Band 104. Nr. 5. XXVIII. Jahrgang. I. Bd. Nr. 5.

Botanisches Centralblatt.

Referirendes Organ

der

Association Internationale des Botanistes

für das Gesamtgebiet der Botanik.

Herausgegeben unter der Leitung

des Präsidenten: **Prof. Dr. R. v. Wettstein.** *des Vice-Präsidenten:* **Prof. Dr. Ch. Flahault.** *des Secretärs:* **Dr. J. P. Lotsy.**

und der Redactions-Commissions-Mitglieder:

Prof. Dr. Wm. Trelease und **Dr. R. Pampanini.**

von zahlreichen Specialredacteuren in den verschiedenen Ländern.

Dr. J. P. Lotsy, Chefredacteur.

No. 5.	**Abonnement für das halbe Jahr 14 Mark** durch alle Buchhandlungen und Postanstalten.	1907.

Alle für die Redaction bestimmten Sendungen sind zu richten an Herrn Dr. J. P. LOTSY, Chefredacteur, Leiden (Holland), Rijn- en Schiekade 113.

Hill, T. G., On the Seedling Structure of Certain Piperales. (Annals of Botany. Vol. XX. 1906. p. 161—175. With one plate and three diagrams in the text).

The transition in structure from stem to root is described in several species of the *Piperaceae* and *Saururaceae*. In *Piper cornifolium* the basal region of each seedleaf contains one large collateral bundle. While passing down the petiole the phloem is resolved into two masses bounding the xylem on each side, and the xylem undergoes rotation so that the protoxylem becomes exarch. At the cotyledonary node the two cotyledonary bundles pass towards the centre of the axis and anastomoses take place between their phloems and the epicotyledonary traces. Finally two phloemgroups are formed and a typical diarch root results.

In *Peperomia eburnea* and *Pep. pellucida* the bundles fuse together at the distal end of the cotyledonary petiole to form one strand in which, while passing down the petiole, the phloem gradually forms two groups of elements. In the stem the metaxylem generally travels inwards and leaves the protoxylem in an exarch position; usually there is no definite rotation. The phloem groups fuse and a diarch root is formed. The plumular bundles are unimportant and the vascular tissue of the root is derived chiefly from the cotyledons.

In *Pep. polystachya* four epicotyledonary strands are formed as the result of fusions. They occur two on one side and a similar pair on the other side of a line joining the two incoming cotyledonary traces. In the latter the protoxylem is exarch and the phloem somewhat bilobed. As they approach the axis the phloem divides into

two masses, each of which fuses with the phloem of the nearest plumular trace. The xylem comes into contact with the protoxylem of the plumular strands. The epicotyledonary bundles fuse in pairs and the metaxylem becomes less abundant but no typical root structure obtains.

The cotyledonary traces in *Pep. amplexifolia* enter the axis as normal collateral structures. In each fusion takes place with the nearest epicotyledonary bundle, the phloem and the metaxylem of both trace and bundle coming into contact. Lower down two large bundles result and an endodermis appears. There is no definite rotation of the protoxylem elements; they seemingly become exarch by the movement of the metaxylem. These changes have much in common with those occurring in *Arum maculatum*.

Pep. tithymaloides and *Pep. maculosa* resemble *Pep. amplexifolia*. The phloem of the seed leaf traces branches only after entering the axis and there is no rotation of the protoxylem; the epicotyledonary traces play a prominent part. In *Houttuynia cordata* and *Saururus cernuus* the transition phenomena are identical. The phloem of the cotyledonary traces branches on arriving near the centre of the axis and fuses with that of the epicotyledonary traces. The protoxylem becomes exarch by rearrangement of the xylem elements.

The author concludes that *Peperomia* is a reduced genus and suggests that the epiphytic habit of many forms has been the determining factor in the reduction. He discusses the phylogenetic importance of the transition phenomena. M. Wilson (Glasgow).

Reed, H. S., and **I. Smoot,** The mechanism of seed-dispersal in *Polygonum virginianum*. (Bull. Torrey Bot. Club. XXXIII. p. 377—386. July 1906).

The achenes are provided with a long lignified style, and when this is broken off the achene is projected for some distance. It is found that the stalk of the achene has a „separation-layer" stretching across it; above this the vascular tissues enclose a dome-shaped mass of pith, the cells of which are thin-walled and are subjected to pressure as the fruit ripens. When the fruit is broken off at the separation-layer the elasticity of the thinwalled pith causes the fruit to be ejected. M. A. Chrysler.

Druery, C. T., Sports and species. (Gardener's Chronicle. Vol. XL. p. 296—297. 1906).

The author points out the remarkable evidence in favour of de Vries' Mutation Theory which is afforded by the sports so often met with by fern-collectors. He considers that at least 2000 such definite „leaps" are on record, many of which would have given rise to good specific distinctions if they had only possessed the faculty of enduring in Nature. Under the conditions afforded by cultivation many of these sports are easily perpetuated from spores, and generally breed quite true. The author refers to a few examples of the establishment of such sports in nature, usually however they are only recorded as isolated individuals. R. H. Lock.

Gregory, R. P., Abortive development of the pollen in certain Sweet-peas (*Lathyrus odoratus*). (Proc. Camb. Phil. Soc. 1905. XIII. 3 p. 148—157).

Sterility of the anthers, arising in certain of the offspring of a hybrid between races of *Lathyrus odoratus*, was found to be a Mendelian recessive character by Bateson. The author examined the sporogenesis of the sterile plants as well as that of one of the normal parent races. In the latter the spore-mother-cells developed according to the usual method, a large nucleolus being present, and the transference of chromatic material from the nucleolus to the nuclear thread being observed.

In the sterile plants two forms of irregularity were seen, though differing only in degree; in one chromosomes of a somewhat irregular appearance were formed, in the other abortion took place at an earlier stage. Normal division of the pollen-mother-cell never took place in these cases. The sterility was always confined to the anthers, and the behaviour of the embryo-sac-mother-cells exactly resembled that shown in the case of ordinary plants. R. H. Lock.

Vries, H. de, Elementary Species in Agriculture. (Proc. Am. Phil. Soc. XLV. 1906. p. 149—156).

A critical examination of the evidence afforded the selection-theory by the results of the agricultural plantbreeder. The methods of German breeders are compared with those employed by Nilsson in Sweden and Hays in the United-States. The author argues that the slow improvement seen in the experiments of agriculturists such as Rimpau is due to the fact that a number of elementary and constant types were represented in their first selections and that the slow improvement observed is due to the gradual elimination of the less desirable of these. In the method of pedigree-cultures adopted by Nilsson and Hays and by careful students of heredity, the less desirable elements of the polymorphic population are recognized much earlier — often in the first generation — and the improvement is much more rapid, consisting, in fact, essentially in the selection and pure propagation of the most desirable of the elementary species already present. Harris.

Beer, R., On the Development of the Spores of Helminthostachys zeylanica. (Annals of Botany, Vol. XX, 1906. p. 177—186. With two plates).

In the first stage described the sporogenous cells have reached their full number and the tapetum consists of one to two layers. Later on the tapetal walls break down, the cytoplasm increases in amount and runs together and the nuclei are found in groups which are partly formed by approximation of nuclei from several cells and probably partly as a result of amitotic division: starch is found at this time in the tapetal cytoplasm. The sporogenous cells now separate into blocks; the middle lamella of the cellwalls becomes mucilaginous and a secondary thickening layer remains round each cell. The sporogenous cells divide into tetrads, but this does not take place simultaneously; no disorganisation of the mother-cells occurs. The tetrad wall is very thin and contains pectose; the young spore wall is a new formation and is cuticularised.

The plasmodium derived from the tapetum sends fingerlike processes into the sporangium between the separated sporogenous cells. These at first are only cytoplasmic but later on nuclei pass into them; while passing in these become elongated but again resume their isodiametric form on coming to rest. The average size of the nuclei is fairly constant. At this stage the plasmodium is rich in starch but the sporewalls are thin and their protoplasm scanty. The spores are tetrahedral and possess three ridges which converge to a point. The endospore which gives pectic reactions arises within the cuticularised wall and forms a continuous layer over its inner surface; it is not derived by the differentiation of the sporewall but is probably a new formation. At the apex of the spore it pushes between the ridges of the exospore and reaches the surface. Later a reticulate sculpturing is formed on the exospore; no epispore is present.

During the formation of the spore coats the spore cytoplasm is scanty and poor in starch, but some starch is found in the ripe spores. Meanwhile the tapetal cytoplasm begins to decrease in amount and to lose its starch; the vacuoles which are surrounded by very distinct plasmatic membranes increase in size and, finally, when the spores are ripe, the plasmatic membranes become completely approximated owing to the almost total disappearance of the cytoplasm. While this is going on the tapetal nuclei which are rich in chromatin often become irregular in shape. The author therefore concludes that the tapetal plasmodium is the centre of metabolic activities in which a substance is elaborated from the raw materials contained in the tapetum and that this substance is directly or indirectly employed in the growth of the sporewall.

M. Wilson (Glasgow).

Ewart, A. J., The Influence of Correlation upon the Size of Leaves. (Annals of Botany. Vol. XX. 1906. p. 79—82. With two textfigures).

The author refers to Lindemuth's statements regarding the size of leaves of *Begonia rex* and *Iresine Lindeni* which have been allowed to root in soil. Experiments performed on *Tilia europaea* are described. All buds except the terminal one were removed from a branch in spring; the leaves of the remaining bud developed to an abnormally large size. The cells were of the normal size and the enlargement was due to an increase of the number of cells formed. On subsequently removing all except the first and second leaf no increase of size occurred in the latter. All the leaves, except those of the terminal buds, were removed in June from two branches. In one case no subsequent increase of the remaining leaves took place. In the other a vertical glass tube was attached to the cut-surface of a lateral branch near the apex and a pressure of from 6—10 ft. of water was maintained for a month, but no enlargement of the leaves was obtained.

He concludes that neither the effect of an unusually abundant supply of water nor of correlative influences due to the removal of other buds and leaves are able to excite renewed growth in adult leaf of *Tilia*, even when acting conjointly. These influences, possibly aided by a more abundant supply of food, do, however, cause leaves to develope to an abnormally large size when applied at a sufficiently early period of their growth. M. Wilson (Glasgow),

---

Kirkwood, J. E., The pollen-tube in some of the *Cucurbitaceae.* (Bull. Torrey Bot. Club. XXXIII. p. 327—342, pls. 16 and 17. June 1906).

The time elapsing between pollination and the arrival of the pollen-tube at the embryo-sac is twenty-six hours in *Melothria*, nineteen hours in *Micrampelis*, and forty-one hours in *Cyclanthera.* Starch-bearing conducting tissue lines the stylar canal and covers the placental lobes, and along this tissue the pollen-tube travels, rarely injuring the cells. The cells of the conducting tissue are compared to those of certain nectaries, and like these appear to produce a nutritive secretion which in the present case exerts a directive force on the pollen-tubes. It is concluded that the behaviour of the pollen-tube is a phenomenon of chemotropism. M. A. Chrysler.

Worsdell, W. C., The Structure and Origin of the *Cycadaceae.* (Annals of Botany. Vol. XX. 1906. p. 129—159. With 17 textfigures).

The paper is divided into two parts.

I. The habit and structure of the Cycads. Short descriptions are given of the morphology and the structure of the Cycads, the structure of the *Medulloseae*, and the structure of *Lyginodendron* and *Heterangium.*

II. The Origin of Cycadean Structures.

a) The Origin of Axial Structures. The view that the Cycadean cylinder is derived from that of such a form as *Medullosa porosa* is adopted. Ancestral characters should be sought for in two principal regions (1) the cotyledonary node, (2) the flowering axis. In the stem of a seedling of *Encephalartos Bateri* Matte has found three almost independent steles, each of very sinuous contour; this structure is exactly comparable to that of *Medullosa anglica.* The irregular orientation of the bundles in the lower part of the peduncle of *Stangeria* may be explained by supposing that the whole cylinder has been derived by fragmentation of a few steles of sinuous contour such as are found in *Medullosa Leuckartii.* If all the bundles resulting from the fragmentation had remained concentric the resulting type of structure would resemble *M. Solmsii*, in which the polystelic character is probably derived from the solenostelic condition found in *M. porosa.* The centripetal xylem found in the upper part of the peduncle is homologous with that of *Lyginodendron*; in the latter each primary xylem group with its secondary xylem and phloem is the one-sided remnant of an entire stele such as occurs in *Medullosa.* It is also homologous with the single stele of *Heterangium* and *Megaloxylon.* In some cases in *L. Oldhamium* concentric stele-like bundles occur and this is the normal structure in *Cycadoxylon:* these are regarded as reversions to an ancestral character. The more concentrated structure of the stele found at the base of the branches of *Lyginodendron* is considered to be a mechanical adaptation. It is to the typical mature structure and not to the early stages of its ontogeny that we must look for the occurrence of ancestral characters.

