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

und der Redactions-Commissions-Mitglieder:

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

von zahlreichen Specialredacteuren in den verschiedenen Ländern.

Dr. J. P. Lotsy, Chefredacteur.

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

Gager, G. S., The ballot for names for the exterior of the laboratory building, Brooklyn Botanic Garden. (Brooklyn Bot. Gard. Record. IV. p. 105—123. Oct. 1915.)

As the outcome of an extensive ballot by American botanists, the following names of deceased botanists were selected as most worthy of commemoration for their contributions to the development of the science, — those of the first group being accorded more prominent places than those of the second.

I. Linnaeus, de Candolle, Gray, Tournefort, J. D. Hooker (systematists); Hofmeister, Mohl, Nägeli, Grew, Schleiden (morphologists); Sachs, Darwin, Saussure, Mendel, Hales, Knight, Spengel, Ingen-Housz (physiologists); de Bary, Fries (mycologists); Brongniart (palaeobotanist).

II. Adanson, Amici, Aristotle, Bauhin, Bentham, Boussingault, R. Brown, Camerarius, Cesalpino, Cohn, Cordus, Delpino, Dioscorides, Dutrochet, Elliott, Engelmann, Gärtner, Ghini, Hedwig, Heer, Hooke, Humboldt, A. L. Jussieu, Kölreuter, Link, Malpighi, Michaux, Micheli, Mirbel, F. Müller, Nuttall, Pasteur, Persoon, Pliny the younger, Pringsheim, Pursh, Rafinesque, Ray, Saporta, Schwendener, Strasburger, Theophrastus, Torrey, Ward, H. M. Wolff. Trelease.

Miehe, H., Allgemeine Biologie. Einführung in die

Hauptprobleme der organischen Natur. (Nat. u. Geistesw. CXXX. 40 F. B. G. Teubner, Leipzig. 1914.)

Das bekannte Büchlein Miehes erscheint unter einem anderen Titel. Trotzdem ist aber der Charakter desselben der gleiche geblieben. Wohl haben einige Kapitel wie das über Fortpflanzung eine wesentliche Erweiterung gefunden, in dem nun die neueren Ergebnisse der so schnell fortschreitenden Vererbungslehre berücksichtigt sind, wie überhaupt überall dem Fortschritt Rechnung getragen ist. Zu erwähnen ist auch die Vergrösserung, die die Zahl der Abbildungen besonders nach der zoologischen Seite hin erfahren hat.

Sierp.

Rouppert, K., Beitrag zur Kenntnis der pflanzlichen Brennhaare. (Bull. Akad. Wiss. Krakau. Mathem.-Naturw. Kl. p. 887—896. 1 Taf. 1914—15.)

Die Arbeit beschäftigt sich mit der Anatomie und Entwicklungsgeschichte der Brennhaare von *Giardinia cuspidata*. Die grossen Haare dieser *Urticacee* stehen ohne Sockel auf dem Pflanzenorgan (Blatt, Stengel, Infloreszens) und sind bis $^4/_5$ ihrer Höhe von einer Arillus-artigen Hülle umgeben; diese besteht im oberen Teile aus einschichtigen Epidermiszellengewebe, im mittleren und im basalen Teile kommen unter der Epidermis noch 1—3 Periblemzellschichten zur Ausbildung. Am Scheitel des verkieselten Köpfchens tritt ein haubenartiges, Pektinstoffe führendes Membrangebilde vor. Diese Brennhaare fungieren als Hydathoden. Ausser bei *Giardinia cuspidata* und *G. heterophylla* wurde Guttation bei mehreren Arten anderer *Urticaceen*- und auch *Loasaceen*-Gattungen konstatiert. Bei diesen aber haben die Haarköpfchen keine Pektinhaube, sondern zerstreute, zwischen der Kutikula und dem Kieselpanzer gelagerte Körnchengebilde, wie solche auch in dem ebenfalls guttationsfähigen Halsteil der *Giardinia*haare vorkommen.

Burgerstein.

Evans, A. W. and **H. D. Hooker Jr.** Development of the peristome in *Ceratodon purpureus*. (Bull. Torrey Bot. Club. XL. p. 97—109. 26 Fig. 1913.)

The original amphithecium, showing eight cells in cross section, divides by periclinal walls into an inner and an outer layer.

The inner peristomial layer develops from the inner amphithecial layer, undergoing division by anticlinal walls until it is composed of twenty four longitudinal rows of cells.

The outer peristomial layer develops from sixteen longitudinal rows of cells cut off by periclinal walls from the outer amphithecial layer, after its eight rows have been divided by anticlinal walls; the outer peristomial layer undergoes no further divisions by anticlinal walls.

Ridges of thickening, representing the future teeth, are laid down upon the periclinal walls between the two peristomial layers.

The cells of the peristomial layers form eight groups, each composed of two rows of cells of the outer layer and three rows of the inner layer. Each group gives rise to two teeth.

In the upper part of each group eight deposits of thickening are laid down in four strands, representing the four branches of

the two teeth; in the lower part only two strands are formed, representing the basal undivided portions of the teeth.

In the outer peristomial layer thickenings are deposited also upon the transverse walls, representing the transverse ridges of the teeth.

In the undivided basal portion of each tooth a fine median longitudinal line on the inner surface represents the vestiges of the radial walls between two rows of peristomial cells.

In the basilar membrane the thickening of the walls in the outer peristomial layer is uniform except in case of the outer walls.

Jongmans.

Gortner, R. A. and **J. A. Harris.** On a possible relationship between the structural peculiarities of normal and teratological fruits of *Passiflora gracilis* and some physico-chemical properties of their expressed juices. (Bull. Torrey Bot. Club. XL. p. 27—34. 1913.)

