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Dr. D. H. Scott.	Prof. Dr. Wm. Trelease.	Dr. J. P. Lotsy.

und der Redactions-Commissions-Mitglieder:

Prof. Dr. Wm. Trelease, Dr. C. Bonaventura, A. D. Cotton,  
Prof. Dr. C. Wehmer und Mag. C. Christensen.

von zahlreichen Specialredacteuren in den verschiedenen Ländern.

Dr. J. P. Lotsy, Chefredacteur.

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**Gwynne-Vaughan, D. T., Observations on the Anatomy  
of the Leaf in the Osmundaceae. (Ann. Bot. XXX. N° CXX.  
p. 487—493. Pl. XIII. Oct. 1916.)**

The author believes that the primitive leaf-trace of the Ferns was a solid elliptical mass of xylem, with two protoxylems, mesarch in position, these being presumably derived from a single, mesarch protoxylem of a still earlier stage. The short axis of the ellipse corresponded to the median plane of symmetry of the leaf and the xylem was probably completely surrounded by phloëm.

From such a form the Zygopteridean type of trace can be evolved; the process would seem to have begun by the substitution of parenchyma for the tracheides on the outside of the two protoxylems; the parenchyma thus developed forms two lateral bays impinging on the tracheides. A further complication, possibly connected with the erect habit of the leaves, is the development by some *Zygopterideae* of four rows of pinnae. On the other hand the C-shaped trace, the numerous varieties of which are so characteristic of the Ferns, might arise by the development of parenchyma instead of tracheides on the adaxial side of the protoxylems.

The author regards it as probable that the original mode of branching of the primitive elliptical trace involved the elongation of the immersed protoxylems in the direction of the long axis of the trace, followed by the division of the elongated protoxylem. The small, protruding mass of xylem, including the outer of the two resulting protoxylems, would then pass out into the branch-trace. The investigations under consideration were made with the object of ascertaining whether the C-shaped trace retained any primitive features in its branching. The simplest form of departure of

the trace in the Osmundaceous leaf is that found in the supply of the smaller veins from the mid-rib of smaller, secondary pinnae; in such cases the trace, whether a band or a crescent, is too small to exhibit peculiar features. In slightly larger traces, the parent strand of which is a relatively stout C-shaped structure the end of the mother strand becomes thickened on the side on which the trace is about to depart. The protoxylem on this side elongates so as to become immersed in the thickened extremity of the strand; the xylem adaxial to the protoxylem may be considered as centripetal. After the later division of the elongated protoxylem the inner of the two protoxylems thus produced is endarch in position, but the outer, departing one is immersed and therefore mesarch in position.

In some of the more advanced forms of branching the thickened portion of the parent strand, the upper part of which passes out higher up, contains some parenchymatous tissue, xylem-sheath only or xylem-sheath, phloem and pericycle. In such cases a small isolated, adaxial mass of xylem, clearly representing the centripetal xylem of the simpler method of branching, is left at the departure of the trace. This detached group of xylem, sometimes reduced to one or two elements, joins up with the main strand, usually in such a way that the latter remains endarch, but occasionally in front of it, in which case the xylem is temporarily mesarch. A yet further development of this type of branching occurs at the departure of larger traces and results in the production of gaps in the parent trace, the endodermis of which is interrupted so that the ground-tissue of the trace becomes continuous with the external ground-tissue.

The author concludes that there are three distinct regions in the C-shaped Osmundaceous trace: a) the abaxial curve; b) the lateral portion which passes out into the branch trace; and c) the xylem that remains in the parent trace, adaxially to that which has passed out into the daughter trace; phylogenetically this is held to represent the centripetal xylem of the adaxial portion of the hypothetical ancestral trace. The rest of xylem of the trace is regarded as centrifugal.

Isabel M. P. Browne (London).

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**Gwynne-Vaughan, D. T., On some climbing *Davallias* and the petiole of *Lygodium*. (Ann. Bot. XXX. N° CXX. Oct. 1916.)**

It has been explained by the present author and Mr. Kidston that the Osmundaceous trace can be derived from an hypothetical ancestral form, the solid xylem of which was more or less rounded or elliptical in transverse section. M. P. Bertrand has shown that the Botryopteridean and Anachropteridean traces can be derived from a similar hypothetical form. It seems probable that the traces of the great majority of the living forms may be regarded as variants of the C-shaped Osmundaceous trace. In the Schizaeaceae *Aneimia* has a C-shaped trace; but according to most authors the traces of *Lygodium* and *Schizaea* are of an absolutely different type. Mm. C. E. Bertrand and Cornaille, however, have offered a remarkable explanation of how the peculiar trace of *Lygodium* may be derived from one of the complex variants of the C-shaped type, of trace. According to them the inverse folds of the more complicated Polypodiaceous and Cyathaceous traces has led by increase of metaxylem to the union, in the median plane, of the two sides of the fold, thus producing the solid hexagonal trace of *Lygodium*.

with its two abaxial groups of protoxylem, exarch in position, and two other widely separated lateral groups.

The present author believes that this ingenious explanation of the phylogenetic origin of the trace of *Lygodium* is correct, except that in it the adaxial hoops of the C-shaped trace are held to have disappeared, whereas the French botanists believe that they have become a constituent part of the solid, condensed petiolar strand of *Lygodium*.

In this connection Gwynne-Vaughan points out that the young petioles of *Lygodium scandens* examined by him usually contain only a single, abaxial protoxylem, which is apparently sometimes mesarch in position. In *L. japonicum* the single abaxial protoxylem is distinctly mesarch in position having a ring of centrifugal xylem of its external side. The key to the problem, or rather the proof of the theory, is held to be supplied by the structure of *Davallia fumarioides*. The petiolar bundle of the latter is at first similar in structure so that of most of the ferns; higher up the climbing habit, occurring also in the petioles of *Lygodium*, makes itself felt. The leaf trace of *Davallia fumarioides* is at first an open C-shaped bundle, with short stout adaxial hooks of xylem the ends of which are thickened in a club-like manner. This bundle contains shallow but distinct lateral bays and the abaxial part of the trace is very narrow. As we pass up towards the region at which the petiole assumes a climbing habit the trace closes up and becomes reniform in transverse section. The space between the two halves of the xylem consists of pericycle and phloem. The former disappears as the lateral xylem masses increase in bulk and the phloem itself becomes reduced to a single row of sieve-tubes separating the cells of the xylem-sheath of each side.

At the departure of a pinna-trace the protoxylem at the side of the C from which the branch is about to depart divides twice and the two outer protoxylems move out into the daughter-trace. If the trace is a well-developed one the adaxial group of tracheides joins up again with the main strand before the branch trace is free; if the daughter branch is a weak one the adaxial group of tracheides may become free one or two inches before the departure of the branch and not close up with the main strand for a long time after departure has been effected. After the junction the main branch may appear to be temporarily mesarch for a short time.

The pinna-trace is at first bluntly triangular with two lateral groups of protoxylem; a third dorsal, group appears later, formed apparently *de novo* in a mesarch position. The adaxial xylem parenchyma and phloem encroach on the tracheides and the xylem thus becomes endarch and C-shaped.

