BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
Cornell University, Ithaca, New York

Vol. X DECEMBER, 1921 No. 2

ENTRIES 383-858

AGRONOMY

C. V. PIPER, *Editor*
MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 436, 437, 438, 518, 524, 531, 576, 580, 704, 717, 718, 751, 769, 793, 797, 799, 856, 858)

383. ANONYMOUS. **Chinese peanut oil.** Pharm. Jour. 106: 262. 1921.—The extraction of the oil from *Arachis hypogaea* is carried out in Kwantung province, China, as follows: The washed dried fruits are passed through a large rice husking mill, the seeds are separated over coarse rattan sieves, and reduced to a meal in narrow mortars with huge stone pestles. The meal is steamed in shallow wooden tubs over a boiling cauldron and pressed in a large hollowed tree trunk, an enormous pressure being obtained against the packed meal by the use of wooden wedges. The oil as received is clear and ready for use.—*E. N. Gathercoal.*

384. ANONYMOUS. **Landwirte. Sammelt Eure Erfahrungen über die neueingeführten schottischen und irischen Kartoffelsorten.** [Farmers, collect your experiences with the new Scotch and Irish potatoes.] Oesterreich. Zeitschr. Kartoffelbau 1⁹: 21–22. 1921.—Instead of 3 varieties only of English potatoes which were originally to be imported, 22 have been sent many of which are immune to the wart disease. The official potato commission plans to obtain comprehensive data as to the value of each new variety as compared with the old Austrian sorts.—*F. Weiss.*

385. ANONYMOUS. **Statistical data compiled by the Bureau of Crop Estimates 1863–1920.** U. S. Dept. Agric. Dept. Circ. 150. *64 p.* 1921.

386. AGELASTO, A. M. **Linters.** U. S. Dept. Agric. Dept. Circ. 175. *10 p.* 1921.—Cotton fiber known as "linters" is composed of short hairs removed not by gins, but by a process used at the oil mills in cleaning and preparing seed for crushing. The character, length of fiber, production, handling, sampling, selling, and commercial values are discussed.—*L. R. Hesler.*

387. BIPPART, E. **Vertilgung von Wildhafer.** [Extermination of wild oats.] Illus. Landw. Zeitg. 41: 228. 1921.—This plant (*Avena fatua* L.) is an important weed, chiefly on heavy clay soils rich in calcium. It is often a serious pest in beet fields and in fields of spring grain. As the wild oat plant is killed by autumn frosts, it is not found in fields of winter grain except in spots in which the stand is poor. Since the seed of wild oats germinate at lower

temperatures than do seeds of cultivated grains, the plant makes its appearance in the field before those of the summer grains. Taking advantage of this fact, summer grain should not be sown in an infested field until after the wild oats have appeared, after which shallow cultivation should be practiced to kill the young plants, care being taken not to cultivate so deep as to bring new seed to depths permitting germination; the field should then be planted to the grain desired. This method failing, the field should be mowed before the weed seed ripens thereby preventing infestation the following year. The seeds are capable of germination even when several years old. To avoid bringing up old seeds to the proper depth for germination, only shallow cultivation should be practiced in infested fields.—*John W. Roberts.*

388. CAMP, WOFFORD B. **Cotton culture in the San Joaquin valley in California.** U.S. Dept. Agric. Dept. Circ. 164. *22 p., 11 fig.* 1921.—A general treatise of the subject is presented together with a list of publications bearing on Egyptian cotton growing in the southwestern states.—*L. R. Hesler.*

389. DAMON, S. C. **Experiences with alfalfa.** Rhode Island Agric. Exp. Sta. Bull. 184. *36 p.* 1921.—A compilation of miscellaneous tests which have been conducted at the station from time to time during the last quarter century is presented.—*B. L. Hartwell.*

390. [DRUCE, G. C.] [Rev. of: GOULDING, E. **Cotton and vegetable fibres, their production and utilization.** *x + 230 p.* John Murray: London, 1916.] Bot. Soc. and Exchange Club British Isles Rept. 5: 75–76. 1917 [1918].

391. HANSEN, ALBERT A. **Lawn pennywort: a new weed.** U. S. Dept. Agric. Dept. Circ. 165. *6 p., 3 fig.* 1921.—*Hydrocotyle rotundifolia*, introduced from southern Asia previous to 1890 as an ornamental plant, has become rather widely distributed as a weed in lawns. It is known to occur in the District of Columbia, Pennsylvania, and Kentucky. Directions for its eradication are given.—*L. R. Hesler.*

392. HANSEN, DAN. **The work of the Huntley reclamation project experiment farm in 1919.** U. S. Dept. Agric. Dept. Circ. 147. *27 p., 4 fig.* 1921.—A report is presented of experimental work with crops, including rotation, grasses, varieties, sugar beets, silage, and fruits.—*L. R. Hesler.*

393. HARTWELL, BURT L. **Field experiments which included the soy-bean.** Rhode Island Agric. Exp. Sta. Bull. 183. *15 p.* 1920.—Numerous varieties have been tested. Yellow-seed varieties have been sought which are late enough to give satisfactory tonnage for silage, and yet early enough to yield viable seed or seed which might be used for human food.—For use with corn for silage purposes, an insufficient proportion of the beans was obtained by planting the crops together in the same drill. There were no indications that the corn derived any advantage from the companionship.—Soy beans yielded more than cowpeas. The hay contained from 2.75 to 3.00 per cent of nitrogen.—Althougb nitrate of soda did not decrease the growth of soy beans, it did decrease the weight of the nodules.—The ability of soy beans to secure their needs for phosphorus was found to rank between that of carrots, which obtained their full requirements, and turnips which were practically unable to grow without phosphatic application.—Soy beans were able to derive ⅓ of their potassium needs from a soil so deficient that mangels could obtain only about ¼ and summer squash about $\frac{1}{15}$ of their requirements.—*B. L. Hartwell.*

394. HARTWELL, BURT L., AND S. C. DAMON. **Fertilizer requirements of rotations including corn, potatoes, rye and hay.** Rhode Island Agric. Exp. Sta. Bull. 185. *39p.* 1921.—Results for the 21st to 27th year of 5 different rotations together with results from associated plants receiving differing fertilizers are presented; also, the record of the first 2 rounds of a 7-year rotation.—From two 5-year rotations which differed only in that clover was included in one and not in the other, the hay in one round of the clover rotation contained 132 pounds more nitrogen per acre than in the other. The yields of the other crops did not differ much.—Where no farm manure was used, fertilizer chemicals equivalent to different amounts of a 5:8:5 fertilizer sufficed in general for the different crops.—*B. L. Hartwell.*

395. HAUNALTER, EMIL. **Die Auswahl und die Vorbereitung der Pflanzkartoffel. [The selection and preparation of potatoes for seed.]** Oesterreich. Zeitschr. Kartoffelbau 1^2: 10–11. 1921.—Selection of varieties for food, industrial and fodder purposes, and selection of tubers for seed are discussed. The author recommends medium-sized (for the variety) whole tubers for seed, claiming that cut seed results in reduced yields, susceptibility to disease, and degeneration.—*F. Weiss.*

396. MCMILLER, P. R. **Fertilizer tests pay in Minnesota.** Potato Mag. 3^{12}: 26. 1921.—In 1920 on 27 farms the application of a complete commercial fertilizer resulted in greater yield of potatoes, each bushel increase costing from 0.18 to 1.77 dollars. The weather was unfavorable. The soil was mostly sandy loam, and in some cases was treated with stable manure.—*Donald Folsom.*

397. MILLARD, W. A. **Dry spraying for the destruction of charlock.** Jour. Ministry Agric. Great Britain **28**: 134–142. *1 fig.* 1921.—In certain parts of England it is not convenient to secure a supply of water for wet spraying for charlock, consequently some tests were conducted during 1919 and 1920, near Leeds, on the use of some powdered chemicals for destroying the weed in grain fields. Nitrolim (calcium cyanamide) was found to be of no value, iron sulphate was effective only in such large quantities as to make it impracticable because of the cost, but copper sulphate gave excellent results. The latter, finely ground and applied at the rate of 20 pounds to the acre, destroyed the charlock provided seed had not set. For successful control the weather should be fairly settled, there should be a heavy dew, but no wind at the time of application; with these conditions dry spraying is quite as effective as wet spraying.—*M. B. McKay.*

398. NICHOLLS, W. D., AND F. W. PECK. **The cost of producing tobacco in Kentucky. (A preliminary report.)** Kentucky Agric. Exp. Sta. Bull. 229. *135–190, illus.* 1921.—One-year cost of production studied on 81 farms in the Burley areas covering 625.5 acres of Burley tobacco and 70 farms in the Dark area covering 679 acres of dark tobacco is given. The total cost per acre, including land rent, in the Burley district ranged from 163.06 to 403.18 dollars, averaging 289.10, with over ½ of the acreage being produced at between 200 and 300 dollars per acre. In the Dark district the total cost per acre varied from 100.03 to 308.19 dollars, averaging 141.76, with over ½ the acreage being grown at a cost of 125 to 150 dollars per acre. Ninety per cent of the Burley tobacco was grown at a cost of 31 cents or less per pound, averaging 26 cents. In the Dark area 90 per cent was grown at a cost of 23 cents or less per pound, averaging 17.2 cents.—*W. D. Valleau.*

399. OAKLEY, R. A., AND H. L. WESTOVER. **Effect of the length of day on seedlings of alfalfa varieties and the possibility of utilizing this as a practical means of identification.** Jour. Agric. Res. **21**: 599–607. *Pl. 111–121.* 1921.—*Medicago falcata* and the 4 varieties of alfalfa,—Peruvian, Kansas, Grimm, and Turkestan,—were grown under conditions for control of exposure to light. Seedlings grown under conditions of a short January day and of a shortened day (7-hour exposure) showed the following sequence with respect to height, erectness, and lack of branching: Peruvian, Kansas, Grimm, Turkestan, *M. falcata.* Under exposure to a lengthened day (electric illumination until 11 o'clock at night) the order is practically reversed. By controlling light conditions it is possible to distinguish between seedlings of the commercial groups of alfalfa.—*D. Reddick.*

400. PARKER, W. H., AND H. CHAMBERS. **The nomenclature of agricultural plants.** Jour. Ministry Agric. Great Britain **28**: 167–180. 1921.

401. PIETERS, A. J., AND L. W. KEPHART. **Annual white sweet clover and strains of the biennial form.** U. S. Dept. Agric. Dept. Circ. 169. *21 p., 8 fig.* 1921.—The authors have brought together all available information on the new sweet clover, including its history, characteristics, and probable usefulness. The existence of several distinct varieties of biennial white sweet clover is noted with brief descriptions of their characteristics.—*L. R. Hesler.*

402. RATZER, WILHELM VON. **Espercette (Onobrychis sativa).** Bienen-vater **53**: 64–65. 1921.—The article gives details of growth, blooming period, type of soil required, etc., of the above species. Sanfoin can be grown successfully as far north as the 66th parallel in Europe. It is very valuable for various purposes, such as increasing the productivity of the soil, as hay, and for its excellent light-colored honey.—*M. G. Dadant.*

403. ROBERTS, HERBERT F. **Relation of hardness and other factors to protein content of wheat.** Jour. Agric. Res. **21**: 507–522. *Pl. 100, 2 fig.* 1921.—A study of available data shows that the correlation between hardness of wheat and protein content is practically nil; this is contrary to common assumption. No correlation is found between specific gravity and protein content nor between volume of the grain and protein content.—*D. Reddick.*

404. RÜMKER. **Winterweizenversuche der Preussischen Forschungsgesellschaft für Landwirtschaft-Berlin in Emersleben 1919–20.** [Winterwheat experiments of the Prussian Agricultural Research Society in Emersleben 1919–20.] Illus. Landw. Zeitg. **41**: 183–186. 1921.—A brief report is made of field tests of 40 varieties of winter wheat.—*John W. Roberts.*

405. SALAMAN, REDCLIFFE N. **The influence of size and character of seed on the yield of potatoes.** Jour. Ministry Agric. Great Britain **28**: 43–48. 1921.

406. SAYRE, L. E. **Corn oil.** Trans. Kansas Acad. Sci. **29**: 114–115. 1920.—A brief statement is made of the excellent keeping qualities, very low melting point but high smoking point, of corn oil and its use as a food.—*F. C. Gates.*

407. SIEGMUND, GUSTAV. **Die Hebung unserer Kartoffelproduktion durch die englische Saatkartoffelaktion.** [The improvement of our potato production through the English seed potato arrangement.] Oesterreich. Zeitschr. Kartoffelbau **1**: 13–14. 1921.—The greatest obstacle to recovery of Austrian potato production, which had fallen about 40 per cent, was the lack of good seed. The furnishing of the best Scotch and Irish varieties through the English Reparation Commission has to a considerable extent overcome the deficiency.—*F. Weiss.*

408. WACKER, J. **Einige Beobachtungen am Kartoffelsortiment des hohenheimer Versuchsfeldes vom Jahre 1920.** [Some observations on varieties of potato in the Hohenheimer experiment field in the year 1920.] Illus. Landw. Zeitg. **41**: 132–133. 1921.—A brief report is made of variety tests of potato in which 93 sorts were used.—*John W. Roberts.*

409. WERNER, H. O. **Irrigation as a factor in seed potato production.** Proc. Amer. Soc. Hort. Sci. **17**: 133–137. 1920 [1921].—Triumph potatoes were grown on the tuber unit basis under irrigation at Minatare, Nebraska, in 1917. They grouped themselves into a well-defined high-yielding group and a low-yielding group, with very few intermediates. Seed stock grown under irrigation gave consistently lower yields than seed stock not grown under irrigation. The data presented "indicate that the conditions produced by irrigation as practiced in the West, have a very markedly deleterious effect upon tubers for seed purposes, which is manifest after the first season. Disease has not been a factor in this work. Irrigation has been the only factor that can be considered responsible for the differences secured."—*H. A. Jones.*

410. WILLIAMS, C. B., W. F. PATE, E. C. BLAIR, AND R. W. COLLETT. **I. Fertilizer experiments with wheat on mountain soils. II. Wheat culture in North Carolina.** Bull. North Carolina Dept. Agric. **41**[10]: 2–48. 1920.—Different amounts of mineral fertilizers were used on wheat with varying profit. General cultural recommendations are included in the paper.—*F. A. Wolf.*

411. WITTMACK, L. **Die Samen unserer Kleegewächse und ihre Verunreinigungen.** [The seeds of our clovers and their adulterants.] Illus. Landw. Zeitg. **41**: 178–180. *7 fig.* 1921.—Descriptions, with drawings, are presented of the seeds of the following species: *Medicago sativa, M. falcata, M. denticulata, M. arabica, M. minima, M. lupulina, Trifolium pratense, T. repens, T. hybridum, T. angulatum, T. parviflorum, T. minus, T. supinum, T. incarnatum, Lotus corniculatus, L. uliginosus,* and *Anthyllis vulneraria.*—*John W. Roberts.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

N. E. STEVENS, *Editor*

(See also in this issue Entries 492, 547, 802)

412. ANONYMOUS. **A plant protection institute.** Boooklyn Bot. Gard. Rec. 9: 127–128. 1920.

413. ANONYMOUS. [**Bothalia.**] Nature 107: 691. 1921.—The appearance of the first issue of this publication for new or little known plants of South Africa is reported. Subscriptions are to be sent to the Chief, Division of Botany, Pretoria.—*O. A. Stevens.*

414. ANONYMOUS. **Conference on fruit diseases.** Brooklyn Bot. Gard. Rec. 9: 128–129. 1920.—Notes are presented on attendance and questions discussed at the conference in the Shenandoah Valley, in Virginia, West Virginia, Maryland, and Pennsylvania, August 3–9, 1920, arranged by the Advisory Board of American plant pathologists.—*C. Stuart Gager.*

415. ANONYMOUS. **Co-operative indexing of periodical literature.** Nature 107: 449–450, 550–551. 1921.—A leading editorial discusses the possibility of making index material available to abstractors prior to the preparation of abstracts, which at present generally precede the corresponding index publication, an indefensible arrangement. A union catalogue of current periodicals in libraries of the United Kingdom, which was prepared in 1914–15, should be published as an essential preliminary to the proper organization of knowledge, and a common system of classification should also be agreed upon. The core of a subject is comprised in a body of homogeneous literature which can best be dealt with by its representative professional society, but outside this is a literature of decreasing relevance which can be economically handled only through cooperative work. The solution would seem to be a central bureau dealing solely with this non-homogeneous material, for which it would transmit entries to the professional societies. As the professional abstracts become better developed, the publication of corresponding indexes would tend to become less necessary. As different branches of knowledge may have different views on the relation of indexing to abstracting, a meeting should be held to determine the special requirements of each, and the feasibility of cooperative work. This editorial was followed in the later issue by a number of letters: F. A. BATHER regards conference to determine the needs of each branch unnecessary, and considers that publication of abstracts before indexes is not indefensible, as the two are different in aim, substance, and preparation, while W. M. FLINDERS PETRIE suggests that the method of handling depends on the future utility of abstracts, and with the latter in view has personally adopted the following form in abstracting: (1) State briefly every new fact and argument that leads to a definite result; (2) add references to any confirmatory or contradictory facts that have been omitted; (3) suggest whether or not the paper is essential.—*O. A. Stevens.*

416. ANONYMOUS. **The American Iris Society.** Brooklyn Bot. Gard. Rec. 9: 129. 1920.—A statement of the objects and activities of the society, organised in New York City on January 29, 1920, is presented.—*C. Stuart Gager.*

417. ANONYMOUS. [REV. of: LAUFER, BERTHOLD. **Sino-Iranica. Chinese contributions to the history of civilization in ancient Iran, with special reference to the history of cultivated plants and products.** Field Mus. Nat. Hist. Publ. Anthropol. Ser. 15: iv + 185–630. 1919 (see Bot. Absts. 8, Entry 876).] Nature 107: 430–432. 1921.