From the determination of the depression of the freezing point, the specific gravity, and the total solids in the expressed juice of 23 samples of abnormal fruits of *Passiflora gracilis* and a like number of controls, the authors are led to the following conclusions:

The experiments indicate that the juice of abnormal fruits has a higher osmotic pressure (greater depression of the freezing point) than that of normals. This is true whether the abnormality be a meristic variation in the fruit wall — i. e. an increase in the number of external sutures or of the number of placentae over the normal condition — or the production of an entirely new structure in the form of an included whorl or whorls of accessory carpels springing from the floor of the fruit (prolification of the fruit).

The average molecular weight of the substances in solution in the plant sap is, apparently, lower in the abnormal fruits, but this is less consistently true for the various classes of structural aberrations recognized.

While the findings are fairly consistent throughout, it must be remembered that the problem is surrounded with many difficulties. A wider series of material is desirable and many questions remain to be investigated. Furthermore, it is clear that the whole problem of the nature of the relationship between the structure of the fruits and the properties of the juice remains to be worked out. The authors claim to have demonstrated that the physico-chemical properties of the plant sap deserve consideration as a first step in the analysis of the factors involved in morphological variations of the fruit.

Jongmans.

Harris, J. A., On the relationship between the number of ovules formed and the capacity of the ovary for maturing its ovules into seeds. (Bull. Torrey Bot. Club. XL. p. 447—455. 2 Diagrams. 1913.)

In dwarf varieties of garden beans, *Phaseolus vulgaris,* there is but a slight relationship between the number of ovules per ovary and its capacity for maturing these ovules into seeds. So lax is this relation that in working with only moderately large samples both positive and negative values of the coefficient may be found in the same strain of material.

Such a relationship does, however, exist. So far as the mate-

rials available may be considered as representative of the species it is generally negative, i. e., as the number of ovules formed in creases the capacity for maturing these ovules into seeds decreases. This conclusion is supported by the facts that the negative correlations are significantly more numerous than the positive, they average larger numerically, and they have a higher degree of trustworthiness with regard to their probable errors.

In some varieties, however, the correlations seem to be generally positive. This is true for the common Navy. All other varieties so far as studied show exclusively or preponderantly negative correlations.

Concerning the explanation of this relationship no suggestion can be made. Such an attempt would be quite premature until ample quantitative data on the nature (sign) and intensity of the relationship in a considerable series of varieties are available. Anyone venturing to suggest explanations must also fully realize that the problem is an exceedingly complex one, involving many difficulties. But as matters of biological fact the results seem definitely established, and represent one further step in the analysis of the problem of fertility and fecundity in plants. Jongmans.

Lillie, R. C., The rôle of membranes in cell processes. (Pop. Sci. Month. LXXXII. p. 132—152. 1913.)

The surface films of living cells consisting of both lipoids and proteins exhibit two physical characteristics which are especially observable: 1) semi-permeability during life, and 2) the capacity to undergo reversible changes in permeability toward dissolved substances. The antagonism existing between the physiological action of various substances is probably in many cases to be explained on the basis of a change in permeability of the membranes. It has also been found, as far as investigated, that the process of stimulation is always accompanied by an increase in permeability, and probably is often dependent on it. Stimulation of a tissue by the electric current appears to be a function of the changing permeability of the plasma membrane. Conversely, when tissues are treated with substances which increase the permeability of the plasma membrane, a difference in potential results, due to a difference in the rate of diffusion of the electric ions in the cells. This is brought about by a change in the polarization of the semipermeable membrane, and this change alters the permeability so that there is a difference in the rate of diffusion of the electric ions.

L. O. Overholts (Sl. Louis).

Mottier, D. M. and **M. Nothnagel.** The development and behavior of the chromosomes in the first or heterotypic mitosis of the pollen mother-cells of *Allium cernuum* Roth. (Bull. Torrey Bot. Club. XL. p. 555—565. Pl. 23, 24. 1913.)

At the end of their paper the writers publish following summary:

The resting nucleus prior to synapsis consists of a reticulum of linin and chromatin granules and of one or more nucleoli. The "Chromatinknoten" of Bonnevie are not present.

Before sinapsis there is, as in *Lilium*, a tendency to form a delicate continuous thread or spirem. There is no union of two spirems in synapsis.

Synapsis is a real contraction of the nuclear net and not a growing away of the nuclear membrane from the nuclear network as claimed by Lawson.

The spirem is a direct transformation from the nuclear net.

The hollow spirem is a thick chromatin cord in which a longitudinal split is only occasionally seen and only in parts of the same. This split whenever present always closes up completely before the cross segmentation.

The rearrangement of the spirem takes place which is referable to the second contraction described for the lilies and other plants. This results in an entanglement of loops and parallel parts of the spirem which twist upon each other. During this rearrangement the transverse segmentation of the spirem occurs.

Each bivalent chromosome is formed by an approximation, usually side by side, of different lengths of the spirem, which may have appeared as loops or otherwise. Each bivalent is, therefore, to be regarded as two somatic chromosomes that were previously arranged end to end in the spirem. The approximation of two somatic chromosomes, side by side, or otherwise, or their adherence end to end to form bivalents, is not known as synapsis in botanical literature, nor is it properly called a conjugation.

The prevalent form of bivalents upon the mature spindle is the large ring, although other forms exist.

The daughter segments split longitudinally during metaphase. This fission may be looked upon as a preparation for the second, or homotypic, mitosis.

In the construction of the daughter nuclei, the chromatin does not pass into a finely divided state. The chromatin segments elongate greatly, becoming wavy or zigzag, and form an interrupted spirem by the union of a number of the free ends. This spirem is disposed in the form of a wreath or crown open at both the polar and antipolar sides. The ends of the chromatin segments do not fuse into "Chromatinknoten" in the daughter nucleus.

Jongmans.