Isabel M. P. Browne (London).

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**Scott, E. L.,** A study of pasture trees and shrubbery.  
(Bull. Torrey Bot. Club. XLII. p. 451—461. 13 text fig. 1915.)

The haws, apples, oaks and elms are able to withstand constant browsing by cattle for a prolonged period of time.

In general other trees in pastures, as the ash, are killed within a few years; or they are avoided by the cattle, as the hickories and other nut-bearing trees.

When the tree is able to withstand the cropping for a long

period it has good chances of reaching the natural size of the species. This is attained in different ways by the different species:

a. The oaks throw the stress of growth into a single series of buds and so prolong the main axis at the expense of lateral branches that the tip of this axis may be lifted beyond the reach of the cattle in comparatively few years.

b. The haws and apples put out a large number of approximately equal branches forming a close network about the center of the tree, which is finally so far removed from the attacks of the cattle that it may grow unmolested. This is a much slender method than the one adopted by the oaks but seems to be somewhat surer as judged by the number of successful individuals.

c. The elms have given up the attempt to reach independence without the help of some other plant but because of their persistence many of them are in time given the necessary protection.

While thorns are undoubtedly a factor in the escape of some species from the cattle their importance may easily be overestimated; the apples are apparently quite as successful as are the haws but are not provided with this armament.

Jongmans.

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**Lubimenko, V.**, Nouvelles recherches sur les pigments des chromoleucites. (C. R. Ac. Sc. Paris. CLX. p. 277—280. 1915.)

L'évolution chimique des pigments contenus dans les chloroleucites au cours de leur transformation en chromoleucites aboutit à la formation d'un grand nombre de substances colorées qui se rattachent à la carotine, la xanthophylle et leurs deux isomères: la lycopine et la rhodoxanthine. L'apparition des substances intermédiaires entre ces quatre formes principales ainsi que la formation des deux derniers pigments rouges, qui n'existent pas dans les chloroleucites, doit être attribuée aux deux processus chimiques opposés, l'oxydation et la réduction, qui remplacent l'un l'autre au cours du développement du tissu chlorophyllien et qui attaquent l'appareil assimilateur. Nous ne savons pas exactement ce qui se passe avec les pigments des chloroleucites pendant leur activité assimilatrice; mais il est très probable que l'oxydation est contrebalancée dans ce cas par la réduction, ce qui donne comme résultat une stabilité apparente de la chlorophylle et des pigments jaunes qui l'accompagnent.

Jongmans.

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**Davis, M. B.**, *Oenothera neo-Lamarckiana*, hybrid of *O. franciscana* Bartlett  $\times$  *O. biennis* Linnaeus. (American Naturalist. L. p. 688—696. 1916.)

The authors researches about artificially made hybrids within the genus *Oenothera*, have yielded results quite as satisfactory as he had hoped. *Oenothera neo-Lamarckiana* is a name which the writer proposes for a synthetic hybrid that so closely resembles *O. Lamarckiana* de Vries that the writer does not believe systematic botanists could separate it from the latter by characters which would enter into a specific description. The parents of his hybrid are *O. biennis* from the sand dunes of Holland and an *O. franciscana* from California.

In the group of *O. neo-Lamarckiana* there is some variation,

but the best plants are so close to the *Lamarckiana* of de Vries, that they can only be distinguished by small plus or minus expressions of a few characters. It is of course not enough for critical bearing on de Vries's interpretation of the behavior of *Lamarckiana* that a hybrid should be synthesized taxonomically similar to it. Such a hybrid must also show a behavior parallel to *Lamarckiana* in its essential features. The two striking peculiarities in the breeding habits of *Lamarckiana* are (1) its ability to produce two types (twin hybrids) in the  $F_1$  when mated to certain other species, and (2) its peculiarity of throwing through successive generation the same types of "mutants" in small, fairly constant proportions.

Crosses between *biennis*  $\times$  *neo-Lamarckiana* (and reciprocal) appear to have given twin hybrids and it should be said that the two groups were recognized and separated when the plants were in the rosette stage and that they consistently presented differences throughout all stages of their development.

With respect to the ability of *neo-Lamarckiana* to throw mutants a most interesting situation is presented by its behavior this summer in the fourth generation. In throwing a large progeny of a type very differing from the parent  $F_3$ -plant, *neo-Lamarckiana* in the  $F_4$  exhibited a behavior with strong resemblance to what Bartlett has described as mass-mutation.

The conditions in sterility in *neo-Lamarckiana* are likely to bear directly on the peculiarities of its behavior in comparison with that of de Vries's plant. The writer's hybrids agree with *Lamarckiana* in having pollen about one half sterile, but the  $F_3$ -parent plant of this year's cultures showed seeds 87 per cent fertile while the seed fertility of *Lamarckiana* is much lower, being reported as from 26—46 per cent. May not the mass variation of *neo-Lamarckiana* in the  $F_4$  be correlated with its very much higher seed fertility?

The results show that *Lamarckiana*-like forms of *Oenothera* may be synthesized by simple crosses between wild species provided the parent species are selected with care. The writer believes that as the isolation of *Oenothera* types proceed a number of different crosses will be found to give similar results, but this is the first successful combination that the writer has been able to study experimentally. He should be the last to suggest that the particular races or species which gave his *neo-Lamarckiana* have been the actual parents of the strains of *Lamarckiana* cultivated by de Vries. It is remarkable that his results have proved so satisfactory; no doubt other species crosses may sometime be made which will give hybrids as close or even closer to *Lamarckiana*-like hybrid may have for the problem of the origin and status of *Oenothera Lamarckiana* is likely to be a clearer understanding of how an obviously impure species, *neo-Lamarckiana*, may arise, a species which seems likely to present a breeding behavior parallel to that of *Lamarckiana*, and most important of all the significance of sterility in the working out of these results.

M. J. Sirks. (Wageningen).

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**Trelease, W.,** Naming American hybrid oaks. (Proc. Amer. Philos. Soc. LVI. p. 44—52. pl. 1—3. May, 1917.)