In the *Medulloseae* the cylindrical and medullary systems of steles are variants of a single system; probably the former is primitive and gave rise to the latter. Similarly in *Macrozamia* the collateral medullary bundles are of cauline origin and constitute the same system as those of the vascular ring. In the fertile part of the axis of the male cone of *Ceratozamia* there is the rudiment of an intrafascicular pri-

mary cylinder. The bundles represent fragmented concentric structures and may be regarded as an ancestral remnant of the innermost cylinder in certain *Medulloseae*. The inversly orientated strands occurring on the dorsal side of the bundles of peduncles and sporophylls are the remains of steles in which the dorsal side has become completely aborted. They thus form remains of a second cylinder. All vascular cylinders or rings of Cycads are to be regarded as mutually homologous, whether primary or secondary. In certain *Medulloseae* the outer part of the secondary xylem of the primary cylinder far exceeds in thickness the inner portion; in all modern Cycads the inner portion is entirely extinct. In the cotyledonary node of *Cycas siamensis* a number of concentric steles occur outside the root stele and these are found in several genera.

Rudimentary inverted strands occur on the inner side of the third and fourth extrafascicular cylinders of *Macrozamia Fraseri* representing portions of concentric strands such as occur outside the central cylinder of *M. Denisonii*. In *Cycas Seemanni* the first extrafascicular ring consists of concentric strands. The cauline collateral bundles of Cycas correspond to these and also to the „accessory strands" of *Medullosa anglica*. The evidence is in favour of the derivation of both the primary and secondary rings of Cycadean stem organs from the polystelic or solenostelic structure of the same organs in the *Medulloseae*.

b) Origin of Foliar Structures. The leaf trace bundles of modern Cycads are homologous with the concentric leaf trace bundles of the *Medullosae*. In the peduncle of *Stangeria* some of the sporophyll traces consist of three small separate bundles, grouped around a common centre and thus representing a concentric bundle; concentric sporophyll traces also occur. In the peduncle of *Encephalartos villosus* the leaf traces leave the cylinder in groups each of which may be regarded as equivalent to a single concentric leaf trace of *Medullosa*. The single concentric petiolar bundle of *Lyginodendron* may be regarded as the equivalent of a number of collateral bundles united by their centripetal xylems, their phloems also fusing and surrounding the whole, such as occur in the petiole of *Myeloxylon* and *Encephalartos*. Such fusion has been described in a partial state in *E. horridus* and *Stangeria paradoxa*.

The cones are regarded as the final result of extreme reduction of complex sporophylls of te Neuropterid type where the sporangia were borne as terminal organs; this terminal position is still found in the female sporophyll of Cycas. Two integuments are probably present and are intimately concrescent, giving the appearance of a single organ. M. Wilson (Glasgow).

De Gasparis, A., Le alghe delle argille pleistoceniche di Taranto. (Atti Acc. Sc. fis. mat. Napoli. Vol. XII. S. II. N°. 4. (1905). p. 1).

Les algues que l'A. a trouvé dans les argiles pleistocéniques de Taranto se rapportent aux Confervacées, Sifonées, Laminariées, Gongilospermées, Nematospermées, Ormospermées et Desmiospermées, avec les espèces suivantes: *Chaetomorpha crassa* (Ag.) Ktz. (?), *Codium tomentosum* Ag., *Dictyota dichotoma* (Huds.) Lamx., *Callithamnion granulatum* (Duchez), *Grateloupia filicina* (Wulf) Ag., *G. Bassanii* n. sp., *Dudresnaya coccinea* (Ag.) Bonnem., *Delesseria crispa* Zanard. et *Gelidium corneum* (Huds.). L. Pampaloni.

Ostenfeld, C. H. & C. Wesenberg—Lund, A regular fortnightly exploration of the plankton of the two Icelandic Lakes, Thingvallavatn and Myvatn. (Proceedings of the Royal Society of Edinburgh. Session 1904—1905 vol. XXV. Part. XII. 1906. p. 1091—1167. 2 pls., 1 photograph, figs. in text).

This is the first record of any systematic investigation of plankton from localities further north than Denmark, and the undertaking was organised by Wesenberg—Lund who reports on the zooplankton collected, leaving the phytoplankton to Ostenfeld. The lakes examined were Thingvallavatn in the southwest of Iceland, situated in about 64° N. lat., its length being 16 km. and the greatest breadth 8 km. The surface covers 115 sq. km. the mean depth is 35 m. the greatest depth 110 m. and it lies 106 m. above sea-level. The other lake, Myvatn, lies in the northern part of the island, about 65° 33′ N. lat. and covers an area of 27 sq. km. In this lake no phytoplankton, only zooplankton, was found. Thingvallavatn cannot be regarded as an Arctic lake for during the entire year in which the samples were taken the surface was not frozen over. Since however the temperature of the water does not rise in summer higher than 11° C. the lake must be regarded as a coldwater one. The phytoplankton consists mainly of a few species of Diatoms, *Asterionelli* and *Melosirae; Myxophyceae* are wanting and both *Flagellates* and *Chlorophyceae* are unimportant. The general character is not alpine but rather that of the lakes in the Central European lowland during winter and early spring. It is very poor in species and one of its most remarkable features is the number of organisms one might have expected to find, but which were wanting: for example, *Tabellaria fenestrata, Dinobryon* sp., *Scenedesmus, Pediastrum, Eudorina,* etc. besides all the *Myxophyceae.* The author gives critical notes on the species which do occur and especially on the *Melosirae* and *Rhizosoleniae.* The chains of *Melosirae* are curved. Two *Rhizosoleniae* are found in samples nearly all the year round. The limnetic *Chlorophyceae* are not abundant, the main form being *Sphaerocystis* which predominates in alpine lakes and is probably common all over the Central European plain. *Ceratium hirundinella* is quite absent. The authors think it probable that the plankton of the Arctic lakes consists mainly of zooplankton, to a much greater degree than in more southern countries, and that the phytoplankton, especially in summer time, plays only an insignificant part in those lakes. They believe also that the phytoplankton of arctic and sub-arctic lakes consists in all probability mainly of algae with yellowish or yellowish-brown chromatophores: and that algae with green or blue-green chromatophores are almost entirely wanting. Exceptions from this general rule are *Sphaerocystis,* the semi-limnetic Desmids and a few rare *Chlorophyceae.* The paper concludes with remarks on Messrs. West's „Further contribution to the Freshwater plankton of the Scottish Lochs," published in the Trans. Roy. Soc. Edin. 1905. p. 477. A list of literature is followed by two plates on which are shewn some of the phytoplankton, and a photograph of Thingvallavatn.

E. S. Gepp—Barton.

Clinton, G. P., Ustilaginales. (North American Flora VII. p. 1—82. Oct. 1906).

This is the first fascicle of this work to appear treating the fungi. In it are treated those fungi which belong to the *Ustilaginales* in-

cluding the two families *Ustilaginaceae* and *Tilletiaceae*. Complete keys are given for the separation of the genera and species. Under each species is given the original citation, synonyms, description, hosts, type locality, distribution, illustration and exsiccati. The hosts are given very fully, each host species being distinctly cited without regard to the number which may belong to the same genus. A host index completes the paper. The new species described are: *Ustilago Rickerii* on *Panicum paspaloides* from Cuba, *U. Kellermanii* on *Euchlaena luxurians* from Guatemala, *U. punctata* on *Polygonum Newberryi* from Washington, *Tilletia Muhlenbergiae* on *Muhlenbergia Schaffneri elongata* from Mexico and *T. Redfieldiae* on *Redfieldia flexuosa* from Nebraska. Perley Spaulding.

Douglas, Gertrude E., The rate of growth of *Panaeolus retirugis*. (Torreya. VI. p. 157—165. 1906).

This is an account of measurements of eighteen individual sporophores of *Panaeolus retirugis*. It was found that the typical plant requires from 4 to 5 days for the complete development after appearing above the ground. The stem grows slowly at first, then very rapidly for 40 to 56 hours, and then more slowly for about 24 hours when it ceases. The pileus also grows slowly at first. It enters its period of maximum growth just before the same ceases in the stem. The growth is not more rapid at night than in the day time. The growth-region of the stem is a few m.m. below the top.

Perley Spaulding.

Evans, P., Peach Rosette. (Bull. Missouri State Fruit Expt. Stat. II. p. 1—10. 1904).

This is a brief paper giving the characteristics of the disease known as peach rosette. It first came to the notice of this station in 1901 in an orchard near the station grounds. It is known to be present in seven different orchards at present. The immediate removal of the diseased trees is recommended together with all parts of the same, even to the leaves. A disease of plums has also been noted which seems to be similar to that of the peach, but it is not yet known whether it is the same. Perley Spaulding.

Faurot, F. W., Report on fungous diseases occurring on cultivated fruit during the season of 1902. (Bull. Missouri State Fruit Expt. Station. VI. p 1—24. 1903).

Gives brief accounts of the following diseases: Scab, bitter rot black rot, fruit spot, sooty mold, leaf spot rust, canker of branches, sun scald and bark rot, root rot, crown gall and hairy root of apple; brown rot, scab, leaf curl, shot hole, bank spot, rosette crown gall, and gum disease of peach; twig blight, scab and leaf spot of pear; brown rot shot hole, and black knot of plum; leaf spot of strawberry and of blackberry, blackberry rust, raspberry anthracnose and black rot of grape. Perley Spaulding.

Garcia, F., Notes on crown gall of grapes. (Bull. New Mexico Agric. Expt. Stat. LVIII. p. 19—21 and 28—30. 1906).

Gives the frequency of occurence upon various varieties. None of the Chasselas or of the Gros Coleman were diseased. Practically

the only disease which is attracting any attention is the crown gall. Co-operative experiments are being carried on with the United States Department of Agriculture. Perley Spaulding.

Hedgcock, G. G., The crown-gall disease of the grape vine. (Bull. New Mexico Agric. Expt. Station. LVIII. p. 30—31. 1906).

This disease has been known for a long time in Europe and in California but seems to have been introduced into New-Mexico from the latter state as it occurs rarely upon vines which have been raised from the Mission stock of the vicinity. The disease drains the vitality of the plant since the sap is often lost to a considerable extent through the loose tissues of the gall. The galls die every winter where freezing weather occurs and the woody tissues beneath also die. The next spring a new gall growth is formed by the surrounding tissues and in the course of a year or two in susceptible varieties the whole stock is encircled and dies. Badly diseased vines bear poorly and are of little value. The following California varieties are subject to the trouble: *Mission, Muscat of Alexandria, Flame Tokay, Rose of Peru,* and *Black Prince.* The following varieties are freeest from the disease: *Sultana Seedless, Feher Zagos, White Sweet Water, Lenoir, Zinfandel* and *Black Malvoise.* The only method of coping with this trouble seems to be that of securing resistant varieties. Diseased vines should be destroyed and none planted in the same field for a number of years. Water should not be allowed to run from a diseased field into one uninfected. Great care should be exercised in getting new stock. Perley Spaulding.

Kauffman, C. H., *Cortinarius* as a mycorhiza-producing fungus. (Bot. Gazette XLII. p. 208—214. Sept. 1906).

The fungus *Cortinarius rubipes* sp. nov. was found by the writer to be connected as a symbiont with the roots of red oak, sugar maple, and *Celastrus scandens.* The fungus did not seem to be associated with any single species. Examination showed that the mycorhiza is truely ectotrophic. The fungus is described in another publication.
Perley Spaulding.

Longyear, B. O., A new apple rot. (Bull. Colorado Agric. Exp. Station. CV. p. 1—12. Nov. 1905).

