Band 129. Nr. 20. XXXVI. Jahrgang. II. Bd. Nr. 20.

Botanisches Centralblatt.

Referirendes Organ

der

Association Internationale des Botanistes für das Gesamtgebiet der Botanik.

Herausgegeben unter der Leitung

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

und der Redactions-Commissions-Mitglieder:

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von zahlreichen Specialredacteuren in den verschiedenen Ländern.

Dr. J. P. Lotsy, Chefredacteur.

No. 46.	**Abonnement für das halbe Jahr 15 Mark** durch alle Buchhandlungen und Postanstalten.	1915.

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

Sirks, M. J., Indisch natuuronderzoek. Een beknopte geschiedenis van de beoefening der natuurwetenschappen in de Nederlandsche koloniën. (Diss. Utrecht en Meded. Kol. Inst. Amsterdam. VI. Afd. Handelsmuseum 2. XII, 303 pp. 23 pl. 1915.)

Scientific researches about nature, flora and fauna and their products in the Dutch Indies have not been made before the beginning of the seventeenth century; the work done in earlier times, only some astronomical observations by marine travellers cannot be called upon as nature-study for its own sake. The history of these researches is divided into two parts, essentially different from each other: the one, the period before 1850, being the time of general nature-study, in which it was possible that one and the same naturalist studied nature as a whole, being occupied by researches on animals and plants, geology and chemistry etc.; the other time, afterwards, the time of specialization, of increased sciences, by which the naturalist was obliged to restrain his work to special studies on one of these sciences or one of the groups of animals or plants.

Therefore the present book, giving a brief history of the development of scientific researches in the Dutch Indies, exists of two parts, one containing chapter I—V, treating the general nature-study before 1850 and the other, chapter VI to XIII, giving the history of each science afterwards. Botany has always played the principal rôle in this history, from the beginning onwards to the present time.

The contents of the book cannot be summarized in a brief review; only the principal features may be mentioned here.

The first chapter, p. 1—24: Baanbrekers (Pioneers) treat the books of W. Bontius, E. Kaempfer and H. A. van Reede van Drakestein; the great work of the last-mentioned: Hortus Indicus Malabaricus is the first standardwork on the flora of Malabar, then a possession of the Dutch East-Indian Company. Van Reede, who was Governor of Malabar, has given us in these twelve folio-volumes a book of very great merits.

Chapter II, G. E. Rumphius (p. 25—61), is a monograph devoted to the life and work of this great naturalist, who has consecrated his whole life by the study of the rich nature, flora and fauna of Ambon and environments. His „Herbarium Amboinense" and his „Amboinsche Rariteitkamer" (cabinet of curiosities), are very meritorious works, being the first books about that wonderful and rich life in the Moluccas.

The time afterwards, from Rumphius' death (1702) till the year 1816, in which the Dutch colonies were given back by England (Chapter III, p. 62—85) was a time of very little scientific work; at first only some astronomical work has been done in that period, but from the last few years the work by Horsfield and Raffles may be mentioned.

Chapter IV (p. 86—140) describes at first the foundation and development of the „Natuurkundige Commissie" the work of which has brought many results, but that has died away after a period of diminished strength. The names Kuhl, van Hasselt and others are connected with this part of the history. In this chapter also the first days of the botanical garden of Buitenzorg are treated, founded May 18, 1817 by C. G. C. Reinwardt, the institute of science, which has become since worldwide well-known, before 1850 by help of C. L. Blume, J. K. Hasskarl, J. E. Teysmann and others.

A special chapter (V, p. 141—153) is given to life and work of the great F. W. Junghuhn, member of the Commission for scientific research, and author of the great work „Java".

The chapters, contained in the second part of the book, may be mentioned by title: VI (p. 154—182). General nature-study since 1850; VII (p. 183—215) The further development of „'s Lands Plantentuin" and the botanical research since 1850; VIII (p. 216—226) Zoölogical studies since 1850; IX (p. 227—239) Chemical researches since 1850; X (p. 240—253) Geological discoveries since 1850; XI (p. 254—264) Physical geography since 1850; XII (p. 265—283) Applied natural sciences. Experiment-stations; XIII (p. 284—294) The West-Indian Colonies. From botanical viewpoint the chapters VI, VII and XII are of interest; chapter VI giving the history of scientific life (societies and expeditions), chapter VII the further development of botanical study with the botanical gardens at Buitenzorg under Scheffer and Treub as centre and chapter XII, treating the organization of applied sciences with the connection between cultures and the natural sciences, especially botany and chemistry.

A register of names (p. 295—303) giving also references to the most important literature, is appended. The book has been published in two editions: one as dissertation, of which the greater part have only a reproduction of the title-page of van Reede's Hortus Malabaricus as frontispiece and another in the Mededeelingen Kolon. Inst. Amsterdam, in which we find the following botanical illustrations as out-text heliotypes: title-page of van Reede's Hortus Malabaricus, of Bontius' De medicina Indorum LL. IV., of Rumphius' Rariteitkamer, and portraits of van Reede, Rumphius, Burman Sr., Valentinus, Reinwardt, Kuhl, van Hasselt, Blume, Teysmann, Hasskarl, Junghuhn, Miquel, Scheffer' Treub, de Vrij, Greshoff and a photo of the new „Treub-Laboratorium", the present workplace of foreign investigators, who are visiting the botanical gardens of Buitenzorg.

M. J. Sirks (Haarlem).

Eberstaller, R., Beiträge zur vergleichenden Anatomie der *Narcisseae.* (Anz. ksl. Ak. Wiss. Wien, math.-nat. Kl. 1915.)

