii* (*Alsine* Fenzl), *Stellaria media succulenta* (*Holosteum succulentum* L.), *Caulophyllum thalictroides giganteum*, *Bursa Bursa-pastoris integrifolia* (*Capsella* DC.), *Opulaster Opulifolius intermedius* (*O. intermedius* Rydb.), *Spiraea alba lanceolata* (*S. salicifolia lanceolata* F. & Gr.), *Crataegus Crus-galli attenuata* (*C. attenuata* Ashe), *Oxalis stricta rufa* (*O. rufa* Small), *O. stricta Bushii* (*O. Bushii* Small), *Prunella vulgaris* var. *iodocalyx* (*P. vulgaris* var. *lanceolata* f. *iodocalyx* Fern.), *P. vulgaris* var. *candida* (*P. vulgaris* var. *lanceolata* f. *candida* Fern.), *Lycopus uniflorus membranacea* (*L. membranacea* Bickn.), *L. uniflorus macrophyllus* (*L. virginicus macrophyllus* Gray), *Veronicastrium virginicum purpureum* (*Leptandra virginica purpurea* Ph.), *Aureolaria virginica* (*Rhinanthus* L.), *A. flava* (*Gerardia* L.), *A. flava integrifolia* (*Dasystema quercifolia integrifolia* Benth.), *A. Pedicularia ambigens* (*Gerardia* Fern.), *A. auriculata* (*Gerardia* Mx.), *A. aspera* (*Gerardia* Dougl.), *A. purpurea* (*Gerardia* L.), *A. intermedia* (*Gerardia* Porter), *A. tenuifolia* (*Gerardia* Vahl), *A. tenuifolia albiflora*

(*Gerardia* Tritt.), *A. tenuifolia* *Skinneriana* (*Gerardia* Wood), *Campanula americana illinoensis* (*C. illinoensis* Fresen.), *Eupatorium trifoliatum maculatum* (*E. maculatum* L.), *E. trifoliatum amoenum* (*E. purpureum amoenum* Gray), *E. trifoliatum foliosum* (*E. purpureum foliosum* Fern.), *E. trifoliatum Bruneri* (*E. purpureum Bruneri* Gray), *Sonchus arvensis eglandulosus*, *Prenanthes alba pinnatifida*, *P. alba trilobata*, *P. alba ovata*, *P. alba quercifolia*, *P. altissima cordata* (*Nabalus* T. & Gr.), *P. altissima deltoidea* (*P. deltoidea* Ell.), *P. altissima ovata* (*Nabalus* T. & Gr.), *Hieracium venosum nudicaule* (*H. Gronovii* L.), *H. subnudum foliosum* (*H. Gronovii* Monn.), *H. subnudum hirsutissimum* (*H. Gronovii hirsutissimum* T. & Gr.), and *H. canadense macrophyllum* (*H. macrophyllum* Ph.). Trelease.

Farwell, O. A., Rare or interesting plants in Michigan. (Ann. Rep. Mich. Acad. Sc. XIX. p. 251–261. 1917.)

Contains as new: *Eriophorum cyperinum pelium* (*Scirpus* Fernald), *Triodon albus* (*Schoenus* L.), *T. albus macer* (*Rhynchospora* Clarke), *Carex polygama heterostachya* (*C. Buxbaumii heterostachya* Anderss.), *Arabis lyrata intermedia* (*A. ambigua intermedia* DC.), *Pyrus melanocarpa atropurpurea* (*Aronia atropurpurea* Britt.), *Viola papilionacea alba* (*V. cucullata alba* T. & Gr.), *Pyrola asarifolia uliginosa* (*P. uliginosa* T. & Gr.), *Galium Aparine echinospermum* (*G. agreste echinospermum* Wallr.), *Heliopsis helianthoides minor* (*H. laevis minor* Hook.), and *Pyrola asarifolia ovata* (*P. asarifolia incarnata* Fern.). Trelease.

Farwell, O. A., The *Trillium grandiflorum*-Group. (Rep. Mich. Acad. Sc. XX. p. 155–159. 1918.)