Orman, E., Recherches sur les différenciations cytoplasmiques (Ergastoplasme et Chondriosomes) dans les végétaux. I. Le Sac embryonaire des Liliacées. (La Cellule. XXVIII. p. 365—443. Pl. 1—4. 1913.)

Le mémoire consiste de deux parties. La première contient un aperçu historique sur les travaux antérieurs qui se rapportent aux différenciations cytoplasmiques. Cet aperçu permet à l'auteur de définir avec précision les questions qui se posent au sujet des formations cytoplasmiques. Ensuite il décrit ses objets d'étude (*Lilium croceum* et *martagon, Fritillaria imperialis* et *Tulipa gesneriana*) et ses méthodes de fixation.

La seconde partie comprend les recherches personnelles, une discussion générale et les conclusions suivantes.

1. Dans une étude des structures cytoplasmiques, il est de toute nécessité de recourir à un examen comparatif des résultats obtenus par diverses méthodes de fixation et de tenir compte des circonstances variées dans lesquelles celles-ci peuvent être employées.

2. Les méthodes „mitochondriales" mettent en évidence, dans le sac embryonnaire, à tous les instants de son évolution, des corpuscules dont les caractères morphologiques et les allures à l'égard

des réactifs correspondent à ce que l'on considère généralement comme spécifique des mitochondries. Néanmoins, nous ne trouvons aucune image qui montrerait leur multiplication par bipartition et rien ne prouve qu'ils entrent en jeu dans l'élaboration du deutoplasme. Nous ne pouvons décider si ces corpuscules sont une forme spéciale de deutoplasme, ou bien s'ils représentent l'état „embryonnaire" des plastes, ou enfin s'ils ont la valeur d'éléments constitutifs du protoplasme.

Les chondriosomes du sac embryonnaire de *Fritillaria* et *Tulipa* n'existent qu'à l'état de mitochondries, apparaissant vésiculeuses après traitement par la liqueur chromo-osmique et pleines après emploi de la méthode de Regaud; on ne trouve ni chondriocontes ni vrais chondriomites.

Ces éléments sont d'origine cytoplasmique et non d'origine nucléaire.

3. Ces mêmes méthodes mitochondriales préservent, dans le cytoplasme, des corps deutoplasmiques abondants. D'abord sous forme de „globules" assez petits, ils apparaissent plus tard comme des corps plus volumineux que nous avons appelés les „boules" deutoplasmiques. Leur colorabilité par l'osmium de liqueurs chromo-osmiques tend à les faire considérer comme des matières grasses. Après le stade pachytène ou le stade strepsitène, les boules se dissolvent dans le cytoplasme.

4. Les méthodes „ordinaires", celles que l'on emploie le plus souvent en cytologie, ne conservent pas les mitochondries du sac embryonnaire et ne montrent pas non plus, sous leur forme naturelle, les enclaves deutoplasmiques. Les „globules" primitifs sont même complètement absents des préparations ainsi obtenues.

5. Les formations „ergastoplasmiques" n'apparaissent nettement que dans les préparations qui ne montrent ni mitochondries ni corps deutoplasmiques. Elles sont toujours lamellaires.

Aux environs des stades pachytène et strepsitène, elles apparaissent sous forme de masses spiraloïdes. Celles-ci sont un résultat d'une altération et d'une dissolution partielle, que les réactifs font subir aux enclaves deutoplasmiques de cette période et ne sont pas l'aboutissement d'une évolution subie par des structures du protoplasme.

L'ergastoplasme du début apparaît sous la forme de lamelles assez épaisses et chromatiques diversement orientées, sans localisation préférée, isolées ou rattachées les unes aux autres. Elles résultent, principalement du moins, d'une altération des globules deutoplasmiques, dont les débris paraissent incorporés dans une structure lamellaire du protoplasme. En tout cas, l'„ergastoplasme" n'est à aucun moment une structure spécialement active du protoplasme. Ce n'est pas un „protoplasme supérieur". Jongmans.

Picard, M., A bibliography of works on meiosis and somatic mitosis in the Angiosperms. (Bull. Torrey Bot. Club. XL. p. 575—590. 1913.)

This bibliography is arranged according to families and in these to genera and species, so that one finds under each species the full list of papers in which it has been treated. Works published before 1880 have not been cited. The citations extend to May, 1913. Works on the morphological development of the male and female gametophytes have been mentioned only when they contain matter

of cytological interest. The writer has used his own discretion with respect to articles of questionable relevance, and also in deciding, whether or not incidental references to somatic mitosis should be cited.

The nomenclature employed in the arrangement of the species is that of N. L. Britton's Manual of the Flora of the Northern States and Canada, 2d Edit. 1907. In the case of forms not within the range of this work, the nomenclature follows the rules, laid down by the International Botanical Congress at Vienna. Where the two systems differ, the designation of the Vienna code is added in parentheses. Jongmans.

Blakeslee, A. F., Sexual reactions between hermaphroditic and dioecious mucors. (Biochem. Bull. XXIX. p. 87—102. 2 textfig. and pl. 2—3. Aug. 1915.)

Reasons connected with imperfect hybridization when hermaphroditic mucors are grown in contact with the sexual races of dioecious forms lead to the conclusion that what Blakeslee has called + races in the latter are female, and — races are male.

Trelease.

Harris, J. A., A first study of the influence of the starvation of the ascendants upon the characteristics of the descendants. I. (Am. Nat. XLVI. p. 313—343. 1912.)

Plants of *Phaseolus vulgaris* were used in the experiments. The work was carried on in the field on "good" and "poor" agricultural lands and the conclusions drawn from the plants grown thereon. The author reports the provisional conclusion that starvation of the ascendants for one to three generations has no conspicuous effect upon the characteristic of the adult descendants, as far as the eye can detect in the field. The calculated statistical constants appeared to indicate a slight decrease in the number of pods per plant.