Eine Fortsetzung der im Institute für systematische Botanik der Grazer Universität begonnenen Untersuchungen über die Familien der *Liliaceen* und *Amaryllidaceen.* In vorliegender Arbeit wurden Vertreter der Gattungen *Calliphruria, Calostemma, Elisema, Eucharis, Eurycles, Hippeastrum, Hymenocallis, Lycoris, Narcissus, Pancratium, Phaedranassa, Sprekelia, Urceolina* untersucht. Die wichtigsten Ergebnisse sind:

I. Die Laubblätter sind entweder ungestielt und schmal, Spaltöffnungen an beiden Blattseiten zumeist, oder sie sind deutlich gestielt mit verbreiteter flacher Blattspreite (jüngeres Entwicklungsstadium), mit Spaltöffnungen nur auf der Unterseite. Die Gefässbündelanordnung ist in den gestielten und in vielen ungestielten Blättern einreihig, bei *Narcissus* mehrreihig, bei welcher Gattung sich die einzelnen Arten sogar durch die Anordnung der Reihen unterscheiden. Bei *Narcissus papyraceus* speziell sind die Gefässbündel nach innen zu gelagert. Im Gegensatze zur Ansicht von E. Lampa (alle Flachblätter der obengenannten zwei Familien hätten sich aus Rundblättern entwickelt) vertritt Verf. die Meinung, die Ausgangsform der Blätter sei eine schmale, flache Blattform ohne Stiel, welche sich durch Anpassung an äussere Bedingungen nach der einen und nach der anderen Seite hin umgebildet hat.

II. Der Blütenschaft hat keinen geschlossenen Bastring. Bei *Narcissus* finden sich nur Bastbelege auf der Leptomseite der Gefässbündel. Bei *Narcissus* tritt an Stelle der subepidermalen Kollenchymschichte der anderen Genera eine Palisadenschichte auf.

III. Wurzel und Zwiebel. In den Wurzeln fehlt im Gegensatze zu den *Liliaceen* stets bei den *Narcisseae* die Endodermis. Alle Arten der letztgenannten Gruppe besitzen eine echte Zwiebel mit geschlossenen Schuppen, die viel Stärke enthalten. In den Zwiebelschuppen einer Art von *Lycoris* fand Verf. ein eigenartiges nicht verholztes, sehr zähes, feinspiraliges Gewebe unterhalb der inneren Epidermis und zwischen den Parenchymzellen, ohne nachweisbaren Zusammenhang mit den Gefässbündeln; es dient zur Wasserspeicherung.

Die Arbeit enthält eine Menge Details; um diese zu erfahren, muss man Einblick in die Originalarbeit nehmen.

Matouschek (Wien).

Belling, J., A study in semi-sterility. (Journ. of Heredity. V. p. 65—73. 1914.)

The writer made several crosses within the genus *Stizolobium,* viz. between the Florida Velvet "bean" (*S. deeringianum*), the Lyon "bean" (*S. niveum*), the Yokohama "bean" (*S. hassjoo*) and the China "bean" (*S. niveum* var.). The hybrid plants resulting from these crosses (F_1) were all similar in one important respect, namely selfsterility. The flowers of these hybrids had uniformly one half of their pollen-grains quite empty and collapsed, and one-half of their ovules had no embryo-sac. Counts gave 3917 perfect pollengrains to 3388 empty grains. (Some of the empty grains are often hidden under the full ones, or swept aside by the liquid). Counts of ovules gave 50 ovules with embryo-sac to 49 ovules with aborted embryo-sacs. The empty pollen-grains were uniformly mixed with the full grains in the anther; and the sterile ovules were distributed at random in the ovaries. The sterile ovules do not grow in size, and the place where they are can usually be seen as a constriction from the outside of the pod. Only about one or two percent of the pods of these hybrids have no aborted ovules; some pods have several aborted ovules, some have few, but the commonest number are two or three.

In the second generation half the plants have perfect pollen-grains, and the other half have a mixture of equal numbers of full and empty grains in all their flowers. The plants with perfect pollen have also perfect ovules; the plants with semi-sterile pollen have also half their ovules sterile. In the F_2-generation of the Velvet-Yokohama cross, which was thoroughly investigated, there were 180 fertile plants and 195 semi-sterile plants. In the F_3 all the descendants of fertile plants showed to be fertile; the progeny of the semi-sterile plants again separates into equal numbers of fertile and semi-sterile plants. The semi-sterile plants have not been tested beyond this third generation; fertile plants remain fertile in pollen and ovules in F_4 and F_5.

The writers conclusions is as follows: "The random abortion of half the pollen-grains and half the embryo-sacs, and the splitting of the progeny of the semi-sterile plants into half semi-sterile and half fertile, as well as the constancy of the fertile plants, agree in all details with a simple Mendelian hypothesis, in which the pollen-grains and embryo-sacs, not the zygotes, are the individuals affected by segregation. If the Velvet been has a factor whose absence stops the development of those pollen-grains and embryo-sacs, which lack it, and the other three allied beans have another similar factor segregating independently, then those pollen-grains and embryo-sacs of the hybrid which have both factors will be abnormal, because unlike the zygote, they normally have single and not double factors. Hence those pollen-grains and embryo-sacs which lack both factors, and those which posses both factors, alike fail to develop. This hypothesis can be verified or disproved by appropriate crosses between different fertile lines, which the writer hopes to undertake". M. J. Sirks (Haarlem).

Castle, W. E., An apple chimera. (Journ. of Heredity. V. p. 200—202. 1914.)

The writher gives in this paper some interesting photographs and descriptions of a peculiar apple chimera; Golden Russet and Boston Stripe being combined in the same fruit, as the result of a graft. Trees producing these apples bear only a few fruits of this composition; the rest of the crop belongs entirely to one or other of the two varieties concerned. The stem end of the apple was in each case of "russet" and without stripes; the blossom end was smooth skinned of a light red color striped with yellow or green. The line of demarcation on the surface was sharp; there was generally a small ridge, because one variety was larger than the other. When one of these apples was cut open the flesh was found to be different in texture and flavor in the two regions. Underneath the russet skin the flesh was coarser grained. One end of the apple was distinctly sour, the other insipid, almost sweet. The line of demarcation of the flesh was also sharp.

In the apples figured the chimera, according to the writer, would seem to be sectorial rather than periclinal, if the line of demarcation ran lengthwise of the apple rather than across it. But as it is, they resemble more a periclinal chimera which has everted its deeper lying tissue at the blossom end of the fruit. The writer asks these questions: "Does the fruit of the apple develop in that way? Will such fruits give us a clue to the answer?"

M. J. Sirks (Haarlem).

Castle, W. E., Pure lines and selection. (Journ. of Heredity. V. p. 93—97. 1914.)