Contains as new: *Trillium grandiflorum orbiculare*, *T. grandiflorum spatulatum*, *T. grandiflorum viride*, *T. grandiflorum obovatum virescens*, *T. lirioides albo-marginatum*, *T. lirioides giganteum*, *T. lirioides ungulatum*, *T. lirioides longipetiolatum*, and its forms *vegetum* and *variegatum* (the latter *T. grandiflorum variegatum* E. F. Smith), and *T. Chandleri*, with its forms *foliaceum*, *palaceum*, *Gladewitsii*, *subulatum*, and *plenum*. Trelease.

Farwell, O. A., The yellow-flowered *Cypripediums*. (Rep. Michigan Acad. Sc. XX. p. 197–8. 1918.)

Includes as new: *Cypripedium pubescens* *Mukasin*, or as an alternative, *C. Makasin*. Trelease.

Fernald, M. L., American variations of *Epilobium*, Section *Chamaenerion*. (Rhodora. XX. p. 1–10. Jan. 1918.)

Contains as new: *Epilobium angustifolium* f. *spectabile* (*Chamaenerion angustifolium* var. *spectabile* Simm.), *E. angustifolium* var. *macrophyllum* (f. *macrophylla* Hausskn.), *E. angustifolium* var. *intermedium* (*E. intermedium* Wormsk.), and *E. angustifolium* var. *platyphyllum* (*Chamaenerion angustifolium platyphyllum* Daniels). Trelease.

Fernald, M. L., Contributions from the Gray Herbarium

of Harvard University. New Series N^o LVII. (Rhodora. XXI. p. 1—22. Jan. 1919.)

Comprises the Captions: 1, The unity of the genus *Arenaria*; 2. The type of the genus *Alsine*; 3. The earlier names for *Alsinopsis*; 4. The American representatives of *Arenaria sajanensis*; 5. The specific identity of *Arenaria groenlandica* and *A. glabra*; 6. The American variations of *Arenaria verna*.

The following new names appear: *Arenaria arenarioides* (*Cerastium arenarioides* Crantz), *A. bryophylla* (*A. musciformis* Edgw. & Hook.), *Arenaria Funkii* (*Alsine Funkii* Jord.), *A. cymifera* (*Alsine cymifera* Rouy & Fouc.), *A. iberica* (*Minuartia dichotoma* L.), *A. caucasica* (*Alsine caucasica* Boiss.), *A. anatolica* (*Alsine* Boiss.), *A. Thevenaei* (*Alsine* Rent.), *A. attica* (*Alsine* Boiss.), *A. sphagnoides* (*Sabulina* Froeb.), *A. aizoides* (*Alsine* Boiss.), *A. decipiens* (*Alsine* Fenzl), *A. dianthifolia* (*Alsine* Boiss.), *A. intermedia* (*Alsine* Boiss.), *A. leucocephala* (*Alsine* Boiss.), *A. pulvinaris* (*Alsine* Boiss.), *A. mek-melensis* (*Alsine libanotica* Boiss.), *A. rimarum* (*Alsine* Boiss. & Balansa), *A. Schimperi* (*Alsine* Hochst.), *A. stellata* (*Chlerleria* Clarke), *A. diversifolia* (*Moehringia* Dolliner), *A. Grisebachii* (*Moehringia* Janka), *A. Jankae* (*Moehringia* Griseb.), *A. dasyphylla* (*Moehringia* Bruno), *A. dasyphylla sedoides* (*M. muscosa sedoides* Cumino), *A. Tommasinii* (*Moehringia* Manches.), *A. glaucovirens* (*Moehringia* Bertol.), *A. polygonoides obtusa* (*A. obtusa* All.), *A. papulosa* (*Moehringia* Bertol.), *A. platysperma* (*Moehringia* Maxim.), *A. Cossoniana* (*M. stellarioides* Coss.), *A. octandra* (*Cherleria* Sieb.), *A. obtusiloba* (*Alsinopsis* Rydb.), *A. marcescens*, *A. groenlandica glabra* (*A. glabra* Michx.), and *A. verna* var. *pubescens* f. *epilis* (*A. verna* var. *propinqua* f. *epilis* Fern.).
Trelease.