418. AGRELIUS, F. U. G. **A half century of bacteriology.** Trans. Kansas Acad. Sci. 29: 23–34. 1920.—The presidential address given before the Kansas Academy of Science, March 15, 1918; an historical account.—*F. C. Gates.*

419. CĂRUNTU, D. **Cuvânt înainte.** [**Foreword.**] Bul. Agric. 1: 3–4. 1920.—There is announced and published the first number of Buletinul Agriculturii issued by the Ministerul Agriculturii şi Domeniilor, Directiunea Agriculturii şi Viticulturii, Bucharest, Roumania.—*J. R. Schramm.*

420. CONCEIÇÃO, JULIO. **Dr. Alberto Löfgren.** Rev. Mus. Paulista 11: 543–560. *Portrait.* 1919.—A biographical account is presented in Portuguese of Löfgren (1854–1918), who was born and educated in Sweden, but spent his life in scientific work in Brazil. He helped to organize the Geographical and Geological Commission of São Paulo, and in 1897 established the Botanical Garden there. He was interested in forest preservation and arboriculture, and active in securing forest legislation for São Paulo. In 1910–1911 he explored and made rich collections in Ceará, Parahyba, Rio Grande do Norte, Bahia, and Pernambuco, and in 1913 he was called to take charge of the section of botany and plant physiology in the Botanical Garden of Rio de Janeiro, where he remained until his death. A long list of his publications is given, perhaps the most important being his Manual das Familias Naturaes Phanerógamas (1917) with keys to Brazilian genera.—*Marie K. Pidgeon.*

421. DUFOUR, LÉON. **Notice sur l'œuvre scientifique du professeur Saccardo.** [A note on the scientific work of Professor Saccardo.] Rev. Gén. Bot. 33: 5–10. *Portrait.* 1921.—A brief biography and tribute to the accomplishments of P. A. Saccardo (1845–1920) is given.—*J. C. Gilman.*

422. LARSEN, TH., OG CARL MARIBOE. **Oversigt over fremmed Litteratur vedrørende Jorddyrkning og Plantekultur for Aar 1918.** [Review of foreign literature on agriculture and plant industry for the year 1918.] Tidsskr. Planteavl 27: 319–376. 1920.—The author presents a classified list of foreign literature, including American.—*Albert A. Hansen.*

423. LODO, BRUNO. **O Museu Nacional de historia natural.** [The National Museum of natural history.] Arch. Mus. Nacion. Rio de Janeiro 22: 13–26. *2 portraits.* 1919.—Mention is made of the principal voyages and explorations relating to Brazil, and the contributions to the botany of the country of Maximilian of Wied, Spix and Martius, Humboldt and Bonpland, Saint-Hilaire, Pohl, Alfred Russel Wallace, and others.—*Marie K. Pidgeon.*

424. MAGALHAES, BASILIO DE. **Biographia de Antonio Luiz Patricio da Silva Manso.** [Biography of Antonio Luiz Patricio da Silva Manso.] Arch. Mus. Nacion. Rio de Janeiro 22: 77–96. 1919.—Silva Manso (1788–1848) was born at São Paulo and originally followed the vocation of his father, who was a painter, but later studied medicine, being licensed to practice in Campinas in 1820, and in 1821 became provincial surgeon of Matto Grosso. Here he became interested in politics, representing the province in the general assembly of Brazil, 1834–1837, and was held responsible for a massacre in the city of Cuyabá in 1834 in connection with the Brazilian struggle for independence. In retribution for this he was murdered January 17 or 18, 1848. He took up the study of botany in 1819, and in 1823 undertook to send plants and natural products of Matto Grosso to the Museu Nacional at Rio. He communicated plants to Martius, who in 1835 requested him to furnish 50 sets from Matto Grosso, especially rare plants or those of economic importance, for his projected Herbarium Brasiliense. Silva Manso wrote but little on botanical topics, but his services to Brazilian botany are highly rated by Martius in his Flora Brasiliensis and Systema Materiae Medicae Vegetabilis Brasiliensis (1843). The biography is accompanied by a list of sources and several hitherto unpublished documents.—*Marie K. Pidgeon.*

425. MORAL, A. **La Oficina de Sanidad Vegetal de la Secretaría de Agricultura, Comercio y Trabajo. Organizacion de la oficina. II.** [The Office of Plant Sanitation of the Department of Agriculture, Commerce and Labor. II. Organization.] Rev. Agric. Com. y Trab. [Cuba] 3: 287–289. *Portraits.* 1920.—John Robert Johnston, professor of phytopathology in the national university and director of tropical research of the United Fruit Co., is at the head of the office of plant pathology of the Cuban Department of Agriculture, and Felipe de la Cruz y Piñera is superintendent in charge of the office and personnel. There are 5 inspection zones with inspectors in charge; Reginald Hart, entomologist, is in charge of the service at ports, railroads, etc.; Charles Ballou in charge of inspection of gardens and nurseries; and Ernesto Moisés Simonetto in charge of the sugar cane mosaic inspection service. A list is given of the circulars and bulletins published.—*F. M. Blodgett.*

426. ROBERTS, J. W. **Stockton Mosby McMurran.** Phytopathology 11: 25–26. *Portrait.* 1921.—A short biographical sketch. [See also Bot. Absts. 8, Entry 1764.]—*B. B. Higgins.*

427. SAMPAIO, A. J. DE. **A Secção de Botanica no primeiro seculo de existencia do Museu Nacional.** [**The Section of Botany in the first century of the existence of the National Museum.**] Arch. Mus. Nacion. Rio de Janeiro 22: 37–47. 1919.—The National Museum of Brazil, founded in 1808, was by the decree of February 3, 1842, divided into sections, the 2nd of which was devoted to botany, agriculture, and the mechanic arts. Luis Riedel, its first director, 1842–1861, did much to build up the herbarium and library, and the section was further notably developed under the directorship of Ladislau Nette, 1865–1893. A full chronological record of all the directors, professors, and assistants of the section is given, together with summary of the South American collections represented in the herbarium.—*Marie K. Pidgeon.*

428. TESCHAUER, CARLOS. **Algumas notas sobre ethnologia e "folklore" na flora e avifauna do Brasil.** [**Some notes on the ethnology and folklore of the flora and avifauna of Brazil.**] Arch. Mus. Nacion. Rio de Janeiro 22: 221–230. 1919.—The associations and traditions relating to a small number of Brazilian plants are given, together with some uses among primitive inhabitants of the country.—*Marie K. Pidgeon.*

429. WOOSTER, L. C. **Botany in Kansas during the past fifty years.** Trans. Kansas Acad. Sci. 29: 41–43. 1920.—A part of a symposium on Fifty Years of Scientific Development in Kansas is presented. The work of several botanists is very briefly mentioned, including among others: J. H. Carruth, W. A. Kellerman, W. T. Swingle, B. B Smyth, Mrs. L. C. R. Smyth, A. S. Hitchcock, Minnie Read, L. E. Sayre, Grace R. Meeker, Elam Bartholomew, Frank U. G. Azrelius. and L. C. Wooster.—*F. C. Gates.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*
ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entry 567)

430. ANONYMOUS. **200 leicht ausführb. botan. Schüler-Übungen nebst Resultaten.** [**Two hundred easily-performed botanical exercises, with results.**] *42 p.* F. P. Datterer & Cie.: Freising, Germany. *2 marks, 50 pf.*

431. ANONYMOUS. [Rev. of: MARTIN, J. N. **Botany with agricultural applications.** *2nd ed., xii + 604 p., 490 fig.* John Wiley: New York, 1920; Chapman & Hall: London, 1920 (see Bot. Absts. 8, Entry 1821).] Sci. Prog. [London] 16: 161. 1921.

432. BLARINGHEM, L. **Sur les collections des plantes vivantes de l'Arnold Arboretum (Université d'Harvard, près Boston, États-Unis).** [**Concerning the collection of living plants at the Arnold Arboretum (Harvard University).**] Bull. Soc. Bot. France 66: 403–405. 1919.

433. CROW, J. W. **Relation of our society to the development of horticulture.** Proc. Amer. Soc. Hort. Sci. 16: 149–151. 1919 [1920].—Horticulture is coordinated with agriculture. Emphasis is placed upon the need of efficient plantsmen for successful horticulture, and suggestions are given for the adequate training of such men.—*H. W. Richey.*

434. HILL, H. A. **The study of botany.** Pharm. Jour. 106: 256–257. 1921.—A discussion is presented with special reference to the Pharmaceutical Syllabus. In the study of both external and internal appearance drawings should be generously used. These should be as large as possible and colored crayons or pencils should be used to emphasize the differentiations. It is believed that few students of elementary botany realize the significance of life histories, though here the real understanding of botanical science begins.—*E. N. Gathercoal.*

435. HOWARD, W. L. **Coordination in teaching horticulture.** Proc. Amer. Soc. Hort. Sci. 16: 151–154. 1919 [1920].—The author discusses the necessity of coordination in agricultural teaching and the advisability of teaching the sciences from an agricultural point of view and the agricultural subjects in their scientific relationship. This obviously necessitates cooperation between the scientific and technical departments, especially in station projects. It is believed that by judicious coordination of subjects and hearty cooperation of colleges, departments, and individuals, much more can be done and done more rapidly.—*H. W. Richey.*

436. MERRILL, F. A. **How teachers may use Farmers' Bulletin 1125: Forage for the cotton belt.** U. S. Dept. Agric. Dept. Circ. 158. *8 p.* 1921.

437. MERRILL, F. A. **How teachers may use Farmers' Bulletin 1148: Cowpeas: culture and varieties.** U. S. Dept. Agric. Dept. Circ. 157. *8 p.* 1921.

438. MERRILL, F. A. **How teachers may use Farmers' Bulletin 1175: Better seed corn.** U. S. Dept. Agric. Dept. Circ. 156. *6 p.* 1921.

439. MORSTATT, H. **Zur Ausbildung für den Pflanzenschutzdienst.** [Training for plant pathological service.] Zeitschr. Pflanzenkrankh. 31: 89–94. 1921.—The author discusses the principles relative to training for plant pathological service.—*H. T. Güssow.*

440. PERCIVAL, JOHN. **Agricultural botany.** *6th ed.* Duckworth & Co.: London, 1921.

441. SCHMITT, CORNEL. **Bilder aus dem Pflanzenleben. Botanische Plaudereien.** [Pictures from the plant world. Botanical talks.] *113 p.* F. P. Datterer & Cie.: Freising, Germany. *1 mark, 50 pf.*

442. SCHMITT, CORNEL. **Der biologische Schulgarten, seine Anlage und unterrichtliche Verwertung.** [The biological school garden, its plan and value for instruction.] *2nd ed., 112 p.* F. P. Datterer & Cie.: Freising, Germany. *1 mark, 70 pf.*

443. SCHOPMEYER, C. H. **How teachers may use Farmers' Bulletin 1087: Beautifying the home grounds.** U. S. Dept. Agric. Circ. 155. *6 p.* 1921.

CYTOLOGY

G. M. SMITH, *Editor*
G. S. BRYAN, *Assistant Editor*

(See also in this issue Entries 530, 595, 596, 743, 771)

444. BEAUVERIE, J. **La résistance plastidaire et mitochondriale et la parasitisme.** [Plastid and mitochondrial resistance and parasitism.] Compt. Rend. Acad. Sci. Paris 172: 1195–1198. 1921.—Saponin applied to tissues containing plastids and mitochondria causes a degeneration by vacuolization. Resistance to degeneration varies with age and with the tissue concerned. This is particularly marked in the chromoplasts of *Ranunculus Ficariae.* The same effect is produced by infection with *Uromyces Ficariae.* The bearing of this on parasitism and plant pathology is not yet apparent.—*C. H. Farr.*

445. DANGEARD, PIERRE. **L'évolution des grains d'aleurone en vacuoles ordinaires et la formation des tannins.** [The development of the grains of aleurone in ordinary vacuoles and the formation of tannin.] Compt. Rend. Acad. Sci. Paris 172: 995–997. *Fig. A–I.* 1921.—A study of the tannin formation in the epidermis of the leaves of *Taxus baccata* and the aleurone grains and tannin in seedlings of *Pinus maritima* is reported. Tannin is found to be of vacuolar origin and not mitochondrial, as Politis contends. The aleurone and tannin are both found associated with the vacuolar system in the pine.—*C. H. Farr.*

446. Dragoiu, J., et F. Vles. **Les conséquences cytologiques de l'arrêt osmotique de la division cellulaire.** [The cytological consequences of the arrest of cell-division by osmotic pressure.] Compt. Rend. Acad. Sci. Paris 172: 1210–1211. 1921.—Cytological studies are reported supporting experimental results on the effect of osmotic pressure on cell-division [see Bot. Absts. 10, Entry 458].—*C. H. Farr.*

447. D[udgeon], W[infield]. [Rev. of: Gates, R. Ruggles. **A preliminary account of the meiotic phenomena in the pollen mother-cells and tapetum of lettuce (Lactuca sativa).** Proc. Roy. Soc. London B. 91: 216–223. *2 fig.* 1920 (see Bot. Absts. 6, Entry 1674).] Jour. Indian Bot. 2: 151–152. 1921.

448. Guillermond, A. **Observations vitales sur le chondriome des végétaux et recherches sur l'origine des chromoplastes et le mode de formation des pigments xanthophylliens et carotiens. Contribution à l'étude physiologique de la cellule.** [Intra-vitam observations on the chondriome of plants and researches on the origin of chromoplasts and the mode of formation of xanthophyll and carotin pigments. Contribution to the physiological study of the cell.] Rev. Gén. Bot. 31: 372–413, 446–508, 532–603, 635–770. *60 pl., 55 fig.* 1919.—A comprehensive treatment is presented of plant chondriosomes with special reference to the formation of xanthophyll and carotin pigments. It includes not only a summary of previous contributions by the author and a consideration of new observations, but also an extensive review of chondriosome literature.—Many species of flowering plants were examined, the most favorable being *Tulipa suaveolens, T. Gesneriana,* and *Iris germanica.* Epidermal and mesophyll cells of sepals, petals, bracts, and other floral organs were studied in the living condition as well as by means of the special fixing and staining methods commonly used in the investigation of these objects. Benda's method of fixation followed by iron-haematoxylin or Kull's staining method proved successful. Osmic acid alone also conserves faithfully the cytoplasmic structures.—The cytoplasm is described as a homogeneous, more or less hyaline substance, probably colloidal in nature, filled with chondriosomes in the form of granular mitochondria, short rods, and elongated (sometimes branched) chondrioconts. These elements are formed only by division of preexisting chondriosomes. They are protoplasmic in nature and play an important physiological rôle, since through them alone certain products are elaborated.—In older cells the chondrioconts (rod- or thread-like chondriosomes) increase in size and become plastids. In cellular degeneration the chondrioconts and bodies derived from them break down into granular masses, and with this degeneration is often associated the appearance of fatty substances. The behavior of cytoplasmic inclusions can be studied in the living cells without fixation. Formation of carotin and xanthophyll pigments is associated with the chondriosomes and plastids derived from them. The pigments may occur within these bodies in the form of minute granules or crystals; in some chromoplasts they appear to be in a diffused state. The presence of fat globules and the temporary appearance of starch within the developing chondrioconts are frequently associated with pigment formation. There seems, however, to be no constant relationship between oil formation, starch formation, and the development of chlorophyll and other pigments.—The author argues strongly for the conception of the plant chondriosome as a self-perpetuating cell organ concerned in the development of plastids and in the elaboration of starch, oil, and pigments in a manner analogous to similar phenomena in animal cells. He replies to the objections advanced by other writers against this view and regards as inadequate the evidence for the existence of 2 or more distinct categories of chondriosomes and for their nuclear origin.—*L. F. Randolph.*

449. Levy, F. **Die Kernverhältnisse bei parthenogenischen Froschen.** [Nuclear phenomena in parthenogenetic frogs.] Sitzungsber. Preussisch. Akad. Wiss. Berlin 1920: 417–425. 1920.

450. Licent, E. **Sur la structure et l'évolution du noyau dans les cellules du méristème de quelques Euphorbiacées.** [Structure and development of the nuclei of meristematic cells of certain Euphorbiaceae.] Compt. Rend. Acad. Sci. Paris 172: 1063–1066. 1921.—Root-tips, stem tips, young leaves, pollen-mother-cells, and developing embryo-sacs were studied. The nucleole sometimes persists through the anaphases and then disappears without leaving

a trace. In some of these cases it first fragments, the fragments going to the poles and behaving as huge chromosomes. In the pollen-mother-cells of *Mercurialis* the chromosomes function in an analogous fashion to these nucleoles.—*C. H. Farr.*

451. Litardière, R. de. **Remarque au sujet de quelques processus chromosomiques dans les noyaux diploidiques du Podophyllum peltatum L.** [**Remarks on certain chromosome processes in the diploid nuclei of Podophyllum peltatum.**] *Compt. Rend. Acad. Sci. Paris* **172**: 1066–1068. 1921.—Alveolization of the daughter chromosomes in the anaphases occurs in this species. Anastomoses between adjacent chromosomes in telophase are not as interpreted by Overton in 1909 but are formed by the fusion of pseudopodia-like projections from the chromosomes. Twelve chromosomes represent the diploid number as opposed to 16 reported by Overton and Mottier in American material. This difference may indicate a varietal difference.—*C. H. Farr.*

452. Politis, J. **Sur les corpuscules bruns de la brunissure de la vigne.** [**On the brown corpuscles of brunissure of the grape.**] Compt. Rend. Acad. Sci. Paris **172**: 870–873. 1921.—Among the causes that have been suggested for the burnishing of the grape are animal parasites, fungi, myxomycetes, and physiological disturbances. Minute intracellular bodies, yellow to brown in color, are found to be present which react to tests for tannin and also appear as mitochondria when treated with the Regaud or the Benda method.—*C. H. Farr.*

453. Politis, J. **Sur l'origine mitochondriale des pigments anthocyaniques dans les fruits** [**On the mitochondrial origin of the anthocyan pigments of fruits.**] Compt. Rend. Acad. Sci Paris **172**: 1061–1063. 1921.—In the epidermis of the fruits of *Vitis vinifera*, *Solanum Melongena*, and *Convallaria japonica* the anthocyan is formed from the tannin in the mitochondria.—*C. H. Farr.*

454. Potts, F. A. **A note on vital staining.** Proc. Cambridge Phil. Soc. **20**: 231–234 1921.

455. Riker, A. J. **Chondriomes in Chara.** Bull. Torrey Bot. Club **48**: 141–148. *Pl. 5.* 1921.—Two species of *Chara* were studied, and the chromatic granules (prochondriomes) were found to appear on the central plate in anaphase, taking their origin in the nucleolus and migrating into the cytoplasm to become chondriomes. Chondriomes can thus arise as nuclear extrusions, but also by fission from other chondriomes. Prochondriome contents seemed not to differ, in the actively growing tip, in purely vegetative cells, and gamete-producing cells; extrusion of prochondriomes "is apparently not connected with nuclear degeneration or differentiation of the germ and vegetative cells."—*P. A. Munz.*

456. Rivett, M. F. **The structure of the cytoplasm in the cells of Alicularia scalaris Card.** Ann. Botany **32**: 207–214. *Pl. 6, 3 fig.* 1918.

457. Sharp, Lester W. **An introduction to cytology.** *xiii + 452 p., 159 fig.* McGraw-Hill Book Co.: New York, 1921.

458. Vles, F., et J. Dragoiu. **Sur la pression osmotique d'arrêt de la division cellulaire.** [**Concerning the effect of osmotic pressure in arresting cell-division.**] Compt. Rend. Acad. Sci. Paris **172**: 1127–1130. 1921.—The increase in external osmotic pressure, without an appreciable variation in the electrolytic dissociation, retards the segmentation of the sea urchin egg. An increase in osmotic pressure of 11 atmospheres stops cytoplasmic division, but not nuclear division, which continues up to 23 atmospheres above normal. The work done in successive divisions of the egg is calculated to be as follows: 1st division, 4.02 ergs; 2nd division, 1.66 ergs; 3rd division, 0.81 ergs; 4th division, 0.28 ergs.—*C. H. Farr.*

459. Ward, Cutler D. **The cytological problems arising from the study of artificial parthenogenesis. Part II.** Sci. Prog. [London] **16**: 71–78. 1921.