For the practical breeder selection has always some result, while for the biologist selection within the pure line is without effect. The writer gives in this paper his ideas about the practical idea of the stock breeder and the theoretical ideal of the biologist. The biologists pure line would be an imaginary thing, as the mathematical circle; it has no more relations to actual animals and plants than the mathematical circle has to the circles described by the most accomplished draftsman. The author believes that the pure line postulates are these two: 1. The effects of environment are not inherited and 2. Inherited characteristics do not vary.

The first postulate stands, if not proved, at least not disproved. The second postulate of the pure line theory is a much shakier one; the writer qualifies his "characteristics" as "the ultimate factors of inheritance". The assumption that many independent Mendelizing units or factors are concerned in the inheritance of size, is not benefiting the pure line theory, unless we suppose further that these hypothetical factors do not vary. "But this is an assumption wholly without warrant. For in all cases studied critically with reference to the constancy of characters demonstrably Mendelian, the characters have found to be inconstant and subject to modification by selection". The writer cites in supporting his manner of view the researches of Calkins and Gregory, showing that the asexual "pure lines" that Jennings obtained in his cultures of Paramaecium do vary, lines may be isolated from a single "pure line" which differ in size from each other more than the "pure lines" of Jennings. The budvariations of botanists are also changes occurring within a "pure line" asexually produced and of the same nature as those which arise in the course of sexual reproduction. The arguments brought in favour of the pure-line-theory by the Hagedoorns (strong resemblance between heads of wheat of 50 years ago of the present day) are wholly insufficient to support the theory. The last words of this paper are: "Let him wo thinks selection ineffectual try it on any character of any animal. If he is persistent and critical in his experiments, I am confident that he will be convinced of the effectiveness of selection as all practical breeders are, and will thenceforth regard "pure lines" as purely imaginary".

M. J. Sirks (Haarlem).

Cook, O. F., Reticular heredity. (Journn. of Heredity. V. p. 341—347. 1914.)

The author characterizes the Mendelian theory of heredity as as monogenic because it assumes the transmission of only one set of gens or character-units in each germ-cell. But this theory does not provide for the transmission of additional gens to represent characters that may not be brought into expression, or that may give rise to unexpected variations in later generations. If a sudden change of characters appears in a member of an otherwise uniform "pure-bred" stock, it is assumed that a new character has been formed and that such changes in the characters of uniform groups are examples of normal evolutionary progress. The effect of these theories is to return to the pre Darwinian doctrine of special creation, except that the species are not supposed to be made altogether de novo, but by implanting the gens of new characters in members of old species. In all cases where a definite change in one character was noticed equally definite differences in other characters were found. Such facts indicate that mutative changes should be thought of as polygenic, that is, as affecting several characters at once, instead of assuming that they are commonly or typically monogenic, in the sense of being limited to single characters.

In reality alternative inheritance is not limited to characters that show the Mendelian reactions, but extends into other fields of heredity where the theory of germinal segregation and alternative transmission of unit characters does not apply. Changes of character, occurring during the development of the same individual plant or animal, must represent alternative expression of characters, instead of alternative transmission. It appears reasonable to expect that sudden changes or abrupt differences among the individuals of the same stock may represent variations in the expression of characters, rather than differences of transmission. Changes of expression must be considered in the study of heredity, as well as differences of transmission.

A polygenic theory is required to account for the fact that latent or suppressed characters are transmitted, as well as those that are brought into expression. A multiple transmission of many alternative gens should be recognized, enough to represent the whole range of ancestral diversities The polygenic nature of heredity is indicated by the fact that mutative changes of expression usually affect many characters at once, instead of single characters. A further advantage of the polygenic conception is that it allows characters to be brought into analogy with ancestral lines that form the network of descent of the species.

Merely increasing the numbers of gen sdoes not fully provide for the fact that many characters are usually changed together instead of one character at a time. Our ideas of relations of the gens to each other have to be modified in addition to recognizing increased numbers of gens. If we think of characters as representing stages and alternative courses of development, the gens, as predetermining rudiments of the characters, must be thought of a having intimate mutual relations, instead of being considered as entirely independent. The idea of alternative courses of development is in better accord with the general facts of biology than the idea of alternative gens, as shown by the nature of individual differences among the members of normally diverse species, with free intercrossing of different lines of descent. Instead of trying to think of gens as separate entities or corpuscles of any sort we may think of them as parts of the ancestral lines that form the network of descent of the species.

The assumption that characters are pre-existent in the protoplasm of germ-cells as discrete particles or independent units of any sort is not justified by observation or by logical necessity. Equally convenient and more truly biological methods of thinking about the problems of heredity can be developed by recognizing the relation of heredity to the network of descent of the species. This conception allows characters to be thought of as representing lines of descent instead of as discrete particles in the protoplasm.

M. J. Sirks (Haarlem).

Cook, O. F., Sexual inequality in hemp. (Journ. of Heredity. V. p. 203—206. 1914.)

A remarkable case of sexual inequality is described by the writer in a plot of hemp, grown in Virginia and recognized as the so-called Russian or Manchurian hemp, probably the same as that described by Pallas as *Cannabis erratica,* though it is not usually considered as a species distinct from the ordinary *C. sativa.* All of the male plants were very slender and spindling, and the foliage was of a pale yellowish green color, in strong contrast with the deep blackish green of the female plants. In addition to their more robust form, the female plants were often a foot taller than adjacent males, the largest of the female plants attaining about three feet. Many of the male plants had already died at the time the photographs, illustrating the paper, were taken, August 13, and the others were evidently to follow shortly. But all of the female plants were still fresh and vigorous, and were growing and flowering under conditions that where bringing the male plants to an early death.

Other varieties of hemp, not grown for seedproduction, bot for fibre or drug purposes do not show such a striking inequality of the sexes. Though the male plants die somewhat in advance of the females, they attain nearly the same stature and live through most of the season.

The writer has not determined the extent to which the presence or the competition of the female plants may be responsible for the early of the death of the male plants, neither does he indicate the causes of this. Only the desirability that the males die early and the advantages of this early death are discussed. "Under extreme conditions short-lived male plants would be likely to leave larger progenies, for the female plants that stood next to short-lived males would be able to ripen more seed. The natural result of such variation and selection would be the development of a plant with short-lived, ephemeral males corresponding to drone bees and similar specializations of the sexes among insects and other invertebrate animals". "But the advantage of having the males die earlier would not of itself cause them to die. Some other specialization or intensification of the sexual differences must have arisen".