Forty reputed hybrids of *Quercus* in the United States are

assembled under binomials.  $\times Q. palaeolithicola$  (*ellipsoidalis*  $\times$  *velutina*) and  $\times Q. Schmettei$  (*bicolor*  $\times$  *macrocarpa*) are made known for the first time, and the following names are given to recorded hybrids either unnamed or under preoccupied names:  $\times Q. Ashei$  (*Catesbaei*  $\times$  *cinerea*),  $\times Q. Beadlei$  (*alba*  $\times$  *Michauxii*),  $\times Q. blufftonensis$  (*Catesbaei*  $\times$  *falcata*),  $\times Q. caduca$  (*cinerea*  $\times$  *nigra*),  $\times Q. carolinensis$  (*cinerea*  $\times$  *marilandica*),  $\times Q. Deami$  (*alba*  $\times$  *Muehlenbergii*),  $\times Q. exacta$  (*iubricaria*  $\times$  *palustris*),  $\times Q. Taxoni$  (*alba*  $\times$  *prinordes*),  $\times G. Fernowi$  (*alba*  $\times$  *stellata*),  $\times Q. Giffordi$  (*ilicifolia*  $\times$  *Phellos*),  $\times Q. Hillii$  (*macrocarpa*  $\times$  *Muehlenbergii*),  $\times Q. Mellichampi$  (*Catesbaei*  $\times$  *laurifolia*), *Q. organensis* (*arizonica*  $\times$  *grisea*),  $\times Q. podophylla$  ( $\times Q. petiolaris$  Ashe, = *cineraria*  $\times$  ? *velutina*),  $\times Q. Pateri$  (*rubra?*  $\times$  *velutina*),  $\times Q. Rehderi$  (*ilicifolia*  $\times$  *velutina*),  $\times Q. Robbinsii$  (*coccinea*  $\times$  *ilicifolia*),  $\times Q. Smallii$  (*georgiana*  $\times$  *marilandica*),  $\times Q. sterilis$  (*marilandica*  $\times$  *nigra*),  $\times Q. subfalcata$  ( $\times Q. falcata$  Ashe, = *falcata*  $\times$  *Phellos*),  $\times Q. subintegra$  (*cinerea*  $\times$  *falcata*),  $\times Q. sublaurifolia$  (*cinerea*  $\times$  *laurifolia*), and  $\times Q. Sudworthi$  (*falcata*  $\times$  *velutina*). Trelease.

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**Winge, Ö., The Chromosomes. Their numbers and general importance.** (Compt. rend trav. Lab. Carlsberg. XIII. p. 131—275. 46 Text-Fig. 1917.) — Also in Danish: Studier over Planterigets Chromosomtal og Chromosomernes Betydning. (Medd. Carlsberg Lab. XIII. p. 127—267. 1917.)

The contents are divided in 8 chapters: 1. General observations on the alternation of generations and nuclear morphology. 2. The system of chromosome values in the vegetable kingdom. 3. Some new chromosome numbers. 4. Theoretical studies on the origin of the system of chromosome numbers. 5. Heterochromosomes. 6. The persistency of chromosomes, and their hereditary significance. 7. Chromosomes in hybrid organisms. 8. Hyperchromatic cells. — Finally a summary and a list of literature, containing 184 titles.

The work is a result of genetic experiments and cytological investigations on plants, and parallels are drawn to the results of zoological investigators. — It is not possible to give a thorough report, but the summary is here reprinted:

As the "cell" in several, especially primitive, organisms, e.g. amoeba, is without walls, and wall formation to be regarded as a morphologically and physiologically higher stage, which is in several plants connected with division of function, so also all would seem to indicate that the nucleus is of phylogenetically younger origin than the living cell itself, and that it indicates a physiologically greater differentiation within the same. — In lower organisms, such as for instance *Plasmodiophoraceae* and *Entorrhiza*, the chromatin is not inseparably connected with the nucleus. In *Entorrhiza*, we even find in the spores a nucleus entirely free from chromatin, and free, split chromosome-like bodies in the cytoplasm.

A statistical survey of the haploid chromosome numbers in higher plants shows that the chromosome numbers can as a rule be resolved into the prime factors 2 and 3. More rarely, 5 and 7 appear as factors. From what is known, 8 and 12 must be regarded as the most frequently occurring chromosome numbers, and are far more often met with than the remainder: next in order come 16, and thereafter 6 and 9.

In the case of higher plants it is a rule that the species in a

more or less systematical group have "related" chromosome numbers: i. e. values which are all simple multiples of one and the same cardinal number, and which enter into an arithmetical progression.

An investigation of 11 species — comprising 5 genera — of the family *Chenopodiaceae* showed that all had 6, 9 or 18 chromosomes, whence the formula for *Chenopodiaceae* would appear to be  $x = 3n (\overline{\sum} 2)$ .

Also in families which — like the *Compositae* — are generally considered to be highly unstable with regard to the chromosome numbers, we find, on investigation of the separate subgroups, that a certain regularity is apparent. The chromosome numbers for the groups *Heliantheae* and *Anthemideae* can thus be characterized by  $x = 8n$  and  $x = 9n$  respectively.

In cases where it is desired to ascertain the possible relationship of lesser systematical units, the chromosome number will at times provide a last weighty argument pro or contra.

Apogamy, and the occurrence of double or manifold chromosome numbers, must be regarded as generally due to hybridization, whereby the chromosomes of the parent gametes are practically added together — but are paired only incompletely, if at all — in the zygote. It must be presumed that when chromosome pairing entirely fails to appear after hybrid fertilization, an indirect chromosome binding (see p. 199) must take place — if the zygote is to be capable of development and propagation — whereby the number of chromosomes is doubled.

In *Callitricha verna*, the reduction division of the pollen mother cells gives rise to a kind of heterochromosomes, which cannot, however, be homologized with those found in the animal world. Corresponding phenomena have previously been observed in other plants, and especially hybrids.

The mottled-leaved Japanese hop, *Humulus Japonicus* var. *albomaculata*, affords an instance of the fact that certain qualities — here that of mottled colouring — are only transmitted to the offspring through the sexual cells of the female plant — and especially through the cytoplasm.

Cell and nuclear division cannot proceed without an occasional loss of material, e. g. parts of chromosomes, which must affect the genotypic constitution of the cell.

It must be presumed that occasional hybridization can give rise to the formation of apogamous, or at any rate sexually abnormal "new species", and that these newly formed biotypes and their offspring persist as special minor species of biotypes simply because they are, from their organization, excluded from fertilization, and thus from the adjusting — or mutually supplementing — effect which is, in the writer's opinion, produced by the alternation of generations.

*Humulus lupulus* can develop fruits containing an embryo on pollination with various related plants. Pollination with *Urtica urens* produced particularly large and strong fruits, though these were incapable of germination. It is presumed that a truly heterogeneous fertilization has taken place, and that the hybrid was capable of development as long as it was nourished by the mother plant, but that lack of internal homogeneity rendered it altogether incapable of independent activity.

In the hyperchromatic cells in the tapetum of phanerogams, nuclear division takes place according to a peculiar system, in which a typical diakinesis stage appears — albeit with doubled or manifold chromosome number; this does not, however, indicate any reduction division.

Ö. Winge (Kopenhagen).

**Asher, L.**, Praktische Uebungen in der Physiologie. Eine Anleitung für Studierende. (XI, 200 pp. kl 8°. 21 A. Berlin, J. Springer. 1916. Preis 6 Mk.)

Das vorliegende Praktikum ist für den Mediziner bestimmt und in der Weise eingerichtet, dass es in Kursen von Zwei-Semesterdauer die Hauptvorlesung über Physiologie zweckmässig ergänzt. Die Darstellung ist bei völliger Vermeidung von theoretischen Auseinandersetzungen ausschliesslich praktisch gehalten. Bei der Organisation des Praktikums war der Verf. bemüht, möglichst viele Aufgaben so einfach einzurichten, dass sie von den Studierenden einzeln oder in Gruppen selbstständig ausgeführt werden können. Einige Aufgaben über wichtige physiologischen Gesetze, die naturgemäß von Studierenden selbst nicht ausgeführt werden können, wurden als Demonstrationsaufgaben aufgenommen. Bei der Auswahl des Stoffes war Verf. bestrebt, eine praktische Vorführung des Gesamtgebietes der Physiologie zu erreichen.