Fernald, M. L., *Helianthemum Bicknellii* and *H. propinquum*. (Rhodora. XXI. p. 36—7. Feb. 1919.)

Contains the new name *Helianthemum Bicknellii* for *H. majus* Bickn., nov. BSP.
Trelease.

Fernald, M. L., Some allies of *Rynchospora macrostachya*. (Rhodora. XX. p. 138—140. Aug. 1918.)

Contains as new: *Rynchospora inundata* (*Ceratoschoenus macrostachys inundatus* Oakes), *R. Careyana* (*C. macrostachys patulus* Chapm.), and *R. corniculata interior*.
Trelease.

Fernald, M. L., Some American *Epilobiums* of the Section *Lysimachion*. (Rhodora. XX. p. 29—39. Feb. 1918.)

Contains as new: *Epilobium densum mesophilum*, *E. molle sabulonense*, *E. glandulosum typicum* and, as other varieties of *glandulosum*, *cardiophyllum*, *adenocaulon* (*E. adenocaulon* Hausskn.), *occidentale* (*E. adenocaulon occidentale* Trel.), *perplexans* (*E. adenocaulon perplexans* Trel.), and *lerionense*, and *E. Steckerianum*.
Trelease.

Fernald, M. L., The specific identity of *Bidens hyperborea* and *B. colpophila*. (Rhodora. XX. p. 146—150. Aug. 1918.)

Contains as new: *Bidens hyperborea colpophila* (*B. colpophila*

Fern. & St. John), *B. hyperborea cathancensis*, and *B. hyperborea gaspensis*.
 Trelease.

Fernald, M. L. and K. M. Wiegand. Some new species and varieties of *Poa* from eastern North America. (*Rhodora*. XX. p. 122—127. July 1918.)

Poa saltuensis and its variety *microlepis*, and *P. paludigena*.
 Trelease.

Ferris, R. S., Taxonomy and distribution of *Adenostegia*. (*Bull. Torrey Bot. Club*. XLV. p. 399—423. p. 10—12. Oct. 1918.)

Contains as new: *Adenostegia Hanseni*, *A. parviflora*, *A. littoralis*, *A. Helleri*, and *A. palmata*.
 Trelease.

Gleason, H. A., The structure and development of the plant association. (*Bull. Torrey Bot. Club*. XLIV. p. 463—481. 1917.)

In these pages the author offers a series of general principles in explanation of the usual phenomena of vegetation, based chiefly on observations of the writer in his own field work. They are summarized as follows:

All phenomena of vegetation, i. e., of numbers of individuals, depend upon the phenomena of the individual plant.

The plant population of any area is determined by environmental selection of immigrants from the surrounding population.

Because of similarity of environmental selection and of available sources of immigration, areas of uniform vegetation are developed, known as plant associations.

Effective changes in the environment or in the surrounding population may lead to significant changes in the vegetation of an area. If these changes involve the establishment upon it of a new association, the phenomenon is known as succession. Jongmans.

Griffiths, D., New and old species of *Opuntia*. (*Bull. Torrey Bot. Club*. XLVI. p. 195—206. pl. 9—10. June 1919.)

Contains as new: *Opuntia effulgia*, *O. cyanea*, *O. diversispina*, *O. hispanica*, *O. chata*, *O. Maidenii*, *O. obovata*, and *O. amarilla*.
 Trelease.

Griggs, R. F., Scientific results of the Katmai expeditions of the National Geographic Society. 1. The recovery of vegetation at Kodiak. (*Ohio Journ. Sci.* XIX. p. 1—57. With 32 illustrations. Nov. 1918.)

Kodiak island was covered about a foot deep by the fall of ash from the Katmai Volcano whose eruption occurred on June 6, 1912. The effect of this was to give the island the appearance of a pine barren, devoid of vegetation except for the trees and bushes which stuck through the ash uninjured. It still had this appearance a year later in June 1913. In June 1915, however, it was found that there had been a remarkable recovery of vegetation, the grasses and other herbaceous plants growing even more

luxuriantly than before the eruption. This revegetation was due not to seedlings but almost entirely to the recovery of old plants which had been buried under the ash for three years. A large number of permanent stations were marked for future study.