M. J. Sirks (Haarlem).

Cook, O. F., The existence of species. (Journ. of Heredity. V. p. 155—158. 1914.)

The following quotations from this paper may be given here as characteristic for the author's point of view:

"The dependence of the cellular organization upon the specific organization continues and becomes more apparent as we ascend in the scale of the structural complexity, and is shown by the need of crossing of lines of descent through sexual reproduction. The species and the individual are morphological facts, and sexuality the physiological function that connects them. The species is a network of interwoven lines of descent and has as real an existence in nature as an individual animal or plant. The species produces the individual and the individual adds its share to the network of descent of the species. To think of the individual as producing itself without reference to the specific organization is like assuming the spontaneous generation of a complex cellular structure."

"There is no structural organization without underlying specific organization. Organisms maintain their existence and make evolutionary progress only in species. It is the species, rather than the individual, that has a truly biological existence. Instead of disregarding species, students of general biological problems should consider the association of all plants and animals in species, in other words, the speciety of living matter, as one of the most significant and fundamental facts."

"That categories of classification of species are artificial is not an indication that the groups themselves have no real existence. As well might we say that continents and islands have no real existence because their shore-lines are not definitely fixed."

"It is true that the boundaries of species often appear less definite in nature than in books, but the same is true of islands. The members of each species are bound together by a network of lines interbreeding into a physiological unity, quite independent of morphological similarities or diversities inside the species. It is organization, that constitutes the species, not the characters that may be ascribed to it." M. J. Sirks (Haarlem).

Gilbert, A. W., The science of genetics. (Journ. of Heredity. V. p. 235—243. 1914.)

The paper gives a brief review of evolutionary ideas of Anaximander, Empedocles, Anaxagoras, Aristoteles, the retrogress in the middle ages till the reviving first by the natural philosophers and rashly speculative writers and finally by the working and observing naturalists. The climax then was reached in the work of Lamarck and finally of that greatest of naturalists and philosophers, Charles Darwin.

The influence of Darwin and de Vries, the present position of genetics, the influence of Gregor Mendel's laws of heredity, the principle of Alexis Jordan, the question of "pure lines", the problem of inheritance of acquired characters, the commercial value of genetics for scientific breeding and the chance for practical man, all these subjects are discussed in more or lesser detail. New facts or new ideas fail. M. J. Sirks (Haarlem).

Gravatt, F., A radish-cabbage hybrid. (Journ. of Heredity. V. p. 269—272. 1914.)

The writer describes in this paper a peculiar hybrid, obtained by him in pollinating emasculated flowers of the radish-variety "Long Scarlet Short Top" with pollen of a first generation cabbage-hybrid between the varieties "Volga Russian" and "Curled Savoy". The hybrid was very vigorous and grew rapidly. The leaves are in size and shape nearer to the cabbage, in colour a mean between the light green of radish and the dark or blue green of cabbage, in taste more like cabbage, but somewhat pungent like radish, glabrous like cabbage, etc. The hybrid has an open, diffuse growth habit as radish, does not develop a tuberous root, but continues to develop numerous large leaves, etc. For further detail vid original.

Nearly every day during March, April and May, pollen from different varieties of radish and cabbage, including the parents, and from cauliflower, collards, Brussels sprouts and their crosses, was tried on the flowers of the radish-cabbage hybrid, but nothing resulted. The hybrid was also sterile to its own pollen. Flowers of the radish, cabbage and various *Brassica* crosses mere emasculated, bagged and pollinated without results. The same process of pollination was gone through in the winter of 1912 with a root cutting of the hybrid and again resulted in failure.

M. J. Sirks (Haarlem).

Griffiths, D., "Reversion" in prickly pears. (Journ. of Heredity. V. p. 222—225. 1914.)

In the cultivation of prickly pears (*Opuntia lindheimeri*) it is in San Antonio region necessary for one to choose between the spineless forms not needing singeing and the much more productive spiny native varieties, which are not only difficult but often impossible to singe properly. It may be possible in time to breed varieties better adapted than the native ones, but the development of such forms from the spiny native prickly pears of the delta of the Rio Grande is an almost hopeless task, the variation in the number of spines produced being so trifling as to scarcely warrant selection, while they do not appear to hybridize readily with the spineless forms.

In 1905 a few cuttings were imported in America from Malta, belonging to the nearly spineless *Opuntia ficus indica*. In the planting of this stock it was noticed, that one side of one plant of this number was very spiny and the other side as spineless as the remainder of the importation. All new growth on one side of the plant, whether from the original cutting or from a younger joint, was practically spineless, while the other side was exceedingly spiny, the latter resembling the more common forms of prickly pears and bearing two to four white spines two-thirds of an inch to one and one-half inches long.

The habit of reversion or bud variation whichever it may be considered, is a very important characteristic, and, while more striking in the above variety than any other which has been cultivated in these investigations, appears to be not at all uncommon. A plant of another spineless variety started to vary in the same direction in 1913.

Both of these variations appear to the writer to point to the origin of the spineless species of the so-called *ficus-indica* group from the spiny ones, the spineless forms being the result of a long series of selection. The striking variation of certain spineless forms to a spiny condition is looked upon as a reversion to an original type.

M. J. Sirks (Haarlem).

Harris, J. A.. Hallett's method of breeding and the pure line theory. (Amer. Breeders Magazine. IV. p. 32—24. 1913.)

In giving some interesting quotations from Hallett's papers about improvement of cereals and other foodplants, the author discusses Hallett's views about the working and effectiveness of selection in wheat grains and in potatotubers. Especially may be mentioned, the following words of the author: "Two things are clear from this quotation. First, Hallett used fifty years ago the "ear to row" test so often emphasized as a modern method. Second, his method of selection in wheat, a generally self-fertilized plant, was essentially a method of improvement by selection within the pure line!" The writer lays "this question of the critical value of Hallett's opinions aside," but "one must admit that if a man's results are to be cited in evidence at all they should be correctly set forth." M. J. Sirks (Haarlem).

Hayes, H. K., Variation in tobacco. (Journ. of Heredity. V. p. 40–46. 1914.)