Lakon (Hohenheim).

**Ilijin, V. S.**, Relation of Transpiration to Assimilation in Steppe Plants. (Journ. Ecology. IV. 2. p. 65—82. 1916.)

The investigations were made during 1913 in the government of Veronezh (Russia). The author has already proved that a simple comparison of the transpiration of different ecological types of plants does not convey a true impression of their water requirements. The part played by transpiration in the plant's life is here reviewed, and the basis selected is the relation between transpiration and assimilation. Trial-methods revealed difficulties in obtaining constant ratios with rooted plants, hence cut plants were used. The observations were made on a series of plants taken from a ravine in the steppe, where within a short distance there were wide variations in habitat. The plants represent various ecological groups, which are indicated in a series of tables giving transpiration, assimilation, and the ratio transpiration in cgr. of water per c.c. of decomposed carbon dioxide. Some of the author's conclusions are as follows: — (1) Plants growing in dry places are adapted to a more economical consumption of water; their protective arrangements enable them to lose less water per unit of decomposed CO<sub>2</sub>. (2) Mesophytes evaporate water uneconomically, since they close their stomata in dry places and thus reduce assimilation; in the case of xerophytes assimilation proceeds actively. (3) Under normal conditions mesophytes lose less water and the rate of transpiration is often slower than that of xerophytes; if however the mesophytes were transferred to the dry places, their transpiration increases to a greater extent than that of xerophytes.

W. G. Smith.

**Coker, W. C.**, The Amanitas of the eastern United States.

(Journ. Elisha Mitchell Sci. Soc. XXXIII. p. 1—88. pl. 1—69. July, 1917.)

A beautifully illustrated account of the species: containing as new: *Amanita Mappa lavendula*, *A. spissa alba*, *A. rubescens alba*, and *A. Atkinsoniana*. Trelease.

**Van der Lek, H. A. A.**, Bijdrage tot de kennis van *Rhizoctonia violacea*. [Contribution à l'étude du *Rhizoctonia violacea*]. (Meded. Rijks Hoogere Land-, Tuin- en Boschbouwschool Wageningen. XII. 1917. p. 49—112. 28 fig. sur 9 planches. Texte hollandais et français (abrégué).)

Un endroit infecté par le *Rhizoctonia violacea*, non loin de Wageningen, offrit à l'auteur l'occasion d'étudier ce champignon, dont l'étude a présenté jusqu'à ce jour de nombreuses lacunes bien que ce fut un des premiers organismes dont se soit occupé la phytopathologie. L'auteur donne un aperçu historique sur son sujet, de Du Hamel (1728) jusqu'à Duggar (1915).

Il démontre qu'à plusieurs reprises on a confondu le *Rhizoctonia violacea* Tul. (= *R. crocorum* [Pers] C.D.) et le *Rhizoctonia Solani* Kühn (= *Hypochnus Solani* P. & D. = *Corticium vagum* B. & C. var. *Solani*), bienque Kühn eût nettement distingué ces espèces. Il insiste surtout sur les observations et les hypothèses d'Eriksson. Cet auteur soutient l'opinion que l'on a réuni sous le nom de *Rhizoctonia violacea* quelques champignons absolument différentes, dont les plus importantes:

a) *Leptosphaeria circinans* Sacc. (= *Rhizoctonia Medicaginis*), un champignon qui se développe sans hétéroécie sur plusieurs légumineuses (surtout sur la lucerne), b) *Hypochnus violaceus* Eriks. qui montre une hétéroécie et que l'on trouve comme parasite en stade stérile sur quelques plantes à racines charnues (e. a. les carottes et les betteraves) et comme saprophyte, en stade fertile, sur de nombreuses plantes sauvages. Les observations de l'auteur se rapportant à la forme du champignon vivant sur les carottes sont en pleine contradiction avec les hypothèses d'Eriksson. Il résume ses résultats comme suit: 1) Le *Rhizoctonia violacea* (ou du moins la race observée) a un pouvoir pathogène prononcé pour les mauvaises herbes; il n'y a point de différence essentielle entre sa façon d'agir envers les plantes cultivées et les plantes sauvages. Loin de se comporter envers ces dernières presqu'en saprophyte" il se montre plutôt parasite dangereux (surtout pour *Urtica urens*, *Sisymbrium officinale*, *Euphorbia Peplus*); 2) Toutes les phases de développement, observées sur les carottes, se retrouvent également sur les mauvaises herbes et inversément. Le „col” (l'*Hypochnus* d'Eriksson) se forme aussi bien sur les plantes cultivées que sur les mauvaises herbes; ce col n'est point du tout une fructification de Basidiomycète et le champignon n'est donc pas une espèce d'*Hypochnus*. C'est donc à tort qu'Eriksson ait contribué à cette parasite le phénomène d'hétéroécie. L'auteur relève les différences très grandes entre le *Rhizoctonia violacea* et l'*Hypochnus Solani*; l'étude plus approfondie, surtout la culture pure de ces deux organismes les accentue encore. Plusieurs efforts pour isoler le *Rhizoctonia violacea* avaient échoué.

L'auteur y a réussi en partant des „corps miliaires”; il décrit en détails la méthode suivie et donne quelques observations, accompagnées de figures, sur l'allure du champignon en culture pure.

Jusqu'à ce moment il n'a pas trouvé de fructifications, ni dans la nature, ni dans la culture; il est incliné à supposer (comme R. Hartig) que le champignon se rapproche du genre *Rosellinia*.

Van der Lek (Wageningen).

**Brotherus, V. F., Contributions à la flore bryologique de l'Argentine.** (Arkiv för botanik. XV. 15 pp. 1917.)

Der Aufsatz enthält die Beschreibung einer von R. E. Fries in den Anden des nördlichen Argentina zusammengebrachten Sammlung von Laubmoosen. Die folgenden neuen Moosarten werden vom Verf. beschrieben:

*Oreoweisia brevifolia*, *Fissidens (Bryodium) jujuiensis*, *Timmiella argentinica*, *B. (Helicopogon) pertorguescens*, *Pottia altipes*, *Desmato-don argentinicus*, *Ptychomitrium aligrimmooides*, *Zygodon orthotrichoides*, *Schlotheimia asperrima*, *Physcomitrium cupulare* C. Müll. var. *latifolium*, *Mielichhoferia (Eumielichhoferia) subpohlioidea*, *Brachy-menium (Dicranobryum) Roberti*, *Aulacopilum intermedium*, *Stereophyllum argentinicum*, *Vesicularia argentinica*.  
Arnell.

**Brotherus, V. F., Moseniella, un nouveau genre des mous-ses du Brésil.** (Arkiv för botanik. XV. 3 pp. 1 Taf. Stockholm, 1917.)