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*
GEO. D. FULLER, *Assistant Editor*

(See also in this issue Entries 399, 402, 556, 577, 580, 581, 583, 592, 594, 601, 602, 603, 606, 607, 608, 609, 611, 625, 642, 745, 747, 751, 752, 797, 801, 802, 803, 804, 805, 806, 807, 809, 815, 816, 819, 823, 835, 848)

GENERAL, FACTORS, MEASUREMENTS

460. T., E. N. **Botany at the British Association.** Nature 104: 520–521. 1920.—Brief abstracts of various papers are presented including the following: H. H. Thomas on desert flora of western Egypt; H. W. Monckton on flora of London Clay; J. C. Willis on northern invasions of New Zealand; Godfery on orchids of Hants and Dorset (members of the section were privileged to see on their expedition one of the rare ones mentioned, *Malaxis paludosa*); W. Brierley on species concept in fungi; R. R. Gates on mutational versus recapitulatory characters; Miss Saunders on inheritance in *Matthiola*; Scott on relations of seed plants to higher cryptogams; Salisbury on monocotyledonous features of the Ranunculaceae; Miss Prankerd on movable cell inclusions; M. C. Rayner on mycorhiza and Ericaceae; Priestley on theoretical consideration of root pressure.—*O. A. Stevens.*

461. THIESSEN, A. H. **Notes on the vertical distribution of temperature.** Trans. Utah Acad. Sci. 1: 55–60. 1918.—This paper was presented to the Academy in April, 1911.—*H. C. Cowles.*

STRUCTURE AND BEHAVIOR

462. AGHARKAR, SHANKAR. **Die Verbreitungsmittel der Xerophyten, Subxerophyten und Halophyten des nordwestlichen Indiens und ihre Herkunft. [Distributional mechanism of xerophytes, subxerophytes, and halophytes of northwestern India, and origin of the mechanisms.]** Bot. Jahrb. 56 (Beibl. 124): 1–41. 1920.—An historical account is given in which it is noted that there have been 2 groups of publications, those dealing with structure of the mechanisms, and the other with operation. The region studied is described in detail. It is semidesert in nature, and except along streams most parts are treeless plains. The climate is analyzed, and tables are given showing the conditions existing. A brief description of the resulting flora is given, the fauna also being mentioned. The distributional mechanisms are divided into active and passive. The active are of 2 sorts, those in which the mechanism is connected with the pericarp, and those in which it is not. The passive are of 5 types adapted to secure distribution respectively by wind, animals, water, and by the opening of seed vessels so as to promote distribution by shaking due to wind or animals; the first 2 are subdivided. The species are classified under these heads in tables. At the end of each table the results are analyzed. Light is thrown on the reasons for the migration of various species from other nearby countries into this region. About 5 per cent of the species are distributed by active means, 50 by wind, 30 by animals, and 15 per cent by being shaken by wind or animals. Of the 260 species, 37 are widely distributed, 46 are Indo-Malayan, 93 Arabo-African, 38 Mediterranean, 1 central-Asiatic, and 45 endemic.—*K. M. Wiegand.*

463. ANDREWS, E. F. **Habits and habitats of the North American Resurrection Fern.** Torreya 20: 91–96. 1920.—The most frequent hosts of *Polypodium polypodioides (L.) Hitchc.* in the southern coastal plain are the post-oak, elm, and tulip-tree. The fern is not a parasite but seems to establish a symbiotic relation with a certain soft moss. Instead of growing in secluded woods, it is found most often on the borders of roads and about dwellings. The scurfy coating on the under surface of the fronds checks evaporation and explains the drought-resisting qualities of the plant. A mat of the plants collected on December 30 showed no signs of withering until January 13, and was not completely withered until 18 days later. On April

11, May 17, and June 15 specimens detached from the mat and exposed to rain revived within 12–24 hours. On October 30 a specimen exposed to a warm mist revived sufficiently in 12 hours to show that it was still alive, and in 12 hours more all the fronds were expanded. On March 8, after more than 14 months without water, 2 fronds were still able to expand, after which the plant did not revive.—*J. C. Nelson.*

464. Bonnier, G. **Nouvelles observations sur les cultures expérimentales à diverses altitudes et cultures par semis.** *[New observations on experimental cultures at various altitudes and seed cultures.]* Rev. Gén. Bot. 32: 305–326. *2 pl., 4 fig.* 1920.—An account is given of the effects of climate upon perennial lowland plants cultivated for more than 30 years at altitudes from 700 to 2400 m. in the Alps and Pyrenees. To eliminate the effect of initial variations fully developed plants were divided into a number of parts, and these were transplanted to various altitudes. The following are some of the conclusions reached: In general, all lowland plants belonging to species naturally able to tolerate the differences in altitude develop well under alpine conditions. Alpine species from other parts of the world grow well in analogous situations in the Alps and Pyrenees. At the end of 30 years in high altitudes nearly all lowland plants have assumed the habit and anatomical structure identical with that of plants of the same species already growing at these altitudes. Complete adaptation of this sort is accomplished in 8 to 10 years by some species, whereas others require more than 25 years; 58 species which have undergone such changes are listed.—Several alpine plants (17 listed) have become so modified by the alpine climate that they are indistinguishable from forms previously described as distinct species. For example, *Helianthus vulgare* Gaertn. after 30 years at 2400 m. has assumed all the characters of *H. grandiflorum* DC.—All species of extensive altitudinal range have an optimum altitude for their development. With increasing altitude the leaves become greener and the flowers more highly colored up to a certain level; beyond this level the colors become less intense, though some adaptive characters continue to become more accentuated. Some changes appearing at once after transplantation disappear in a few years; conclusions are valid only if based on observations extending over many years.—Plants belonging to typical alpine species rapidly lose some of their alpine characters or even perish when transferred to too low altitudes. The same is true of lowland species grown at high altitudes and then returned to the plains. Some annual lowland species become biennial or perennial at high altitudes; the perennial habit represents one of the principal alpine adaptations.—By a number of experiments with seeds germinated at low and high altitudes it is shown that the seedling stages also show striking adaptations to alpine conditions. The most conspicuous changes are the dwarfing of all parts and the alteration in the shape and vesture of the leaves.—*L. W. Sharp.*

465. Brewster, A. A. **Pollination of Persoonia lanceolatus by the bee, Halictus.** Australian Nat. 4: 157–158. 1920.

466. Hamilton, A. A. **Reproduction of plants from leaves.** Australian Nat. 4: 149–150. 1920.

VEGETATION

467. Bews, J. W. **Plant succession and plant distribution in South Africa.** Ann. Botany 34: 287–297. 1920.—The operation of Willis' "age and area" law is profoundly modified under conditions of extreme climatic variation such as obtain in South Africa. The author attempts to account for certain phases of plant distribution within the range under consideration by the application of successional principles. He finds that "species with a wide distribution are usually found in an early stage of the plant succession." He regards this as an "ecological amplification" of Willis' law applicable in regions characterized by great variations in climate. It is pointed out that certain pioneer species are not widely distributed due to the fact, in some cases at least, that their spread is prevented by the presence of more stable plant communities. Furthermore, there are certain large classes of species having a restricted distribution that "belong of necessity to climax or sub-climax stages of succession."—*P. D. Strausbaugh.*

468. DUDGEON, WINFIELD. **A contribution to the ecology of the Upper Gangetic Plain.** Jour. Indian Bot. 1: 9–10. 1920.—A study of vegetative types and successions based on observations through several seasons in a region about Allahabad is reported. The climatic factors produce 3 distinct seasons: (1) Rainy season, July–Sept., with high rainfall, low insolation, high temperature, high humidity; (2) cold season, Oct.–Feb., with low rainfall, high insolation, low temperature, high humidity; (3) hot season, Mar.–June, with low rainfall, high insolation, high temperature, low humidity, and high winds.—The biotic feature influences the vegetation as much as does the climatic. The rural population of the region is 530 per square mile; grazing domestic animals number 470 per square mile. This causes marked and continual retrogression from the climatic climax. Seasonal succession is distinct, the vegetation being luxuriant in the rainy season, moderately luxuriant with different types prevailing in the cold season, and sparse in the hot season.—Hydrarch topographic succession is obscured by the interference of human factors but it presents in general the following stages: (1) aquatic, (2) wet meadow, (3) dry meadow, (4) thorn scrub poorly developed. If the retrogressive influence of biotic factors were removed it seems clear that successions would progress through (5) thorn scrub fully developed, (6) pioneer monsoon deciduous forest, (7) climatic climax monsoon deciduous forest.—*L. A. Kenoyer.*

469. HARVEY, LEROY H. Some phytogeographical observations in Lake County, Michigan. Michigan Acad. Sci. Ann. Rept. 21: 213–217. 1919.—The author holds that the northern half of the southern peninsula of Michigan represents "a great tension zone in which the northern outposts of the deciduous climax forest formation and the southern relicts of the nortbeastern evergreen forest formation overlap and intermingle, thus becoming competitors for occupation." A study of soil and atmospheric conditions proves inadequate to explain present distributional conditions, and renders it probable that succession has been abbreviated in most, if not all, of the tree associations. He believes that the original upland forest associations have been more the result of preoccupation and self-perpetuation than of a well-marked successional development. In general he believes that "any region should be classified upon the basis of the highest ecological type which may find expression therein." From these considerations, the presence of numerous areas of hardwood or mixed hardwood formations in this region of conifers would seem to link it up with the deciduous climax formation to the south.—*H. T. Darlington.*

470. HASTINGS, GEORGE T. **The vegetation of a cinder field.** Torreya 20: 96–100. 1920.—In the summer of 1916 an area of some 3 acres on the west shore of the Hudson River opposite Hastings, New York, was filled in with ashes and rubbish from 1 to 6 feet in depth, and over this a layer of cinders 6 inches to a foot in thickness was placed. In the summer of 1917 the area became well covered with vegetation; the next year, however, the area was covered with a layer of clayey soil, and but few of the original plants reappeared. In 1917, 96 species of flowering plants appeared on the area. This was distinctively a weed flora, only 6 of the species belonging to the flora of the adjacent hillside. Only 29 per cent of the species were native, and over half were annuals. The grasses and composites made up more than 40 per cent of the species. Many of the plants would have survived for many seasons had not the cinders been covered the following season. A complete list of the species observed is appended.—*J. C. Nelson.*

471. PHILLIPS, E. PERCY. **A preliminary report on the veld-burning experiments at Groenkloof, Pretoria.** South African Jour. Sci. 16: 285–299. *Pl. 31–33 and diagrams.* 1920.—The burning of the veld tends to encourage the flowering of many plants, particularly hemicryptophytes. There appears to be a definite life history in the development of the succession and the formation of vernal aspect societies. Soil protected by vegetation does not exhibit such extremes of heat and cold as bare soil. The water content of soil covered with vegetation does not fluctuate between very high and very low extremes; it is more stable in this respect than bare soil.—*E. P. Phillips.*

472. RAMALEY, FRANCIS. **Some mountain plant communities on sandy soil.** Plant World 22: 313–328. *3 fig.* 1919.—An account is given of the vegetation on a sandy area near George-

town, Colorado, in Clear Creek Cañon at an altitude of 8500 feet. Four habitats are considered: sand, sand-gravel slopes, rock wash, and rock ridges. Three associations occur on sand: (1) shrub association, (2) wheat-grass association, and (3) short-grass association. The principal shrubs in the 1st of these associations are *Symphoricarpos vaccinoides*, *Rhus trilobata*, *Ribes inebrians*, and *Chrysothamnus linifolius*. The shrub communities are considered as intermediate between grassland and coniferous forest, and it is pointed out that well compacted soil tends to forests on steeper slopes, and to grasslands on more level areas. A list of 64 species found on the sandy area is given.—*Charles A. Shull.*

473. RAMALEY, FRANCIS. **Vegetation of undrained depressions on the Sacramento plains.** Bot. Gaz. 68: 380–387. *Fig.* 1919.—The numerous depressions of the Sacramento plains have a very fine-graded soil, where water stands during the period of winter rain and even into early spring. The vegetation is very different from that of the usual grassland of the region, being composed of very few species, with practically no introduced weeds. The depressions usually show a central area and a marginal zone, the former characterized by a dense growth of *Allocarya* or *Baeria*, and the latter by *Floerkea Douglasii* and *Deschampsia danthonioides*. Subordinate species of both areas are noted and the seasonal changes indicated. A systematic list is given of 29 species, 10 of which are marked as characteristic, 8 as frequent, and 11 as merely occasional.—*Francis Ramaley.*

474. RUSSELL, W. **Esquisse sur la végétation d'un coin du Gévaudan granitique. [Sketch of the vegetation of a corner of the granitic Gévaudan.]** Rev. Gén. Bot. 32: 226–229, 256–269. *1 fig.* 1920.—A brief description is given of the physiography and vegetation of the high undulating plateau between the mountains of Aubrac and the Margeride. The vegetation is divided into 4 physiognomic groups inhabiting respectively the prairies, woods, waste places, and cultivated lands; lists of species constituting each group are given. The prairies are particularly rich in montane species.—*L. W. Sharp.*

475. SHREVE, FORREST. **A comparison of the vegetational features of two desert mountain ranges.** Plant World 22: 291–307. *7 fig.* 1919.—A description of the physiographic features of the Pinaleno mountains is presented, and a comparison of the general vegetational and floristic features of the Pinaleno range and the Santa Catalinas. The main differences noted are due to the higher altitude, and the more sharply cut and better watered cañons of the Pinalenos. The higher altitude leads to more extensive development of a type of forest sparingly represented at the highest altitudes of the Santa Catalinas; and the well watered cañons lead to a more conspicuous interdigitation of lowland and mountain vegetation on the slopes. Comparative rainfall records for the two ranges are given for 1917, and lists of species found in the Pinaleno mountains that are absent from the Santa Catalinas. Certain species found in both ranges raise the question as to the means of dispersal of species from range to range across the arid lowlands between them. The floristic differences indicate a secular movement of species from the larger and higher ranges to the lower and more isolated ones, with rapid impoverishment of the flora as the latter are approached.—*Charles A. Shull.*

FLORISTICS

476. ANONYMOUS. **The botanical survey of the Union of South Africa.** Kew Bull. 1919: 399–403. 1919.

477. BAILEY, JOHN W. **Adventures in mossland:—Polytrichadelphus Lyallii Mitt.** Bryologist 23: 49–50. 1920.—This is a popular account of the collection of a rare moss upon Mt. Rainier, with some notes upon its surroundings.—*E. B. Chamberlain.*

478. BARNOLA, JOAQUIN MARIA DE. **Notas fitostáticas sobre la vegetación brilógica de las cercanías del Lago de Bañolas. [Ecologic notes upon the bryophytes of the neighborhood of Lake Bañolas.]** Broteria Ser. Bot. 18: 64–73. 1920.—Lake Bañolas is near the town of the same name in northeast Spain. It apparently occupies a much smaller basin than formerly,

present dimensions being about 0.5 by 2 km. The region is underlain by limestone ("terreno nummulitico") with some sandstone, and considerable travertine from the lake. There are many fissures and faults in the neighborhood as well as small fluctuating lakes.—A list of 31 mosses and 9 hepatics is given, in each case with short notes upon habitat, soil preference, and general distribution. One hepatic, *Lejeunea calcarea* Lib. var. *Rosettiana* Mass, is noted as new to the flora of Spain.—*E. B. Chamberlain.*

479. BEAN, W. J. **Abraham's Oak.** Kew Bull. 1919: 233–236. *1 fig.* 1919.—*Quercus coccifera palaestina* from Jerusalem is discussed.—*E. Mead Wilcox.*

480. BRITTON, N. L. **A botanical expedition to Trinidad.** Jour. New York Bot. Gard. 21: 101–118. 1920.—Besides a general narrative of the expedition, the article presents general accounts of the vegetation of Trinidad and the neighboring islands. This includes tropical rain-forest, open savannas, and coastal deserts with abundant cacti.—*H. A. Gleason.*

481. COBURN, LOUISE H. **Flora of Birch Island in Attean Pond.** Rhodora 22: 129–138. 1920.—Attean Pond is one of the Moose River chain of lakes which extend from west to east across the northern part of Somerset County, Maine, draining into the Kennebec by way of Moosehead Lake. Birch Island, the largest in this lake, has an area of something over 25 acres, is very irregular in outline, and appears to have a backbone of granite boulders,—glacier-borne from the rocky heights to the north,—while the sand and gravel of the beaches show the same origin. The larger part of the island is covered with a nearly pure stand of fir which is coming up under and slowly replacing an older white birch forest. The flora of the island divides itself naturally into 7 associations: (1) The forest flora; (2) flora of the rocky shore below high water line; (3) flora of the marshes; (4) flora of the gravel beaches; (5) water flora of the coves; (6) flora of the cleared ground; (7) waste ground flora. A list of species is given for each of these associations with an additional short list of plants found in Attean Township outside of Birch Island.—*James P. Poole.*

482. DARLINGTON, H. T. **Distribution of the Orchidaceae in Michigan.** Michigan Acad. Sci. Ann. Rept. 21: 239–261. *1 pl.* 1919.—The greater number of species of the Orchidaceae of Michigan occur south of the Jack Pine Region; a few are found in the Upper Peninsula and in the northern part of the Lower Peninsula. *Cytherea* is one of the distinctly boreal species. The rarest species known in the state is *Triphora trianthophora*. The orchid flora of the state comprises 70 per cent of the total number of species known within the northeastern United States and Canada. A key to the genera and species and full notes on the distribution of the species are given.—*Bertha E. Thompson.*

483. FINCKH, H. E. **On Riccia fluitans.** Australian Nat. 4: 151. 1920.—The occurrence of the species in 2 localities is mentioned.—*T. C. Frye.*

484. FITZPATRICK, T. J. **The fern flora of Nebraska—II.** Amer. Fern Jour. 10: 33–44. 1920.—The article contains an annotated list of 21 species of pteridophytes, distributed among 14 genera and 6 families.—*F. C. Anderson.*

485. GINZBERGER, A. **Zwei neue Standorte der gefeldert-rindigen Buche, Fagus silvatica var. quercoides Pers., in Mittel Italien und Slavonien.** [Two new stations for the groove-barked beech, Fagus silvatica var. quercoides Pers., in central Italy and in Slavonia.] Naturwiss. Zeitschr. Forst- u. Landw. 18: 39–41. 1920.—Previous reports had confined the range of this tree to southern, central, and western Germany, and 1 stand in southern Hungary. The tree recently identified in Italy was found in the southern Abbruzzia, the other in the highlands of western Slavonia in 1918; both were old, the latter evidently decadent. The author also discovered 2 beautiful examples of var. *quercoides* in 1919 in the Lainz Zoological Park near the western city limits of Vienna.—*J. Roeser.*

486. GRAVES, E. W. **The fern flora of Alabama.** Amer. Fern Jour. 10: 65–82. *Pl. 1, fig. 1–8.* 1920.—The author lists 69 species of pteridophytes distributed among 23 genera and 3 families.—*F. C. Anderson.*

487. Harper, Roland M. **Southern Louisiana from the car-window.** Torreya 20: 67–76. 1920.—The vegetation of southern Louisiana has not been extensively described. The author has made 2 trips across the territory, the 1st in July, 1915, from New Orleans westward on the Southern Pacific, and the 2nd in August, 1918, from New Orleans to Baton Rouge, and thence westward to the Sabine River. Five regions are enumerated: the Sugar-Cane Region, the Cotton Region, the Prairies, the Long-Leaf Pine Region, and the Hammock Forests. Lists of species observed from the train in passing through each of these regions are given; the determination in many cases is merely conjectural.—*J. C. Nelson.*

488. Hitchcock, A. S. **Report on a recent trip to British Guiana.** Jour. New York Bot. Gard. 21: 129–137. *Pl. 248–249.* 1920.—The author presents general information on the climate and vegetation of the region, and describes in detail his method of drying plants for herbarium specimens.—*H. A. Gleason.*

489. Moncrton, Horace W. **The flora of the district of the London clay.** [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 335. 1920.