In recent years many foreign types of tobacco have been grown from imported seed in the United States. In most cases these have proved very variable in their characters during the early years of their development and this has led to a common belief that a breaking up of type is caused by the change of environment when seed of southern tobacco is grown in the north. Shamel believed two efficient means of inducing variability as a source of new types to be: change of environment and crossing. Hasselbring at the other side denied the breaking up of type in a number of "pure lines" which were grown in Cuba and in Michigan; whatever modifications did appear due to the change of environment, appeared alike in all of the plants of a given strain.

In 1908 the writer became interested in the study of heredity in tobacco and has had many opportunities to observe the effects of environment on tobacco characters. The general conclusions from this work are that environment is of great importance in any system of tobacco breeding, and quantitative characters and especially quality of cured leaf are in a large measure dependent on this feature. Change of environment, however, does not cause a breaking up of type, and whatever variations occur due to environment appear alike in all plants of a particular type.

Heredity is the second important factor and poor types will give unfavorable results even under the best environmental conditions. Any system of tobacco breeding must take both heredity and environment into account.

The only known means of producing variability as a source of new types is by crossing. The number of new forms which will appear due to a particular cross will depend on the number of germinal characters by which the parent plants differ. As interesting instance of cross the author mentions a hybrid between a Cuban Havana tobacco which has very large leaves but only a few of them, with a Sumatra type, which has numerous leaves, but only small ones. A very good form, Halladay Havana, has been grown from the offspring of this crossing. M. J. Sirks (Haarlem).

Figdor, W., Ueber die panaschierten und dimorphen Laubblätter einer Kulturform der *Funkia lancifolia*

Spreng. (Anz. ksl. Ak. Wiss. Wien. 1914. Auch: Sitz. Ber. dieser Ak. CXXIII. p. 1085—1096. 1914.)

Bei *Funkia undulata* var. *vittata* (Kulturform der *F. lancifolia* Spreng.) beeinflusst die Temperatur die Erscheinung der Panaschüre. Letztere tritt sehr augenfällig bei der Temperatur von 9—13° C zutage: Der rinnige Blattstiel und die Blattfläche erscheint weiss oder gelbweiss gestreift. Grüngefärbte Streifen wechseln mit mehr minder albikaten in longitudinaler Richtung ab. Wegen des bogig verlaufenden Nervenverlaufes erscheint die zu innerst gelegene Partie der Blattfläche und die basiskope „Hälfte" der Lamina am stärksten panaschiert. Höhere Temperaturen (20—25° C) färben die anfangs gelblichen Streifen der Blätter in kurzer Zeit gelblichgrün und zuletzt ganz grün aus. Es spielt da bei der normalen Blattfärbung die relative Feuchtigkeit der Atmosphäre sicher auch eine Rolle. Die panaschierten Laubblätter obiger Kulturform zeigen sonderbarerweise eine bisher noch nicht verzeichnete dimorphe Ausbildung, in Abhängigkeit von der Zeit ihres Entstehens: Die Frühjahrsblätter sind wohl so lang, aber bedeutend breiter als die Sommerblätter. Die Form ersterer ist eiförmig zugespitzt, die letztere aber ± lanzettlich. Der Uebergang der ersteren Blattform in die letztere findet fast unvermittelt statt. Es erhebt sich da die Frage: Ist der Dimorphismus der Laubblätter bei den einzelnen Arten von *Funkia* etwas Gesetzmässiges, der Gattung eigentümliches, was eventuell zur Charakterisierung des ganzen Genus herangezogen werden könnte? Dies zu entscheiden, erheischt noch weitere Untersuchungen. Matouschek (Wien).

Strasser, P., Sechster Nachtrag zur Pilzflora des Sonntagberges (N.-Oe.), 1914. (2. Fortsetzung). (Verh. k. k. zool. bot. Ges. Wien. LXV. p. 208—227. 1915.)

Neu sind: *Heteropatella Strasseri* Bubák (auf der Innenseite abgelöster Rinde von *Abies pectinata*); *Coryneum aesculinum* Strasser (auf dürren Zweigen von *Aesculus Hippocastanum*; doch kleinere, nicht russfarbige Sporen, längere Konidienträger als *C. Salicis* Tagn. Die neue Art ist vielleicht als Varietät zu *C. Salicis* zu ziehen); *Steganosporium multiseptum* Strasser (auf gleichem Substrate); *Aspergillus muscivora* v. Höhnel (auf toten Fliegen), *Coniosporium densum* Strasser (auf dürren Umbelliferenstengeln); *Torula canceratica* Strasser (*Trachytosa*-Grüppe) [auf krebsigen Harzausflüssen junger Lärchen; Rasen weit ausgebreitet, glanzlos, olivengrünschwarz, angefeuchtet tiefschwarz, die Hauptkette der Konidien mitunter über 200 μ lang]; *Speira polystycta* v. Höhn. (auf dürren Stengeln van *Senecio*); *Macrosporium vesiculiferum* v. Höhn. (auf dürren entrindeten Ranken von *Clematis Vitalba*).

Systematisch-nomenklatorische Details: *Scoriomyces Cragini* Sacc. et Ell. gehört nach v. Höhnel in den Entwicklungskreis eines Myxomyceten. — *Glyocladium Clarciana* (Boud.) v. Höhn. et Sacc. und *Haplotrichium capitatum* Lk. (von Nees falsch abgebildet) zieht Bresadola zu *Glyocladium penicillioides* Cda. — *Monosporium articulatum* Bonord wurde auf *Lycogala* und *Arcyria* gefunden; die Konidien desselben auf *Lycogala* sind bedeutend grösser als die auf *Arcyria*. Die grosssporige Form mit den zylindrischen, an den Enden abgerundeten Sporen gehören nach Bresadola zu *Cylindrophora tenera*. Bon. — *Didymostilbe Eichleriana* Bres. et Sacc. wurde mit am Grunde dunkelgefärbten Stielen gefunden. — Auf dürren Aesten von *Juglans regia* wurde eine wohl bisher nicht beschriebene *Tubercularia vulgaris* Tode gefunden. Interessant ist ein schwarzer gelatinöser Ueberzug mit darauf sitzenden kugeligen oder ovalen, etwas gelblichen Konidien von 24—36 μ Durchmesser mit dunkelbrauner dicker Membran; er wurde provisorisch zu *Phylloedia* gezählt. — Sonst viele Berichtigungen und Ergänzungen von Diagnosen bekannter Arten.