Verf. äusserst sich über die von ihm beschriebene neue Gattung unter anderem wie folgt: „Genus *Splachnacearum*, *Orthodonti proximum*, *sporogonii structura dignoscendum*, *habitu Physcomitriis non nullis valde simile*.“ Die Gattung wurde nach dem schwedischen Botaniker Hj. Mosén, der von Brasilien reiche Moossammlungen heimgebracht hat, benannt. Die einzige Art der Gattung *M. brasiliensis* Broth. n. sp. wurde bei Caldas in der Provinz Minas Geraës im Jahre 1873 eingesammelt.  
Arnell.

**Williams, R. S., Mosses from the west coast of South America.** (Bull. Torrey Bot. Club. XLII. p. 393—404. Pl. 21—25. 1915.)

This paper contains a list of mosses collected in Peru, Bolivia and Chile, among which a large number of new species occurs.

*Campylopus peruvianus*, Peru, near Mollendo; *Astomum chilense*, Chile, near La Serena; *Pterogoneurum Roseae*, Peru, near Lima and Posco; *Crossidium Rosei*, Peru, near Lima; *Pseudocrossidium* nov. gen. with *P. chilense*, near Valparaiso, *P. apiculatum*, above Arequipa and *P. excavatum* (Mitt.) comb. nov. (*Tortula excavata* Mitt.); *Desmatodon subtrophaceus* (R. S. Williams) (nov. comb. (*Didymodon subtrophaceus* R. S. Williams)); *Tortula limensis*, near Lima; *T. minuscula*, Peru, near Cuzco; *Physcomitrium Roseae*, near Valparaiso; *Philonotis fragilicaulis*, Peru, Araranca.  
Jongmans.

**Brandegree, T. S., Plantae Mexicanae Purpusianae. VIII.** (Univ. California Publ. Bot. VI. p. 363—375. Mar. 23, 1917.)

Contains as new: *Aristolochia racemosa*, *Celosia chiapensis*, *Polygonum polyedra*, *P. scopolorum*, *P. neurocarpa*, *P. parrasana*, *P. vagans*, *P. laeta*, *P. pycnophylla*, *Euphorbia xeropoda*, *E. pueblensis*,

*E. bicapitata*, *Jatropha urens longepedunculata*, *Hibiscus Purpusii*, *Ayenia peninsularis*, *A. reflexa*, *A. cuneata*, *Laetia glabra*, *Sicyos sinaloae*, *S. acerifolius*, *S. silvestris*; **Ecliptostelma** n. gen. (Asclepiadaceae, with *E. molle*; *Asclepias polyphylla*, *Vincetoxicum atrocoronatum*, *Bassoria Purpusii*, *B. foliosa*, *B. setosa*, *Solanum sylvicola*, *S. stephanocalyx*, *Episcia aurea*, *Crusea chiapensis*, and *Aster spinosus spinosissimus*.  
Trelease.

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**Britton, N. L.**, Studies of West Indian plants. IX. (Bull. Torr. Bot. Cl. XLIV. p. 1—37. Jan. 1917.)

Contains as new: *Cleome obtusa*, *Chamaecrista obcordata* (*Cassia obcordata* Sw.), *C. pinetorum*, *C. Tuerckheimii*, *C. caribaea* (*Cassia caribaea* Northr.), *C. inaguensis* (*Cassia inaguensis* Britt.), *C. lucayana* (*Caesia lucayana* Britt.), *C. Dussii*, *C. Swartzii* (*Caesia Swartzii* Wikstr.), *C. polyadena* (*Cassia polyadena* D.C.), *C. pygmaea* (*Cassia pygmaea* D.C.). *C. riparia* (*Cassia riparia* H.B.K.), *C. strigillosa* (*Cassia strigillosa* Benth.), *C. Chamaecrista* (*Cassia Chamaecrista* L.), *C. adenisperma* (*Cassia adenisperma* Urb.), *C. pedicellaris* (*Cassia pedicellaris* D.C.), *C. Buchii* (*Cassia Buchii* Urb.), *Leucocroton saxicola*, *L. angustifolius*, *L. linearifolius*, *Passiflora nipensis*, *P. Shafei*, *P. pseudociliata*, *Rondeletia canellaefolia*, *R. yamuriensis*, *R. Leoni*, *R. intermixta*, *R. baracoensis*, *R. insularis*, *R. savannarum*, *R. vacciniifolia*, *R. bicolor*, *R. camagueyensis*, *Eriocaulon arenicola* Britt. & Small, *E. fusiforme* Britt. & Sm., *E. ovoideum* Britt. & Sm., *Dupatya montana*, *D. pungens* (*Paepalanthus pungens* Griseb.), *Pilea Cowellii*, *Ichthyomethia havanensis* Britt. & Wils., *Castelaria calcicola* Britt. & Sm., *Stenostomum obovatum*, *S. aristatum*, and *Evolvulus siliceus* Britt. & Wils. (*E. arenicola* Britt. & Wils.). Trelease.

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**Candolle, C. de**, Meliaceae Centrali-Americanae et Panamenses. (Smithsonian Misc. Colb. LXVIII. № 6. p. 1—8. (Public. 2479. July 23, 1917.)

Contains as new: *Guarea brevianthera*, *G. Cook-Griggsii*, *G. ternifoliola*, *G. parva*, *G. Tonduzii*, *G. Williamsii*, *G. longipetiola*, *G. cubbrana*, *G. Pittieri*, *Trichilia chiriquina*, *T. albiflora*, and *T. havanensis pilipetala*. Trelease.

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**Craib, W. G.**, Species of *Piptanthus* in Cultivation. (Gard. Chron. LX. Nos 1559 and 1564. Nov. and Dec. 1916.)

Critical notes on the genus *Piptanthus* with a key to species and diagnoses of three novelties as follows: *P. bicolor* Craib, *P. concolor* Harrow, *P. Forrestii* Craib. E. M. Cotton.

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**Davie, R. C.**, Some Brazilian Plants. (Journ. Bot. № 656. LV. p. 201—203. Aug. 1917.)

A list is given of plants collected during a visit to the States of Rio de Janeiro and São Paulo and among them the following new species are described: *Gaultheria Willisiana*, *Pleurostachys Geraldiana*. E. M. Cotton.

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**Dykes, W. R.,** *Iris arizonica*. (Gard. Chron. LXI. p. 45. Feb. 3, 1917.)

*Iris arizonica* is described as a new species. It forms a connecting link between *I. longipetala* of California and the Asiatic *I. ensata*.

E. M. Cotton.

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**Gates, R. R.,** A revision of the genus *Polygonatum* in North America. (Bull. Torr. Bot. Cl. XLIV. p. 117—126. pl. 4—6. Mar. 1917.)

Contains as new: *Polygonatum pubescens* (*P. boreale australe* Farwell), *P. biflorum hebetifolium*, *P. commutatum virginicum* (*P. virginicum* Greene), *P. commutatum ovatum* (*P. biflorum ovatum* Farwell), and *P. cobrense* (*Salomonia cobrensis* Woot. & Standl.).

Trelease.