An apple rot caused by *Alternaria* has been known since 1902 in Colorado. It has also been found in Michigan and in apples from California. Pears have also been found to be affected. Spraying with Bordeaux mixture will probably control the disease.
Perley Spaulding.

Massee, George, A fungus parasitic on a moss. (Torreya VI. p. 48—50. March 1906).

A brief account of a fungus *Epicoccum torquens* sp. nov., occurring as a parasite upon the moss *Weisia viridula* from Thomasville, Georgia. This attacks the capsule or fruit where it forms minute, dark-colored warts. Perley Spaulding.

Murrill, W. A., A new chestnut disease. (Torreya VI. p. 186—189. 1906).

This is a description of the fungus *Diaporthe parasitica* sp. nov. which causes a very serious disease of the branches of living trees of *Castanea dentata* in the vicinity of New York city and extending into New Jersey, Maryland, the District of Columbia and Virginia. An account of the disease is given. The fungus enters through wounds and attempts to inoculate twigs without wounds have been wholly unsuccessful. The fungus attacks all parts of the tree alike without regard to the size, and soon extends its field until the branch or stem is girdled and killed. The fungus works beneath the bark so the only method of treatment seems to be that of pruning out the diseased parts. Perley Spaulding.

Murrill, W. A., The pileate *Polyporaceae* of central Maine. (Torreya VI. p. 34—37. Feb. 1906).

This is a list of fungi collected in Maine during August and September, 1905. A single new species, *Polyporus fagicola* is described growing upon a decorticated beech log. Perley Spaulding.

Smith, Ralph E. and Elizabeth H. Smith, A new fungus of economic importance. (Bot. Gazette XLII. p. 215—221. Sept. 1906).

A peculiar rot of lemons in California has recently received attention by the Agricultural Experiment Station. The new rot differs from the ordinary blue mould rot which is so well known. The new rot spreads by contact and soon infests the whole box of fruit if left undisturbed. The rotted lemons have a peculiar rancid smell which is characteristic of the disease. Affected lemons may be found even upon the trees in the orchard during very wet weather. The fungus has been carefully studied in cultures. It does well only on liquid media. The fungus is found to represent a new genus and has been named *Pythiacystis*. It is intermediate between *Saprolegnia* and *Peronospora*. The new species *Pythiacystis citrophora* has been made and described, this being the fungus causing the disease of lemons. Perley Spaulding.

Wilson, G. W., Mycological notes from Indiana. (Torreya VI. p. 191—192. 1906).

Brief notes on *Peronospora Floerkeae, Hydrogera Kleinii*, and *Staminaria americana*. Perley Spaulding.

Campbell, D. H., Multiple Chromophores in *Anthoceros* (Annals of Botany, Vol. XX, 59, 1906. p. 321).

An *Anthoceros* discovered in Tjiapus Gorge, Buitenzorg, was found to contain multiple chromophores in all its cells; these were not infrequently as many as eight in number in each cell. The pyrenoid was absent. This species belongs to the section of the genus with spiral elaters and with no stomata in the sporophyte. M. Wilson (Glasgow).

Smith, R. G., A Gelatin-hardening Bacterium. (Proc. Linn. Soc. N. S. Wales 1905).

The bacterium was isolated from the tissues of *Schinus molle* which was exuding a turquoise-coloured gum-resin. When it was grown upon ordinary glucose-gelatin, the medium became deep-brown in colour and was not liquefied when heated to the boiling point of water. Tannin, formaldehyde, or oxidising enzymes could not be detected. Autorreferat.

Smith, R. G., A Pleomorphic Slime-Bacterium. (Proc. Linn. Soc. N. S. Wales 1905).

The micro-organism grows in suitable media, producing a slime which yields a gum with the reactions of arabin. It is easily hydrolysed to a mixture of two reducing substances, one of which is arabinose; the other is related to galactose, but gives an osazone melting at 184°. According to the combination of nutrients, the bacterium grows as 1. a bar of greater breadth than lenght, to the long sides of which are attached rounded wing-like capsular structures; 2. a rod with elongated capsular wings; 3. a rodshaped capsule with a transverse bar, a central coccus or square; and 4. a bipolar or with uniformly staining naked rod with rounded ends.

Autorreferat.

Smith, R. G., The Origin of Natural Immunity towards the Putrefactive Bacteria. (Proc. Linn. Soc. N. S. Wales 1905).

The author shows: 1⁰. That there is a close analogy or identity between the production of bacteriolytic bodies and the digestion of food. 2⁰. That bacteria do traverse the intestinal wall, and that negative experimental results regarding the same are untrustworthy. 3⁰. That natural immunity, especially towards the bacteria that normally inhabit the intestinal tract, is occasioned and maintained by the comparatively few bacteria which, in crossing the intestinal wall and possibly gaining access to the body fluids and organs, stimulate the cells to produce immune bodies. 4⁰. That the agglutination of bacteria may claim a much more active part in the production of immunity than is generally supposed. Autorreferat.

Smith, R. G., The Possible Relationship between Bacteria and the Gum of *Hakea saligna*. (Proc. Linn. Soc. N. S. Wales 1905).

The conclusions to which this research has led, are as follow: 1⁰. The gum of *Hakea saligna* is neither arabin, metarabin, nor pararabin. The hydrolytic products consist of reducing bodies that yield indefinite osazones, and are probably akin to the furfuroïds of Cross, Bevan and Smith. It is not pectin, although it approaches this substance in some respects. 2⁰. Of the bacteria occuring in the tissues of the plant, the most probable producer of the gum is one intermediate between *Bact. acaciæ* and its variety *Bact. metarabinum*, but as we do not yet know that the host plant can alter a gum once formed by a bacterium, it cannot be said that the gum is produced by this micro-organism. 3⁰. Bacteria which produce galactan gums

that behave to reagents like arabin, are not uncommon. A second is described under the name of *Bacillus pseudarabinus II.*

Autorreferat.

Smith, R. G., The Probable Bacterial Origin of the Gum of Linseed Mucilage. (Proc. Linn. Soc. N. S. Wales 1905).

Following is a summary of the research: 1⁰. The gums of linseed mucilages vary in their chemical reactions, and, therefore, probably vary in their chemical constitution. 2⁰. The products of hydrolysis consist of galactose and reducing substances wich yield indefinite osazones that are possibly akin to the furfuroïds of Cross, Bevan and Smith. 3⁰. The gum bacteria in the tissues of *Linum* are relatively very numerous, and consist chiefly of races of two species. 4⁰. The chemical reactions of the gums from these are practically identical with the reactions of average linseed gum. 5⁰. The gum of one of the bacteria is hydrolysed to galactose, and of the other to galactose and a reducing substance that yields an indefinite osazone. Both gums contain a large proportion of the furfuroïd substances. 6⁰. The gum formed by bacteria is probably altered by the plant into mucilage and other substances required in the plant economy. 7⁰. A number of so-called species of gum bacteria have probably one common origin: the host plant can alter the nature of the gum product which influences the growth characters. Autorreferat.

Smith, R. G., The Probable Identity of the Opsonins with the Normal Agglutinins. (Proc. Linn. Soc. N. S. Wales 1905),

The author has previously shown that active agglutinating serum which had been heated to destroy the opsonins was capable of causing an ingestion of bacteria by the mobile leucocytes. In this paper, certain points of similarity between the opsonins and normal or natural agglutinins are brought forward. Like the agglutinins, *Staphylococcus* opsonin is not destroyed by a moderate heat, viz. 60° C.; the opsonic power is only temporarily in abeyance. Dead bacteria in contact with the heated serum for over 20 hours at 37° C. become fully opsonised. With dilute heated serum the same recovery takes place, and in addition the bacteria are agglutinated. Dilution with saline solutions increases the agglutinative and the relative opsonic powers. The opsonic and the agglutinative powers of normal serum are increased when potassium salts are used in preparing the suspensions and dilutions. Suspensions of a 48 hours' culture of a feeble race of *Staphylococcus* were agglutinated in weaker dilutions of serum than a 24 hours' culture, and the opsonic power was also greater (21 : 14). The experiments bear out the idea that the first phase of agglutination, viz. the deposition of a precipitate upon the bacterial membranes, is what is known as opsonisation. The second phase, viz. the gathering together of the membranes with the enveloped bacteria is visible as an agglutination. The precipitated films consist of a substance positively chemotactic to the leucocytes.

Autorreferat.

Smith, R. G., The Rôle of Agglutination in Immunity. (Proc. Linn. Soc. N. S. Wales 1905).

The research has shown that 1⁰. Normal typhoid bacteria are incapable of being absorbed by the leucocytes when these have been freed from adhering serum; 2⁰. typhoid bacteria, when treated with

active agglutinating serum which has been heated to destroy the opsonins, are agglutinated and are then englobed by the leucocytes; 3⁰. typhoid bacteria which have been grown in agglutinating serum, heated or not heated, are also absorbed; 4⁰. while active agglutinating serum prepares the microbes for inception by the phagocytes, the so-called chemical agglutinating substances do not possess this property; and 5⁰. the rôle of agglutinin is, therefore, to coat the bacteria with a precipitate which is positively chemotactic towards the leucocytes; and thus, by facilitating the absorption of the microbes, agglutination plays an active part in immunity. Autorreferat.

Campbell, D. H., Germination of the Spores of *Ophioglossum*. (Annals of Botany. Vol. XX, 59, 1906. p. 321).

The spores of *O. Moluccanum* germinate freely. A small amount of chlorophyll occurs in the young prothalli, the largest obtained consisted of four cells. *O. pendulum* and *O. intermedium* germinate much more slowly. Chlorophyll was not detected in either of these cases but in the latter a mycorhiza was present in all plants that had grown beyond the three-celled stage.

M. Wilson (Glasgow).

Arber, E. A. N., On the Past History of the Ferns. (Annals of Botany. Vol. XX. p. 215—232. with a diagram in the text, 1906).

This paper embodies a reexamination of the evidence for the existence of the three great groups of modern Ferns in Mesozoic and Palaeozoic times. It is concluded that, as is already generally agreed, the *Leptosporangiatae* were, in the Mesozoic period, in the position of a dominant group, and most of the families still existing had then become differentiated.

But in the Palaeozoic period it seems doubtful if we can distinguish clearly between two groups, the *Eusporangiate* and the *Leptosporangiate.* It is more probable that the members of the Fern alliance, which then existed, although not in the later Palaeozoic forming a dominant group, were really an ancient stock, from which the Mesozoic *Leptosporangiatae* were derived. For this ancient group, the name *Primofilices* is suggested, and the *Botryopterideae* are regarded as being the, at present, best-known family within that group.

As the result of recent research on the nature of the male and female organs of the *Cycadofilices*, which has tended to show that many of the Fern-like fructifications occurring in the Palaeozoic rocks, formerly regarded as belonging to Eusporangiate Ferns, are more probably the male organs of Pteridosperms, it can no longer be held that the *Eusporangiatae* were a dominant group in Palaeozoic times. Thus the Geological Record no longer supports the conclusion arrived at by some botanists from a study of the recent Ferns, that the Eusporangiate is the more primitive type as compared with the Leptosporangiate.

The life-line of the Eusporangiatae can only be regarded at present as obscure, so far as the Palaeozoic and Mesozoic rocks are concerned. Even in the latter, little evidence of this race is to be found. Certain fronds of *Taeniopteris* are perhaps the best examples which have been put forward in this connexion, but even this genus is not entirely above suspicion. As regards the Palaeozoic fructifications, formerly regarded as belonging to Eusporangiate Ferns, it is impossible to say at present, which were really of this nature,

and which were the male organs of Pteridosperms. Until this can be decided, at least in some degree, it will be impossible to trace back the life-line of the *Eusporangiatae* with any confidence.

It is pointed out that the male organs of Pteridosperms and the *Bennettiteae* present a remarkable case of homoeomorphy when compared with the isosporous fructifications of the modern Eusporangiatae. The precise significance of this phenomenon is no doubt a matter of opinion, but it is pointed out that it may be simply due to parallelism of development.