Biologische Daten: *Oidium quercinum* Thuem. wurde im Gebiete schon über 15 Jahre beobachtet; Perithezien nie gefunden. — Bezüglich *Dasyscypha Willkommii* Hartig: Geschlossene Larchenbestände in jungen Kulturen sind an sich schon der Gefahr des Lärchenkrebses mehr ausgesetzt als gemischte. Wenn diese Kulturen aber an einer von den Winden geschützten Berglehne vorkommen, also einer energischen zeitweiligen Durchlüftung durch Winde entbehren, so wird das Wuchern des Pilzes befördert, und es werden zuletzt durch den verursachten Harzausfluss („Lärchenbrand", „Rindenbrand") die Lärchenkulturen auf weite Strecken zerstört.

Matouschek (Wien).

Metcalf, H., The Chestnut bark disease. (Journ. Heredity. V. p. 8—17. 1914.)

The very harmful chestnut bark disease, caused by *Endothia parasitica,* seems to occur in nature in a remote part of northeastern China, in the province Chili, on *Castanea mollissima,* where it does relatively little harm. Being introduced into America in the 90's or late 80's, the parasite found here the American sweet chestnut as a wonderfully susceptible host. Its early history in America is obscure, and will probably always remain so. By 1903 or 1904 it was in full blast in the vicinity of New York City and its subsequent spread is authentic history. The distribution since has been general; and there is not now the slightest indication that it is decreasing in virulence or that the climate of any region to which it has spread is having any appreciable retarding effect upon it. The author describes manner of infection and the girdling of trees. The most conspicuous symptom at all times of the year is the occurrence of sprouts at the base of the tree, on the trunk or on the branches. The wood is not materially injured and may be used for all timber purposes for which healthy trees might be used. Chestnut nursery stock has been the most important factor in the spread of the bark disease, and must therefore be inspected by inspectors, who are trained in recognizing the more obscure symptoms of fungous disease. There is no apparent reason why, with rigid inspection of purchased stock and of the orchards themselves, all chestnut orchards and nurseries from Indiana to the Pacific coast can not be kept permanently free from the bark disease. The author thinks that the most practical control results will be obtained by the breeding and propagation of varieties of chestnut that are immune or highly resistant to the bark disease, such as the species of Chinese chestnut and of Japanese chestnut, strains of which seem apparently immune and form the most hopeful basis for breeding at present. The spreading of this disease has lessoned us the truth of „Prevention is cheaper than cure".

M. J. Sirks (Haarlem).

Morris, R. T., Chestnut blight resistance. (Journ. of Heredity. V. p. 26—29. 1914.)

The present paper gives the results of the writers experience and observations in growing chestnuts and their resistance to bark disease. When it became evident, that the American chestnut trees on his place were seriously menaced, the question of finding blight-resistant individuals among species and varieties came up and the writer proceeded to add to his collection various species and varieties until it included twenty-six different kinds, among these kinds species were as follows: American sweet chestnut (*Castanea americana*), bush chinquapin (*Castanea pumila*), tree chinquapin (*Castanea pumila arboriformis*), alder-leaf chestnut (*Castanea alnifolia*), evergreen chestnut (*Castanopsis chrysophylla* or *C. sempervirens*). In addition to these American species of chestnut there were two specimens of the chinese *Castanea mollissima* and many specimens of species not determined by the writer from England, France, Italy, China, Korea and Japan. Very resistant showed to be *Castanea alnifolia* and *Castanea mollissima*; none of the trees belonging to these species has blighted. In his breeding experiments in order to obtain hybrid chestnuts, which would be resistant to blight, the writer made various combinations between staminate and pistillate flowers of *Castanea alnifolia, C. pumila* and *C. mollissima*. The most promising hybrid for timber purposes would presumably be one between *C. mollissima* and *C. pumila arboriformis*.

When making hybrids between various species of chestnuts, the writer incidentally determined that parthenogenesis apparently occurs among the *Castaneas*. The parthenogenetic nuts showed some peculiar features: freaks, cotyledons protruding through the involucre before the nuts were fully developed showed a trifle of chlorophyll coloration; the disparity in size between shoots which grew from them in the following year, some becoming much larger and some remaining smaller than chinquapins from normal gametes. Incidentally the writer states that similar experiments were tried with *Juglans cinerea, Hicoria ovata, H. glabra* and *H. minima* and all of these apparently developed nuts by parthenogenesis, *Juglans cinerea* freely, and the three hickories sparingly. M. J. Sirks (Haarlem).

Bazhanov, S., Weeds on the Buzuluk Experiment Field (Samara prov.) and in the vicinity. (Bull. appl. Bot. VIII. p. 276—293. 1915. Russian and english.)

Owing to the presence of weed seeds in the soil, the total amount of weeds in the harvest of wheat on the Buzuluk Experiment Field showed a marked increase, in relation to the percentage of weed-seeds among the sown grains. Therefore the writer has made some analyzations of the soil samples, taken from different parts of the experimental field, the results of which are published in this paper.

It was observed that the distributions of weed seeds attains the rate of about 3000 seeds in the soil per 1 sq. metre of seed bed, 2 inches deep, what makes 34.000.000 seeds per 1 hectar and 160.000.000 per the same area but 8 inch deep. These seeds belong mostly to *Convolvulus arvensis, Dracocephalum thymiflorum, Ceratocarpus arenarius, Triticum repens, T. intermedium, Kochia sedoides* a. o. Besides the examinations of the soil samples, the field crop of the wheat has also been investigated by the author. There have been collected all the plants, grown on each of two test plats. After the study of weeds grown among the field crop on the farmers field the author came to the conclusion that the weeds have been distributed with reference to their height in three groups: to the first (upper) height belong *Artemisia Absinthium, Centaurea Scabiosa* etc.; to the second (middle) *Avena fatua, Convolvulus arvensis* etc.; to the third (low) *Achillea Millefolium, Dracocephalum thymiflorum* etc.

The total amount of weeds observed on the Buzuluk Experiment Field, as it is to be seen on a table, given by the author, reached 107 species. There are among them 26 per cent of representatives of local prairy flora, as for instance *Amygdalus nana, Alyssum desertorum* etc. *Cannabis sativa* is the only cultivated plant, which became wild. The remainders are the common representatives of weeds of the Russian black-earth. M. J. Sirks (Haarlem).