490. Schlechter, R. **Die Verbreitung und das Auftreten der Orchideen in Europa nebst Winken über ihre Kultur.** [The distribution and occurrence of orchids in Europe together with hints as to their culture.] Orchis 13: 19–25, 35–40. 1919.—Some 120 species of native orchids occur in Europe; many of these are worthy of cultivation. The various genera and species are listed with notes concerning distribution and culture.—*E. B. Payson.*

491. Small, J. K. **Cypress and population in Florida.** Jour. New York Bot. Gard. 21: 81–86. *Pl. 245–247.* 1920.—The cited ranges of *Taxodium distichum* and *T. ascendens* cover only the portions of Florida already settled. Both species actually extend much farther south. The plates illustrate the habit and leaf form of both species.—*H. A. Gleason.*

492. Small, J. K. **Of grottoes and ancient dunes.** Jour. New York Bot. Gard. 21: 25–38, 45–54. *Pl. 241–244.* 1920.—The author gives extended notes on a 1200 mile trip through various parts of Florida, describing the prevailing vegetation and citing numerous species. The fern grottoes are occupied by a dense and luxuriant growth of 14 species of ferns. J. H. Barnhart adds, in footnotes, brief biographies of John Bartram, William Bartram, William Baldwin, Severn Rapp, Mary Evans Francis, Cameron Mann, A. H. Curtiss, and John Donnell Smith.—*H. A. Gleason.*

493. T., W. B. **Carex riparia, var. gravilis in Britain.** Kew Bull. 1920: 141. 1920.

494. Taylor, Norman. **A rare palm from Cuba in the conservatories.** Brooklyn Bot. Gard. Rec. 9: 101–102. 1920.—A specimen of this palm, *Coccothrinax crinita* (Griseb. & H. Wendl.) Becc. (*Thrinax crinita* Griseb. & H. Wendl.), was discovered by Charles Wright in eastern Cuba "during our Civil War." Until quite recently no living specimen was known. The specimen in the Brooklyn Botanic Garden was collected on March 17, 1894, by R. D. Hoyt, of Clearwater, Florida, in western Cuba (Pinar del Rio). It is suggested that the original record may have been in error.—*C. S. Gager.*

495. Thomas, H. Hamshaw. **On the desert flora of western Egypt.** [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 332. 1920.

496. Turrill, W. B. **Botanical exploration in Chile and Argentina.** Kew Bull. 1920: 57–66. 1920.

497. Turrill, W. B. **Botanical results of Swedish South American and Antarctic expeditions.** Kew Bull. 1919: 268–279. 1919.

498. Weatherby, C. A. **A European primrose in New England.** Rhodora 22: 143. 1920.—The discovery of a colony of *Primula officinalis* (the English cowslip) well established

on a shady river bank in Salisbury, Connecticut, is reported. Apparently this colony was started by seed thrown out with rubbish. A station has also been reported from Greene, Maine. The author reports that a search of the literature has failed to disclose any previous record of the plant occurring spontaneously in the eastern U. S. A., although in his Catalogue of the Canadian Plants, John Macoun reports it as well established near North Sydney, Cape Breton, and near Victoria, Vancouver Island.—*James P. Poole.*

499. WILLIS, J. C. **On the floras of certain islets outlying from Stewart Island (New Zealand).** Ann. Bot. 33: 479–484. *1 map.* 1919.—From a survey of 2 papers by Poppelwell and another by Cockayne the author gleans some further facts which he presents briefly as evidence of the "extraordinary applicability of his "age and area" hypothesis. He concludes that for restricted areas such as are dealt with here "age and area can be relied upon to explain the general composition of any of the floras that occur."—*P. D. Strausbaugh.*

500. WILLIS, J. C. **The northern invasions of New Zealand with special reference to Lord Howe Island.** [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 333. 1920.

501. WILSON, E. H. **A phytogeographical sketch of the ligneous flora of Formosa.** Jour. Arnold Arboretum 2: 25–41. 1920.—The topography and geological formation and the climatic factors of the island, which is 244 miles long and 75.6 miles broad in its widest part and covers an area of 13,908 square miles, are briefly discussed. The island is very mountainous and its central range stretching from north to south reaches an elevation of 3985 m. on Mt. Morrison, which carries snow for fully 6 months. In general the climate is warm-temperate and the rainfall varies between 130 inches in the north and 70 inches in the south. A short history of the botanical explorations of the island is given. The total number of flowering plants and vascular cryptogams recorded up to 1918 amounts to 3359 species and 57 varieties belonging to 1173 genera and 169 families, according to Hayata. The most important trees and shrubs are named and briefly characterized. The alluvial plains are nearly all under cultivation, but the high mountains are clothed with evergreen forests. The forest is similar in character from near sea-level to 1800 m.; it is a rain-forest and nearly all woody plants are evergreen. Above 1000 m. Lauraceae and Fagaceae are dominant types; from 1800–3000 m. conifers prevail mixed with broadleaf trees, mostly evergreen; above 3000 m. broad-leaf trees decrease and shrubs, particularly those belonging to northern genera, increase. The tree limit on Mt. Morrison is at 3800 m. Palms are represented in Formosa by only 5 genera, and only 3 species are common. Pinaceae are represented by 11 and Taxaceae by 3 genera. Among the Pinaceae, *Taiwania cryptomeriodes* is particularly noteworthy; it is related and similar to *Sequoia*, and is the tallest tree of Eastern Asia, attaining a height of 200 feet; the 2 species of *Chamaecyparis* are nearly as tall. Some northern genera, such as *Alnus*, *Carpinus*, *Fagus*, *Ulmus*, and *Malus*, reach the southern limit of their range. The affinity of the flora is with that of western and southwestern China, though some important types, such as Nyssaceae, *Eucommia*, *Euptelia*, *Cercidiphyllum*, *Magnolia*, and *Hamamelis*, are absent; it also shows close relationship to that of Japan, the Liukiu Islands, and the coastal provinces of China. In the south some Philippine species occur. [See also Bot. Absts. 4, Entries 1758, 1759.]—*Alfred Rehder.*

502. ZENARI, SILVIA. **Primo contributo alla Flora della Val Cellina (Fruili Occidentale).** [**First contribution to the flora of the valley of Cellina.**] Nuova Gior. Bot. Ital. Nuova Ser. 27: 11–37. 1920.—The author gives a list of plants, with habitat and elevation of the latter, collected in the valley of Cellina, the westernmost part of the pre-alpine basin of the Fruili.—*Ernst Artschwager.*

APPLIED ECOLOGY

503. SCOTT, W. R. M., AND E. J. PETRY. **Correlation of variation in resin content of Podophyllum with certain habitats.** Michigan Acad. Sci. Ann. Rept. 21: 225–231. 1919.—The 3 habitats selected varied as to shade, air movement, soil moisture, humus, and associated plants. The study was undertaken to lower if possible the cost of production by determining

the habitat producing plants yielding most resin for a given amount of material and a minimum amount of labor in collecting the rhizomes. Extraction methods are noted. Soil analyses and habitat characteristics are given in tabular detail. Of the 3 habitats, No. 1 was considered the best, all things considered. No. 2 produced the greatest rhizome growth but the resin content was lowest. In No. 1, conditions were such that good growth was made and the resin content was high enough to be profitable. It is added that further work would undoubtedly develop economic relations between grower and manufacturer.—*R. P. Hibbard.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*
J. V. HOFMANN, *Assistant Editor*

(See also in this issue Entries 469, 485, 725, 772)

504. ANONYMOUS. **In the open. The national forests of Washington.** U. S. Dept. Agric. Dept. Circ. 138. *78 p., illus.* 1920.

505. ANONYMOUS. **Pisgah national game preserve. Regulations and information for the public.** U. S. Dept. Agric. Dept. Circ. 161. *11 p.* 1921.

506. ANONYMOUS. **Forestry in France.** [Rev. of: WOOLSEY, T. S., JR. **Studies in French forestry; with two chapters by** W. B. GREELEY. *xxvi + 550 p.* John Wiley and Sons: New York; Chapman and Hall: London, 1920.] Nature 107: 548–549. 1921.

507. COOK, I. W., H. SCHMITZ, AND L. A. GRANT. **The availability of western wood oils for flotation concentration.** Univ. Idaho Bull. 16[13]: 1–22. 1921.—Douglas fir (*Pseudotsuga taxifolia*), western yellow pine (*Pinus ponderosa*), lodgepole pine (*Pinus contorta* var. *Murryana*), western larch (*Larix occidentalis*), western red cedar (*Thuya plicata*), and white fir (*Abies grandis*) wood was destructively distilled by the Prichard process and the resulting oils tested for their flotation properties. The oil produced from western yellow pine not only gives good flotation results, but can be produced on a commercially profitable basis.—*Henry Schmitz.*

508. DAVIDSON, JOHN D. **More about fir sugar.** Amer. Bee Jour. 61: 233–234. *Fig. 1.* 1921.—It is possible that British Columbia will replace Turkestan and Persia as a source of the rare sugar, melezitose.—*J. H. Lovell.*

509. SCHMITZ, H., AND A. S. DANIELS. **Studies in wood decay I. Laboratory tests on the relative durability of some western coniferous woods with particular reference to those growing in Idaho.** Univ. Idaho School of Forest. Bull. 1. *11 p.* 1921.—The wood of western white pine, western yellow pine, Douglas fir, western larch, western red cedar, white fir, and Engelmann spruce was subjected to the action of *Polyporus lucidus, Lenzites saepiaria, Fomes pinicola, Merulius pinastri, Polystictus versicolor, Pleurotus sapidus, Echinodontium tinctorium, Trametes pini, T. carnea,* and *Lentinus lepideus* for 10½ months and the amount of decay noted. The conclusion is reached that white fir and Engelmann spruce are not as susceptible to decay as generally thought.—*Henry Schmitz.*

GENETICS

GEORGE H. SHULL, *Editor*
JAMES P. KELLY, *Assistant Editor*

(See also in this issue Entries 403, 405, 457, 459, 460, 565, 574, 649, 650, 661, 668, 816, 832, 833, 837)

510. ANONYMOUS. [Rev. of: RAWES, A. N. Sterility in plums. Jour. Roy. Hort. Soc. 46: 353. 1921.] Gard. Chron. 70: 107. 1921.

511. ALVERDES, F. [German rev. of: ALVERDES, F. Das Verhalten des Kerns der mit Radium behandelten Spermatozoen von Cyclops nach der Befruchtung. (The behavior of the nucleus of radium-treated spermatozoa of Cyclops after fertilization.) Arch. Entwicklungsmech. 47: 375–398. 1921.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 301. 1921.

512. ALVERDES, F. [German rev. of: HAECKER, V. (1) Entwicklungsgeschichtliche Eigenschaftsanalyse (Phänogenetik). Gemeinsame Aufgaben der Entwicklungsgeschichte, Vererbungs- und Rassenlehre. (Developmental analysis of characters (Phaenogenetics). General problems of development, heredity and eugenics.) *344 p., 181 fig.* G. Fischer: Jena, 1918 (see Bot. Absts. 1, Entry 1216; also 3, Entries 45, 2184). (2) Über die Ursachen regelmässiger und unregelmässiger Vererbung. (On the causes of regular and irregular inheritance.) Flugschr. Deutsch. Ges. Zücht. 50. *20 p.* Berlin, 1920. (3) Über weitere Zusammenhänge auf dem Gebiete der Mendelforschung. (On further correlations in the field of Mendelian investigation.) Pflügers Arch. Gesam. Physiol. 181: 149–169. 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 302–308. 1921.

513. ALVERDES, F. [German rev. of: JUST, GÜNTHER. Der Nachweis von Mendel-Zahlen bei Formen mit niedriger Nachkommenzahl. Eine empirische Prüfung der Geschwister und Probandenmethode Weinbergs auf Grund von Kreuzungsversuchen mit Drosophila ampelophila Löw. (The determination of Mendelian ratios in forms with low number of offspring. *An empirical test of Weinberg's method on the basis of crossing experiments with Drosophila ampelophila* Löw.) Arch. Mikrosk. Anat. 94: 604–652. 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 308–310. 1921.

514. ALVERDES, F. [German rev. of: POLL, HEINRICH. Mischlingsstudien VIII. Pfaumischlinge, nebst einem Beitrag zur Kern-Erbträger-Lehre. (Hybridization studies VIII. *Peafowl hybrids and a comment on the theory of nuclear bearers of heredity.*) Arch. Mikrosk. Anat. 94: 365–458. *5 fig.* 1920 (see Bot. Absts. 7, Entry 1819).] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 310–312. 1921.

515. BARTOS, W. Der Einfluss der Veredlung auf den Wert der Rübe. [The influence of breeding on the value of the beet.] Zeitschr. Zuckerindust. Böhmen 42: 299–302. 1918.—The author presents a summary of data collected between 1897 and 1916 for Bohemian beet crops. The steady rise in sugar percentage as well as in average weights of roots and foliage is credited to the plant breeder, for even where greater fertilization is partially concerned the plants must be of a kind capable of profiting by it. [From anonymous review in Zeitschr. Pflanzenzücht. 6: 98. 1918.]—*J. P. Kelly.*

516. BATESON, W. The progress of Mendelism. Nature 104: 214–216. 1919.—The author presents a review of recent work in genetics ("physiology of breeding"), touching on Morgan's linear arrangement of genes, time of segregation, sex linkage, sex determination, cumulative factors, and species crosses. Segregation is clearly connected with synapsis in animals but not always in plants; somatic segregation and cases where male and female organs of the same plant differ in the factors they carry are cited. The author suspects that plants, as genetic machines, differ fundamentally from animals, an idea suggested by the fact that

"in the animal the rudiments of the gametes are often visibly separated at an early embryonic stage, whereas in the plant they are given off from persistent growing points." Considering the work of Nilsson-Ehle and East on cumulative factors, the author concludes that "many factors can, and on occasion do, break up as the sex-factor almost certainly does. . . ." —*Merle C. Coulter.*

517. Blakeslee, Albert F. **A chemical method of distinguishing genetic types of yellow cones in Rudbeckia.** Zeitschr. Indukt. Abstamm.- u. Vererb. **25**: 211–221. *Pl. 9.* 1921.—The author reports on the variation of *Rudbeckia hirta* possessing a yellow disk or cone. Treatment of yellow-coned plants with alkalies revealed 2 types; in one the cones turned blackish and in the other reddish. Each type proved to be a simple Mendelian recessive when crossed with normal purple cone. The 2 yellow types crossed gave purple plants in F_1 and a ratio of 9 purples to 7 yellows in F_2. Alkalies showed that F_2 yellows were again of blackish and reddish-yellow kinds. Chemical treatment indicated in the yellow group what might correspond to the double recessive expected once in every 16 F_2 individuals. No genetical tests were applied to identify this yellow type.—*James P. Kelly.*

518. Blandenier, A. E. **Note sur les principaux cotons égyptiens et leurs hybridations.** [Note on the principal Egyptian cottons and their hybrids.] Proc. Verb. Soc. Vaud. Sci. Nat. 11. 1920.—The author was collaborator of the late Professor Sickenberger, who is quoted to the effect that Egyptian cottons have undergone continual transformation as the result of incessant natural hybridization. The author regards existing Egyptian varieties as complexes of hybrids among 4 species of *Gossypium*,—*G. arboreum, G. barbadense, G. tomentosum*, and *G. herbaceum*,—and claims that the several interspecific hybrids present in each variety-complex can be distinguished by the color of the "fuzz," or short hairs, on the seed. —*T. H. Kearney.*

519. Blaringhem, L. **Métamorphose des étamines en carpelles dans le genre Papaver.** [**Metamophosis of the stamens into carpels in the genus Papaver.**] Compt. Rend. Soc. Biol. **83**: 1521–1523. 1920.—*Papaver bracteatum* ordinarily shows few variations. Tardy shoots, however, have been observed to give small, abnormal flowers in which there is surprisingly complete metamorphosis of stamens into carpels. The author thinks the change is due to a disturbed equilibrium in water relations, the stem providing more water than can be transpired by these tardy and underdeveloped buds. This metamorphosis is exceptional in *P. bracteatum*, but a similar phenomenon commonly occurs as a heritable mutation in *P. somniferum polycephalum.*—*Merle C. Coulter.*

520. Blaringhem, L. **Note sur la xenie chez le châtaignier.** [**Xenia in the chestnut.**] Bull. Soc. Bot. France **66**: 354–356. 1919.—*Castanea sativa* crossed with *C. dentata* resulted in an enlarged embryo intermediate between the 2 parents. The enlarged embryo ruptured the wall of the ovule.—*A. Gershoy.*

521. C., G. H. **Studies in animal inheritance.** [Rev. of: (1) Castle, W. E. **Studies of heredity in rabbits, rats and mice.** Carnegie Inst. Washington Publ. 288. *56 p., 3 pl.* 1919 (see also Bot. Absts. 6, Entry 723). (2) Onslow, H. **The inheritance of wing colour in Lepidoptera. 1. Abraxas grossulariata var. lutea (Cockerell).** Jour. Genetics **8**: 209–259. *Pl. 9–10, 25 fig.* 1919 (see Bot. Absts. 4, Entry 689). (3) Harrison, J. W. Heslop. **Studies in the hybrid Bistoninae. III. The stimulus of heterozygosis.** Jour. Genetics **8**: 259–265. *2 fig.* 1919 (see Bot. Absts. 4, Entry 596). (4) Hindle, Edward. **Sex inheritance in Pediculus humanus var. corporis.** Jour. Genetics **8**: 267–277. *1 chart.* 1919 (see Bot. Absts. 4, Entry 611).] Nature **106**: 297. 1920.

522. Claussen, P. [German rev. of: Blakeslee, A. F. **Sexual reactions between hermaphroditic and dioecious mucors.** Biol. Bull. **29**: 87–102. *3 pl.* 1915.] Zeitschr. Bot. **13**: 529–530. 1921.

523. CLAUSSEN, P. [German rev. of: BLAKESLEE, A. F. **Sexuality in mucors.** Science 51: 375–382, 403–409. *4 fig.* 1920 (see Bot. Abstr. 5, Entry 330).] Zeitschr. Bot. 13: 531–532. 1921.