As regards the *Hydropterideae*, there are no real grounds for believing, so far as the present evidence is concerned, that they existed at all in the Palaeozoic period. Even in the truly Mesozoic floras, the only example which can be put forward as a possible representative of this group is the genus *Sagenopteris*, and even here the case cannot be said to be proved. Arber (Cambridge).

Berry, E. W., Living and Fossil Species of *Comptonia* (Amer. Nat., XL, N⁰. 475, 1906. p. 485—520. pl. 1—4).

The author maintains a separate generic status for *Comptonia* which he holds to have branched from the *Myrica*stock during the lower Cretaceous. Its original home was probably in the greatly extended lands of the semi-tropical or warm-temperate Arctic region, though the earliest know specimens are from the Atane beds of Greenland. The *Myricas* were a prominent element in the Mesozoic migrations, one of the first of which was southward, along the Atlantic coastal plain, at least as far as Raritan, New Jersey. Contemporaneously with this southward movement in America, there was a similar advance through northern Europe by way of the Scandinavian peninsula. The final reduction of a once widely distributed and abundantly represented genus, to the single species now confined to North America, appears to have resulted from the refrigeration of the Pliocene and Pleistocene climates in temperate latitudes. Some twenty-one species of *Comptonia* are dealt with, and their synonymy is given in full. A diagram is introduced to show the probable relationship — not necessarily phylogenetic — of the leaves of fossil species. Two pages are occupied with a list showing the nomenclatural changes which the name has undergone. Four plates of figures illustrate the various leaf forms.

D. P. Penhallow.

Berry, E. W., Pleistocene Plants from Virginia. (Torreya, VI. N⁰. 5, 1906. p. 88—90).

Gives an account of five species of trees and vines — represented by existing species — from the Pleistocene of Tappahannock (Talbot formation), Virginia. The matrix was hard lignite. The specimens are from the collections of Dr. B. L. Miller, and are deposited in the Museum of Johns Hopkins University.

D. P. Penhallow.

Cockerell, Th. D. A., Fossil Plants from Florissant Colorado. (Bull. Torr. Bot. Club, XXXIII. N⁰. 5, 1906. N⁰. 307—312).

Describes seven new species of exogens, chiefly trees, and renames five species described by Lesquereux and others.

D. P. Penhallow.

Gothan, W., Ueber die Entstehung von Gagat und damit Zusammenhängendes. (Naturw. Wochenschr. Bd. XXI. (N. F. Bd. V.,) 1906. p. 17—24. 7 Fig.).

Nach einer kurzen Auseinandersetzung über Historisches und Mineralogisches betr. der als Gagat, Jet u. s. w. bezeichneten, sehr festen und homogenen Kohle wird zunächst auf Grund des Zusammenvorkommens von Gagat und echt versteinerten Hölzern — und zwar in organischem Zusammenhang am selben Stück — festgelegt, dass der Gagat überhaupt aus Hölzern hervorgegangen ist, wie auch Gümbel und Seward u. a. meinten. Unklar bleiben bezüglich der Entstehung des Gagats besonders folgende Punkte: 1. die ungeheure Kompaktheit und Festigkeit des Gagats, 2. die merkwürdigen, von Seward abgebildeten Zickzacklinien in Gagat, 3. dass meist neben dem Jet auch echt versteinerte Hölzer vorkommen. Verf. ist es nun gelungen, recente oder subfossile Ablagerungen mit Drifthölzern aufzufinden, die sich mit den fossilen — meist jurassischen — in Parallele setzen lassen, wie aus verschiedenen, im Original nachzulesenden Gründen hervorgeht. Das Interessante an diesen Drifthölzern ist, dass sie, solange sie sich in Wasserhaltendem Gesteinsmedium befinden, selbst bei sehr starker Verrottung infolge des hydrostatischen Drucks des darin befindlichen Wassers nicht kollabieren selbst bei sehr langem Verweilen in solchen Schichten, dagegen unter gänzlichem Strukturverlust zu einer mehr oder weniger homogenen Masse zusammenschrumpfen, sobald das umgebende Medium das Wasser verliert. Sobald dieses eintritt, erleiden die Hölzer — je nach dem Grade der vorhandenen Verrottung — einen ausserordentlich starken Volum- und Strukturverlust, der unter Umständen selbst bei diesen jungen Vorkommnissen bis zum fast völligen Schwinden der mikroskopischen Struktur gehen kann. Zugleich wird die im feuchten Zustande minimale (butterweiche) Festigkeit der Holzmasse, von der nach dem Schrumpfen nur ein kleiner Bruchteil der Grösse der imbibierten Holzmasse übrig bleibt, ausserordentlich fest, und überdies zeigt der Querschnitt Zickzacklinien, die sogleich an die des Jet erinnern, dessen enorme Kompaktheit und Festigkeit ebenfalls mit der Beschaffenheit unseres trockenen Holzes übereinstimmt. Es ist einerseits bemerkenswert, wie gross der Strukturverlust der geschrumpften Jethölzer ist, anderseits wie gross der Grad der Verrottung der Hölzer sein kann, ohne dass ein Kollabieren stattfinden kann, solange nämlich das Gesteinsmedium wasserhaltend ist. Diese Tatsache ist von höchster Bedeutung für das Verständnis des Versteinerungsprozesses bei fossilen Hölzern, da durch sie begreiflich wird, wie Hölzer ohne zunächst zu versteinern, ungeheure Zeiträume in den einhüllenden Geschichten verbleiben können. Ueberträgt man dies auf die Jetvorkommnisse, so stellt also der Jet selbst die kollabierten Hölzer dar, die versteinerten Hölzer diejenigen, die beim Fortschreiten des Wasserverlustes in dem umhüllenden Medium schon weit genug versteint waren, um einem Kollaps zu begegnen. Dass Jet und versteintes Holz am selben Stück zusammenvorkommen müssen, bedarf keiner weiteren Erläuterung. Gothan (Berlin).

Jeffrey, E. C. and **M. A. Chrysler,** On Cretaceous *Pityoxyla*. (Bot. Gaz., XLII, N⁰. 1, 1906. p. 1—15).

The various previously reported studies of the Cretaceous formation at Kreischerville, Staten Island, by Dr. Hollick and

Prof. Jeffrey, are now followed by a detailed study of some of the coniferous woods associated with the occurrence of amber. An examination of the various excavations in the Cretaceous deposits at Kreischerville, carried out by Hollick and Jeffrey in 1905, resulted in the discovery of amber in situ, enclosed in the substance of lignites, which were found in large quantities. These lignites represent three genera: *Araucarioxylon*, *Cupressinoxylon* and *Pityoxylon*. The first two genera represent several species, but only the last was found to be succiniferous. Two species of *Pityoxylon* are described: *P. statenense*, a hard pine from the Kreischerville deposits, and *P. scituatense* from Scituate, Mass., which owing to certain important structural differences, is only provisionally regarded as a pine.

The authors conclude that the peculiar structure of the wood in the Cretaceous pines, as compared with those of Tertiary age, and those of now extant, affords a probable explanation of the greater vigor of the genus under modern conditions, especially with respect to an improvement in the water supply. The structural differences referred to, embrace in the Cretaceous species: (a), the absence of ray tracheids; (b), the highly resinous ray cells; (c), the association of features which, among existing species, are separately associated with either the soft or the hard pines. These differences may be regarded as ancestral, and they appear to point to the fact that the ray tracheids probably had their origin not earlier than the Tertiary. The paper is accompanied by two plates of finely executed photo-micrographs. D. P. Penhallow.

Lewis, F. J., The Plant Remains in the Scottish Peat Mosses. Part. I. The Scottish Southern Uplands. (Trans. Roy. Soc. Edinburgh, Vol. XLI, Part III, p. 699—723, Pl. I—VI, and a diagram, 1905). See also a general account: The History of the Scottish Peat Mosses and their relation to the Glacial Period. (Scottish Geogr. Mag. Vol. XXII. p. 241—252, with a diagram and 3 textfigures, 1906).

In the Scottish Southern Uplands, three types of peat are recognised. The oldest are the upland valley and hilltop peats, lying at 900—2000 feet, which are of later date than the fourth glacial epoch wich, at its maximum, overwhelmed the Southern Upland valleys and adjacent districts with considerable glaciers. The peat occurs round and upon the moraines of this period. As the severe conditions obtaining during this cold period passed away, a gradual immigration of the vegetation took place, but no peat appears to have been formed until the climate had so far ameliorated as to permit the growth of *Betula nana L.* The remains of this shrub, together with such plants as *Calluna vulgaris L.*, and *Salix repens L.*, occur at the base of the peat. Arctic plants have not been found, as perhaps might be expected, below this layer. The next layer of peat consists entirely of *Sphagnum*, which in turn gives place to *Eriophorum vaginatum L.* with traces of *Scirpus*. This in turn is covered with a dense layer of *Empetrum nigrum L.*, *Salix herbacea L.*, *S. reticulata L.*, and in some cases *Loiseleuria procumbens Desv.*, most of which are typical Arctic plants, and thus indicate a decided decrease in temperature. The higher beds of the peat show the incoming of forest conditions, the dominant trees being *Betula* or *Pinus sylvestris*, which in turn were succeeded by wet conditions, as shown by the occurrence of *Scirpus*, *Sphagnum* and *Eriophorum*.

The peat of the second type, that of the 25-feet raised beach, shows at the base remains of *Corylus Avellana* L., *Betula alba* L., and *Alnus glutinosa* Gœrtn., which later give place to a great growth of *Phragmites* on some of the beaches, and mosses such as *Hypnum* on others. This in turn was succeeded by vegetation essentially similar to that found inland. It is remarked that the vegetation at present covering the peat areas is nearly always of a drier type then that found at slightly greater depths in the peat, and this fact is not without its bearing upon the present denuded state of the peat areas. A comparison is also made between the peat of the Southern Uplands and of the Highlands of Scotland.

The third type, the Lowland Peat, occupies large hollows in the till between the outcrop of Silurian rocks and reaches a depth of about 20 feet. No Arctic plants occur at the base. The basal vegetation consists of shrubby birch, followed by beds representing lake or swamp conditions, succeeded by forest, and finally by wet moorland conditions.

Instances of buried peat are described, and the denudation of the peat is discussed. The author concludes that the evidence at present available from the Scottish peat mosses gives strong support to the view that the later phases of the glacial period were separated by fairly long, genial, interglacial periods. Arber (Cambridge).

Scott, D. H., The Life and Work of Bernard Renault. (Journ. Roy. Microsc. Soc. 1906, p. 129—145, pls. 4—5).

The subject of this Presidential address was one of the leaders in the elucidation of the structure of fossil plants by means of microscopic investigation. In the short account of his life, the author describes some of Renault's experiences when collecting material at Autun and elsewhere, of the difficulties under which his work was always performed, and the neglect and discouragement which he suffered throughout his career. Passing to his botanical work, which may be divided into two divisions, the second coinciding approximately with the last ten years of his life, the author notices more especially Renault's work on the *Botryopterideæ*, *Pecopterideæ*, *Neuropterideæ*, *Cordaiteæ* and *Poroxyleæ*. The hypotheses as to the method of fertilisation in Permo Carboniferous seeds, deduced by Renault from the structure of fossil pollen-grains, and Renault's views on the question of the secondary wood of Palæozoic Cryptogams, are also discussed at some length.

The address concludes with a bibliography of references to Renault's more important works. An excellent portrait of the subject of the memoir, and a photograph of his laboratory and workshop in Paris illustrate the paper. Arber (Cambridge)

Scott, D. H., The occurrence of Germinating Spores in *Stauropteris oldhamia*. (New Phytologist, Vol. V, p. 170—172, with two textfigures, 1906).

Germinating spores have been found in a sporangium belonging to *Stauropteris oldhamia*, an observation which appears decisive in favour of the reference of this plant to *Filicineæ*. In the previous note, by the same author, on this fossil fructification, the question was left open whether it was a member of the true Ferns, or a Pteridosperm.

The sporangia show spores, apparently ungerminated, which measure as little as 32 μ in diameter, while those, which are in course of germination, have a swollen appearance, with a transverse diameter approaching 50 μ. Enlarged drawings are given of the latter, in which the rhizoids of the germinating spores are clearly seen.