Brehmer, W. von, Aufzählung der afrikanischen Arten von *Wahlenbergia* nebst Diagnosen der neuen Arten. (Bot. Jahrb. f. Syst. LIII. p. 72—143. 3 Fig. 1915.)

Enthält folgende Neuheiten:

W. sessiliflora nebst var. α *dentata* v. Brehmer, *W. Dunantii* A.DC. var. α *glabrata* v. Brehmer, *W. ramifera* v. Brehmer, *W. Ecklonii* Buek var. α *brevisepala* v. Brehmer, *W. mollis* v. Brehmer, *W. sphaerica* nebst α *longifolia* v. Brehmer, *W. longisepala* v. Brehmer, *W. capillata* v. Brehmer, *W. kilimandscharica* Engl. var. α *intermedia* v. Brehmer, *W. mashonica* N. E. Br. var. *Junodis* v. Brehmer, *W. dentata* v. Brehmer, *W. minuta* v. Brehmer, W. *compacta* v. Brehmer, *W. tumida* nebst var. *gracilis* v. Brehmer, *W. subfusiformis* nebst var. *involuta* v. Brehmer, *W. tortilis* v. Brehmer, *W. psammophila* Schltr. var. *longisepala* v. Brehmer. *W. rara* Schltr. et v. Brehmer, *W. sabulosa* v. Brehmer, *W. lobata* v. Brehmer, *W. foliosa* v. Brehmer, *W. Buseriana* v. Brehmer, *W. scopella* nebst var. *rotundata* v. Brehmer, *W. brachycarpa* Schltr. var. *pilosa* v. Brehmer, *W. tomentosula* v. Brehmer, *W. lobulata* v. Brehmer, *W. acuminata* v. Brehmer, *W. subpilosa* v. Brehmer, *W. Bolusiana* Schltr. et v. Brehmer, *W. filipes* nebst var. *dentata* v. Brehmer, *W. asperifolia* v. Brehmer, *W. acicularis* v. Brehmer, *W. lycopodioides* Schltr. et v. Brehmer, *W. macra* Schltr. et v. Brehmer, *W. fasciculata* nebst var. *pilosa* v. Brehmer, *W. virgulta* v. Brehmer, *W. capillifolia* E. Mey. var. *conferta* v. Brehmer, *W. clavata* v. Brehmer, *W. squamifolia* nebst var. *tenuis* v. Brehmer, *W. roëlliflora* Schltr. et v. Brehmer, *W. constricta* v. Brehmer, *W. fruticosa* v. Brehmer, *W. arabidifolia* (Engl.) v. Brehmer, *W. arguta* Hook. fil. var. *parvilocula* und *longifusiformis* v Brehmer, *W. schistacea* v. Brehmer, *W. subrosulata* nebst var. α *grandifolia* v. Brehmer, *W. Zeyheri* Buek var *pyriformis* und *lanceolata* v. Brehmer, *W. cernua* (Thunb.) A.DC. var. *cuspidata* v. Brehmer, *W. maculata* nebst var. *nuda* v. Brehmer, *W. clavatula* v. Brehmer, *W. transvaalensis* v. Brehmer, *W. caledonica* Sond. var. *cyanea* v. Brehmer, *W. Engleri* v. Brehmer, *W. Dinteri* nebst var. *rotundicapsula, paucilaciniata, virgulta, elongata* v. Brehmer, *W. scoparia* nebst var. *obovata* v. Brehmer, *W. inhambanensis* Klotzsch var. *erecta* v. Brehmer, *W. distincta* v. Brehmer, *W. subtilis* v. Brehmer, *W. riparia* A.DC. var. α *virgulta,* β *etbaica,* γ *clavata,* δ *segregata* v. Brehmer, *W. pseudoinhambanensis* v. Brehmer, *W. obovata* nebst var. α *cernua,* β *fissa,* δ *lata* v. Brehmer (γ fehlt), *W. gracilis* E. Mey. var. *integerrima* v. Brehmer, *W. Schlechteri* v. Brehmer, **W. lasiocarpa* Schltr.

et v. Brehmer, *W. Cooperi* v. Brehmer, *W. grandiflora* nebst var. α *fissa*, β *lanceolata*, γ *lata*, δ *undulata* v. Brehmer, *W. dentifera* v. Brehmer, *W. glandulifera* v. Brehmer, *W. rivularis* Diels v. *oblonga* v. Brehmer, *W. annuliformis* v. Brehmer, *W. fistulosa* v. Brehmer, *W. longisquamifolia* v. Brehmer, *W. brevissquamifolia* v. Brehmer, *W. Galpiniae* Schltr. var. *excedens* v. Brehmer, *W. virgata* Engl var. α *longisepala*, β *valida*, γ *tenuis* v. Brehmer, *W. undulata* (Thunb.) A.DC. var. α *latisepala*, γ *rotundifolia* v. Brehmer, *W. dilatata* v. Brehmer, *W. polychotoma* v. Brehmer, *W. furcata* v. Brehmer, *W. rotundifolia* v. Brehmer, *W. denudata* A.DC. var. α *mutata*, β *brevisepala* v. Brehmer, *W. congestifolia* nebst var. α *glabra*, β *laxa* v. Brehmer, *W. cuspidata* v. Brehmer, *W. littoralis* Schltr. et v. Brehmer, *W. Meyeri* A.DC. var. α *subacaulis*, β *lanceolata* v. Brehmer, *W. silenoides* Hochst. var. α *elongata* v. Brehmer, *W. Mannii* Vatke var. α *intermedia*, β *virgulta* v. Brehmer, *W. densicaulis* nebst var. α *angusta* v. Brehmer, *W. ovalis* v. Brehmer, *W. montana* A.DC. var. β *angustisepala* v. Brehmer, *W. squarrosa* v. Brehmer, *W. solitaria* v. Brehmer, *W. procumbens* Thunb. var. α *intermedia* v. Brehmer, *W. saxifragoides* v. Brehmer, *W. oppositifolia* A.DC. var. β *crenata* v. Brehmer, *W. serpentina* v. Brehmer, *W. pseudoandrosacea* v. Brehmer, *W. nana* v. Brehmer, *W. floribunda* Schltr. et v. Brehmer, *W. androsacea* A.DC. var. α *multicaulis* v. Brehmer, *W. perennis* v. Brehmer, *W. rosulata* v. Brehmer, *W. pseudonudicaulis* nebst var. α *diversa* v. Brehmer, *W. annularis* A.DC. var. α *Bolusiana* v. Brehmer, *W. glandulosa* v. Brehmer, *W. oligotricha* Schltr. et v. Brehmer nebst var. *hispidula* v. Brehmer.