524. COOK, O. F. **Cotton a community crop.** Jour. Heredity 11: 174–177. 1920.—Deterioration of cotton varieties is due to cross-pollination in the field and mixing of the seed at public gins. It can be avoided only by limiting each community to a single variety grown from pure seed. It is shown that such limitation makes possible standardization of cultural and marketing practices.—*T. H. Kearney.*

525. COOK, O. F., AND ROBERT CARTER COOK. **Biology and government. Further discussion of Alleyne Ireland's articles on democracy and the accepted facts of heredity.** Jour. Heredity 10: 250–258. 1919.—Contrary to Ireland's theory that we become bimodal, or tend to separate into superior and inferior groups, the author believes that the real tendency is to *restrict ourselves further and further toward mediocrity and inferiority. Our system uses* up and exterminates talent as rapidly as possible. Biological problems should be studied from the standpoint of politics as much as the problems of government should be studied from the standpoint of biology. Even though autocracies are the strongest governments, the most benevolent autocracy cannot remain benevolent because vanity, ambition, and greed are so dominant in human psychology. Great men in history have not been produced by centralized governments. The conspicuously great men of Germany appeared while it was fairly free, not since it was an efficiently organized government. The sense of present-day humanity that popular government is the best is the product of experience recorded by history. Mr. Ireland's theory of government does not appear progressive but archaic. The general problem of government is to develop popular systems of more direct interest to the people, not to restrict interest or responsibility to a special governing class.—*H. H. Laughlin.*

526. COULTER, M. C. **Chlorophyll inheritance.** [Rev. of: (1) WINGE, Ø. **On the non-Mendelian inheritance in variegated plants.** Compt. Rend. Trav. Lab. Carlsberg 14^2: 1–20. *4 fig.* 1919 (see Bot. Abstr. 3, Entry 307). (2) LINDSTROM, E. W. **Concerning the inheritance of green and yellow pigments in maize seedlings.** Genetics 6: 91–110. 1921 (see Bot. Abstr. 9, Entry 1347).] Bot. Gaz. 72: 110–112. 1921.

527. DEARING, CHARLES. **The production of self-fertile Muscadine grapes.** Proc. Amer. Soc. Hort. Sci. 1917: 30–34. 1918.—An account is given of the origin of perfect-flowered and fully functional hermaphrodites in Muscadine grapes from stocks previously composed of individuals either staminate or functional only as females (imperfect hermaphrodites). Three such plants were obtained among many seedlings and from distinct parentage. In the progeny of these and of crosses with the best varieties of cultivated sorts, about 1,000 hermaphrodites were obtained. Some of these produce fruits of a quality equal to that of the best varieties of Muscadine grapes, some exhibit new characters of fruit which combine the best qualities of different sorts, and some are decidedly more productive.—*A. B. Stout.*

528. EMERSON, R. A. **The genetic relations of plant colors in maize.** Cornell Univ. Agric. Exp. Sta. Mem. 39. *156 p., 11 colored pl.* 1921.—Six major color types of maize, purple, sun red, dilute purple, dilute sun red, brown, and green (colorless); and the subtypes, weak purple, weak sun red, green-anthered purple, green-anthered sun red; and 5 genotypes of green, are described and illustrated, and their environmental and genetic relations discussed. Sun red and dilute sun red types are shown to be dependent on light for development, while purple, dilute purple, and brown develop characteristic colors in local darkness. Diversities of temperature and soil moisture are without direct effect on maize color. Infertile *soil intensifies development of purple-red series (anthocyanins) but has no effect on brown* (flavonol) pigment. Deficiency of nitrogen, and probably also of phosphorus, is responsible for the effect of infertile soils. Accumulation of carbohydrates is associated with strong color development. Genetic behavior of the several color types is interpreted on the basis of 2

allelomorphic pairs and 2 series of multiple allelomorphs. Two of the 4 are also involved in development of aleurone color. One pair of allelomorphs is linked with yellow endosperm and 1 series of allelomorphs with liguleless leaf.—*R. A. Emerson.*

529. FAIRCHILD, DAVID. **Visible records of heredity.** Jour. Heredity **12**: 174–176. 1921.—A plea is made for greater use of photography in recording results of genetic researches, with suggestions for more adequately and properly photographing new forms produced in breeding experiments.—*C. B. Hutchison.*

530. GUTHERZ, S. VON. **Geschlecht und Zellstruktur.** [Sex and cell structure.] Naturwissenschaften **8**: 878–888. 1920.—The author presents data taken from the work of others on the question of the relation between sex and cell structure. He discusses in some detail digametic sexes in unisexual organisms, also morphological and physiological aspects of sex chromosomes. Conclusions derived from his investigations on the spermatogenesis in the white mouse are as follows: (1) Spermatogenic development proceeds in rhythmic series; (2) an intra-nuclear basic-staining body looked upon as a heterochromosome is manifest between the middle and end of the spermatocyte period; (3) the heterochromosome may be a form of nucleolus; (4) it becomes indistinguishable in the later stages of spermatogenesis; (5) no final conclusion is reached as to whether the heterochromosome is a sex chromosome.—*Helen Bergfried.*

531. HILSON, G. R. **Cambodia cotton (*Gossypium hirsutum*). Its deterioration and improvement.** Agric. Jour. India **16**: 235–243. 1921.—Deterioration in India of this type of cotton, originally introduced from America, is attributed to absence of selection and possible crossing with other varieties. A method for improvement by selection is outlined.—*T. H. Kearney.*

532. HUXLEY, JULIAN S. **The inheritance of acquired characters.** I. Sci. Prog. **15**: 640–641. 1921.—A letter written to the editor of "Science Progress," in which the author objects to certain statements made by MacBride in his article: "The inheritance of acquired characters" (see Bot. Absts. 9, Entry 252). [See also Bot. Absts. 10, Entry 541.]—*W. H. Taliaferro.*

533. JENNINGS, H. S. **Life and death, heredity and evolution in unicellular organisms.** *14 × 21 cm., 233 p., 53 fig.* R. G. Badger: Boston, 1920.—The author presents for students of genetics a review of their field as applied to the unicellular organisms, especially the protozoa. The volume comprises the lectures delivered by the author under the Richard B. Westbrook Free Lectureship Foundation at the Wagner Free Institute in Philadelphia. Chapter I forms an introduction to the general subject and is a general survey of the life histories found in the protozoa with especial reference to such questions as potential immortality, reproduction, mating, and rejuvenescence. It is followed in Chapter II by a short summary of some of the observed facts of inheritance in the protozoa. Attention is directed chiefly toward the general method of inheritance of diversities, the non-inheritance of acquired characters, and the general results of the "pure line" work on protozoa. Chapter III gives a brief review of the recent work which has been carried out in the author's laboratory and which indicates that a race descended from a single parent can be separated into hereditably diverse races by selection. After considering the effectiveness of selection the author reviews in Chapter IV the question of experimental modification of hereditary characteristics (inheritance of environmental effects). Chapters V, VI, and VII give a comprehensive exposition of the general subject of sex and the results of mating in the protozoa. These subjects are taken up from a cytological as well as experimental standpoint and are considered in relation to such questions as rejuvenescence, biparental inheritance and production of variations, and their relation to evolution. In the final chapter a comparison is made between the phenomena observed in the study of genetics in the protozoa and in higher organisms; this chapter also contains a résumé of the general subject. Of particular interest is the reiteration of the author's view that there is no essential disagreement between his work on the effectiveness of selection in the protozoa and the study of mutations and modifying factors in *Drosophila* which has been carried out by Professor Morgan and his collaborators.—*W. H. Taliaferro.*

534. KAPPERT, H. **Untersuchungen über den Merkmalskomplex glatte-runzlige Samenoberfläche bei der Erbse. [Studies on the character-complex smooth-wrinkled surface of peas.]** Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 185–210. *5 fig.* 1920.—The 4 characters evident on crossing smooth and wrinkled peas are: (1) Appearance of the seed, whether smooth or wrinkled; (2) capacity for water absorption, whether high or low; (3) form of the starch grains, whether long or round; and (4) nature of the starch, whether the grains are separate or clumped. —The author takes exception to Darhishire's statement that these characters are inherited independently. On the contrary, all are caused by the same factor.—A statistical study was made of the form of the starch grain in the parental and hybrid generations. For an expression of form a "breadth index" was used which is the breadth of the starch grain expressed as a percentage of the length. The hybrid was intermediate between the 2 parents in respect to this character.—*C. M. Woodworth.*

535. KOTTUR, G. L. **Cross-fertilization and sterility in cotton II.** Agric. Jour. India 16: 406–409. 1921.—Evidence presented in a former paper (see Bot. Absts. 9, Entry 241) that continuous self-fertilization of strains of *Gossypium herbaceum* and *G. neglectum* did not induce sterility is confirmed by experience with "one or more strains" of Dharwar-American (*G. hirsutum*). The author attributes increased vigor of F_1 to a combination of recognizable parental characters and states that "cottons which are alike in all or most of their characters, however, do not show any improvement by crossing." In a hybrid between *G. herbaceum* and *G. neglectum*, F_1 showed same kinds and degree of sterility as parents, and F_2 and F_3 a greater amount. A type of complete sterility is described accompanied by vegetative peculiarities (abnormal leaf color, etc.) not seen in parents and F_1, but affecting about 7 per cent of F_2 individuals and from 0 to 20.5 per cent in different F_2 progenies.—*T. H. Kearney.*

536. LENZ. [German rev. of: BUCURA, C. **Über Hämophilie beim Weibe. (On haemophilia in women.)** Wien u. Leipzig, 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 299–300. 1921.

537. LENZ. [German rev. of: GOLDSCHMIDT, R. **Einführung in die Vererbungswissenschaft. Zwanzig Vorlesungen für Studierende, Aerzte, Züchter. Dritte, neubearbeitete Auflage. (Introduction to the science of genetics. 20 lessons for students, physicians, breeders.)** *3rd rev. ed., 519 p., 178 fig.* W. Engelmann: Leipzig, 1920.] Biol. Zentralbl. 41: 382–383. 1921.

538. LENZ. [German rev. of: LUNDBORG, H. **Hereditary transmission of genotypical deaf-mutism.** Hereditas 1: 35–40. 1920 (see Bot. Absts. 6, Entry 1717).] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 299. 1921.

539. LENZ. [German rev. of: MOHR, OTTO L., AND CHR. WRIEDT. **A new type of hereditary brachyphalangy in man.** Carnegie Inst. Washington Publ. 295. *64 p., 7 pl., 4 fig.* 1919 (see Bot. Absts. 5, Entry 1584).] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 300. 1921.

540. LITTLE, C. C. **A note on the human sex ratio.** Proc. Nation. Acad. Sci. [U. S. A.] 6: 250–253. *1 fig.* 1920.—The records of the Sloane Maternity Hospital in New York City were studied for sex ratio among progeny of certain types of matings, and an analysis is attempted by contrasting the sex ratios of the offspring of *primipara* with those of subsequent birth. The 5 categories of matings were: European "pure," European "hybrid," United States white, British West Indies colored, and United States colored. The following conclusions may be drawn: (1) Hybrid white matings give a significant excess of males over pure white matings; (2) hybrid colored matings give a significant excess of females over relatively "pure" colored matings; (3) the difference between the sex ratio of the United States born whites and the United States born colored is 9 times its probable error; (4) in "pure" European matings the offspring of *primipara* have a sex ratio of 115.51 ± 1.5, while the offspring from subsequent births have a ratio of 97.33 ± 1.18,—a difference 9.7 times its probable error; (5) in the hybrid matings studied no such difference between the sex ratio of offspring of *primipara* and of subsequent births exists; (6) the sex ratio of the United States white births recorded is not significantly different from that of hybrid European matings.—*H. H. Laughlin.*

541. MACBRIDE, E. W. **The inheritance of acquired characters. II.** Sci. Prog. **15**: 642–644. 1921.—In a letter to the editor of Science Progress, the author attempts to answer criticisms by Julian Huxley (see Bot. Absts. 10, Entry 532) on the author's previous paper on this subject (see Bot. Absts. 9, Entry 252), and reiterates some of his former statements.—*W. H. Taliaferro.*

542. P[OPENOE], P[AUL]. **The child, before and after.** [Rev. of: FELDMAN, W. M. **The principles of ante-natal and post-natal physiology, pure and applied.** *694 p., 6 pl., 129 fig.* Longmans, Green & Co.: London, 1920.] Jour. Heredity **12**: 109. 1921.

543. SAFFORD, WILLIAM E. **Synopsis of the genus Datura.** Jour. Washington Acad. Sci. **11**: 173–189. *3 fig.* 1921.—The present systematic synopsis of the genus *Datura* is part of an extensively illustrated paper on the genus to appear in the Year-Book of the Smithsonian Institution. The purple-flowered form (*Datura Tatula*), which has been found to differ from the white-flowered form by a single Mendelian factor, is included in the latter in the species *D. Stramonium*, as also the form with spineless fruits (*D. inermis*), which is recessive to the type with spiny fruits.—*A. F. Blakeslee.*

544. SCHROEDER. **Entstehung und Vererbung von Missbildungen an der Hand eines Hypodaktyliestammbaumes.** (Origin and inheritance of deformities in the case of a hypodactylous pedigree.) Monatsschr. Geburtshilfe Gynäkol. **48**: 210–222. *3 pl., 7 fig.* 1918.—A condition involving reduction in number of digits and other rather extensive malformation of the hands and feet appears in five successive generations of one family. The progenitress of the strain, who is said to have had normal parents, produced three affected and two normal children. Her normal descendants have apparently had only normal children; the affected individuals have 28 normal and 16 affected offspring. The condition is transmitted by both sexes. Examination of the foetal membranes of the youngest child showed no evidence of an amniogenetic origin of the malformation, which the author regards as a primary germinal variation which may, however, be transmitted by other means than the chromosomes (cytoplasmic). The trait is believed to become progressively less marked in successive generations.—*C. H. Danforth.*

545. TERBY, JEANNE. **Les "Taraxacum" de graine sont-ils différents des "Taraxacum" de boutures? [Are Taraxacums produced from seed different from those produced from cuttings?]** Bull. Acad. Roy. Belgique Cl. Sci. **1919**: 497–502. 1919.—On the basis of his experiments the author reports the following results: Plants produced from seeds taken from different heads of the same plant show no variability. The conditions to which the embryo is subjected in the seed are without importance from the point of view of variability, since plants produced from cuttings are identical with those produced from seeds of the same plant. Neither the medium in which the plant is cultivated, whether clay or sand, nor the time of year in which the seeds are produced has any influence on variability. The author asks whether these results do not demonstrate, at the same time, that variability is brought about only by chromatin reduction.—*H. C. Sampson.*

546. T[HOMSON], J. A. **Lamarckism unashamed.** [Rev. of: KIDD, W. **Initiative in evolution.** *x + 262 p.* H. F. & G. Witherby: London, 1920.] Nature **107**: 419–420. 1921.

547. VRIES, HUGO DE. **Opera e periodicis collata.** [Works collected from periodicals.] *16.5 × 24 cm., 589 p.* Vol. 5. A. Oosthoek: Utrecht, 1920.—The volume contains reprints of the author's book on "Intracellular pangenesis," published originally in 1889, and 14 other articles on heredity and variation, published in scientific journals during the years 1889–1896. The pagination is not that of the original, but is consecutive for the volume, the full citation of the originals being indicated at the beginning of each article.—*Geo. H. Shull.*

548. VRIES, HUGO DE. **Opera e periodicis collata.** [Works collected from periodicals.] *16.5 × 24 cm., 593 p.* Vol. 6. A. Oosthoek: Utrecht, 1920.—The volume contains reprints

of 48 articles on variation and heredity which appeared in scientific journals during the years 1897–1914 inclusive. All articles are repaged, but complete citations are given.—*Geo. H. Shull.*

549. WOODS, FREDERICK ADAMS. Twins prove the importance of chromosomes. Jour. Heredity 10: 423–425. 1919.—The author states that identical twins alone have the same kind of chromosomes because early in embryonic life there occurs an almost absolutely precise division of the chromosomes so that 2 individuals develop, controlled by similar determiners. The importance of these determiners is proved by the extreme resemblance of identical twins, thus demonstrating also the lack of importance of the environment. In a sense, environment is all-important, for growth depends upon nourishment, oxygen, and warmth; but these are customary and expected. Identical twins show that ordinary differences within the uterus of the mother, home life, school life, and adult life do not modify greatly the control of the chromosomes. On the other hand, non-identical twins are not similar although having the same similarities and differences that are found in the case of identical twins. Great changes in environment may cause considerable modification in individuals, but great changes are not usual. The physical and mental differences observed in one's friends are due to differences traceable to the chromosomes.—*H. H. Laughlin.*

550. WRIGHT, SEWALL. A case of heredity vs. environment. [Rev. of: KEY, WILHELMINE E. Heredity and social fitness: a study of differential mating in a Pennsylvania family. Carnegie Inst. Washington Publ. 296. *102 p., 2 diagrams.* 1920 (see Bot. Abstr. 9, Entry 239).] Jour. Heredity 12: 116. 1921.

HORTICULTURE

J. H. GOURLEY, *Editor*
H. E. KNOWLTON, *Assistant Editor*

(See also in this issue Entries 391, 392, 400, 433, 435, 443, 490, 527, 693, 702, 719, 726, 727, 740, 773, 776, 778, 789, 839, 855)

FRUITS AND GENERAL HORTICULTURE

551. ANONYMOUS. [Rev. of: COPELAND, E. B. **The coco-nut.** *2nd ed., xvi + 225 p., 88 illus.* MacMillan & Co.: London, 1921.] Sci. Prog. [London] 16: 160. 1921.

552. ANONYMOUS. [Rev. of: WHYMPER, R. **Cocoa and chocolate: their chemistry and manufacture.** *Rev. ed., xxi + 368 p., 16 pl., 58 fig.* J. & A. Churchill: London, 1921.] Sci. Prog. [London] 16: 160. 1921.