The conclusion that the mode of reproduction of *Stauropteris oldhamia* was essentially that of a true Fern is important as throwing light on the systematic position not only of this genus but of the *Botryopterideae*, to which *Stauropteris*, both in the mode of insertion of its sporangia, and in its anatomical characters, is more closely related than to any other family. The sporangium with germinating spores, previously described by the same author in 1904, has much in common with that of *Stauropteris*, and may probably prove to have belonged to another species of the same genus.

Arber (Cambridge).

Baker, R. T. and **H. G. Smith,** On an undescribed species of Leptospermum and its essential oil. (Proc. Roy. Soc. N. S. Wales. December 1905).

The "Lemon-scented Leptospermum", the species described in this paper occurs in the North Coast District of New South Wales and the Southern Coast District of Queensland. It is a shrub attaining a height from 6 to 12 feet, with erect branches and small, lanceolate, ovate leaves; the flowers occurring in the axils of the leaves on the upper branchlets. The fruits measure about two to three lines in diameter. Its differentiation from described species is based on both morphological and chemical characters, although the former are alone sufficiently marked to warrant its specific rank. It may possibly in the past have been confused with some of the varieties of *L. flavescens*, but apart from well marked taxonomic characters none of those species give a lemon-scented odour. The leaves and terminal branchlets of this plant yielded 0.227°/₀ of an essential oil containing a considerable amount of citral. This appears to be the first time that the oils of the *Leptosperma* have been investigated, and the indications for the previously described species are not commercially promising. However, other species will be worked as opportunity offers. The marked lemon odour given by the leaves when crushed appears to be characteristic of this species, and is an aid in its discrimination. Besides citral (35°/₀) the oil contained dextro-rotatory pinene (25°/₀), an alcohol considered to be geraniol (9.74°/₀), an ester most probably geranyl-acetate (5.35°/₀) and a sesquiterpene. Citral is the only aldehyde present in the oil, as proved in several ways. The crude oil was soluble in an equal volume of 80°/₀ alcohol, but not in 10 volumes 70°/₀ alcohol; it had a specific gravity 0.8095 at 15° C., a refractive index 1.4903 at 16° C., and a rotation in a 100 mm. tube of 9.2 degrees to the right. The pinene, which on a final rectification, boiled between 155—157° C., had a specific gravity 0.8601 at 15° C., a refractive index 1.4706 at 20°, a rotation $a^D + 35.5°$, and gave a nitrosochloride melting at 103°. The purified citral obtained both from the crystalline bisulphite, and from the soluble compound, gave in both samples a refractive index 1.4913 at 20°, a specific gravity 0.8937 at the same temperature; it had the odour of citral and also gave the naphthocinchoninic acid for that aldehyde. The non-aldehydic portion of the oil had a specific gravity 0.8866 at 20°, rotation + 13.4° and refractive index 1.4855

at 22°. It was esterised in the usual way for the determination of the free alcohol. Limonene could not be detected, nor were either phellandrene or cineol present. The name proposed for the species is *L. Liversidgei.* Autorreferat.

Beck v. Mannagetta, G., Ueber die Bedeutung der Karstflora in der Entwicklung der Flora der Ostalpen. (Résultats scientifiques du Congrès international de Botanique, Wien 1905. Verlag von G. Fischer in Jena, 1906. p. 174—178).

Verf. macht zunächst auf die durch die neueren Glacialforschungen festgestellte Tatsache aufmerksam, dass auch in den Eiszeiten die Vergletscherung der Alpen von Westen nach Osten abnahm und auch am Südabhang der Alpen bedeutend geringer war als in den Central- und Westalpen, dass statt grösserer zusammenhängender Eismassen in den östlichen Alpenländern nur gesonderte, relativ kleine Talgletscher vorhanden waren, welche das Vorland nicht mehr erreichten, dass infolgedessen zur Diluvialzeit die Vorbedingung des Gedeihens einer Vegetation am Ostrande der Ostalpen gegeben war, die ganz anders beschaffen sein konnte als jene des westlichen Alpenzuges im gleichen Zeitalter, indem in Niederösterreich sowie in Steiermark eine frostharte Waldregion selbst zur Zeit der grössten Vergletscherung der Alpen bestehen konnte und sich dieser im Vorlande der Alpen gegen Ungarn und gegen die Balkanhalbinsel eine Vegetation anschloss, die an den Gestaden des ungarischen Binnenmeeres auch empfindlichere Gewächse enthalten konnte. Von dieser Tatsache aus, dass sich in den östlichen Alpenländern eine von den Eiszeiten relativ wenig berührte Vegetation erhalten konnte, welche jedoch keinen subtropischen Charakter besass, sucht Verf. die Bedeutung der Karstflora für die Entwicklung der Flora in den österreichischen Donauländern zu würdigen, indem er weiter noch die früher von ihm bewiesene Tatsache heranzieht, dass die Flora der Karstländer, welche einen Teil der westpontischen Flora darstellt, derzeit nicht eine an den Abfall der illyrischen Gebirge gegen die Adria gebundene Vegetationsregion darstellt, sondern dass die Karstflora als eine scharf gesonderte Zone der westpontischen Flora zu betrachten ist, deren Verbreitung im allgemeinen aus den Ländern der Balkanhalbinsel im Anschluss an das mediterrane Florengebiet bis zum Südostrand der Alpen zu verfolgen ist. Verf. erläutert nun an kurzen Beispielen eine Reihe von pflanzengeographischen, die Verbreitung der Karstflora betreffenden Tatsachen, dass nämlich die massige Entfaltung der Formationen der Karstflora derzeit bis zu einer nordwestlichen Grenze stattfindet, dass über diese Grenze hinaus die Karstgewächse wohl noch weiter verbreitet sind, aber nicht mehr zu Formationen zusammenschliessen, sondern ihre Verbreitung zerstückeln, dass zahlreiche Karstgehölze die Hochgebirgskette der südlichen Kalkalpen überschritten haben, dass zahlreiche zerstreut vorkommende Karstpflanzen gegenwärtig am Ostrand der Alpen sowie im benachbarten Ungarn gedeihen und am östlichen Abfall der niederösterreichischen Kalkalpen sich neuerdings zu Pflanzenformationen verdichten, die nach ihrem Oberholze mit jenen des Karstes überraschend zusammenstimmen, dass endlich einzelne von den Karstgewächsen sich auch weiter am Nordabhang der österreichischen Alpen verfolgen lassen und eine grössere Zahl derselben die Donau nach Norden überschreitet. Diese Tatsachen erklärt Verf. durch die Annahme, dass während der letzten Inter-

glacialzeit die jetzigen Karstgewächse die Ostalpen umgürteten und deren montane Region besetzt hielten, dass diese Gewächse im Herzen der Alpen durch die letzte Eiszeit vernichtet wurden, und dass mithin die zerstreuten Inseln der Karstflora nicht als Vorposten einer vordringenden, sondern als Relikte einer reducierten Flora anzusehen sind, die an klimatisch günstigen Oertlichkeiten selbst noch in Formationen erhalten blieb. Die Karstflora stellt sich hiernach als eine tertiäre Flora dar, die während der Diluvialperiode bereits bestand und sich mit ihrem grossen Reichtum eigentümlicher Gewächse auch ausserhalb ihres im nordwestlichen Teil der Balkanhalbinsel gelegenen Stammlandes unbeeinflusst durch die Vergletscherung der Alpen erhielt. In Anbetracht der erheblich höheren Lage der Schneegrenze in der letzten Interglacialzeit, in der die weitgehendste frühere Verbreitung der Karstflora geschah, gelangt Verf. hiermit auch zu einer Erklärung für die Ueberschreitung der heute für sie unüberwindlichen Pässe der südlichen Kalkalpen durch diese Flora sowie für die relative Armut der Südalpen an Karstpflanzen und für das auffällig rasche Verschwinden derselben nach Westen zu am Nordabhang der Alpen. Am Ostrande mischten sich in jener Periode mehr thermophile Gewächse bei, die zum grossen Teil durch den Einfluss der letzten Eiszeit vernichtet wurden, zum Teil gegenwärtig an der Grenze zwischen der mediterranen und Karstflora leben und deren Zuteilung zu einer dieser Floren Schwierigkeiten bereitet. Erst nach der Eiszeit hat die mitteleuropäische montane Flora infolge besserer Anpassung an das durch die Eiszeit veränderte postglaciale Klima das Terrain der Karstflora occupiert, während die pontisch-pannonische Steppenflora als letzte nach der Glacialzeit erschien.

W. Wangerin (Halle a/S).

Gradmann, R., Beziehungen zwischen Pflanzengeographie und Siedlungsgeschichte. (Geographische Zeitschrift. Bd. XII, Heft 6. 1906. p. 305—325).

Das Problem, um das es sich in der vorliegenden Arbeit handelt, ist die Frage nach dem Causalzusammenhang, der den auffallenden Beziehungen zwischen Pflanzengeographie und Siedlungsgeschichte zu Grunde liegt, wie sie sich darin offenbaren, dass die reichlich besiedelten offenen Landschaften, welche schon in sehr alter Zeit neben unbewohnten grossen und geschlossenen Waldgebieten in Mitteleuropa bestanden, weithin mit den Gebieten sich decken, die nach übereinstimmenden paläontologischen, stratigraphischen und pflanzengeographischen Zeugnissen als ehemalige Steppenlandschaften anzusehen sind. Der erste Abschnitt ist der Darlegung der Verbreitungstatsachen gewidmet. Nachdem Verf. den Begriff der Steppenpflanze dahin umgrenzt hat, dass er darunter nur die im östlichen Europa streng auf die Steppenformationen beschränkten specifischen Steppenpflanzen oder Leitpflanzen der Steppe versteht, verfolgt er in grossen Zügen die höchst merkwürdige mitteleuropäische Verbreitung dieser Gewächse, welche in Mitteleuropa Standorte bewohnen, die mit den echten Steppen des Ostens die grösste Aehnlichkeit, nur meist eine sehr beschränkte Ausdehnung besitzen, und gelangt so zu dem Ergebnis, dass die Verbreitung der Steppenpflanzen mit dem Verbreitungsbild der vorgeschichtlichen Siedlungen eine weitgehende Uebereinstimmung aufweist, welche auf gewissen Strecken sogar überraschend genau ist; indem Verf. die von Andr. Hansen gemachte Entdeckung hinzunimmt, dass im südlichen

Norwegen die ältesten Siedlungen in auffallender Weise der Verbreitung einer ganz bestimmten Pflanzengenossenschaft, der sogen. Origanum-Formation, welche mit unseren Steppengenossenschaften in innigster Verwandtschaft steht, folgen, ergibt sich der Schluss als unabweisbar, dass hier kein Spiel des Zufalls vorliegen kann, sondern dass ein, sei es unmittelbarer oder mittelbarer, Causalzusammenhang vorausgesetzt werden muss. Um diesen beurteilen zu können, sucht Verf. im zweiten Abschnitt die Merkmale, durch die sich die Verbreitungsbezirke der Steppenpflanzen und die ältere Besiedlung von den dazwischen liegenden Lückengebieten unterscheiden, möglichst genau zu bestimmen. Das Resultat dieser Untersuchung besteht darin, dass diese charakteristischen Eigenschaften (relativ continentales, niederschlagsarmes Klima, feinkörnige Böden, Kalkböden) dieselben sind, die in den Steppenländern des Ostens als waldfeindliche und direkt oder indirekt steppenbegünstigende Eigenschaften bekannt sind, während umgekehrt die den Lückengebieten eigentümlichen Eigenschaften (relativ oceanisches Klima, reiche Niederschläge, kalkarme Böden, besonders Sandböden) sich überall da, wo der Wald mit der Steppe im Kampfe liegt, dem Wald besonders günstig erweisen. Auch für die Vergangenheit erscheint der Schluss, dass, wenn einmal ein absolut continentales Klima geherrscht hat, in erster Linie die heutigen Verbreitungsbebezirke von Steppenpflanzen in steppenartige Landschaften umgewandelt gewesen sein müssen, durchaus begründet und durch stratigraphische und palaeontologische Zeugnisse direkt bestätigt. Für die Zeit der Einwanderung der Steppenpflanzen folgt daraus zunächst noch gar nichts, doch bleibt von dieser Frage unberührt das Ergebnis, dass Klima und Boden in den Verbreitungsbezirken dieser Flora für den Wald relativ ungünstig, für die Steppenbildung relativ günstig liegen, und dass diese Bezirke mit den Wohngebieten der vorgeschichtlichen Bevölkerung im mitteleuropäischen Binnenland und auch in Skandinavien auf weite Strecken zusammenfallen. Im dritten Abschnitt tritt Verf. nunmehr der Frage nach dem Causalzusammenhang zwischen der pflanzengeographischen Erscheinung auf der einen und der siedlungsgeographischen auf der anderen Seite näher. Da hier, wie Verf. näher ausführt, eine direkte Abhängigkeit im strengen Sinne des Wortes nicht zu erkennen ist, die Zurückführung auf die Bodenfruchtbarkeit sich ebensowenig als stichhaltig erweist, so bleibt nur die Annahme übrig, dass die ältesten Ansiedler ebenso wie die Steppenpflanzen offene, waldfreie oder wenigstens nicht mit geschlossenem Urwald bestandene Stellen aufgesucht haben, wo ohne all zu mühsame Rodung ein Pflanzenbau möglich war und die Herdentiere in der natürlichen Bodenvegetation von Gräsern und Kräutern ihr Futter finden konnten. Hiermit erhebt sich sofort die Frage, wie gross man sich im mitteleuropäischen Binnenland die Waldlichtungen, wie sie durch das Vorkommen charakteristischer Steppenpflanzen bezeichnet werden, vorstellen darf. Da die heutzutage von steppenartigen Formationen eingenommenen Flächen nur von ganz unbedeutendem Umfang und überdies meist auf Felsen oder mehr oder weniger steilen Hängen gelegen sind, man aber andrerseits nur im Widerspruch mit allen bekannten Tatsachen voraussetzen könnte, dass irgend ein erheblicher Teil der heutigen Ackerflächen unter einem Klima wie dem gegenwärtigen von Natur waldlos sei, so bleibt schliesslich als einziger Ausweg die Annahme, dass zur ersten Siedlungszeit die natürlichen Waldlichtungen etwas grösser waren, als sie es unter dem heutigen Klima