Ein alphabetisches Register erleichtert die Auffindung der Arten und ihrer Synonyme. Die folgenden Arten sind abgebildet:

W. squamifolia v. Brehmer, *W. oxyphylla* A.DC., *W. capillacea* (Thunb.) A.DC. var. *tenuior* Engl., *W. kilimandscharica* Engl., *W. lasiocarpa* Schltr. et v. Brehmer, *W. fasciculata* v. Brehmer.

W. Herter.

Brehmer, W. von, Ueber die systematische Gliederung und Entwicklung der Gattung *Wahlenbergia* in Afrika. (Bot. Jahrb. Syst. LIII. p. 9—71. 11 Abb. 1915.)

Verf. geht zunächst auf die Abgrenzung von *Wahlenbergia* gegen *Lightfootia* und *Cephalostigma* ein. Sodann werden ausführlich diejenigen Merkmale besprochen, die für die Charakterisierung natürlicher Artgruppen innerhalb der Gattung *Wahlenbergia* von Wert sind: Verzweigung, Blattstellung, Blattform, Kelchzipfel, Schlitzung der Blumenkrone, Staubblätter (Filamente und Antheren), Griffel, Narbenlappen und Drüsen, Kapsel, Blütenstände, Aufbau der Blüte. Anschauliche Abbildungen sind diesem Teile der Arbeit beigegeben. Eine dieser Darstellungen erläutert die Verwertung der Artengruppenmerkmale zu den verwandtschaftlichen Beziehungen der Artengruppen untereinander; ein Stammbaum der Artengruppen von *Wahlenbergia* und *Lightfootia* sowie ein Schlüssel der Artengruppen (clavis gregum) beider Gattungen wird versucht.

Von pflanzengeographischem Interesse sind sodann die kurzen Kapitel über die Beschränkung der einzelnen Artgruppen auf bestimmte Gebiete und das hypothetische Kapitel über den wahrscheinlichen Entwicklungsgang der Verbreitung in Afrika. Als „Zentrum" der Gattung *Wahlenbergia* wird das südliche Kapland angesehen, von hier aus erstreckt sich die Gattung ausläuferartig in die tropischen Gebiete hinein. Einen selbständigen Charakter weisen die Bewohner des Kilimandscharo auf. Vertreter der hier vorkommenden Artengruppe *Argutae* wanderten über den nördlichen Teil der zentralafrikanischen Seenzone bis zum Kamerunberg. Beziehungen zu Südafrika fehlen. Bei der Artengruppe *Cervicinae* kommen Vertreter in der ägyptischen Zone und dann im Kunene-Kubangoland bis zum extratropischen Südwestafrika vor. Verf. vermutet in diesem Fälle Einwanderung von Indien über Arabien, wobei der Einbruch der Sahara alle Zwischenformen vernichtet hat. So nimmt Verf. für *Wahlenbergia* drei Verbreitungsmöglichkeiten in Afrika an:

1. Süden der Kapkolonie, den Küsten folgend, mit gleichzeitigen Ausläufern auf dem afrikanischen Hochplateau, bis weit nordwärts.
2. Kilimandscharo über Kiwu-Ruwenzori bis zum Kamerunberg (oder umgekehrt).
3. Indien? — Aegypten bzw. Somaliland (Zwischenglied Sahara) — Kamerunberg — Extratropische Südwestafrika.

Die Verbreitung der Samen erfolgte durch den Wind.

Der nun folgende systematische Teil enthält Diagnosen der 30 Artengruppen nebst Schlüssel der 150 Arten der Gattung *Wahlenbergia*. In einer besonderen Arbeit folgt sodann die Aufzählung der Arten (s. obenstehendes Referat). W. Herter.

Harms, H., *Oxystigma msoo* Harms, spec. nov., der Msoo Baum von Deutsch Ostafrika. (Rep. Spec. nov. XIII. p. 417—419. 1914.)

Beschreibung eines neuen, im lichten Regenwald des Kilimandscharo-gebietes auf feuchtem tiefgründigem Boden wachsenden grossen und wertvollen Nutzholzes. Die bisher nur von Westafrika bekannte Gattung der Leguminosen ist damit auch für die Waldreste des östlichen tropischen Afrika nachgewiesen. Das Holz des neuen Baumes hat grosse Aehnlichkeit mit dem von *Oxystigma Mannii* (Baill.) Harms, im übrigen steht die Art *O. Buchholzii* Harms nahe, die aber kahle Aehrenspindel hat, während diese bei *O. msoo* eine sehr feine Behaarung zeigt. W. Herter.

Harms, H., Ueber einige von P. Preuss gesammelte Arten der Gattung *Inga* Scop. (Rep. Spec. nov. XIII. p. 419—420. 1914.)

Diagnosen von *Inga paterno* aus Zentralamerika und Mexiko und *I. Preussii* aus San Salvador. Beide Bäume sind hohe Schattenbäume für die Kaffeepflanzungen. Die Früchte sind sehr beliebte Näschereien. *I. paterno* heisst in der Heimat independent paternó, cuajinicuil oder jinicuil, *I. Preussii* cuxinicuil. Erstere ist nicht mit der mexikanischen *I. jinicuil* Schlechtd. zu verwechseln, die sitzende oder nur äusserst kurz gestielte Blüten und kleinere lanzettliche oder verkehrt-lanzettliche schmälere Nebenblätter besitzt. Letztere steht der *I. Pittieri* Micheli von Costarica sehr nahe, die aber schmälere lineale Brakteen hat.

Zu *I. fastuosa* (Jacq.) Willd. gehört auch *I. longituba* Harms (Preuss n^{0}, 1685). W. Herter.

Ausgegeben: 16 November 1915.

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