W. B. McDougall.

Hayata, B., Some Conifers from Tonkin and Yunnan. (Bot. Magaz. Tokyo. XXXI, p. 113—119. 2 Textfig. 1917.)

This paper contains enumeration and description of a small set of Conifers collected by Prof. Shitaro Kawaii in the districts between Yunnan and Tonkin. Some new species are described. *Fokienia Kawaii*, near *F. Hodginsii* Henry et Thomas, but differs from it in the shape of seeds and their wings. *Cryptomeria Kawaii*, near *C. japonica* D. Don, but with much shorter secondary shales with much shorter teeth. *Thuja orientalis* L. forma *Kawaii*. *Taxus* sp. nov., somewhat near to *T. cuspidata* var. *chinensis*, but widely different in general features. Unfortunately without fruits or flowers. The other species found in the same forest are: *Juniperus chinensis* L. (probably planted), *Cupressus funebris* Endl and *torulosa* D. Don, *Tsuga yunnanensis* Masters and *Podocarpus neriiifolia* D. Don.

Jongmans.

Hofmann, J. V., Seed vitality as a factor in determining forest types. (Ames Forester. 5. p. 13—16. pl. 1—5. 1918.)

The plates represent seeds, and seedlings up to the age of 1 year, of *Pinus ponderosa*, *P. monticola*, *Pseudotsuga taxifolia*, *Thuja plicata* and *Tsuga heterophylla*.

Trelease.

Koidzumi, G., Contributiones ad floram Asiae orientalis. (Bot Mag. Tokyo. XXXI. p. 31—41, 128—143, 253—262. 1917.)

These contributions contain a number of new species and many notes on synonymy, distribution, and other remarks on older species.

Ligusticum (*Euligusticum*) *linearilobum*, near *L. japonicum* Max., both with very narrow leaves; *Evonymus Vidalii* Fr. et Sav. var. *stenophylla*; *Angelica refracta* F. Schmidt var. *glaucophylla*, var. *multinervis* and var. *Yabeana*, *Angelica edulis* Miyabe forma *triloba*; *Malus* (*Calycomeles*) *pisiformis* (? *M. pumila* × *baccata* × *spectabilis* C. K. Sch.), near *M. cerasifera*; *Primula cuneifolia* Ledeb. var. *albiflora*; *Orchis aristata* Fisch. var. *albiflora*; *Saussurea Riederii* Herd. var. *albiflora*; *Rhododendron kamtschaticum* Pall. var. *albiflorum*.

An enumeration of all the species of the genus *Morus* is accompanied by notes on synonymy and distribution. A number of new names and new combinations are found in this enumeration; *Dolichostylae* sect. nov.: *M. nigriiformis* (Bureau) comb. nov. (*M. alba* L. var. *nigriiformis* Bureau; *M. arabica* (Bureau) comb. nov. (*M. alba* L. var. *arabica* Bureau); *M. mongolica* C. K. Sch. var. *diabolica* (Korea); *M. rotundiloba* (Siam); *M. humilis*, near *M. bombycis* Koidz. but smaller and with otherwise-shaped leaves. Sect. 2. *Macromorus* Miq. emend. *M. boninensis* (Bonin Islands); *M. argutidens*, near *M. alba* (Japonia, cultivated).

Cnidium Tilingia Tak. var. *pectinata*; *Rosa* (*Synstylae*) *pulcherrima* (cultivated, Yokohama), near *R. taiwanensis*; *R. jasminoides* near *R. fujisanensis* (Sikoku, Prov. Awa, mnt. Tsulugissan); *R. sambucina*

(*R. moschata* Koidz. non Mill.), near *R. Brunonii*, and var. *pubescens* (Formosa); *R. sikokiana*, near the former (Sikoku: prov. Awa, mnt Tsulugisan); *R. Franchetii* nom. nov. (*R. multiflora* var. *trichogyna* Fr. et Sav., *R. Luciae* var. *paniculata* Mak., *R. Luciae* var. *euluciae* f. *paniculata* Koidz., *R. trichogyna* Nakai pars) and var. *paniculigera* (Mak.), (*R. paniculigera* Mak, *R. trichogyna* Nakai pars). *Rubus* (*Corchorifolii*) *ludabilis* (*R. palmatus* var. *subinermis* Koidz.) near *R. yenshimanus*, and var. *glaber*. *Rubus palmatus* Thunb. var. *Hisautsui* (Nippon).