L. O. Overholts (St. Louis).

McClendon, J. F., The effects of alkaloids on the development of fish (*Fundulus*) eggs. (Amer. Journ. Physiol. XXXI. p. 131—140. fig. 1—9. 1912.)

Thousands of *Fundulus,* eggs were placed in solutions of several substances grouped together as alkaloids though being very different organic compounds and belonging to both the aliphatic and the carbocyclic series. Despite their diverse character these alkaloids produced the same morphological effects on the eggs, retarded development, and caused the same general abnormalities in the resulting embryos. While it may be possible that the same abnormalities can be produced by any chemical treatment yet quantitative results show differences, for example, in the effect produced by alcohol and that by alkaloids. M. C. Merrill (St. Louis).

Llyod, F. E., Leaf water and stomatal movement in *Gossypium* and a method of direct visual observation of stomata in situ. (Bull. Torrey Bot. Club. XL. p. 1—26. 3 Fig. 11 Tables. 1913.)

In the foregoing paper a method for the direct observation and

measurement of stomata in situ is described. The method is adapted to field work by night and by day.

Leaf water, stated in percentage of dry weight, was found to vary in the cotton plant under usual conditions between 318 and 220 per cent. On the day of observation the minimum leaf water content was reached at the 14 hour or there abouts. This reduction represents a net loss as shown by the determinations made relative to unit area and, therefore, with quantitative regard to dry weight.

The amount of loss of leaf water when thus determined is from 7 to 15 per cent on the initial amount at sunrise, under the conditions prevailing when the observations were made. Among these conditions it may be mentioned incidentally that the soil was well drained and rich in moisture at the time. Severer circumstances would no doubt effect a still greater loss. The observed loss, however, may be taken as indicative of a usual phenomenon, the reality of which is made evident in an observed daily wilting of the leaves beginning at about the 9 hour, detectable not alone by change in position (since this may occur as a phototropic response) but by flaccidity. The case may be otherwise stated by saying that under usual day conditions, with sunshine, the roots are unable to supply loss of water from the leaves. Balls' view that the water supply is the limiting factor of growth, and his observation that no growth takes place under the Egyptian sun appear to be quite applicable to Alabama. With regard to the amount of growth in Alabama, preliminary measurements, prompted by the results obtained from the determinations of leaf water, indicate that even under the presumably more favorable humidity conditions obtaining here growth does not take place for the major portion of the day, since during the latter part of the growing season an actual daily shrinkage in stem and leaf length has been observed The writer can hardly concur, however, with Balls in his view that because growth does not take place in sunshine this is to be interpreted as unfavorable. Comparative measurements on the same variety of cotton obtained in Arizona betray a no more unfavorable reduction of leaf water than in Alabama, when there is sufficient water in the soil. There is evidence that variations in soil moisture are registered in both the absolute leaf water content and in the rate of recovery after the minimum quantum for the day has been reached, while the loss during the first part of the day appears to be less affected. It would seem that the real test is the growth integer for the season, and it is not evident that, with irrigation, the conditions in the semiarid Arizona desert at all events are unfavorable from this point of view. A hot sunshiny day after all may be good for cotton, but this good may not be apparent in growth at the time. This is indicated by the amount of photosynthates formed (measured with small error due to well understood causes) by the increase in dry weight. Two series in Arizona gave increases of 24 and 32 per cent for 8 hours. In Alabama, with the exception of one series of old leaves in which there was no apparent change in weight, the increases ranged from 6 to 25 per cent, the latter being one instance out of a total of seven series. Whatever may be said of increase in dimensions, therefore, it remains the fact, that in spite of the hot unmodified Arizona sun shining throughout continuously cloudless days in August, more energy in the form of carbohydrates was made available than in the similar periods in Alabama. It is proper, however, to recall that the leaves studied

in Arizona were of fuller development, while those in Alabama were either rather young (10—15 cm. transverse measurement) or overmature.

It is obvious that it will be of great interest to make careful measurements of growth, as indeed of other functions, for comparison with those of Balls in Egypt.

The stomata are practically closed at night, but nevertheless show a tendency to open during the early morning hours. The more obvious daily opening begins at about 6.30, in Alabama in September, and the maximum is reached at about 8.30 or 9, after which closure progresses until 11 or somewhat later. A concomitant and appreciable wilting takes place, correlated with the reduction of leaf water. During wilting there appears to be no "temporary opening" of the stomata, although the writer has observed a measurable but not very marked rise in the rate of transpiration about a half hour after wilting starts in, followed by a sudden reduction of rate. Jongmans.

McClendon, J. F., The increased permeability of striated muscle to ions during contraction. (Amer. Journ. Physiol. XXIX. p. 302—305. 1912.)

While the question of the positive electric charge on the surface of muscles is not settled yet according to the membrane theory of Bernstein there is a plasma membrane or surface film surrounding the muscle fibre which permits easier exit to some kations than to the correspondings anions and these kations penetrating through the surface film give the surface a positive electric charge. When this film is destroyed there is a negative variation, and as this is due to increased permeability towards any ions there should be an increased conductivity on contraction of the muscle. To determine if such is the case experiments were conducted on frog's muscle and the conductivity measured by the Kohlrausch method. It was found that there was increased conductivity during contraction and this was interpreted as demonstrating an increase in permeability to anions by some structures within the muscle, and according to the membrane theory a reduction of electrical polarization and increased surface tension and contraction. These muscular structures are exceedingly small. M. C. Merrill (St. Louis).

Antevs, E., Einige Bemerkungen über *Cycadopteris Brauniana* Zigno und *C. Zeilleri* n. sp. (Geol. För. i Stockholm Förhandl. CCCVII. p. 376—384. Taf. 8. 1915.)