553. ATKINS, W. R. G. **Natural indigo.** Sci. Prog. [London] 16: 56–70. 1921.—A brief general outline is presented of the field covered in the study of natural indigo. More detailed accounts of the work may be found in the Reports of the Sirsiah Indigo Research Station and in the Botanical Institute, Pusa. The best varieties to grow, proper methods of fertilization and cultivation, best known means of obtaining the indigo from the plant, and the demands of the markets of the world have all been subjects for considerable research. Before the World War natural indigo was being rapidly replaced by a synthetic product. The great value of the plant in adding nitrogen to the soil through the agency of the legume bacteria, and the manurial value of the fermented plants from which the indigo has been removed make it possible to produce the indigo quite cheaply. The plant is not subject to diseases known to be produced by micro-organisms; but a wilt disease, thought by some to be due to a deficiency of available phosphates in the soil, occurs.—*J. L. Weimer.*

554. BIRMINGHAM, L. E. **Cooperative organization for fruit growers.** Trans. Indiana Hort. Soc. 1919: 45–48. 1920.—A suggestive account is presented of the organization and activities of a fruit growers union in the Sturgeon Bay region of Wisconsin.—*Max W. Gardner.*

555. BROOKS, CHARLES. **Apple scald—its cause and prevention.** Better Fruit 15⁸: 24–26; 15⁷: 11–12. 1921.—The author presents a popular discussion of apple scald and of experiments conducted to study means of control. [See also Bot. Abstr. 2, Entry 1143; 4, Entry 1617.]—*A. E. Murneek.*

556. BURNS, W., AND L. B. KULKARNI. **Some observations on the roots of fruit trees.** Agric. Jour. India 15: 620–626. *Pl. 35–37, fig. 1–3.* 1920.—Observations on the spread of roots of citrus and guava trees are recorded.—*J. J. Skinner.*

557. CARDINELL, H. A. **Some indirect methods in extension horticulture.** Proc. Amer. Soc. Hort. Sci. 16: 166–171. 1919 [1920].—A discussion is presented of the development of horticultural extension work in Missouri, explaining some indirect methods used in promoting the work, such as: Assisting local dealers to select proper pruning tools and spray supplies; maintaining a list of orchards for sale or lease; publishing selling prices of fruit; and assisting merchants in disposing of their fruits.—*H. W. Richey.*

558. CRUESS, W. V. **Rain damage insurance.** Monthly Bull. Dept. Agric. California 10: 58–66. 1921.—The installation of evaporators by vineyard owners permits more thorough ripening of the grapes, thereby greatly increasing the yield and quality of the dried product. An air blast progressive tunnel type of evaporator with furnace equipped to burn oil or wood, and with cars and tracks to facilitate handling of the trays, is recommended.—*E. L. Overholser.*

559. [DRUCE, G. C.] [Rev. of: FARRER, REGINALD. **The English rock garden.** *2 vol. lxxiv + 504 p., viii + 524 p.* T. C. & E. C. Jack: London and Edinburgh, 1919. *£3. 3s net.*] Bot. Soc. and Exchange Club British Isles Rept. 5: 591–593. 1919 [1920].

560. DURST, C. E. **The development of practical horticulture, and its relation to the farm bureau movement.** Proc. Amer. Soc. Hort. Sci. 16: 155–162. 1919 [1920].

561. EVANS, J. A. **Patch-budding large limbs and trunks of pecan trees.** Texas Agric. Exp. Sta. Circ. 20. *7 p.* 1920.—Detailed directions for patch-budding are given.—*L. Pace.*

562. FAGAN, F. N. **Orchard soil management.** Trans. Indiana Hort. Soc. 1919: 56–62. 1920.—An account of experimental results in Pennsylvania orchards with reference to commercial fertilizers, mulches, and cover crops is presented. The importance of maintaining the content of organic matter in the soil is emphasized.—*Max W. Gardner.*

563. FARNSWORTH, W. W. **Opportunities in small fruit growing.** Trans. Indiana Hort. Soc. 1919: 25–31. 1920.—An account is given of a grower's experience with strawberries, raspberries, and currants.—*Max W. Gardner.*

564. GARDNER, V. R. **Pruning the apple.** Trans. Indiana Hort. Soc. 1919: 49–55. 1920.—The terms pruning and training are differentiated. Pruning of the bearing tree should consist of "a thinning out of small branches throughout the top of the tree in such a manner that a more abundant supply of light is made available for each and every fruit spur." Heavy pruning the first 3 or 4 years to force rapid growth is advised.—*Max W. Gardner.*

565. HOOPER, CECIL H. **Pollination of fruits.** Jour. Ministry Agric. Great Britain 28: 124–133. 1921.

566. JENKS, A. R. **The county horticultural agent.** Proc. Amer. Soc. Hort. Sci. 16: 163–166. 1919 [1920].

567. KEEBLE, FREDERICK. **Intensive cultivation.** Rept. British Assoc. Adv. Sci. 1920: 200–214. 1920.—The author discusses the status of horticulture in Great Britain during the World War. The key-note of the discussion is the part which intensive cultivation has played in the past, and which it should play in the future. The great necessity of education for the average intensive cultivator along horticultural lines is urged.—*C. L. Wilson.*

568. LESOURD, F. **Phosphorescence des bois. [Phosphorescence of wood.]** Rev. Hort. 93: 247. 1921.

569. MOOMAW, SAMUEL B., AND CAROLINE B. SHERMAN. **Australia and New Zealand as markets for American fruit.** U. S. Dept. Agric. Dept. Circ. 145. *16 p.* 1921.

570. NISWONGER, H. R. **Renewing old orchards in Kentucky. First year results in a five-year program.** Kentucky Agric. Exp. Sta. Ext. Circ. 90. *14 p.* 1921.—A short description is given of the methods used and the 1st year's results in renovating 7 Kentucky orchards. The cost of renovation per tree was $1.27. The net return per tree was $1.53.—*W. D. Valleau.*

VEGETABLE CULTURE

571. ANONYMOUS. **Peppers.** U. S. Dept. Agric. Dept. Circ. 160. *10 p.* 1921.—A treatment on growing and canning of peppers is presented.—*L. R. Hesler.*

572. BROWN, H. D. **Gardening in France.** Trans. Indiana Hort. Soc. 1919: 39–43. *4 fig.* 1920.—The discussion of the relation of such factors as climate and animal pests to gardening conditions in France is followed by a brief account of the use of manure as a fertilizer and the cultural methods used in growing certain vegetables and fruits.—*Max W. Gardner.*

573. HARTWELL, BURT L., AND S. C. DAMON. **Fertilizer versus manure for continuous vegetable growing.** Rhode Island Agric. Exp. Sta. Bull. 182. *10 p.* 1920.—Ten cords of stable manure were compared annually for 16 years with about the equivalent of 2500 pounds of a 5:6:6 fertilizer. After the 1st fewy ears, the crops generally grew better with the manure than with the fertilizer. At the end of the 1st decade there were about 800 ppunds more nitrogen in an acre foot of the manure area than of the fertilizer area. It is estimated that 1000 pounds more nitrogen had been added in the manure than in the fertilizer.—*B. L. Hartwell.*

574. HUELSEN, WALTER A. **Selecting and saving tomato seed.** Purdue Univ. Agric. Exp. Sta. Bull. 250. *26 p., fig. 1–12.* 1920.—Records of yield under Indiana conditions of different strains of several tomato varieties are presented. For the benefit of growers detailed instructions concerning the technic of selection work are given. These include a description of the important vine and fruit characteristics. A method of large-scale seed separation and the machinery involved, especially the driers, are described and well illustrated.—*Max W. Gardner.*

575. POTTER, GEORGE F. **Hydrocyanic acid injury to tomatoes.** Proc. Amer. Soc. Hort. Sci. 17: 120–126. 1920 [1921].—The author presents experimental data on fumigation of tomatoes to show that "the lethal dose is not directly related to the time of exposure but is almost exactly inversely proportional to the square root of the time." High relative humidity of the air, high moisture content of the soil, and high temperature all lower the maximum safe dose for fumigation.—*H. A. Jones.*

576. THOMPSON, H. C. **Effects of cultivation on soil moisture and yields of certain vegetables.** Proc. Amer. Soc. Hort. Sci. 17: 155–161. 1920 [1921].—"In 1919 early and late crops of carrots, a late crop of beets, and a late crop of beans showed very little advantage in cultivation over scraping off the weeds. The late onions, a crop of lettuce, and the tomatoes responded to cultivation more than simply to killing the weeds. There is a slight evidence that celery was also benefited by cultivation." Data presented for 1920 "show no benefits from cultivation for carrots and cabbage. In fact the yield of cabbage was greater on the scraped plots than on the cultivated plots. Onions, beets, and celery responded to cultivation, and tomatoes show some benefits from cultivation on both the trained and untrained plots." Moisture determinations of the soil made in 1919 on the onion plots show an increase of 1.25 per cent in the cultivated over the scraped plots. In the carrot plots the moisture content

of the soil was 0.19 per cent less in the cultivated plots when compared with the scraped plots. "From a study of the root systems, it appears that those crops which respond least to cultivation, over scraping to keep down weeds, are the ones having the greatest root growth. Where there was considerable space between the rows, which contained few or no roots, cultivation increased the yield. On the other hand, where the space between the rows was well filled with roots, cultivation did not increase the yield over scraping. In fact with cabbage, which crop had the largest root system, the cultivated plots produced much less than the scraped plots . . . Celery and onions responded to cultivation more than the other crops and these two had the poorest distribution of roots and the most space between the rows without roots."—*H. A. Jones.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 411, 463, 519, 520, 642, 650, 732, 763, 770, 816, 828, 841, 848)

577. AGRELIUS, FRANK U. G. **Botanical notes, 1917–1918.** Trans. Kansas Acad. Sci. 29: 85. 1920.—Late-flowering dates are recorded for *Diervilla florida* Sieb. & Zucc., *Viola pedata* L., and *Spiraea trilobata* L. (October 22, 1917). Notations regarding *Taraxacum officinale* Weber and polycotyledony in certain tomato and bean seedlings complete the report.—*F. C. Gates.*

578. CHAUVEAUD, GUSTAVE. **Les monocotyledones et les dicotyleones possedent le même type vasculaire.** [Vascular systems in monocotyledons and dicotyledons of the same type.] Bull. Soc. Bot. France 66: 373–381. 1919.—The difference in vascular structure between the 2 main groups of angiosperms which so impressed the older anatomists,—the closed vascular bundles of the monocotyledons and the open bundles with interfascicular cambium and secondary thickening of the dicotyledons,—is not fundamental, since it proves to be simply the predominance of one or other of the terminal forms of a development of which the preceding phases are identical. The difference in vascular organization, especially as based on cambium activity, can no longer be used even to separate the 2 groups, since many monocotyledons, such as *Allium cepa*, have open vascular bundles, while certain dicotyledons, such as the Ranunculaceae, have vascular bundles of the closed type.—*M. A. Raines.*

579. DENIS, MARCEL. **Les sucoirs du Cassytha filiformis L.** [The haustoria of Cassytha filiformis L.] Bull. Soc. Bot. France 66: 398–403. *6 fig.* 1919.—A study of the morphology and development of the haustoria of this phanerogamic parasite is reported. Two stages are distinguished in development, the adhesive and the perforating. Haustoria may be formed at points of contact of branches of occasional free-living individuals.—*A. Gershoy.*

580. FITCH, C. L. **The Colorado wild potato.** Potato Mag. 3^{12}: 12, 26, 28. *4 fig.* 1921.—*Solanum Jamesii* produces small shoots and tubers and many seeds which alone survive some winters. It grows in and near southwestern Colorado in dry soil at an altitude of 6,000 feet. It has proved useful in greenhouse experiments upon the relation of tuber shape to environment.—*Donald Folsom.*

581. GAGNEPAIN, F. **Intéressante adaptation des grains de Sphaeranthus aux stations humides.** [An interesting adaptation of the seeds of Sphaeranthus to moist habitats.] Bull. Soc. Bot. France 66: 409–412. 1919.—The cells of the persistent corolla become filled with air, forming a bladder-like envelope, of different shape in the various species, which provides for dissemination by wind or water.—*A. Gershoy.*

582. KASHYAP, SHIV RAM. **Some observations on Cycas revoluta and C. circinalis growing**

at first 2 or 3 small crowns of leaves per year, later only 1 crown. On mature plants in the botanic gardens "usually 1 cluster appears every year, whether of (about 60) foliage leaves or (120–170) sporophylls." No male plants are known near Lahore, yet ripe ovules, without embryos, occur, possibly due to the influence of foreign pollen from *Zamia* or *Cycas circinalis*. There is a repeatedly dichotomized specimen of *C. circinalis* in the gardens; this plant tends to produce sporophylls on 1 side only of the growing point ". . . possibly . . . a tendency to variation in the position of the female cone from terminal to lateral." The dichotomy is considered to be due to equal growth of lateral buds.—*Winfield Dudgeon.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. Transeau, *Editor*
L. H. Tiffany, *Assistant Editor*

(See also in this issue Entries 627, 651)

583. Ayyangar, M. O. Parthasarathy. **Observations on the Volvocaceae of Madras.** Jour. Indian Bot. 1: 330–336. 1920.—Rainfall is intermittent, with the principal fall during the winter monsoon, October–December. For 1919 the total rainfall was slightly over 50 inches, and the mean temperature ranged from 77.8 to 90.2° F. Volvocaceae are found in various temporary and permanent bodies of water and reach their greatest development during the summer. Of the genera recorded as occurring at Madras, *Chlamydomonas, Carteria, Gonium, Pandorina*, and *Eudorina* are common, while *Pleodorina* and *Volvox* are rare.—*Winfield Dudgeon.*

584. Conrad, W. **Sur un flagellé nouveau à trichocystes, Reckertia sagittifera.** [On a new flagellate having trichocysts. Reckertia sagittifera.] Bull. Acad. Roy. Belgique Cl. Sci. 1920: 541–553. *4 fig.* 1920.—The arthor describes a new flagellate collected in August, 1920, in an aquarium at the Botanical Garden of Brussels. Special consideration is given the origin and development of the trichocysts.—*Henri Micheels.*

585. Coupin, Henri. **Algae.** Album Gén. des Cryptogames Fasc. 23. *Pl. 214–221.* 1921.—The present fascicle, like the preceding, consists of 2 parts, one devoted to the algae, the other to the fungi. The material is in the form of black and white plates accompanied by an explanatory legend and numerous bibliographic notes. It is planned to cover in 50 fascicles all genera of algae and fungi. The series is edited by the author, 5 rue de la Santé, Paris xiii, France.—The genera of the following families of Rhodophyceae are covered in the present fascicle: Acrostylaceae, Gigartinaceae, and portions of Gelidiaceae and Rhodophyllidaceae.—*J. R. Schramm.*

586. Coupin, Henri. **Algae.** Album Gén. des Cryptogames Fasc. 24. *Pl. 222–229.* 1921.—The present fascicle completes the genera of the Rhodophyllidaceae, covers the genera of the Sphaerococcaceae, and begins the treatment of the Rhodymeniaceae. [See also Bot. Absts. 10, Entry 585].—*J. R. Schramm.*

587. Coupin, Henri. **Algae.** Album Gén. des Cryptogames Fasc. 25. *Pl. 230–237.* 1921.—The present fascicle completes the treatment of the Rhodymeniaceae and begins the presentation of genera of the Delesseriaceae. [See also Bot. Absts. 10, Entry 585.]—*J. R. Schramm.*

588. Coupin, Henri. **Algae.** Album Gén. des Cryptogames Fasc. 26. *Pl. 238–244.* 1921.—The author completes the treatment of the Delesseriaceae, presents the family Bonnemaisoniaceae, and begins the consideration of genera of the Rhodomelaceae. [See also Bot. Absts. 10, Entry 585.]—*J. R. Schramm.*

589. COUPIN, HENRI. **Algae.** Album Gén. des Cryptogames Fasc. 27. *Pl. 245–252.* 1921.—In the present fascicle the presentation of genera of the Rhodomelaceae is continued. [See also Bot. Absts. 10, Entry 585.]—*J. R. Schramm.*

590. COUPIN, HENRI. **Algae.** Album Gén. des Cryptogames Fasc. 28. *Pl. 253–260.* 1921.—In the present fascicle the author presents the remaining genera of Rhodomelaceae and begins the treatment of the Ceramiaceae. [See also Bot. Absts. 10, Entry 585.]—*J. R. Schramm.*

591. HODGETTS, W. J. **Notes on freshwater algae. I–IV.** New Phytol. 19: 254–263. *Fig. 1–2.* 1920.—A new species of *Pyramimonas*, *P. inconstans*, is described from near Birmingham.—Zoogonidia of *Oedogonium cryptoporum* Wittr., with cilia of a length unusual in the Oedogoniaceae, are described and figured, with notes on the mode of progression.—The Hormidium state of *Prasiola crispa* shows under certain conditions a false branching comparable with that of *Tolypothrix*.—The gametes and zygotes of *Chlamydomonas variabilis* Dang. are described and figured.—*I. F. Lewis.*

592. J., J. **Recent English marine biology.** [Rev. of: ALLEN, E. J. **Contribution to the quantitative study of plankton.** Jour. Marine Biol. Assoc. 12: 1–8. 1919 (see Bot. Absts. 4, Entry 1008).] Nature 104: 707. 1920.—Four 10 cc. samples gave a mean of 14.45 organisms per cc. The same sample examined by inoculating flasks (sterilized sea water with culture solutions used by Allen and Nelson for marine diatoms) showed 464 organisms per cc. This result is apparently an under-estimate as some organisms found in centrifuged samples did not grow in the medium. "The result is therefore another and closer approximation to a biological value which is of extraordinary interest."—*O. A. Stevens.*

593. JANET, CHAS. **Sur le Botrydium granulatum.** [Concerning Botrydium granulatum.] *4 p., 1 pl.* Limoges, 1918.—The plants are found in more or less irregular and often branched form or as pyriform vesicles developed from (1) a purely vegetative cell, (2) an asexual planospore, (3) a zygote. In each case the cell develops a simple vesicle consisting of a spherical layer of nucleated chlorophyllous protoplasm covered with a wall and surrounding a cavity filled with a clear fluid containing numerous corpuscles. A narrow aerial tube is developed from the upper part, a rhizoidal tube from the lower, the former developing into the vesicle. There are 3 kinds of vesicles distinguished by the nature of the cell producing them: (1) Those in which all of the cells of the parietal layer of the vesicle develop in situ into small syncytial blasteas which, through the collapse of the vesicle, are dislodged and disseminated by rain and generally germinate at once. (2) Those in which the protoplasmic layer becomes divided into 1 or several layers of naked protoplasts which become planospores by acquiring a single flagellum. These are then discharged when moist by the swelling and rupturing of the vesicle, later lose their flagella, develop into small spherical blasteas, and germinate as above. (3) Those in which, toward the end of summer, 1 cell in the parietal layer develops in situ into a syncytial blastea at the expense of the rest of the layer, which degenerates and disappears, leaving the blastea to fill the mother vesicle. Each nucleus of the blastea becomes a gamete. The pyriform blastea, when the gametes are about ripe, is discharged by the breaking up of the containing vesicle. When conditions are favorable the wall of the blastea is gelatinized and the gametes are discharged and unite to form zygotes. The blastea is homologized with the oogonium and spermagonium of *Fucus* and with the structure producing the gametangia in the vascular cryptogams.—*Winifred Goldring.*

594. MCNAUGHT, JAMES BERNARD. **Algae of Kansas reservoirs.** Trans. Kansas Acad. Sci. 29: 142–177. *Pl. 1–4.* 1920.—The author presents the first report of the survey of the algae of Kansas, with the special object of aiding the sanitary engineer, including 19-page list of species in key-form; 110 species are listed, only 12 of which had been previously reported from Kansas. Under reservoir conditions changes due to differences in the seasons do not appear to occur.—Examples of the successful use of the copper sulphate method of treatment are given. The algae found most active in causing bad tastes, colors, and odors are species

of *Anabaena, Conferva, Oscillatoria, Spirogyra, Cladophora, Clathrocystis, Synedra,* and *Navicula.* To these may sometimes be added animals of polyzoan and protozoan groups. A bibliography of 33 entries is appended.—*F. C. Gates.*