sind und sein können, und dass sie sich namentlich auch auf ebenes Gelände erstreckt haben, was nur unter dem Einfluss eines trockneren Klimas der Fall gewesen sein kann. Schwierigkeiten ergeben sich nun aber bei dem Versuch, die Vorgänge in die geologische und archaeologische Chronologie einzureihen. Dieselben finden ihre Lösung durch den, den neueren Fortschritten Quartär-Geologie zu dankenden Nachweis, dass die in die ersten Abschnitte der Rückzugsstadien der letzten Vergletscherung fallende Klimaschwankung, nämlich die der Steppenfauna von Schaffhausen, nicht die einzige ist, die seit dem Maximum der letzten Vergletscherung eingetreten ist, dass vielmehr auch für die postglaciale Zeit im engeren Sinne an zahlreichen Punkten vom südlichen Fuss der Alpen bis nach Skandinavien die Beweise für einen teils wärmeren, teils trockneren Klimacharakter vorhanden sind. Danach stellt sich der zeitliche Verlauf der Ereignisse, wie Verf. im Schlussabschnitt ausführt, in den Grundzügen folgendermassen dar: während der spätglacialen Rückzugsperiode, die dem Maximum der letzten Vergletscherung gefolgt ist, ist ein ausgeprägtes Steppenklima eingetreten, das zwar trockner, aber zugleich kälter war als in der Gegenwart und demnach etwa dem heutigen Klima in den nordöstlichsten Steppengegenden des europäischen Russlands entsprochen haben muss; gleichzeitig fand eine weniger empfindliche Steppenflora weite Ausbreitung und lebte eine palaeolithische Bevölkerung auf der Nordseite der Alpen. Gegen den Schluss der spätglacialen Zeit ist dann eine vorübergehende starke Erwärmung eingetreten, der ein abermaliger Gletschervorstoss folgte. In der hierauf folgenden eigentlichen postglacialen Zeit ist auf grosse Strecken der Eintritt teils eines trockneren, teils eines wärmeren Klimas bestimmt nachgewiesen, welches zum Teil streng nachweisbar, zum Teil mit höchster Wahrscheinlichkeit mit der neolithischen Cultur zeitlich verknüpft ist. Während auf die erste Steppenperiode eine ausgeprägte Wälderperiode gefolgt ist und den Palaeolithiker aus dem mittleren Europa vollständig verdrängt hat, hatte der erneute Eintritt eines trockneren und jetzt zugleich wärmeren Klimas eine erneute Ausbreitung der lichtliebenden, steppenartigen Vegetation auf den wieder grösser werdenden Waldlücken, das Eindringen einer thermophilen Flora und zugleich die Verbreitung von Steppentieren im weiteren Sinn, aber auch die Einwanderung und Festsetzung der neolithischen Bevölkerung auf den natürlichen Waldlichtungen zur Folge. Mit dem allmählichen Eintritt des heutigen viel ausgesprocheneren Waldklimas mussten sich die Lücken grösstenteils wieder schliessen, doch konnten sich an geeigneten Stellen Reste der Steppenflora und -fauna erhalten; auch blieben die vom Menschen und dessen Culturflächen besetzten Lücken annähernd vollständig erhalten, bis dann mit dem Eindringen der römischen Herrschaft eine Erweiterung durch Rodung der Urwälder erfolgte. W. Wangerin (Halle a/S.).

Léveillé, Mgr. H., Les Saules du Japon. (Bull. Acad. intern. Géogr. bot. 1906, p. 143—152).

Ces pages renferment l'énumération des *Salix* récoltés au Japon par le R. P. Faurie et la description d'une espèce nouvelle de l'île Nippon: *S. ignicoma* Lévl. et Vnt. L'auteur a établi, pour déterminer les Saules japonais, trois clefs dichotomiques, l'une à l'aide des chatons mâles, l'autre à l'aide des chatons femelles et une troisième à l'aide des feuilles. J. Offner.

Scholz, J. B., Die Pflanzengenossenschaften Westpreussens. (Schriften der Naturforschenden Gesellschaft in Danzig. N. F. Bd. XI, Heft 3. 1905. p. 49—302. Mit 24 Abb.).

Verf. hat mit der vorliegenden umfangreichen Arbeit über die Pflanzengenossenschaften Westpreussens einen überaus wertvollen Beitrag zu der Heimatskunde der Provinz geliefert. Durch die seit lange planmässig und sorgfältig betriebene Durchforschung der westpreussischen Flora, welche im Lauf der Zeit ein reiches Material zusammengebracht hat, war Verf. in der Lage, auf breiter Basis und unter eingehender Berücksichtigung der geologischen und physikalischen Verhältnisse ein den pflanzengeographischen Verhältnissen im vollen Umfange gerecht werdendes Bild von der westpreussischen Flora, dem Charakter ihrer Zusammensetzung, den Verbreitungsverhältnissen interessanter und bemerkenswerter Arten, der Art und Weise ihres Auftretens u. s. w. zu liefern. Die Lösung dieser Aufgabe ist um so mehr zu begrüssen, als die natürliche Pflanzendecke von der vordringenden Kultur von Jahr zu Jahr mehr zurückgedrängt wird, und infolgedessen eine getreue Aufnahme der ehemaligen und zum Teil noch jetzt bestehenden Verhältnisse nicht nur in heimatskundlicher Beziehung wünschenswert ist, sondern auch geeignet erscheint, wichtige Aufschlüsse über die Aufeinanderfolge der Pflanzengesellschaften in den letzten Perioden der Erdgeschichte und ihre Einwanderungswege zu ergeben. Referent muss es sich versagen, näher auf den Inhalt der Arbeit einzugehen, da ein solches Eingehen den zur Verfügung stehenden Raum weit überschreiten würde, und möchte nur auf das allgemeine Ergebnis kurz hinweisen, dass in der westpreussischen Flora die zur osteuropaeischen (pontischen) Pflanzengenossenschaft gerechneten Arten eine bevorzugte Stellung einnehmen, dass am stärksten die Ränder der hohen Weichselufer und der bedeutenderen Nebentäler von ihnen besetzt sind und hier namentlich das eigenartige Mischungsverhältnis in der Zusammensetzung der Pflanzendecke ganz besonders zum Ausdruck kommt, während auf den am höchsten gelegenen Teilen der Provinz im nordwestlichen und nordöstlichen Waldgebiete die Flora eine wesentlich andere Zusammenstellung zeigt, indem sich hier zahlreiche Glieder einer alpin-nordischen Flora der baltischen Flora hinzugesellen.

Die Form der Darstellung ist vom Verf. der Absicht entsprechend gestaltet, dass die Arbeit nicht nur für Fachleute berechnet ist, sondern sich an alle Gebildeten, die der heimischen Pflanzenwelt Interesse und Verständnis entgegenbringen, wendet; wertvolle Hinweise für die auf Schutz der Naturdenkmäler gerichtete Bewegung finden sich zahlreich eingestreut. Die Gliederung der zur Besprechung gelangenden Formationen ist zunächst in der üblichen Weise erfolgt, innerhalb der einzelnen Unterabteilungen schildert Verf. zunächst die Zusammensetzung und den Charakter der verschiedenen Pflanzengenossenschaften im allgemeinen, daran schliesst sich die Besprechung der wichtigeren und interessanteren Typen und die Schilderung einzelner Standortslocalitäten. Eine grössere Zahl von wohl gelungenen Vegetationsbildern ist der Arbeit beigegeben.

W. Wangerin (Halle a/S.).

Strecker, W., Erkennen und Bestimmen der Schmetterlingsblütler. Mit 107 Textabb. (Verlag von P. Parey, Berlin. 1906. 180 pp. Preis 3.— M.).

Das Werk ist nach denselben Gesichtspunkten angelegt, wie

das folgende. Auch hier liegt der Hauptwert in den leicht zu hand habenden Bestimmungstabellen. Dieselben berücksichtigen alle in Deutschland und Oesterreich vorkommenden Papilionaceen und erweisen sich als besonders praktisch, weil das zur Bestimmung gewöhnlich herangezogene Merkmal, nämlich die Hülse, bei Seite gelassen und durch andere Merkmale erzetzt ist, sodass die Pflanzen auch in blühendem Zustande mit Sicherheit bestimmt werden können.

Den Tabellen voraus geht gleichfalls eine Beschreibung der einzelnen Organe, vor allem der in Betracht kommenden Unterscheidungsmerkmale. Den Schluss bildet wieder eine Beschreibung der einzelnen Arten. Paul Leeke (Halle a/S.).

Strecker, W., Erkennen und Bestimmen der Wiesengräser. Mit 96 Textabb. (Verlag von P. Parey, Berlin. 1906. 141 pp. Preis 2.50 M.).

Der besondere Wert dieses kleinen Werkes liegt in den übersichtlich und praktisch zusammengestellten Bestimmungstabellen. Dieselben stellen einen nach dem Linné'schen System entworfenen Schlüssel dar, welcher die deutschen Gramineen, auch die nicht auf den Wiesen vorkommenden, berücksichtigt. Insbesondere hervorzuheben sind die Nebeneinanderstellungen von Unterscheidungsmerkmalen der leicht mit einander zu verwechselnder Gräser, die schnell eine sichere Bestimmung ermöglichen.

Den Tabellen voraus geht nach einer einleitenden Betrachtung über die Zusammensetzung der Grasnarbe eine Schilderung des Baues der Gräser, bei der vor allem die Unterschiede der verschiedenen Erkennungszeichen ausführlich besprochen und durch Abbildungen erläutert werden. Es folgt ihnen eine kurze Beschreibung der einzelnen Arten, mit besonderer Berücksichtigung ihrer Ansprüche an Klima und Boden und ihres Wertes als landwirtschaftliche Kulturpflanzen.

In einem besonderen Abschnitt werden dann die Gräser nach der Bestockungsform, nach der Zeit der Blüte, nach dem Wuchse, nach dem Gebrauchswerte und nach der Bodenart gruppiert, und in einem Schlusskapitel noch die bei der Samenmischung, bei der Neuanlage von Wiesen etc. zu beachtenden Grundsätze kurz erörtert.

Paul Leeke (Halle a/S.).

Ashby, S. F., A contribution to the study of factors affecting the quality and composition of potatoes. (Journ. agric. Sci. 1905. I. 3. p. 347—357.