Verf. wendet sich gegen Signora Grandoris Zusammenführen von heterogenen Elementen unter einer und derselben Art wie auch gegen ihre Auffassung von den Umgestaltungen der Blätter und der Cuticula während der Entwicklung der Blätter. *Cycadopteris Brauniana* umfasst, wie Zeiller dieselbe auffasst, zwei verschiedene Blatttypen, eine mit getrennten Spaltöffnungstaschen, eine zweite mit einer zusammenhängenden Spaltöffnungsfurche. Für den letzteren Typus bringt Verf. den Namen *C. Zeilleri* in Vorschlag. In systematischer Hinsicht ist *Cycadopteris* neben *Thinnfeldia* u. a. m. zu den Pteridospermen oder zu einer anderen ausgestorbenen, jenen nahestehenden Pflanzengruppe zu führen. Autorref.

Allen, R. F. and **H. D. M. Jolivette.** A study of the light reaction of *Pilobolus*. (Wis. Acad. Sci., Trans. XVII. p. 533—598. 1913.)

By means of a dark box with a circular opening the authors observed the reaction of cultures of *Pilobolus* with regard to the accuracy of aim of the sporangiophores toward the source of light, the reaction toward different colored lights, the reaction toward light from two sources, and the reaction toward different colored light from different directions.

It was found that the aim of the fungus was less accurate as the distance from the source of light became greater. The inaccuracy was due to the gravity factor. The response to blue light was the same as to white, but perhaps slightly more accurate, the response to yellow light was less accurate, and that toward red light very slight.

With two sources of light on the same side of the box, the sporangiophores discharged at the nearer and were uninfluenced by the other. Perception and reaction could take place in fully matured sporangiophores. White light showed stronger influence than blue; blue stronger than yellow; while red light showed but little attraction for the sporangiophores.

J. C. Gilman (St. Louis).

Blakeslee, A. F. and **R. A. Gortner.** Reaction of rabbits to intravenous injections of mould spores. (Biochem. Bull. IV. p. 45—51. pl. 2. Mar. 1915.)

Though agglutination was produced, no cytolitic substances capable of dissolving the spores of certain mucors were produced.

Trelease.

Davis, J. J., Notes on parasitic fungi in Wisconsin. (Trans. Wisc. Acad. XVIII. 1. p. 78—271. Oct. 1915.)

Supplementary to the author's Provisional List of Parasitic Fungi in Wisconsin — previously noted in the Centralblatt — and containing numerous annotations and descriptions. The following new names are proposed: *Leptosphaeria folliculata oxyspora, Phyllosticta Liatrides, Diplodia Uvulariae, Septoria Andropogonis, S. polita, S. carpinae* (*Xyloma carpinea* Schw.), *Sacidium microspermum* (*Septoria microsperma* Pk.), *Colletotrichum Helianthi, Ovularia Asperifolii Lappulae, Cercosporella exilis, C. fingens, Septoria Senecionis-aureae, Cylindrosporium vermiforme, Ascochyta Saniculae, Ramularia fraxinea, Cercospora Echinochloae, Fusarium carpineum, Ascochyta marginata, Septoria cylindrospora, Colletrotrichum sordidum, Ramularia ionophila, Cercosporella scirpina, C. filiformis, C. trichophila, Cercospora Camptosori, C. Erysinii, C. Corni,* and *C. Arctostaphyli.* Trelease.

Fromme, F. D., The culture of cereal rust in the greenhouse. (Bull. Torrey Bot. Club. XL. p. 501—521. 1913.)

The results of this investigations have been summarized by the author as follows.

1. Two of the cereal rusts, *Puccinia dispersa* Erikss., on rye, and *P. coronifera* Kleb., on oats, have been cultured in the uredo stage, on the living hosts in the greenhouse, for a consecutive period

of six months, from December 1912 to June 1913, by the transfer of infection once a month. *P. coronifera* was also cultured for a period of eight months, from September 1912 to May 1913, with transfer of infection once a week. During this period the rust went through 37 generations of the uredostage. No decrease in the degree of infection secured resulted from such continuous culture.

2. The average degree of infection maintained in mass cultures was approximately 200 pustules per plant. The largest number of pustules counted on an individual plant was 996.

3. *P. coronifera* does not self-propagate to any extent even when abundant host material is supplied and a constant humidity of 93 per cent is maintained.

4. High humidity is the essential factor in securing successful inoculation with uredospores of *P. coronifera*. No infections resulted when cultures were exposed in an atmosphere of 75 to 80 per cent of humidity, and at 93 per cent only 6 per cent of the normal degree of infection was obtained. Normal infections were secured only when cultures were covered with a bell jar for twenty-four hours subsequent to the application of spores.

5. The rate of development of *P. coronifera* increased with temperature increase. A decrease in the normal incubation period of five days, or 41 per cent, was produced in the "stove" where the temperature ranged from 20° to 30° while the range at which the normal cultures were grown was 14.5° to 21°.

6. Total light exclusion either early or late in the incubation period checks the development of *P. coronifera* and results in an almost complete cessation of growth.

7. Uredospores of *P. coronifera* when stored at room temperature gradually lose their capacity for germination. A 0.2 per cent germination was obtained after storage of eighty-four days.

Jongmans.

Janssens, F. A., E. van de Putte et **J. Helmsmortel.** Le chondriosome dans les champignons (Notes préliminaires). (La Cellule. XXVIII. p. 448—452. Pl. 1, 2. 1913.)

L'appareil mitochondrial a été fort peu étudié dans les plantes inférieures. Il n'y a dans la littérature qu'une courte notice de Guillermond à ce sujet et les auteurs ne pensent pas qu'il existe dans la littérature du chondriosome des données plus précises concernant les champignons.

La première notice traite du chondriosome dans les asques de *Pustularia vesiculosa*. On trouve l'appareil mitochondrial dans les asques à tous les stades de leur évolution jusqu'à la formation des spores. Le chondriosome de l'asque est une partie fort importante de son protoplasme, qui passe entièrement dans les spores, lors de leur formation.