595. MANGENOT, G. **La structure des anthérozoïdes des Fucacées.** [The structure of the sperms of the Fucaceae.] Compt. Rend. Acad. Sci. Paris 172: 1198–1200. 1921.—The author contributes to the discussion between Strasburger and others on the one hand and Guignard and others on the other as to the nature of the sperm, the former holding that it is all nucleus. The author inclines to the view of Guignard, finding that a large part of the tail of the sperm is protoplasmic in nature, containing inert inclusions and pheoplasts, the latter often in great numbers. The pigment spot is found to arise from the pheoplasts by the development of carotin.—*C. H. Farr.*

596. MANGENOT, G. **Sur les "grains de fucosane" des Phéophycées.** [On the so-called grains of fucosan of the Phaeophyceae.] Compt. Rend. Acad. Sci. Paris 172: 126–129. 1921.—It is decided that the grains of fucosan are neither the living organites of Crato nor the special vacuoles of Kylin, but that they are simply vacuolar precipitates such as tannins and such as occur in other groups of plants.—*C. H. Farr.*

597. PAVILLARD, J. **Sur la reproduction du Chaetoceros Eibenii Meunier.** [On the reproduction of Chaetoceros Eibenii.] Compt. Rend. Acad. Sci. Paris 172: 469–471. *Fig. 1–11.* 1921.—*Chaetoceros Eibenii* belongs to the sub-genus *Phaeoceros.* A description and figures are given of the auxospores and the endocysts in this species; these bodies have never before been reported in this form.—*C. H. Farr.*

598. PAVILLARD, J. **Sur le Gymnodinium pseudonoctiluca Pouchet.** [On Gymnodinium pseudonoctiluca.] Compt. Rend. Acad. Sci. Paris 172: 868–870. *Fig. 1–6.* 1921.—This remarkable organism belongs to the Peridineae. No chromoplasts but many small uncolored plastids are found. Food is ingested.—*C. H. Farr.*

599. SHAW, WALTER R. **Campbellosphaera, a new genus of the Volvocaceae.** Philippine Jour. Sci. 15: 493–520. *Pl. 1–2, fig. 1.* 1919.—The somatic protoplasts lack connecting fibers and the gonidia migrate from the outside to the inside of the embryo.—*Albert R. Sweetser.*

600. TIFFANY, L. H. **Algal food of the young gizzard shad.** Ohio Jour. Sci. 21: 113–122. 1921.—One hundred and forty species and varieties of algae were found in an identifiable condition in the digestive tract of the gizzard shad. These are grouped as Myxophyceae, Euglenidae, Peridineae, Bacillariae, Desmidiaceae, Protococcales, and the filamentous algae.—*H. D. Hooker, Jr.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 477, 478, 483)

601. ALLORGE, A. P. **Sur deux Sphagnum nouveaux pour la flore parisienne: S. laricinum R. Spruce et S. Warnstorfii Russow.** [Two species of Sphagnum new to the flora of Paris: S. laricinum R. Spruce and S. Warnstorfii Russow.] *Bull Soc. Bot. France 66:* 406–409. 1919.—A critical study of *S. laricinum* and *S. Warnstorfii* is given, their geographical distribution is described, and the character of the moss flora of Paris is discussed.—*A. Gershoy.*

602. BRITTON, ELIZABETH G. **The rediscovery of Physcomitrium pygmaeum James.** Bryologist 24: 26. 1921.—The original description of *Physcomitrium pygmaeum* was drawn from scanty and immature material collected in Utah, but more abundant and better developed specimens have since been found in Nevada by C. F. Baker and in Alberta by A. H. Brinkman. On the basis of these specimens the author gives a more complete description of the species. [See also Bot. Absts. 9, Entry 878.]—*E. B. Chamberlain.*

603. DAVY DE VIRVILLE, AD., ET ROBERT DOUIN. **Sur les modifications de la forme et de la structure des hépatiques maintenues submergées dans l' eau. [Concerning the modifications of form and structure of hepatics brought about by maintaining them under water.]** Compt. Rend. Acad. Sci. Paris 172: 1306–1308. 1921.—*Riccia ciliata, Fegatella conica, Pellia calycina, Calypogeia Trichomanis, Palgiochila asplenioides,* and *Lophocolea bidentata* were studied. They were all found susceptible to adaptation when submersed but showed changes in development, structure, shape, and direction of growth. If they had been found growing wild in their altered condition they would have been classed as distinct varieties and perhaps as new species, although the genera to which they belonged would still have been recognizable.—*C. H. Farr.*

604. DOUIN, R. **Recherches sur les Marchantiées. [Investigations concerning the Marchantieae.]** Rev. Gén. Bot. 33: 34–55, 99–145, 190–213. *Pl. 1–32, 35 fig.* 1921.—The 1st chapter of this extensive work discusses the structure of the thallus, the vegetative point, and the methods of branching in the Marchantieae, with illustrative examples; the 2nd describes the structure and development of the sexual branches, both male and female; the 3rd deals with the nutrition of the fruiting bodies, and the 4th with an interpretation of the structures involved; the 5th proposes a new classification of the group and gives a critical discussion of its affiliations. From his investigations the author concludes that the thallus develops by the activity of a single initial cell and that the methods of branching are varied, certain methods giving a key to the origin of the male and female inflorescences. He finds that the latter are the products of specialized vegetative points, arising above or below the vegetative point of the thallus, and he uses his deductions as the basis of his new classification, employing certain characters not heretofore used.—*J. C. Gilman.*

605. JANSEN, P. **Die Blüten der Laubmoose. Ein Beitrag zur Kenntnis ihrer äusseren und inneren Gestaltung. [The inflorescences of the mosses. A contribution to our knowledge of their external and internal configuration.]** Hedwigia 62: 163–281. *31 fig.* 1921.—The author shows that the detailed study of moss inflorescences and of their component parts has been largely neglected by bryologists, in spite of its importance from a taxonomic standpoint. In a series of introductory sections he defends and defines the term "inflorescence" as applied to mosses and gives a general discussion of the distribution of the sex organs; of the component parts of inflorescences and their respective functions; of the perigonial and perigynial leaves; of the antheridia, archegonia, and paraphyses; of the perichaetial leaves; of the numerical and spatial relationships in inflorescences; and of the protective and adaptive arrangements which they sometimes show. The main body of the work, however, is occupied by detailed descriptions and figures drawn from the inflorescences of 28 species of mosses, representing a wide range of genera arranged according to Limpricht. The descriptions and figures bring out the histological features of the involucral and perichaetial leaves, as well as their form and other characteristics, and likewise give the peculiarities of the sex organs themselves. The genera treated are the following, a single species being described except where otherwise indicated: *Sphagnum, Andreaea* (2), *Archidium, Dicranum* (4), *Campylopus, Fissidens* (2), *Hedwigia, Splachnum, Funaria, Leptobryum, Webera, Mnium* (3), *Philonotis, Polytrichum, Buxbaumia, Diphyscium, Fontinalis, Dichelyma, Pterygophyllum, Climacium,* and *Amblystegium.*—*A. W. Evans.*

606. JENNINGS, O. E. **Hepatics of Iberia (Spain and Portugal).** [Rev. of: CASARES-GIL, A. **Flora Iberica. Briófitas, primera parte. Hepáticas. (Flora of Iberia. Bryophytes, first part. Hepaticae.)** *8vo., 775 p., 4 pl., 399 fig.* Mus. Nacion. Cien. Nat. Madrid, 1919 (see Bot. Absts. 8, Entry 2027).] Bryologist 24: 30–31. 1921.—The reviewer outlines the divisions and scope of the work, lists the new combinations proposed, and indicates changes in the generic classification of many species. He commends the illustrations and figures and suggests that the manual ought to prove useful to students of the Hepaticae in the U. S. A.—

607. NAVEAU, R. **Belgische Sphagnum Vormen. [Belgian forms of Sphagnum.]** Bull. Cercle Sci. Anvers (Tijdschr. Wetensch. Kring Antwerp.) 12: 39-43. 1920.—The author comments on the polymorphism of the genus *Sphagnum* and discusses 21 varieties, forms, and subforms of various species, which are known at present from Belgium only. Most of these were recognized by Warnstorf in his "Sphagnologia universalis" of 1911.—*A. W. Evans.*

608. NICHOLSON, WILLIAM EDWARD. **New and rare British hepatics.** Jour. Botany 59: 202-204. 1921.—The author gives notes on *Riccia Huebeneriana* Lindenb., *Cephalozia spinifora* Schiffn., and *Cephaloziella elachista* (Jack) Schiffn. var. *spinigera* (Lindb.) K. M.—*S. H. Burnham.*

609. PEARSON, WM. HY. **Notes on a small collection of hepatics from Oregon.** Bryologist 24: 21. 1921.—This is a list of 10 species with descriptive notes, based on a collection made by C. Potter within the city limits of Portland, Oregon.—*E. B. Chamberlain.*

610. POTTIER, JACQUES. **La parenté des Andreaeées et des hépatiques et un cas tératologique qui la confirme. [The relationship of the Andreaeaceae and the hepatics and a teratological case that confirms it.]** Bull. Mus. Hist. Nat. [Paris] 26: 337-344. *8 fig.* 1920.—The species of *Andreaea* and of certain hepatics have been confused in the past because of similarities of aspect and structure. The structures developed on the germination of the spores of *Andreaea* are more reminiscent of the hepatics than of the mosses. The development of the leaf of the Andreaeaceae resembles that of the Jungermanniaceae and not that of the mosses. The pseudopodium, which also occurs in the Sphagnaceae, has its analogue among the hepatics. The greatest point of resemblance between the 2 groups, however, is the opening of the capsule by 4 valves. In the subgenus *Acroschisma* of *Andreaea* these valves separate quite to the summit of the capsule, as is usual in the bepatics. An abnormal leaf of *Andreaea angustata* with 2 lobes is described and compared with the normal leaves of certain hepatics. This resemblance is not only superficial but extends to the anatomical structure. Especially striking is the resemblance between *Andreaea petrophila* and *Herberta adunca*. The various points of similarity between the Andreaeaceae and the hepatics would seem to indicate an indirect relationship.—*E. B. Payson.*

611. THÉRIOT, I. **Considérations sur la flore bryologique de la Nouvelle-Calédonie et diagnoses d'espèces nouvelles. [Remarks on the bryological flora of New Caledonia and diagnoses of new species.]** Rev. Bryologique 47: 69-71. 1920.—In the 1st part of this article, which is to be continued, the author reviews the work which has been done on the mosses of New Caledonia and estimates that the number of species occurring on the island is approximately 500. In the 2nd part he begins the discussion of a collection made by I. Franc, citing *Trematodon paucifolius* C. M. from New Caledonia for the 1st time and proposing *Holomitrium Franci* as a new species.—*A. W. Evans.*

612. THÉRIOT, I. **Une rectification à propos du Stereodon lignicola Mitt. [A correction in regard to Stereodon lignicola Mitt.]** Rev. Bryologique 47: 71-72. 1920.—It is shown that *Stereodon lignicola* of India was based on 2 distinct species. The 1st is an *Isopterygium* and may be known as *I. lignicola* (Mitt.) Jaeger; the 2nd is a *Sematophyllum*, too fragmentary for determination, although probably undescribed.—*A. W. Evans.*

613. WARNSTORF, C. **Über einige Arten aus der Gattung Calypogeia Raddi sensu Nees. [On certain species of Calypogeia.]** Hedwigia 62: 1-11. 1920.—The author calls attention to the confusion which still prevails regarding the specific limitations of *Calypogeia Trichomanis* (L.) Corda and certain other members of the genus, and records a series of observations based largely on the specimens distributed by V. Schiffner in his "Hepaticae europaeae exsiccatae." He reaches the conclusion that *C. Neesiana* (Massal. & Carest.) K. Müll. is not specifically distinct from *C. Trichomanis*, the one passing into the other by insensible intergradations. In his opinion the specimens distributed by Schiffner under the name *C. paludosa* Warnst. do not represent that species but belong instead to *C. trichomanoides* Warnst. The true *C.*

paludosa and also *C. sphagnicola* (Arn. & Perss.) Warnst. he now regards as synonyms of *C. tenuis* (Aust.) Evans. He recognizes the validity of *C. fissa* (L.) Raddi and also of *C. Muelleriana* Schiffn. (as represented by Schiffner's No. 609), referring *C. adscendens* (Nees) Warnst. to the latter species as a synonym. He likewise maintains that the North American *C. Sullivantii* Aust. is amply distinct from *C. arguta* Mont. & Nees.—*A. W. Evans.*

614. WHELDON, J. A. **New British Sphagna.** Jour. Botany 59: 185–188. *5 fig.* 1921.—The author describes new forms of *Sphagnum rubellum* Wils., *S. plumulosum* Röll, and *S. aquatile* Warnst., and also the following new varieties: *S. obesum* Wils. var. *devonense* Sherrin & Wheldon and *S. hercynicum* Warnst. var. *Binsteadii* Wheldon. The latter variety is figured.—*S. H. Burnham.*

615. WILLIAMS, R. S. **Hyophila subcucullata sp. nov.** Bryologist 24: 22–25. *Pl. 2.* 1921.—This is a description and plate of a proposed new species, nearest to *Hyophila microcarpa* (Schimp.) Broth.; it was collected by Brothers Leon and Hioram in the province of Pinar del Río, Cuba.—*E. B. Chamberlain.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 585, 638, and those in the section Pathology)

FUNGI

616. BEHRENS, J. **Die Perithecien des Eichenmehltaus in Deutschland.** [The perithecia of oak mildew in Germany.] Zeitschr. Pflanzenkrankh. 31: 108–110. 1921.—Oak mildew has attracted considerable attention in Europe since 1907 and, although the leaves are abundantly covered with conidia, perithecia are rare. Records show that Arnaud and Foëx found perithecia at Cavillargues, France, and were enabled thereby to identify the mildew with the American oak mildew, *Microsphaera quercina* (Schw.) Barr. In 1920 the author discovered a group of perithecia on a single oak leaf near Hildesheim, Germany. Subsequent comparison showed the form found in Germany to be the same as that in France.—*H. T. Güssow.*

617. FYSON, P. F. [Rev. of: SUNDARAMAN, S. **Ustilago Crameri Koern. on Setaria italica Beauv.** Agric. Res. Inst. Pusa Bull. 97. *11 p., 2 pl., map,* 1921.] Jour. Indian Bot. 2: 154. 1921.

618. HÖHNEL, F. VON. **Bemerkungen zu H. Klebahn, Haupt- und Nebenfruchtformen der Ascomyceten 1918.** [Remarks on H. Klebahn, Perfect and imperfect fruits of Ascomycetes 1918.] Hedwigia 62: 38–55. 1920.—The sources and merits of Klebahn's work are considered and a critical consideration from the point of view of recent taxonomic studies of ascomycetes is given. The author states that Klebahn obtained his measurements partly from dry material imbedded in balsam and partly from material soaked in water. Since dry material gives from 25 to 50 per cent smaller measurements than wet tissues, he thinks that Klebahn's results must be taken with due allowance. He gives differences between Klebahn and other authors for measurements of perithecia, asci, ascospores, and conidia, and then passes to a critical discussion of the treatment of *Mycosphaerella*, which he considers at length regarding the relationships between perfect and imperfect forms, and the bearing of the various fruit forms on the disposition of genera and species. The genera *Carlia, Epiploca, Gnomonia, Entomopeziza, Fabraea, Pseudopeziza, Trochila,* and *Gloeosporium* are discussed with respect to their validity and certain of their species. Klebahn's disposition of genera and species is frequently criticized.—*Bruce Fink.*

619. HÖHNEL, F. VON. **Fragmente zur Mykologie.** [Mycological notes.] Sitzungsber. Akad. Wiss. Wien. (Math.-Nat. Kl.) Abt. 1. 129: 137–184. 1921.—The following are described

as new: *Asterina Loranthacearum* Rehm var. *javensis*, *A. subglobulifera*, *Asterinella tjibodensis*, *Limacinia graminella*, *Hypocrea Bambusae*, *Hypocrella lutulenta*, *Didymella Pandani*, *Astrosphaeriella bambusella*, *Massariopsis substriata*, *Anthostomella graminella*, *A. bambusaecola*, *Paranthostomella bambusella*.—*Botryosphaeria inflata* C. and M. and *Physalospora xanthocephala* B. and S. are believed to be based upon immature stages of the same species, and a form collected in Java, showing upon a dothidiaceous stroma yellow, perithecium-like horns which have only unorganized cellular contents, is believed to be a later stage; it is made the type of a new genus, **Creomelanops**, becoming *C. xanthocephala* (B. and S.) v. H.—Segregation of byaline-spored species of *Corallomyces* Berk. and Curtis into *Corallomycetella* P. Henn. takes no account of diversity of imperfect spore forms on which 5 sections of the genus can be based; all can be distributed between *Nectria* and *Letendraea*.—*Herpotrichia Schiedermayeriana* var. *Caldariorum* P. Henn. is transferred to the Nectriaceae and a new genus, **Xenonectria** erected to receive it. *Chiaquea* Sacc. based on Otth's description of *Nectria Hippocastani* is fallacious, but forms have since been discovered conforming to the description; this name is retained and several forms hitherto regarded as sphaeriaceous are transferred to it, thus: *Ch. rhodomela* (Fr.) v. H. (*Sphaeria rhodomela*, *Melanomma sanguinarium*), and *Ch. Hendersoniae* (Fckl.) v. H. (*Trematosphaeria porphyrostoma*, *Cucurbitaria Hendersoniae*). Brown-spored Nectrias parasitic in perithecia of other forms are segregated in a new genus, **Weesea**, of which *W. Balansiae* (*Calonectria Balansiae*) is the type.—*Hypocrea equorum* Fckl. and *H. merdaria* Fr. are not distinguishable from *Anthostoma*. *Podospora* Cesati and *Bombardia* Fr. are valid genera differing in characters of ascus and stroma. *Delitschia* is rejected and its species variously distributed, the type becoming *Phorcys didyma*. *Sporormia* differs from *Scleroplella* only in the separation of its mature ascospores into their constituent cells; confusion has arisen owing to the fact that the same species may develop on wood or on dung but grows more luxuriantly on the latter. *Pleophragmia* Fckl. is rejected and its 3 species transferred to *Pleospora*. *Rhynchostoma cornigerum* Karst. conforms to the section *Entosordaria* of Saccardo's *Anthostomella*; the sub-genus is elevated to generic rank and species of *Anthostomella* as well as *Paranthostomella unciniicola* and *P. valdiviana* Speg. are transferred to it.—The imperfect form of *Didymella Pandani* is *Septoriopsis Pandani*.—*Pterydiospora Javanica* has violet spores when ripe.—*Cladosphaeria Sambuci-racemosae* Otth is a small-spored form of *Karstenula hirta* (Fr.) v. H.—*Ophiobolus* consists at present of a mixture of dothidiaceous (*Entodesmium*) and sphaeriaceous (*Leptospora*) types; the genus **Leptosporopsis** is erected to receive the dothidiaceous forms with long spores, like *Ophiobolus Rostrupii*. *Paranthostomella eryngiicola* Speg. is distinct from *Anthostomella*, but *Maurinia* Nies. is rejected; *A. rostrispora* (Ger.) Sacc. is transferred to *Heptameria foliicola* (Sacc.) v. H. together with a number of other forms supposed to be Anthostomellas.—*F. Weiss.*