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**Hayek, A. von,** Beitrag zur Kenntnis der Flora des albanisch-montenegrinischen Grenzgebietes. [Bearbeitung der von I. Dörfler im Jahre 1914 auf einer im Auftrage der ksl. Akad. d. Wiss. unternommenen Forschungsreise gesammelten Farn- und Blütenpflanzen]. (Denkschr. ksl. Akad. Wiss. Wien. Math.-nat. Cl. XCIX. Bd. p. 127—210. 7 Tafeln u. 1 Kartenskizze. Wien 1917.)

Die Reiseroute Dörfler's war folgende: Vom Skutarisce über Rapša nach Hani Grabom, von da nach Podgorica, Bioce, Nosica, Andrijevica, Plav auf die Hochebene Vermoš (und Umgebung), von Vunsaj aus in den Gebirgszug Proletija und über alpine Höhen in die Gebiete Dečani und Goranica, von da über Čar nach Spaš, Baštrik, Fleti, dann über Puka nach S. Giovanni di Medusa. Die Mehrzahl der um Skutari gesammelten Arten sind zur mediterranen, das übrige zur illyrischen Flora zuzurechnen, letztere mit vielen endemischen Formen, z.B. *Euphorbia capitulata* Rehb., *Alyssum scardicum* Wettst., *Viola Kosanini* (Deg.) Hay., *Astragalus Fialae* Deg., *Melampyrum Dörfleri* Ronn., *Valeriana Paucicüll* Hall. et Bald., *Achillea abrotanoides* Vis., *Hieracium gymnocephalum* Gris., *Lilium albanicum* Gris., dazu *Wulfenia carinthiaca* Jacq. (sonst in Montenegro und der Gailtaler Alpen), *Euphrasia brevipila* B. et Gr. (neu für die Balkanhalbinsel), *Potentilla Visianii* Panč. (bisher nur aus Serbien erwähnt), *Allium meteoricum* H. et Hausskn. (bisher nur bei Skutari, sonst in Griechenland einheimisch). — Als neu werden folgende Arten und Formen aufgestellt: *Minuartia Velenovskyi* (Rohl. pro var. *Alsines tenuifoliae*), (durch anders gestalteten Kelch und Kapsel, durch die grossen Petalen und violette Antheren von *Als. tenuifolia* verschieden), *Min. liniflora* n. var. *glandulosissima*, *Silene marginata* Kit. f. n. *hirtella* (folia margine breviter ciliata et saltem inferiora etiam in lamina pilis brevibus obsita), *S. acaulis* L. n. f. *balcanica* Hay. et Vierh. (a typo differt caespitibus densioribus, floribus breviter, circa 5 mm. pedunculatis pedunculis hinc inde asperulis), *Ranunculus Hayekii* Dörfl. (aus dem Kreise des *R. montanus* Willd., völlig kahl, eigenartiger Zuschnitt der Blätter, mit Adventivwurzeln und 2. Blattrosette am Stengel dort wo er aus dem Geröll hervorbricht, von *R. Marschlinii* Std. von Korsika verschieden), *Viola vilainensis* (e sect. *nominum* Ging., hellviolette Blüte mit dunklen Adern),

*V. Kosanini* (Deg. pro subsp. *V. delphinianthae*) als n. sp., *V. Skan-*  
*derbegii* Dörf. et Hay. (e sect. *Melanium*; maxime accedit ad *V.*  
*elegantulam* Schott et *V. daciram* Borb., a quibus statura robustiore,  
*foliis* et *floribus* duplo fere maioribus speciosissimis et calcare bre-  
*viore* longe diversa est), *Polygala Dörfleri* (verwandt mit *P. ni-*  
*caensis*, aber ein eigenartiger Blütenstand, hellrosenrote Blüten  
 und starkverkürzter Schenkel des Arillus), *Potentilla rubens* (Cr.)  
 Beck var. *subalpina* (Th. Wolf) Hayek  $\times$  *ternata* C. Koch n. hybr.,  
*Medicago pseudorupesris* (junge Früchte ganz gerade), *Coronilla*  
*varia* L. n. f. *recta* (caulis erecti firmi ca 60 cm alti, nec procum-  
 bentes), *Melampyrum Dörfleri* Ronn. (monomorphe Rasse), *Stachys*  
*Beckeana* Dörf. et Hay. (verwandt mit *St. anisochlia* Vis. et Panč.),  
*Petasites Dörfleri* (bei 2200 m; sekt. *Nardosmia*, nur mit *P.*  
*frigidus* (L.) verwandt), *Leontodon hispidus* L. n. var. *Pseudindicus*  
 (eigenartige Behaarungsverhältnisse). *Hieracium Hoppeanum* Schult.  
*grex macranthum* (Ten.) N. P. subsp. n. *macrantholepis* Zahn n.  
 var. *submultiseutum* Zahn und n. subsp. *macrolepioides* Zahn, *Hier.*  
*Pilosella* L. subsp. *acutissimum* Zahn var. n. *coniosphaera* Zahn,  
*Hier. alpicolum* Schl. subsp. *glanduliferum* N. P. n. f. *pilosicaule*  
 Zahn, *Hier. brachiatum* Bert. subsp. *brachiatiforme* N. P. n. f.  
*glandulosissimum* Zahn, *Hier. murorum* L. n. f. *macrocephalum*  
 Zahn und n. subsp. *subbifidiforme* Zahn f. *pseudatratum* Tout.,  
*Hier. gymnocephalum* Gris. f. *subglandulosum* Zahn, *Sesleria Wett-*  
*steinii* Dörf. et Hay. (kurze Hüllspelzen, die mit der Spitze nur  
 etwa die Mitte der unteren Deckspelzen erreichen), *Foa pratensis*  
 L. f. n. *depauperata* Hackel. Wenn kein anderer Autorname hinter  
 den neuen Arten und Formen steht, so ist Hayek als solcher zu  
 ergänzen. — Die vorliegende Arbeit enthält aber auch noch eine  
 Menge kritischer Studien: Eine Bestimmungstabelle der Arten  
 und Formen des Formenkreises des *Dianthus Carthusianorum*  
 (exkl. *D. Grisebachii* Boiss., der zur Sect. *Armeria* gehört). — Es  
 gibt Uebergänge zwischen *Anemone blanda* Sch. N. K. und *A.*  
*pennina* L. — Die Karpathenpflanzen und die der steirischen  
 Alpen und bosnischer Gebirge sind typischer *Ranunculus crenatus*  
 W. K., die Pflanze der Abbruzzen und die von Prokletija  
 (2100 m) sind typischer *R. magellensis* Ten. — Die von Pančić  
 1867 beschriebene *Cardamine Kopaonicensis* beschriebene Art be-  
 nennt Hayek neu als *Cardamine Pancicii* n. sp. (nur in Ser-  
 bien). — Auf der Črna gora fand Dörfler vier Formen der  
*Draba scardica* (Gris.) Deg. et Dörf., die genau beschrieben wer-  
 den. — Ein Bestimmungsschlüssel der auf der Balkanhalbinsel  
 vorkommenden *Viola*-Arten aus der Sectio *Melanium*. — Eine  
 Gliederung der Sect. *Miscopetalum* der *Saxifraga*-Gattung wird  
 entworfen. — Von *Sax. prenja* Beck, *S. sedoides* L. und *S. Hohen-*  
*warthii* Stbg. wird eine detaillierte Darstellung der Verbreitung  
 gegeben: Die erstgenannte Art ist auf den Kalkhochgebirgen der  
 nordwestlichen Balkanhalbinsel vom Velebit bis Albanien  
 verbreitet; die 2. Art erstreckt sich über die südlichen Kalkalpen  
 von Veltlin bis in die Julischen Alpen und über die nördl.  
 Kalkalpen vom Toten Gebirge bis Hochschwab und Hochkar,  
 stellenweise auf Kalk mitten in den Zentralalpen auftretend, auch  
 im Apennin und in Pyrenaeen (nach Engler); die 3. Art  
 kommt nur im Osten der südlichen Kalkalpen (östl. Karawanken,  
 Samtaler Alpen) vor. — Die Verbreitung der *Saxifraga media*  
 Gouan, *S. porophylla* Bert, und *S. Friderici* Augusti Bias. wird