La deuxième notice contient des remarques sur le système mitochondrial dans les *Saccharomycetes*. Les auteurs n'en donnent pas encore des détails. Leur premier but était de convaincre le lecteur de l'existence d'un chondriosome dans les saccharomycètes.

Jongmans.

Baccarini, P. und **G. Bargagli-Petrucci.** Prime ricerche sulla malattia del *Trifolium pratense* (Bolognino) chiamata „incappucciamento" II. (Atti della Reale Accad. econom.-

agrar. dei Georgofili di Firenze. 5. Ser. XI. disp. 2a, p. 23—96. 1 A. 12 fig. Firenze 1914.)

Del Quercio, G., Richerche preliminari sulle cause dello stremenzimento o incappuciamento del trifoglio. (Ibidem, p. 133—183. 39 fig.)

Die Krankheit „incappucciamento" (stremenzimento) des *Trifolium pratense* trat zum erstenmale in Toskana auf (1908). Es wurden mehrere Hypothesen über die Entstehung und Ursache der Krankheit aufgestellt.

1. Die von den kranken Kleepflanzen isolierten Pilzarten (z. B. *Sclerotinia Trifoliorum, Botrytis cinerea, Fusarium metachroum*) kommen als Primärursachen nicht in Betracht.

2. Man isolierte 4 Bakterienformen; forma *a* erzeugte nach Impfung auch im Freien die Krankheit. Doch muss der Keim durch eine Wunde eintreten können. *Cecidomyia*-Arten, auf dem Klee lebend, besitzen auf ihrer Oberfläche diese Bakterienform.

3. Ob Bodenerschöpfung oder ein ungünstiges Verhalten der Kalksalze im Boden die Ursache der Krankheit sind, ist recht wenig glaubwürdig.

4. Gewisse Veränderungen des Bodens, erzeugt z. B. durch Ueberschwemmungen, vermögen vielleicht auf irgend ein Mikroorganismus des Bodens derartig einzuwirken, dass er, eingedrungen in die Kleepflanze, durch Stoffwechselprodukte eine krankhafte Veränderung hervorbringen kann. Da heisst es, mit dem Kleeanbau zu warten, bis der Boden wieder seine normalen Eigenschaften erhält oder Fruchtwechsel eintreten zu lassen, bis der Boden wieder normal ist.

Del Quercio bemerkte zweierlei Veränderungen an kranken Pflanzen aus Oberitalien, *a.* solche, die durch Tiere nicht verursacht waren. Er meint, diese seien auf „Zwergbildung" zurückzuführen, und rät an Düngung und Fruchtwechsel. *b.* solche, die durch niedere Tiere verursacht werden. Eine grössere Rolle spielen da *Hylastes trifolii, Apion virens, Cecidomyen* und *Tylenchus devastatrix.* Ausser diesen haben sich andere Schädlinge zusammengetan, so dass man allen diesen Tieren den Beginn der Krankheit in die Schuhe schieben kann. Dann erst setzen die anderen Ursachen ein. Man muss da, wie sich aus dem kurzen Referate ergibt, noch weiter studieren. Matouschek (Wien).

Florensa y Condal, J., *Puccinia Oryzae,* ein Schädling des Reis im rechten Ebrodelta (Spanien). (Internation. agrar.-techn. Rundschau, VI. 3. p. 514—515. 1915.)

Juli 1914 wurde im genannten Gebiete der Reis von *Puccinia Oryzae* stark befallen. Verf. konstatierte diesen Pilz als den Schädiger und glaubt, dass folgende Faktoren zur Entwicklung des Pilzes beigetragen haben: recht hoher Wasserstand (eine Art Erstickung erzeugend), Verwendung nicht ausgewählten und nicht desinfizierten Samens, zu starke Düngergaben (zuviel P, K, Fe), Mangel an Wärme von der Keimung bis zur Blüte, zu dichter Anbau, Bodenmüdigkeit infolge mehrjährigen Anbaues derselben Pflanze, unzureichende Entfernung zwischen den einzelnen Reispflanzen, Vorhandensein von Unkräutern. Es werden 4 Sorten im Gebiete angepflanzt: „Ostiglia", „Bomba", „Pextero", „Benlloch", 75% der Ernte wurden zerstört. Bekämpfungsmittel waren nicht anwendbar. Vorbeugungsmassregeln sind folgende angegeben: Auf allen mit Reis bepflanzten

Feldern sind alle Pflanzen zu verbrennen. Will man doch das Stroh benützen, so muss es weit wegtransportiert werden und mit einer $FeSO_4$- oder $CuSO_4$-Lösung oder auch mit einer starken Kalkmilch begossen werden. Dann ist der Boden (nach dem Verbrennen des Pflanzenwachses) zu desinfizieren durch 1 g. rohes schwefelsaures Ammoniak oder 3 g. Kalk oder 400 l. Schwefelkohlenstoff per 2190 qm. (= 1 Jornal). Letzterer Stoff kommt aber zu teuer. Man wähle widerstandsfähige Sorten (japanische S., z. B. „Shiraighe", „Onsen", „Oba", „Kitakawa"). Auswahl des von den ausgewählten Sorten erzeugten Samens (nur von Spezialinstituten auszuführen). Keine Entnahme von Samen aus infizierten Böden. Ist dies unmöglich, so tauche man die Samen 6 Stunden lang in gewöhnliches Wasser und dann 10 Minuten in heisses (54° C.). Vor der Aussaat muss jedes Saatgut, aus nicht infizierten Böden stammend, 8—10 Stunden lang gebeizt werden mit Kalkmilch (1 kg. Aetzkalk in 100 l. Wasser) oder 2—3% H_2SO_4 oder ½%iger $CuSO_4$-Lösung oder Formalinlösung (250 g. in 100 l. Wasser). Dann Trocknung und sofortige Aussaat. Die anzuwendenden, praktisch erprobten Düngemittel und ihr Ausmass sind angegeben. Auf den Dämmen ist das Unkraut zu entfernen; der Wasserstand darf kein zu hoher sein; man pflanze eventuell in vor N.-Winden geschützten Lagen. Die einzelnen Pflänzchen dürfen nicht näher als ± 30 cm. zu einander stehen. Man wechsle alljährlich die Sorte oder gar die Frucht. Alle diese Massregeln müssten aber in gleicher Weise und gleichzeitig von allen Reisbauern angewendet werden. Matouschek (Wien).