Work undertaken in the hope of establishing some connection between the character of soils as shown by chemical and mechanical analysis and the composition of the potatoes grown on them.

A high ratio of amide to nitrogen was found in the good quality potatoes; and evidence was obtained that physical causes exercise the greatest influence on quality (judged especially by the absence of a tendency to blacken on boiling). R. H. Lock.

Caruso, G., Esperienze di concimazione con calciocianamide etc. (Atti Accademia d. Georgofili. Vol. LXXXIII. p. 228—238 (1906)).

Bei Anbauversuchen mit Gartenbohnen und Mais war Calcium-

cyanamid als Stickstoffquelle dem Ammonsulfat überlegen, es folgte dann Natronsalpeter und am schlechtesten bewährte sich Abtrittsdünger. Verf. sieht die Hauptbedeutung des Kalkstickstoffes in der Kalkzufuhr und der langsamen andauernden Zersetzung.

Pantanelli (Roma).

Dorph-Petersen, K., Aarsberetning for „Dansk Frökontrol" [Jahresbericht der Dänischen Samenkontroll-Station]. 1904—05. (Tidsskrift for Landbrugets Planteavl. Bd. XIII. p. 1—47. 1906).

Von mehr allgemein botanischer Interesse sind folgende Mitteilungen des vorliegenden Jahresberichtes:

Die Keimungsversuche mit Samen von wildwachsender Pflanzen sind festgesetzt worden; die in diesem Bericht besprochenen 30 Arten verteilen sich in folgenden Gruppen:

1. Alle oder fast alle Samen keimen sofort oder fast sofort nach der Aussaat.
2. Die Keimung fängt sofort an aber dehnt sich ohne wesentliche Unterbrechung über mehrere Monate aus.
3. Ein grösserer oder kleinerer Teil keimt sofort, alle übrige im Winter oder Frühjahr des folgenden Jahres.
4. Alle oder fast alle Samen keimen im ersten Frühjahre nach der Aussaat (Sommer oder Herbst).
5. Die meisten keimen im ersten Frühjahre, die übrigen im zweiten.
6. Die meisten keimen im zweiten Frühjahre, die übrigen im dritten.
7. Die geringere Anzahl keimt im ersten, die grössere im zweiten Frühjahre.
8. Keimung im ersten und zweiten Herbste.

Aus einer Versuchsreihe mit im Boden eingegrabenen Samen kann angeführt werden, dass Samen von *Plantago lanceolata* und *Sinapis arvensis* nach Verlauf van 6 Jahren mit resp. 23 und 66 p. ct. keimten, während die im Laboratorium aufbewahrten Samen resp. mit 73 und 58 p. ct. keimten.

F. Kolpin Ravn.

Elofson, A., Ur berättelse öfver en med understöd af Letterstedtska resestipendiet åren 1903—1904 företagen studieresa. [Aus: Bericht über eine mit Unterstützung des Letterstedt'schen Reisestipendiums in den Jahren 1903—1904 vorgenommene Studienreise]. (Landtbruks-Akademiens Handlingar och Tidskrift 1905, pp. 341—365).

I. Kartoffelveredelung und diesbezügliche Versuchstätigkeit.

Verf. berichtet über seine hauptsächlich in Deutschland, aber auch in Oesterreich und der Schweiz gemachten Studien über die Kartoffelveredelung. Zuerst werden die allgemeinen Resultate der deutschen Kartoffelzüchtung und die Bedeutung der Sortenauswahl namentlich auch für schwedische Verhältnisse besprochen, dann werden Bemerkungen über einige für die Veredelung wichtige Eigenschaften der Kartoffelpflanze mitgeteilt. Darnach geht Verf. auf die Tätigkeit der hervorragendsten Kartoffelzüchter, besonders in Deutschland, ein und verbreitet sich speziell über die Veredelungsmethoden, sowie die Beurteilung und Vermehrung der neuen Sorten. Besondere Kapitel werden der Versuchsstation in Berlin und der privaten, von Landwirten und Landwirtsschaftsschulen ausgeübten Tatigkeit in der Kartoffelveredelungsarbeit gewidmet.

Grevillius (Kempen a. Rh.).

Freeman, W. G. and **S. E. Chandler,** The World's Commercial Products. (Pitman & Sons, London. 1906. Parts 1—4. pp. I—VIII. 1—28).

The subtitle of this publication "A descriptive account of the Economic Plants of the World and their commercial uses" will indicate its scope. It will be completed in twelve fortnightly parts published at 7 d. each. The parts already issued treat of wheat, barley, oats, rye, rice, millets, maize, starches, sugar and cacao. An account is given of the plant or plants yielding each products, its occurrence, cultivation, mode of collection or harvesting and the preparation and uses of its products. The work is fully illustrated with photogravure reproductions and coloured plates, and there are also maps showing the geographical distribution of the more important plants.

W. G. Freeman.

Hall, A. D., On the accumulation of fertility by land allowed to run wild. (Journ. agric. Sci. 1905. I, 2. p. 241—249).

Describes the result of leaving two fields, untouched from 1882 to 1904. On one of the fields wheat had previously been grown for 40 years in succession. On being left to itself the wheat died out completely in four years. Afterwards bushes and young trees were removed from the ground but otherwise the vegetation which naturally established itself was not interfered with; this vegetation included about 25 per cent of leguminous plants.

The second field had carried beans from 1847 to 1878, and clover from 1883 to 1885. After 1885 the field was untouched. In June 1903 this field contained practically no leguminous vegetation, but bore 86 per cent. of a particular grass, *Aira caespitosa.*

The most interesting result recorded in the paper lies in the remarkable increase in the amount of nitrogen contained in the soil. This increase amounted in the case of the first field to 100 lbs. per acre per year for 22 years, and in the case of the second field to somewhat less.

Neither the action of leguminous plants nor of soil bacteria, nor the additions brought by rain are deemed sufficient by the author to account for the increase recorded — even in combination with the two other factors suggested, namely capillary movements of subsoil nitrates, and absorption of atmospheric ammonia by soil and plant. In any event a very remarkable increase in the nitrogen contents of land left fallow is clearly established, and one which it is not easy to account for on ordinary lines. R. H. Lock.

Hall, A. D., The analysis of the soil by means of the plant. (Journ. agric. Sci. 1905. I. 1. p. 65—68).

Experiments undertaken to test the efficiency of the method of ash analysis of the plant itself as a means of estimating the requirements of a given soil for specific manures.

"The scheme is to take a particular plant grown upon the soil in question, and determine in its ash the proportions of constituents like phosphoric acid and potash. Any deviations from the normal in these proportions may then be taken as indicating deficiency or excess of the same constituents in the soil and therefore the need or otherwise of specific manuring in that direction".

The author sums up his results under the following general conclusions:

"1. The proportion of phosphoric acid and of potash in the ash of any given plant varies with the amount of these substances available in the soil, as measured by the response of the crops to phosphatic or potassic manures respectively.

2. The extent of the variation due to this cause is limited, and is often no greater than the variations due to season, or than the other variations induced by differences in the supply of non-essential ash constituents — soda, lime, etc.

3. The fluctuations in the composition of the ash are reduced to a minimum in the case of organs of plants, which, like the grain of cereals, or the tubers of potatoes, are manufactured by the plant from materials previously assimilated.

4. The composition of the ash of cereals is less affected by changes in the composition of the soil than is that of root crops like swedes and mangels.

5. The composition of the ash of mangles grown without manure on a particular soil gives a valuable indication of the requirements of the soil for potash manuring. Similarly the phosphoric acid requirements are well indicated by the composition of the ash of unmanured swedes, though in this case determination of the citric acid soluble phosphoric acid in the soil gives even more decisive information.

6. Pending the determination of phosphoric acid and potash „constants" for some test plant occurring naturally on unmanured land the interpretation of soil-conditions from analyses of plant-ashes is not a practicable method by which chemical analysis of the soil can be displaced." R. H. Lock.

Hall, A. D., The Book of the Rothamsted Experiments. (London, 1905 8⁰. XL, 294 pp. ill.).

The author, who succeeded Sir J. H. Gilbert as director of the Rothamsted Experiment Station, has in this book collected in a convenient form the results of all the work of the Station since its foundation.

He begins with a chapter on the sources of the nitrogen of vegetation, one of the earliest subjects investigated at Rothamsted. Then follow chapters on the Meteorological Records, and the Soils of the Experimental Fields.

The greater part of the book consists of a systematic discussion of the experiments on the continuous growth of Wheat, Barley, Oats, Root-crops, Clovers and Hay; and on the growth of crops in rotation. Each crop is discussed in a separate chapter, at the end of which the results are summarised, and a list given of all the original publications on the subject.

The important work on Nitrification and Drainage Waters, and on the Feeding of Animals, is dealt with in two chapters, and the book concludes with a chapter on such min r subjects as Sewage, Malting, Ensilage, and the Milling products of Wheat.

Practical conclusions, which appear to be drawn partly from the results of the experiments and partly from the author's general experience, are given at the end of each chapter, in order that the book may be of use not only to the student but also to the practical agriculturalist.

The point of each experiment is illustrated by photographs or diagrams. Mr. R. Warington has written an introduction, in which

he gives a short biographical note of the founder, Sir J. B. Lawes, and of his colleague Sir J. H. Gilbert. T. B. Wood.

Hall, A. D. and **N. H. J. Miller,** The effect of plantgrowth and of manures upon the retention of bases by the soil. (Proc. R. Soc. B. Vol. LXXVII. p. 1—32. 1906).

The communication "deals with the changes in the amount of calcium carbonate, the chief substance in the soil acting as a base, which are brought about by natural agencies, by manuring, and particularly by the growth of plants".

The following summarised statement of results is appended:

"1. Arable soils which contain upwards of 1 per cent. of calcium carbonate are subject to a normal loss of that constituent in the drainage water amounting to about 800 lbs. to 1000 lbs. per acre per annum.

2. The loss is increased by the use of ammoniacal manures by an amount equivalent to the combined acid of the manure. The loss is diminished by the use of sodium nitrate or organic debris like farmyard manure.

3. The growth of plants normally returns to the soil a large proportion of the bases in the neutral salts which the soil provides for the nutrition of plants.

4. The calcium oxalate and other organic salts of calcium present in plant residues are converted by bacterial action in the soil into calcium carbonate.

5. The return of base by the growth of plants and the production of calcium carbonate by the decay of plant residues are sufficient to retain soils neutral which are poor in calcium carbonate, and to replace the bases which have been consumed in nitrification and similar changes". R. H. Lock.

Hooper, D., Composition and Trade Forms of Indian Cutch. (Agricultural Ledger. 1906. N⁰. 3. p. 23—50).

Cutch is an extract from the wood of *Acacia Catechu,* Willd., and the allied species, *A. Catechuoides*, Benth., and *A. Sundra*, DC. A very large series of samples are reported on. The tannin in them varied from 15 per cent, (and in one case 8 per cent) to 54 per cent, and the Catechin from nil to 36 per cent. No rule was found regulating the relation between the Catechin and the tannin acid; but there was noticed a certain similarity in the composition of Cutches from the same locality. J. H. Burkill.

Hooper, D., The uses and value of the root of *Costus speciosus* as a food stuff. (Agricultural Ledger 1906, N⁰. 2. p. 19—21).

The root of *Costus speciosus* contains a considerable percentage of starch and sugar. A small quantity of an oleoresin is present. Moisture in dried and powdered root 5.50: Ether extract 0.75: Albuminoids 6.75: Carbohydrates 66.65: Fibre 10.65: and Ash 9.70%.

J. H. Burkill.

Luxmoore, C. M., The hygrometric capacity of soils. (Journ. agric. Sci. 1905. I. 3. p. 304—321.

A contribution to the study of the capacity of soils to retain

moisture in equilibrium with the atmosphere. The experiments, which were confined to the examination of fine earth under laboratory conditions, consisted in a comparison of the mechanical and chemical composition of soils of different degrees of fineness, and containing different proportions of organic material, with the amount of moisture absorbed by them under different conditions of atmospheric moisture.

Some of the author's conclusions are to the following effect:

1. The amount of organic material is a potent factor, it has also an indirect effect, probably owing to its causing differences in the surface attraction of the inorganic particles.