genau angegeben. — Von *S. Rocheliana* Stbg. wird die n. var. *balcanica* Hay. beschrieben (foliis rosularum oblongo-cuneatis obtusis fere duplo longioribus plerumque 7 punctatis patentibus, floribus eximie maioribus; namentlich im Trojan-Balkan). — Studie über *Myosotis alpestris* Schmidt, wozu *M. olympica* Boiss. (am besten noch charakterisiert), *M. lithospermifolia* Horn, *M. cognata* Schott., *M. suaveolens* W. K. (nec Poir.) und *M. pyrenaica* Pourr. gehören; alle diese sind voneinander aber schwer zu unterscheiden. -- Entwurf einer Gliederung des Formenkreises *Melampyrum subalpinum* Jur., dem auch *M. bihariense* A. K. und *M. Dörfleri* Ronn. angehören. — Die Diagnose von *Melampyrum heracleoticum* Boiss. et Orph. wird ergänzt. Verf. hält es für unrichtig, *M. nemorosum* und *M. heracleoticum* als Subspezies einer Art zu betrachten was zur Folge hätte, eine Riesenspezies für alle Arten mit blau gefärbten Deckblättern aufzustellen. In N.-Oesterreich sah Verf. nie Übergänge zwischen *M. nemorosum* und *M. subalpinum* und anderseits zwischen *M. arvense* und *barbatum*. Beauverd's Ansichten werden da einer Kritik unterzogen. — Eine kritische Skizze über *Betonica Alopecurus* L. und *B. Jacquinii* Gren. et Godr. und über Kerner's Ansichten über die Pflanzenarten. — Ueber *Phillyrea*-Formen der Balkaninsel; *Ph. latifolia* L. ist namentlich im O. und N. des Verbreitungsgebietes der ganzen Gruppe zuhause, in S.-Tirol und Istrien scheint sie allein vorzukommen, nach dem S. seltener; das Gleiche gilt für Albanien. *Ph. media* L. geht von Spanien und S.-Frankreich bis Griechenland, erreicht die N.-Grenze der Art nicht, fehlt in S.-Tirol und Istrien. *Ph. angustifolia* L. ist entschieden ein westlicher Typus, kommt aber auch auf der dalmatinischen Insel Busi vor, wo alle drei „Arten“ sonderbarerweise zu sehen sind. — Eine scharfe Grenze zwischen *Asperula longiflora* W. K. und *A. glabra* (Koch) Degen hat Verf. nicht gefunden. — Studie über *Chrysanthemum larvatum* Gris. und *Chr. lanceolatum* Pers. — Bei *Doronicum columnae* Ten. unterscheidet Verf. zwei Formen: f. *occidentale*: drüslose Haare sind sehr spärlich oder fehlen ganz. (Alpen, Apennin, Balkanhalbinsel) und f. *orientale*: drüslose Deckhaare sehr zahlreich, am Rande des Hüllblattes weitaus zahlreicher als die Drüsenhaare (Alpen, Karpaten, Balkan). — *Leontodon rilaensis* Hayek n. sp. aus Bulgarien, Berg Mus Allah, 2400 m, steht näher dem *L. montanus* Lam. als dem *L. croceus* Hke i. e. *L. pyrenaicus* Gou. — *Lilium carniolicum* Bernh. sens str. zerfällt in 4 Rassen:

A. Blüten orangerot.

- a. Blätter unten an den Nerven behaart: *L. carniolicum* s. str.
- b. " kahl: *L. bosniacum* (Beck).

B. Blüten goldgelb:

- a. Blätter unter an den Nerven behaart: *L. Jankae* Kern.
- b. " kahl: *L. albanicum* Gris.

*Carex caryophyllea* Lat. hat *C. verna* Chaix 1787 zu heissen. — *Carex rostrata* Stokes ist bisher nur in N.-Europa und in N.-Amerika gefunden worden. — *Sesleria taygetea* n. sp. = *S. coeruleus* B. *tenerrima* in Halácsy, Suppl. Conspl. fl. Graec. p. 111. — Die Tafeln bringen sehr gute photographische Reproduktion der eingangs erwähnten neuen Arten und Formen im Habitus und anderseits morphologische Details kritischer Arten.

Matouschek (Wien).

**Hutchinson, J.**, *Olearia gunniana* and its allies. (Gard. Chron. LXI. p. 3, 13–14, 23–24. Jan. 1917.)

A critical revision of the taxonomy of *Olearia gunniana*, *O. stellulata*, *O. lyrata* and allied species and varieties. Under the revised system eight species are recognized namely: *O. lyrata* Hutchinson (comb. nov.), *O. canescens* comb. nov., *O. flavescent* sp. nov., *O. stellulata* D.C., *O. Gunmaia* Hook., with several varieties, *O. quercifolia* D.C., *O. rugosa* comb nov., *O. subrepanda* comb. nov.