Grundmann. Beitrag zur Sortenkunde des Winterroggens. (Zschr. Pflanzenzücht. III. p. 27—41. 1915.)

An 21 des verbreitesten und wertvollsten Sorten des Winterroggens wurden an 50,000 Messungen gemacht. Die sämtlichen Sorten lassen sich demnach in folgende 3 Klassen gliedern. 1) Lockerähriger Roggen. Er liefert bei niedriger Bestockung hohe bis sehr hohe Erträge. Er hat eine lange Vegetationsdauer und stellt hohe Ansprüche an Feuchtigkeit. 2) Mitteldichtähriger Roggen. Hohe Bestockung ist mit Frühreife verbunden Die Erträge sind oftmals schwankend. 3) Dichtähriger Roggen. Er giebt bei mittlerer Bestockung hohe bis sehr hohe Erträge; ist sehr lagerfest und anpassungsfähig. Seine Vegetationsdauer wechselt je nach Sorte von sehr früh (296 Tage) bis spät (305 Tage).

Boas (Weihenstephan).

Holm, T., Medicinal plants of North America. 91. *Jatropa gossypifolia* L. (Merck's Report 24. p. 165—167. f. 1—21. July 1915.)

The external and internal morphology of the plant is described and figured. The seedling has a long, stout hypocotyl and the cotyledons are large, oblong and obtuse. Characteristic of the root-structure is the early development of pericambial cork, and the secondary cortex contains a band of separate strands of stereïds. In the stem the phellogen arises in the hypodermal stratum of cortex; laticiferous ducts abound in the cortex. There is no endodermis and no closed pericycle, but isolated strands of stereome surrounding a broad zone of starch bearing parenchyma with many ducts. With regard to the leaf the petiole bears many glandular, branched hairs, and the stipules are deeply divided into such hairs; stomata occur

on both faces of the leaf-blade, but the chlorenchyma shows a typical dorsiventral structure with a ventral palisade-tissue; the midvein contains a single arch of mestome with a barely distinguishable support of stereome. In the upper part of the petiole is an oval based of seven separate, collateral mestome strands embedded in a large green parenchyma with ducts and numerous aggregated crystals.

Theo Holm.

Holm, T., Medicinal Plants of North America. 92. *Ananassa sativa* Lindl. (Merck's Report 24 p. 192—194. f. 1—18. 1915.)

Some years ago V. Marcano discovered that the juice of pineapple has the power of digesting proteid vegetable and animal substances. Furthermore R. H. Chittenden found that the fresh juice is a very constant and powerful digestant of albuminous matters; that the ferment, bromelin, is decidedly active in the presence of either acide or alkaline carbonates, but is most energetic in ven tral solution. The plant is described and figured. The roots have a thinwalled exodermis bordering on a closed sheath of about 15 layers of stereïds, sclereïds and thickwalled parenchyma. The cortex proper is thinwalled, and breaks down so as to form wide lacunae. The endodermis is thickwalled, a typical U-endodermis, and the pericambium is of two layers, nowhere interrupted by the protohadrome-vessels. In the stele is a very broad, central group of thickwalled conjunctive tissue. None of the roots were observed to remain enclosed within the stemcortex as is otherwise characteristic of several generic of the *Bromeliaceae* as described by Alfred Invergensen (Bot. Tidsskr. 3. Vol. 2. p. 144. Copenhagen 1877—1879). The leaf-structure agrees in most respects with that of the epiphytic genera viz. the huge water-storage tissue with spiral thickenings; the very open pneumatic tissue, and the dorsal location of the palisade-tissue, beside the presence of a double hypoderm.

Theo Holm.

Holm, T., Medicinal plants of North America. 93. *Vanilla planifolia* Andr. (Merck's Report. 24. p. 212—215. f. 1—16. Sept. 1915.)

The plant is figured and described. The aerial roots have no velamen, but several strata of pericambium, the cells of which are thickwalled outside the leptome; a large conjunctive tissue occupies the center of the stele. The aerial stem has no endodermis, but a closed sheath of a few layers of stereome, inside of which is a large parenchyma traversed by many scattered, collateral mestome-strands all supported by arches of stereome on the leptome-side. The leaf-structure is dorsiventral so far as concerns the location of the stomata, but the chlorenchyma lacks a palisade-tissue; the entire chlorenchyma is very thick and consists of about eighteen strata of roundish cells. All the veins are thin, arranged in a single plane, and embedded in the chlorenchyma; they are surrounded by thinwalled parenchyma-sheaths, and are supported by arches of stereome. The correlation between the root-structure and the leaf-structure is, thus, well illustrated by *Vanilla,* the absence of a velamen in the roots, and the presence of a large water storage-tissue in the leaves.

Theo Holm.

Holm, T., Medicinal plants of North America. 94. *Maranta arundinacea* L. (Merck's Report 24. p. 238—241. f. 1—14. Oct. 1915.)