Elaeagnus (*Auctumnales*) *maritima* (near *E. glaber*; Nippon); *Geranium* (*Sanguinea*) *Yoshiiianum* Koidz., new description; *Thalictrum yakushimense* Koidz., *Platanthera* (*Bifoliae*, *Monophyllae*) *amabilis* Koidz., new descriptions; *Angelica Matsumurae* Yabe, var. *glabra* (Nippon); *Hierochloe pluriflora* (Yezo); *Sanguisorba obtusa* Maxim. var. *contraria*; *Cacalia auriculata* DC. var. *bulbifera* (*C. Matsumurae* Kudo); *Sorbus commixta* Hedl. var. *sachalinensis* (*S. japonica* Koidz. non Koehne); *Anemone yezoensis* (Miyabe), (*A. umbrosa* var. *yezoensis* Miyabe); *Viola glabella* Nutt. var. *crassifolia* (Yezo); *Erigeron Kamtschaticus* DC. var. *linearifolius* Koidz. (Honto and Sikoku), var. *manshuricus* (Kom.), (*E. acris* var. *mansh.* Komarov); *Erigeron* (*Eurigeron*, *Monocephali*) *Matsudae*, near *E. dubium* Mak. (China: Chihli); *Crepis* (*Youngia*) *gymnopus*, near *C. glauca*, but differs by the form of the achenes; *Taraxacum officinale* Weber var. *lividum* Koch var. *dissectissimum* (Yezo).

Saussurea Tilesii Ledeb. var. *imperialis* nom. nov. (*S. imperialis* Koidz.), var. *nivea* (*S. acuminata* Nishida), var. *elegans* (all Yezo); *Poa hayachinensis*, near *P. pensia* (Nippon); *Poa macrocalyx* Trautv. et Mey. var. *sachalinensis*; *Poa tomentosa*, a very distinct species with densely hairy leaves (Nippon); *Poa nipponica* nom. nov. (*P. pratensis* var. *anceps* Hack., *P. annua* f. *maxima* Hack., *P. pratensis* var. Hack.); *Poa misera* (Thunb.) β *strictula* (Steud.), γ *sphondylodes* (Trin.).

Blyxa Noronh. Subgen. *Diplosiphon* Sect. I. *Acaulis* nov. sect.: *B. leiosperma* n. sp. (Nippon), *B. muricata*, near *B. malyana* (Nippon, Ponape island, east Caroline group). Sect. II *Caulescens* nov. sect.: *B. japonica* (Miq.) Maxim.

Malus pumila Mill. var. *dulcissima* Koidz., var. *Rinki* Koidz., var. *asiatica* (Nakai), var. *subsessilis* C. K. Schn. *Polygonum Reynoutria* (Houtt.) Mak. var. *elliptica*. *Pittosporum boninense*, near *P. Tobira* Ait. *Boninia glabra* Planch (nom. nud.) description (Bonin Islands).

New for the Japanese flora are: *Deschampsia Wibeliana* Parl., *Carex koreana* Komarov and *Juncus ensifolius* Wikstr.

It is a pity that the author does not bring more regularity in his publication, so that at least those plants, belonging to the same family, are placed together. Jongmans.

Koidzumi, G., *Plantae novae Micronesiae*. II. (Bot. Mag. Tokyo. XXXI. p. 232–233. 1917.)

Elaeocarpus Kusanoi n. sp., near *E. samoensis* (Ponape island, east Caroline group); *Alpinia* (*Dieramalpinia*, *Eubracteata*) *carolinensis* (Ponape island). Jongmans.

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