2. The organic substance in different fractions, consisting of groups of particles of different sizes, has not always the same hygroscopic power.

3. Mineral particles of the same size in different soils have not always the same hygroscopic power.

4. The finest grade particles show a specially high attraction for water in atmospheres of extreme moisture.

For these reasons the attraction of mineral particles for moisture cannot be expressed as simply proportional to their surfaces.

Within certain limits the following statement seems however to express the facts most nearly: "The moisture multiple tends to assume a value inversely proportional to the diameter raised to the two-thirds power." R. H. Lock.

Monaco, E., Su l'impiego delle rocce leucitiche nella concimazione. (Stazioni sperimentali agrarie Vol. XXXIX. p. 340—349 (1906)).

Zur Fortzetzung früherer Versuche (Ebenda, Vol. XXXVII, p. 1831—1834 (1904)) über Anwendung vulkanischer Gesteine, woran Italien so reich ist, bei der Düngung, berichtet Verf. über die Verwendung des Fluorits neben dem Leucit. Dieser Zusatz scheint der Kalkzufuhr halber vorteilhaft zu sein, denn Fluorit giebt nur 0.062 % Kali dem Leucitboden ab. Eine etwas höhere Kalidarreichung erzielt man durch Fluoritzusatz bei kaliarmen Gesteinen, z. B. Glaukonit. Leucit hat sich als Kalidünger bei Weizen, Tabak und Reis gut bewährt. Pantanelli (Roma).

Montanari, C., Diverso potere assorbente dei terreni di fronte ai perfosfati d'ossa ed ai perfosfati minerali. (Stazioni sperimentali agrarie. Vol. XXXVIII. p. 253 (1905)).

—, Comportamento dei perfosfati d'ossa e dei perfosfati minerali nel terreno e modificazioni che essi vi apportano. (Ebenda. Vol. XXXIX. p. 323—329 (1906)).

Nach zwei Jahre lang fortgesetzten Versuchen konnte Verf. schliessen, dass die Phosphorsäure der Mineralperphosphate im Boden schneller als die Knochenphosphorsäure gebunden wird. Die stärkste Absorption vollzieht sich in an Erdalkalikarbonaten, tonartigen Materialien, Eisen- und Aluminiumphosphaten und Humusstoffen reichen Böden. Das Unlöslichwerden der Perphosphatphosphorsäure geht in gewöhnlichen Böden sehr schnell vor sich, mit Ausnahme sandiger oder kiesreicher Böden.

Wiederholte Phosphatzufuhr ruft im Boden Verminderung der Erdkarbonaten unter Bildung der entsprechenden bi- und trimetallischen Phosphate, Abnahme der Sesquioxyde unter Zunahme der

Pflanzenwurzeln wenig zugänglichen Eisen- und Aluminiumphosphate, Dealkalisierung der Tonerde unter Verringerung ihres Absorptionsvermögens und Zartwerden von Kieselsäure, welche zu Kieselsand allmählich entwässert wird. Im ganzen wird der Boden lockerer und kalkärmer. Bei stetig erneuter Phosphatdarreichung wird schliesslich ein Gleichgewichtzustand erreicht, wo der eine bestimmte Menge Phosphorsäure enthaltende Boden den auslaugenden Gewäszern einen konstanten Bruchteil Phosphorsäure abgiebt. Pantanelli (Roma).

Nilsson-Ehle H., Behofvet af att främja den inhemska klöfverfröodlingen. [Die Notwendigkeit der Beförderung der einheimischen Kleesaatzucht]. (Vortrag in der Sitzung der Landwirtschaftsgesellschaft des Bezirkes Skaraborg am 9 März 1906. Sveriges Utsädesförenings Tidskrift 1906, H. 4, p. 151—161. Malmö 1906).

Verf. empfiehlt aus folgenden Gründen besonders die Kultur des späten schwedischen Rothklees in Schweden:

1. Der Spätklee ist der für den grössten Teil von Schweden beste, sicherste und ertragreichste Typus.

2. Er ist von den für schwedische Verhältnisse ungeeignetsten, frühzeitigen Sorten nicht schwer zu unterscheiden.

3. Durch Verbreitung vom echten Spätklee kann man die Züchtung der in ihrem Werte m. o. w. zweifelhaften Stämme, von denen Samen im Lande geerntet werden und die, obschon importiert, als „schwedischer Rothklee" gelten, einschränken.

Ausserdem ist es aber wünschenswert, die Züchtung der besten Stämme von den frühen Rothkleesorten, die wenigstens für die südlichen Provinzen von Bedeutung sind, auszubreiten.

Vergleichende Züchtungsversuche haben gezeigt, dass von dem späten Rothklee verschiedene Typen vorhanden sind. Der schwedische Saatzuchtverein hat auch die Arbeit mit den Reinzüchtungen der besten von diesen Typen in Angriff genommen.

Grevillius (Kempen a Rh.).

Tedin, H., Utsädesföreningens arbete med ärter och vicker samt baljväxtadlingens betydelse för våra dagars jordbruk. [Die Arbeit des Schwedischen Saatzuchtvereins mit Erbsen und Wicken und die Bedeutung der Züchtung der Hülsenfrüchte für die heutige Landwirtschaft]. (Vortrag bei der Jahresversammlung des schwed. Saatzuchtvereins am 1 Aug. 1906. — Sveriges Utsädesförenings Tidskrift 1906. H. 4, p. 135—150. Malmö 1906).

In zwei Tabellen wird eine graphische Darstellung der in den vergleichenden Versuchen bei Svalöf 1891—1905 gefundenen Ertragsfähigkeit der wichtigsten Erbsen und Wickesorten gegeben, wobei teils neue, teils bekanntere alte Sorten berücksichtigt werden.

Unter den Erbsen kommt an erster Stelle die grünsamige Kocherbse Svalöfs Concordia mit Durchschnittsertrag von 2500 kg. pr. har. Sie zeichnet sich u. a. durch sichere und gleichmässige Reife aus; da indessen die Samen grün sind, hat Verf., um der überwiegenden Geschmacksrichtung Genüge zu leisten, durch Kreuzungen gesucht, eine gelbsamige, im Uebrigen ähnliche Sorte zu gewinnen, mit dem Resultate, dass gegenwärtig 35 Pedigreenummern von gelb-

samigem Concordia-Typus vorhanden sind und vergleichend weiter gezuchtet werden.

Auch Svalöfs Capitalerbse, eine frühzeitig reife, erstklassige Kocherbsensorte, hat oft grünliche, die neuere Sorte Capitalerbse II dagegen reiner gelbe Samen.

Unter den Grünfuttererbsen ist die Peluschke in Schweden immer mehr zur Verwendung gekommen, hat aber eine späte und in Schweden unsichere Reife. Es ist gelungen, eine neue (mit 0351 bezeichnete) Sorte in Svalöf zu züchten, die eine genügend sichere Reife hat und höhere Körner- und Stroherträge als die Peluschke liefert; diese Sorte wird baldmöglichst in Handel gebracht.

Unter den Wickesorten haben die drei neuen Sorten 0402, 0542 und 0151 die höchsten Erträge.

Inbezug auf die sonstigen Ausführungen des Verf. muss auf das Original verwiesen werden. Grevillius (Kempen a. Rh.).

Dillingham, F. P., A contribution to the history of the use of bark bread. (Bulletin of the Bussey Institution. III. p. 120—128. 1906).

A historic account is followed by details of chemical analysis from which it appears that the frequently used inner bark of Conifers etc. actually contains less mannan than the wood of the same trees, and the source of any nutritise value that this bark may possess is left still open. Trelease.

Smith, H. G., Aluminium the chief inorganic element in a proteaceous tree, and the occurence of Aluminium succinate in trees of this species. (Proc. Roy. Soc. N. S. Wales 1903).

In this paper the author announces the discovery of a flowering plant which uses the element aluminium in large quantities in its construction, and thus differs in this respect, from all other Phanerogams. This plant, *Orites excelsa,* R. Br., (N.O. Proteaceæ) is one of the „Silky Oaks" of Australia, and occurs plentifully in northern New South Wales and Queensland. It is a tall tree and reaches a diameter of three feet. A section of a tree from Queensland was exhibited which was three feet in diameter. In the centre of this tree was a large deposit of a basic aluminium succinate of the formula $Al_2 (C_4 H_4 O_4)_3 Al_2 O_3$. The ash of the wood furthest from the deposit contained 79.61 per cent. of alumina, a considerably larger amount than had previously been found in any of the Cryptogams, in which alone aluminium was supposed to occur. This specimens was evidently an abnormal one in regard to the large amount of alumina, and the deposit of aluminium succinate is evidently nature's method of getting rid of an excess of aluminium. Three other samples of the trees of this species from northern New South Wales were investigated, and in the ash of all these large quantities of alumina was found, ranging in amount from 36 to 43 per cent. A large amount of the alumina in the ash was present as an aluminate of potash soluble in water, and as no carbonate of potash was detected it is supposed that the potassium aluminate was originally present in the tree as such. In the ash of the sample from Mullimbimby, cobalt was found, together with 3 per cent. of manganese, so that probably cobaltiferous manganese occurs in that

locality. Free normal butyric acid was found in the succinate deposit, this was separated and determined by its barium salt; no other volatile acid could be detected. It is evident that the succinic acid is derived from the butyric acid by natural oxidation, and it then probably forms the basic salt with the aluminium in solution. Investigation was made of the ash of *Grevillea robusta*, of *G. Hilliana*, and of *G. striata* but no alumina could be detected in either, so that the statement previously made (Proceedings 1895), that aluminium succinate occurred in the timber of *Grevillea robusta* was evidently made in error, and it is probable that the tree from which that deposit was obtained was *Orites excelsa*. When portions of the wood of the Queensland sample were ignited, it was possible to obtain the characteristic cobalt-blue colour for alumina when the ash was moistened with cobalt nitrate and ignited, the other salts being too small in amount to interfere with the reaction. Autorreferat.

Smith, H. G., On the occurence of Calcium oxalate in the barks of the Eucalypts. (Proc. Roy. Soc. N. S. Wales. December 1905).

The author announces the presence, in large quantities, of calcium oxalate in the barks of several species of Eucalyptus. It is similar in form and appearance in all species, being well defined monoclinic crystals in stout microscopic prisms, averaging 0.0174 mm. in length, and 0.0077 mm. in breadth and containing one molecule of water. A peculiarity of these is the tendency to form twins geniculate in appearance; twinned forms being pronounced in some species. From botanical and chemical evidence it is assumed that *Eucalyptus salmonophloia* of West Australia and *E. oleosa* of New South Wales belong to the same species, and that the latter tree, which most often occurs as a "Mallee," is only the degenerate stage of the former. The theory is advanced that some of the "mallees," or shrubby Eucalypts, have been formed through the poisoning effect of the excess of oxalic acid, acting for a long time upon species which originally grew as large trees. The tannins in those Eucalyptus barks containing a large amount of calcium oxalate are of very good quality, light in colour, astringent, easily soluble, and should make leather of good quality. On evaporating the extract to dryness on the water bath but little darkening takes place, and the product is still readily soluble. This class of Eucalyptus barks should, therefore, make excellent tanning extracts. From the bark residue the calcium oxalate should be profitably extracted, and the oxalic acid obtained cheaply from this, practically as a by-product. The air dried bark of *Eucalyptus salubris*, the "Gimlet" of West Australia, gives 30.5% of total extract and 18.6% of tannin absorbed by hide powder, and contains 16% of calcium oxalate. The bark of *Eucalyptus gracilis* contains 16.66% of calcium oxalate; that of *E. Behriana* 16.5%; of *E. oleosa* 10.64%; of *E. dumosa* 9.8%; and of *E. salmonophloia* 8.34%. The barks of all the Eucalypts tested contain calcium oxalate, although in some species in very small amount Autorreferat.

Ausgegeben: 5. Februar 1907.

Verlag von Gustav Fischer in Jena.
Buchdruckerei A. W. Sijthoff in Leiden.

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: Botanisches Centralblatt

Jahr/Year: 1907

Band/Volume: 104

Autor(en)/Author(s): Diverse Autoren Botanisches Centralblatt

Artikel/Article: Referate. 113-144