The rhizome gives rise to two kinds of buds, some that develop

into aerial shoots with leaves and flowers, and others that remain subterranean, in the shape of long tubers densely covered with fibrous, scale-like leaves. All the roots are of nutritive type, and show no points of special interest. The tubers contain a broad cortex and a thinwalled endodermis, which surrounds another broad zone of parenchyma transversed by numerous mestome-strands, collateral or hadrocentric. The leaf-structure is dorsiventral; a very conspicuous hypoderm surrounds the chlorenchyma, which is differentiated into ventral palisade- and a dorsal pneumatic tissue; the midrib contains a huge water-storage-tissue, and many mestome-strands. The upper part of the long petiole forms an articulus or pulvinus of the characteristic structure described by Schwendener in his paper: Das Wassergewebe im Gelenkpolster der *Marantaceen*. The very characteristic foliage with thin, ample blades and with pulvini of the remarkable structure, known only from this family, gives an exellent idea of a sciaphilous type from the shady, tropical forests. Theo Holm.

Holm, T., Medicinal plants of North-America. 95. *Petiveria alliaceae* L. (Merck's Report 24. p. 266—270. f. 1—23. Nov. 1915.)

The plant is described and figüred, and shows little, if really any affinity to the *Phytolaccaceae*. The cotyledons are of very different shape, the one oblong, the other cordate, and obtusely cuspidate. Root-shoots abound. Mature roots, though not very thick show the same anomaly as certain species of *Phytolacca*, and the secondary cortex contains styloids in great abundance, and of gigantic size. No anomaly was absorved in any parts of the stem. The leaves are thin, and stomata occur on both faces; numerous styloids, placed vertically on the blade, are visible as translucid dots. There is a typical palisade tissue of one stratum covering a compact pneumatic tissue of only four layers. Six separate mestome-strands constitute the midrib, all supported by arches of stereïds, and embedded in a large water-storage-tissue. The same structure, recurs in the cotyledons. With regard to the floral structure, the perianth consists of four linear leaves, spreading during anthesis, afterwards erect, surrounding the fruit, and persisting. The four to eight stamens are inserted on a hypogynous disk, and the filaments vary in length. The ovary is tomentose, bearing four to six reflexed setae at apex, and the peniciliate stigma is situated some distance below the apex on the dorsal face of the ovary; the mature fruit is an achene. Theo Holm.

Schneidewind, W., Die Ernährung der landwirtschaftlichen Kulturpflanzen. Lehrbuch auf der Grundlage wissenschaftlicher Forschung und praktischer Erfahrung bearbeitet. (Berlin, P. Parey. 1915. 15 Fig. Gebunden 13 Mark.)

Die Einteilung des Werkes ist folgende:

I. Teil: Physiologie der Ernährung: Ernährung der Keimpflanze und der grünen Pflanze

II. Teil: Behandlung des Bodens: Bestandteile der festen Erdrinde; Bodenbildung; über Bodenarten, ihre Eigenschaften und Umwandlungen durch menschliches Eingreifen.

III. Teil: Düngung. Die verschiedenen Düngemittel und ihre Anwendung, die Düngung der einzelnen Kulturpflanzen; Beispiele

für die Düngung von Fruchtfolgen und Anlagen von Feldversuchen. Aus diesen Beispielen soll der Landwirt ersehen, in welcher Art die Höhe der Düngungen der einzelnen Früchte von der Vorfrucht und Düngung der Vorfrucht abhängig zu machen ist.

Das fast 500 Seiten starke Werk ist eine „angewandte Agrikulturchemie". Aus den Ergebnissen agrikulturchemischer Forschung wird unter Verwertung praktischer Erfahrungen die Ernährung der landwirtschaftlichen Kulturpflanzen abgeleitet und gründlich erläutert. Es schlägt eine Brücke zwischen Forschung und Anwendung und ist auch für jeden theoretischen Botaniker lesenswert.

Matouschek (Wien).

Siebenlist, T., Forstwirtschaft in Deutsch-Ostafrika. (Berlin, Paul Parey. 8. IV. 118 pp. 4 Taf. 1915.)

Im ersten Teil behandelt Verf. eingehend die Wald- und Forstverhältnisse der Kolonie. Im Anhang von Seite 69—118 werden die auf dem Hochplateau von Westusambara in 1600—2000 m Meereshöhe gefundenen 63 Waldbäume näher beschrieben. Abgesehen von zahlreichen ausführlichen Angaben über Habitus, Morphologie und forstliche Verwertung, sind auch nahezu überall Bemerkungen über Keimung, Bodenansprüche und die Benennung bei den Eingeborenen vorhanden. Ferner ist bei jedem Holz das spezifische Gewicht angegeben. Es schwankt von 0,455 bei *Mysteroxylum aethiopicum* bis 1,082 bei *Olea chrysophylla*. Schwerer als Wasser sind ausserdem nur noch *Ptaeroxylum obliquum* mit 1,037 und *Olea Hochstetteri* mit 1,056. Auf 4 Tafeln finden sich gute erläuternde Vegetationsbilder. Infolge der ausführlichen Beschreibungen und sonstige Bemerkungen wird der botanische Teil in botanischen Kreisen nicht unwillkommen sein.

Boas (Weihenstephan).

Torrend, P. C., S.J., A culturo do inhame da costa. (Broteria. XIII. 6. 1915.)

Le frère Torrend, botaniste distingué, actuellement au Brésil, fait description de l'igname da costa, qu'il suppose pouvoir rapporter au *Dioscorea alata*, culture, récolte, conservation des tubercules. Une gravure donne idée des tubercules. Celui qui a été photographié avait 0,60 m de longueur et le poids de 12 k. Dans la même gravure on voit un autre igname assez petit, mais recommandable parce qu'il est très productif et de facile culture dans les terrains argileux et compacts.

J. Henriques.

Personalnachrichten.

Ernannt: Dr. **W. Benecke** zu Berlin zum ord. Prof. der Bot. a/d Univ. in Münster i. W.

Gestorben: Dr. **Julius Klein**, Prof. der Bot. a/d Techn. Hochschule in Budapest, daselbst im 71. Lebensjahr.

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