E. M. Cotton.

**Murrill, W. A.**, Agaricaceae. [Continuation]. (N. A. Flora. X. p. 77–144. Apr. 26. 1917.)

Analysis of the Genera *Claudopus*, *Eccilia*, *Leptoniella*, *Nolanea*, *Pleuropus*, *Lepiota*, *Entoloma*, *Pluteus*, *Chamaeota* and *Volvariopsis*. The following new names appear: *Claudopus multiformis* (*Agaricus variabilis* Pers.), *C. avellaneus*, *C. byssoides* (*A. byssoides* Pers.), *Eccilia angustifolia*, *E. tenuipes*, *E. parvula*, *E. pungens*, *E. Housei*, *E. fuliginosa*, *E. californica*, *E. Yatesii*, *E. mexicana*, *Leptoniella albida*, *L. albinella* (*Leptonia albinella* Peck), *L. subserrulata* (*Leptonia* Pk.), *L. assularum* (*Agaricus assularum* B. & C.), *L. transformata* (*Leptonia* Pk.), *L. acericola*, *L. Whiteae*, *L. rosea* (*Leptonia Longyear*), *L. roseibrunnea*, *L. parva* (*Leptonia* Pk.), *L. aeruginosina* (*Leptonia* Pk.), *L. foliomarginata* (*Agaricus foliomarginatus* Pk.), *L. columbaria* (*A. columbarius* Bull.), *L. multicolor* (*A. varicolor* B. & C.), *L. subplacida*, *L. Earlei*, *L. glabra*, *L. undulatella* (*A. undulatellus* Pk.), *L. alabamensis*, *L. longirostrata* (*Leptonia* Pk.), *L. Grisea* (*Leptonia* Pk.), *L. umbilicata*, *L. validipes* (*Leptonia* Pk.), *L. abnormis* (*Leptonia* Pk.), *L. hortensis* (*Leptonia* Pk.), *L. gracilipes* (*Leptonia* Pk.), *L. seticeps* (*Leptonia* Pk.), *L. Davisiana* (*Leptonia* Pk.), *L. semiglobata*, *L. flavobrunnea* (*Leptonia* Pk.), *L. strictipes* (*Leptonia* Pk.), *L. subvilis* (*Clitopilus subvilis* Pk.), *L. edulis* (*Leptonia* Pk.), *L. occidentalis*, *L. fuliginosa*, *L. nigra*, *L. murina*, *Nolanea parvipapillata*, *N. Earlei*, *N. isabellina*, *N. substauerospora*, *N. olivacea*, *N. gracilipes*, *N. parvula*, *N. avellanea*, *N. fibrillosipes*, *N. dysthales* (*Agaricus dysthales* Pk.), *N. subspicea*, *N. occidentalis*, *Pleuropus Underwoodii* (*Clitopilus Underwoodii* Pk.), *P. subplanus* (*C. subplanus* Pk.), *P. lignicola*, *P. Woodianus* (*Agaricus Woodianus* Pk.), *P. caespitosus* (*Clitopilus caespitosus* Pk.), *P. Melilotus* (*Agaricus Melilotus* B. & C.), *P. prunulus* (*A. prunulus* Scop.), *P. obesus* (*A. obesus* Batsch), *P. noveboracensis* (*A. noveboracensis* Pk.), *P. Seymourianus* (*A. Seymourianus* Pk.), *P. depressus* (*Orcella depressa* Clements), *P. albogriseus* (*Agaricus albogriseus* Pk.), *P. subcinereus*, *P. cinericolor*, *P. murinus*, *P. washingtoniensis* (*Clitopilus washingtoniensis* Braendle), *P. magnisporus*, *P. unitinatus* (*Agaricus unitinatus* Pk.), *P. socialis* (*Clitopilus socialis* Pk.), *P. micropus* (*Agaricus micropus* Pk.), *P. squamulosus* (*Clitopilus squamulosus* Pk.), *P. pascuensis* (*Agaricus pascuensis* Pk.), *P. irregularis* (*Clitopilus irregularis* Pk.), *P. erythrosporus* (*C. erythrosporus* Pk.), *P. Leptonia* (*C. Leptonia* Pk.), *P. sphaerosporus* (*C. sphaerosporus* Pk.), *P. adnatifolius*, *P. avellaneus*, *Lepista tarda* (*Clitocybe tarda* Pk.), *L. graveolens* (*Entoloma graveolens* Pk.), *Entoloma alutaceum*, *E. parvulum*, *E. subsericellum*, *E. pallidum*, *E. tortipes*, *E. violaceum*, *E. adirondackense*, *E. tenuipes*, *E. fumosatibulum*, *E. pallidibrunneum*, *E. fuliginosum*, *E. fibrillosum*, *E. angustifolium*, *E. atribrunneum*, *E. albidum*, *E. pubescens*, *E. Burlinghamiae*, *E. Earlei*, *E. bicolor*, *E. melleidiscum*, *E. Davisii* (*Clitopilus Davisii* Pk.), *E. fragile*, *E. melleicolor*, *E. brevipes*, *E. inocybiforme*,

*E. rubribrunneum*, *E. pluteiforme*, *E. commune*, *E. alcalinum*, *E. avellaneum*, *E. washingtonense*, *E. Cokeri*, *E. sericeiceps*, *E. subjugatum*, *E. subsinuatum*, *E. Whiteae*, *E. giganteum*, *Pluteus niveus*, *P. unakensis*, *P. aurantiacus*, *P. rugosidiscus*, *P. melleus*, *P. leptotiformis*, *P. melleipes*, *P. nanellus*, *P. glabrescens*, *P. squamodiscus*, *P. umbrinidiscus*, *P. atriavellaneus*, *P. eximius* (*Agaricus eximius* Pk.), *P. pallidicerinus*, *P. campanulatus*, *P. brunneidiscus*, *P. Whiteae*, *P. longipes*, *P. ludovicianus*, *P. griseobrunneus*, *P. avellaneus*, *P. deliquescentes*, *P. fuliginosus*, *P. fibrillosus*, *P. latifolius*, *P. washingtonensis*, *P. fulvibadius*, *P. myceniformis*, *P. compressipes*, *P. pulverulentus*, *P. spinulosus*, *Chamaeota mammillata* (*Annularia mammillata* Longyear), *C. Broadwayi*, *Volvariopsis Loweiana* (*Agaricus Loweiana* Beck.), *V. pusilla* (*Amanita pusilla* Pers.), *V. pubescens* (*Agaricus pubescens* Pk.), *V. perplexa* (*Volvaria perplexa* Pk.), *V. umberata* (*Volvaria* Pk.), *V. Earleae*, *V. concinna* (*Volvaria* Clements), *V. villosovolva* (*Volvaria* Lloyd), *V. submyochroa* (*Volvaria* Clements), *V. Peckii* (*Volvaria* Atk.), *V. speciosa* (*Amanita speciosa* Fr.), *V. emendator* (*Agaricus emendator* B. & C.), *V. viscosa* (*Volvaria* Clements), *V. gloiocephala* (*Agaricus gloiocephalus* D.C.), *V. alabamensis*, and *V. volvacea* (*A. volvaceus* Bull.). Trelease.

**Lipman, C. B. and W. F. Gericke.** Antagonism between anions as affecting barley yields on a clay-adobe soil. (Journ. Agric. Research. IV. p. 201—218. Pl. 29. 1915.)

Results are given in this paper which establish for the first time, so far as the authors are aware, the existence of antagonism between anions in a clay-adobe soil for barley (*Hordeum*) as follows:

Antagonism is shown between sodium chlorid and sodium sulphate and between sodium chlorid and sodium carbonate in the second crop. None is shown in the first crop.

Slight antagonism is shown between sodium carbonate and sodium sulphate in the first crop. It is questionable whether any exists at all in the second crop.

In subsidiary experiments the following points are established in addition to those named above.

Marked antagonism exists in both the first and second crop between sodium sulphate and calcium sulphate in soil cultures. This has not been considered possible hitherto by Hilgard.

In testing the toxicity of single alkali salts it is found that 0.1 per cent each of sodium chlorid and sodium sulphate stimulates barley in the first crop and reacts poisonously to it in the second crop.

Sodium carbonate does not manifest toxicity, but, on the contrary, shows stimulation even up to concentrations equal to 0.3 per cent of the dry weight of soil. Jongmans.

## Personalnachricht.

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