620. HÖHNEL, F. VON. **Fungi Imperfecti. Beiträge zur Kenntnis derselben. [Contributions to a knowledge of Fungi Imperfecti.]** Hedwigia **62**: 56–89. 1921. [Continued from Hedwigia **60**: 209. 1918.]—Ninety-five species or genera of imperfect fungi have been considered before the present paper, in which Nos. 96–116 are discussed. The genera and species are as follows: *Cryptodiscus placidioides* Desm., *Asteromella* Pass. & Thüm., **Amphiciliella** *Eriobotryae* Höhn. gen. & sp. nov., *Strasseria* Bres. & Sacc., *Plagiorhabdus* Shear, *Cytospora Buxi* Desm., *Phoma petiolarum* Desm., *Phyllostictina Ericae* Höhn., *Coleophoma Ericae* Höhn., *Stilbum aureolum* Sacc., *Phyllosticta concentrica* Sacc., *Pazschkeella brasiliensis* Sydow, the dwarfed forms of *Septoria Aceris* (Lib.) Berk. & Br., species of *Septoria* on maples, *Hendersonia fructigena Crataegi* Alles., form genera of *Lophodermellina*, *Readeriella mirabilis* Sydow, *Xyloma caricinum* Fries, *Acarosporium* Buk. & Vleug., *Diaporthe* and *Phomopsis* on European elms, form genera of *Diaporthe*, *Phoma Samarorum* Desm., and certain species of *Phomopsis*.—Pages 74–76 are devoted to forms of *Septoria* on maples in North America.—*Bruce Fink.*

621. KLEBAHN, H. **Der Pilz der Tomatenstengelkrankheit und seine Schlauchfruchtform. [The fungus of tomato canker and its ascigerous form.]** Zeitschr. Pflanzenkrankh. **31**: 1–16. *10 fig.* 1921.—The fungus, generally referred to *Ascochyta*, showed after over-

wintering, besides its usual pycnidia, numbers of perithecia. Pure cultures, made with the ascospores, proved the relationship between the pycnidia and perithecia; infection experiments with ascospores provided additional proof. Apparently the conidial form resembles very closely Hollos' *Diplodina lycopersici*, if it is not actually identical with it. The perithecia may belong to *Mycosphaerella* or *Didymella*. Owing to the presence of paraphyses, Klebahn places the fungus in tho genus *Didymella*, though thus far this genus has not included pathogenic species. Provisionally the ascigerous form may be known as *Didymella lycopersici* n. sp. The author concludes his treatise with a review of related Ascomycetes. But, in view of the fact that most of these apparently related fungi have not been successfully studied as to structure and development, a regrouping of them does not, in his opinion, seem possible at present.—*H. T. Güssow.*

622. LAIBACH, F. **Untersuchungen über einige Septoria-Arten und ihre Fähigkeit zur Bildung höherer Fruchtformen. I und II.** [Septoria species in relation to higher fruiting forms.] Zeitschr. Pflanzenkrankh. 30: 201–223. *12 fig.* 1920.—Several species of the genus *Septoria* Fries are chosen as subjects for research concerning the production of ascigerous forms. The relationship of *S. sorbi* to a species of *Mycosphaerella*, discovered on overwintering leaves of *Sorbus aucuparia*, is proved through infection experiments and pure cultures. In determining the *Mycosphaerella* the author finds it necessary to discuss the *Septoria* species occurring on *Sorbus*. He decides that *Septoria sorbi*, *S. hyalospora*, and *S. piricola* are 3 very closely related fungi which possess almost identical ascigerous forms. He prefers to regard them as distinct, and considers the ascigerous form of *S. piricola* Desm. as *Mycosphaerella sentina* (Fuck.) Schroeter on pear leaves, of *Septoria sorbi* Lasch as *Mycosphaerella aucupariae* Lasch on *Sorbus aucuparia*, and of *Septoria hyalospora* (Mont. et Ces.) Sacc. as *Mycosphaerella topographica* (Sacc. et Speg.) Lindau on *Sorbus torminalis*. *Septoria scabiosicola* (DC.) Desm. was also studied but an ascigerous form was not found.—*H. T. Güssow.*

623. PEYRONEL, BENIAMINO. **La forma ascofora dell 'Oidio della quercia a Roma.** [The ascigerous stage of the Oidium on oak at Rome.] Staz. Sper. Agrarie Ital. 54: 5–10. 1921.—The author in November and in December found the perithecia of the Oidium on oak leaves in 2 different localities in Rome. He attributes their development to the joint action of cold weather and low humidity, and to the necessity of better adaptation of the organism to these conditions. After a review of various related species, the conclusion is reached that the name of the organism is *Oidium gemmiparum* (Ferraris) nob. (*Oidium quercinum* var. *gemmiparum* Ferr. in Ann. Mycol. 1909; *O. alphitoides* Griffon et Maublanc in Bull. Soc. Mycol. France, 1910).—*A. Bonazzi.*

624. ROSSI, GINO DE. **I lieviti apiculati nella fermentazione vinaria.** [The yeasts of the group apiculatus and their rôle in the fermentation of wine.] Staz. Sper. Agrarie Ital. 53: 233–297. *Photomicr. 1–3, fig. 1–8.* 1920.—A contribution is presented on the physiology, morphology, and classification of this comprehensive group of organisms. The paper is divided into 5 chapters as follows: (1) Synthetic review of the collective species *Saccharomyces apiculatus*; (2) description of 2 new species of *Pseudosaccharomyces* common on the grapes and in the musts of the region; (3) studies upon the influence of these organisms upon the path of the fermentation caused by *Saccharomyces ellipsoideus*; (4) experiments upon the use of *Pseudosaccharomyces magnus* in wine manufacture; (5) conclusions. An extensive list of the literature bearing on the subject is appended. Fifty-five stock cultures isolated and studied are divided into the 2 following groups, which have the general characteristics indicated: (1) *Pseudosaccharomyces apiculatus*, a bottom yeast; cells single or in groups of two, 3.4–6 × 1.5–3.2 μ, gram positive, containing glycogen and fat, non-spore forming, gelatin liquefying, limits of growth between 1–3.5 and 31–35.5°C., thermal death point at 44–47°C. The organism ferments glucose and levulose, producing only 3.15–4.55 per cent alcohol, while it fails to ferment maltose, lactose, and saccharose. (2) *Pseudosaccharomyces magnus*, a bottom yeast; cells grouped in chains of 3–4, each cell measuring 4.8–9.6 × 2.7–4.8 μ. While the organism behaves somewhat similar to *P. apiculatus*, it does not liquefy gelatin and has a maximum growing temperature of 33–35°C. and a thermal death point of 49–50°C., and under the same conditions

as the former organism produces 8.30–9.15 per cent alcohol. Both organisms, when grown together with *Saccharomyces ellipsoideus*, grow more rapidly than the latter at the start, but are overcome when the alcohol content of the fermenting mixture has reached the point of maximum endurance, after which *S. ellipsoideus* continues the fermentation practically alone. Neither organism induces a noticeable variation in the normal course of the fermentation by *S. ellipsoideus* nor do they produce compounds which are deleterious to the taste of the wine.—*A. Bonazzi.*

625. Weiss, H. B. **Dipters and fungi.** Proc. Biol. Soc. Washington [D. C.] 34: 85–88. 1921.—Attention is called to the relationship between certain Dipterous families, chiefly Mycetophilidae and Platypezidae, and the fleshy fungi, particularly the families Agaricaceae and Polyporaceae. Lists of the insects and the fungus hosts upon which they have been found are given.—*J. C. Gilman.*

LICHENS

626. Bioret, G. **Revue des travaux parus sur les lichens de 1910 à 1919.** [Review of the published work on lichens from 1910 to 1919.] Rev. Gén. Bot. 33: 63–76, 146–160, 214–220, 264–272, 328–336, 372–396. 1921.

627. Moreau, F. et Mme. [Moreau]. **Les différentes formes de la symbiose lichénique. Chez le Solorina saccata Ach. et le Solorina crocea Ach.** [Different kinds of symbiosis among the lichens. The case of Solorina saccata Ach. and S. crocea Ach.] Rev. Gén. Bot. 33: 81–87. *Pl. 33.* 1921. Three degrees of symbiotic relation are reported between the fungus and alga in the case of *Solorina saccata* and *S. crocea*. In the 1st case, that of the external cephalodia of *S. saccata*, the alga, foreign to the lichen but accidentally brought in contact with it, brings about a defensive action on the part of the lichen. The alga becomes surrounded by the lichen and its progress is thus limited. In the 2nd case, that of the internal cephalodia of *S. saccata*, the alga is accepted within the tissues of the fungus, but not without certain limitations, as is evidenced by the frequent occurrence of dead algae. In the 3rd case, that of the internal cephalodia of *S. crocea*, the alga is received into intimate relations with the lichen and reaches therefore a larger development. The alga in this case may form a secondary gonidial layer below the usual gonidial layer of the lichen. The differences among these types are due to the degree of tolerance which occurs between the 2 organisms.—*J. C. Gilman.*

628. Moxley, George L. **Some vacation lichens.** Bryologist 24: 24–25. 1921.—The author gives a list of 31 species of lichens collected in the Topanga Canyon region, Southern California. Brief notes accompany the list, and there is a running account of the region and the general collection.—*E. B. Chamberlain.*

629. Watson, W. [Rev. of: Smith, Annie Lorrain. **A handbook of the British lichens.** *158 p., 90 fig.* British Museum: 1921.] Jour. Botany 59: 180–182. 1921.

630. Zschacke, H. **Die mitteleuropäischen Verrucariaceen. III.** [The Verrucariaceae of central Europe III.] Hedwigia 62: 90–154. 1921.—This 3rd paper treats the genus *Thelidium*. A 5-line diagnosis of the genus is followed by a long discussion of generic characters. Fifty-two species, 21 with immersed and 31 with semi-immersed perithecia, are treated, including keys, diagnoses, citations of exsiccatae and discussions of distribution, habitat and synonymy. *Thelidium circumvallatum, T. wettinense,* and *T. austriacum* are described as new. Several subspecies and forms are listed with short diagnoses; some of these are described as new.—*Bruce Fink.*

MYXOMYCETES

631. Elliott, W. T. **Mycetozoa on the Midland Plateau.** Jour. Botany 59: 193–196. 1921.—The author lists 121 species and varieties of slime molds for Warwickshire, Worcestershire, and Staffordshire.—*S. H. Burnham.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

(See also in this issue Entries 460, 755)

632. ANONYMOUS. **The microstructure of coal.** Nature 107: 282. 1921.—The present is an abstract of a paper by A. L. BOOTH, read at the autumn meeting of the Iron and Steel Institute. Microscopic examination is very useful in determining suitability of different coals. Commercial British coal is divided into 3 classes: (1) "Humic," composed of leaves, stems, and broken down woody tissue; (2) "Spore," in which micro and megaspores predominate; (3) "Cannel." The humic-coals are suited for "steam-raising or town-gas" manufacture, spore-coals for producer gas, and cannel for direct-fired furnaces.—*O. A. Stevens.*

633. ANONYMOUS. [Rev. of: SCOTT, D. H. **Studies in fossil botany.** Vol. I. Pteridophyta. *3rd ed., xxiii + 434 p., 190 illus.* A. and C. Black: London, 1920 (see Bot. Absts. 8, Entry 2092).] Sci. Prog. [London] 16: 161–162. 1921.

634. BERRY, E. W. **A Pseudocycas from British Columbia.** Amer. Jour. Sci. 2: 183–186. *Fig. 1–3.* 1921.—A species of *Pseudocycas* is described from the Upper Cretaceous Dunvegan sandstone of British Columbia.—*E. W. Berry.*

635. BERRY, EDWARD W. **Tertiary fossil plants from the Dominican Republic.** Proc. U. S. Nation. Mus. 59: 117–127. *Pl. 21.* 1921.—New species of *Pisonia, Pocaites, Inga, Pithecolobium, Sophora, Sapindus, Calyptranthes, Bucida, Melastomites, Bumelia,* and *Guettardia* are described from the Tertiary of the Dominican Republic.—*E. W. Berry.*

636. CARPENTIER, A. [Rev. of: KIDSTON, R., AND W. A. LANG.* **On old red sandstone plants showing structure from the Rhynie chert bed, Aberdeenshire. Part III. Asteroxylon Mackiei Kidston and Lang.** Trans. Roy. Soc. Edinburgh 52: 643–680. *Pl. 1–37.* 1920.] Rev. Gén. Bot. 33: 77. 1921.

637. COLANI, M. **Étude sur les flores tertiaires de quelques gisements de lignite de l'Indochine et du Yunnan.** [Study of the Tertiary floras of the lignite deposits of Indo-China and Yunnan.] Serv. Géol. Indochine Bull. 8: 11–609. *Pl. 1–30.* 1920.—A detailed and monographic study of the floras associated with the lignites of Yunnan, Tonkin, and Annam is reported. These come from 15 localities, which are fully described. Most of them are of late Tertiary age resting unconformably upon schists or Triassic. Since so few Tertiary floras are known from the tropics the comparative data for exact age determinations are lacking. The oldest flora, that from Na-giao, is believed to be Eocene or Oligocene in age. Most of the floras, although they show slight differences probably due to age, are considered as Mio-Pliocene, and one, that from Tuyên-quang, appears to be Pliocene. All are considered to be pre-Pleistocene. Numerous new species are described and figured; these are critically discussed and carefully compared with related fossil and existing forms. The treatment is conservative throughout, many species being referred to the form genus *Phyllites* with their probable botanic affinity indicated, and several groups of closely related leaves are treated in a broad way, as for example the group of *Quercus Relongtanense* or the group of *Dryophyllum yunnanse.* The Tertiary floras of this region, like that associated with the ape man of Trinil, appear to show a derivation from the eastern Himalayan region, an elevated habitat in the Tertiary or a considerable climatic change in the lowlands. Oriental oaks and the ancestral oaks of the extinct genus *Dryophyllum* are the most prominent elements, and other forms represented include *Libocedrus, Engelhardtia, Myrica, Pisonia, Pseudolmedia, Ficus,* numerous Lauraceae, *Osmanthus, Polyalthia,* etc. The work furnishes a permanent basis for future studies of tropical Tertiary floras and former geographic distribution.—*E. W. Berry.*

638. COLANI, M. **Sur quelques Araucarioxylon indochine. [Upon several Araucarioxylons from Indo-China.]** Serv. Géol. Indochine Bull. 6[1]: 1–17. *Pl. 1–3.* 1919.—**Fragments of**

Araucarioxylon from Indo China are described together with traces of fuogal and bacterial parasites contained in the silicified wood, of probably Rhaetic age.—*E. W. Berry.*

639. Colani, M. **Sur quelques végétaux Paléozoiques.** [Upon several Paleozoic plants.] Serv. Géol. Indochine Bull. 6[1]: 1–21. *Pl. 1–2.* 1919.—*Annularia*?, *Arthropitus*?, *Lepidodendron* C., and various other doubtful objects from Yunnan from a horizon believed to be upper Devonian are recorded.—*E. W. Berry.*

640. Colani, M. **Sur un Dipterocarpoxylon annamense nov. sp. du Tertaire supposé de l'Annam.** [On a new species of Dipterocarpoxylon from the supposed Tertiary of Annam.] Serv. Géol. Indochine Bull. 6[3]: 1–8. *Pl. 1–2.* 1919.—A petrified Dipterocarp from the supposed Tertiary of Annam is described.—*E. W. Berry.*

641. Davies, D. **Ecology of plants from the Westphalian and the lower part of the Staffordian Series of Clydach Vale and Gilfach Goch (East Glamorgan).** [Abstracts.] Ann. and Mag. Nat. Hist. 7: 144. 1921.—A generic record has been made of 45,000 plants taken from 10 horizons of these regions. In any 1 horizon the generic proportion remains the same, but when horizons are taken vertically there is often a complete alteration of balance. Equisetales occur on 4 horizons, Filicales on 3, Pteridosperms on 3, Lycopodiales on 2, and Cordaitales on 1. When Lycopodiales are dominant, Filicales and Pteridosperms are rare, and vice versa. It is thought that physical changes caused this alteration of balance of plants. [From author's abstract of a paper read at a meeting of the Geological Society.]—*H. H. Clum.*

642. [Druce, G. C.] [Rev. of: Small, James. **Origin and development of the Compositae (contd.).** Reprint from New Phytologist 18: 1–35, 65–91, 129–176, 201–234. 1919 (see Bot. Absts. 3, Entries 1142, 1979; 5, Entry 720; 6, Entry 452).] Bot. Soc. and Exchange Club British Isles Rept. 5: 614. 1919 [1920].

643. Edwards, W. N. **Note on Parka decipiens.** Ann. and Mag. Nat. Hist. 7: 442–444. *Pl. 12, fig. 4–5.* 1921.—Two specimens of *Parka decipiens* Fleming in the British Museum (Natural History) found in the lower Old Red Sandstone of Canterland, Kincardineshire, support the view that *Parka* may have been stalked rather than an entirely independent organism. Both of these specimens are stalked, and 1 shows the stalk attached to a stouter axis. As this one is smaller than any previously found, it is thought that *Parka* may have been attached only in its younger stages.—*H. H. Clum.*

644. Edwards, W. N. **On a small Bennettitalean flower from the Wealden of Sussex.** Ann. and Mag. Nat. Hist. 7: 440–442. *Pl. 12, fig. 1–3.* 1921.—A specimen in the British Museum (Natural History) registered as "Wealden, near Hastings," consists of a whorl of bracts, thought to be sporophylls, radiating from a prominent central region. Little could be discerned of the structure of the central region, but some microspores were obtained. The specimen is thought to belong to the genus *Williamsoniella*, and the name *Williamsoniella valdensis* is proposed.—*H. H. Clum.*

645. E[dwards], W. N. [Rev. of: Seward, A. C. **A text book for students of botany and geology.** Vol. IV. *xvi + 543 p., fig. 630–818.* Cambridge, 1919.] New Phytol. 19: 277–278. 1920.

646. F[yson], P. F. [Rev. of: Arber, Agnes. **Water plants, a study of aquatic angiosperms.** *xvi + 436 p., 171 fig.* Cambridge Univ. Press: 1920 (see Bot. Absts. 9, Entry 374).] Jour. Indian Bot. 2: 155–156. 1921.

647. Halle, T. G. **Psilophyton (?) Hedei n. sp., probably a land-plant from the Silurian of Gothland.** Svensk Bot. Tidskr. 14: 258–260. *Pl. 1.* 1920.—The author describes what appears to be a species of *Psilophyton* from an outcrop in Gothland of Silurian age and correlated with the Lower Ludlow of Britain.—*E. W. Berry.*

648. Kidston, R., and W. H. Lang. **On the old red sandstone plants showing structure from the Rhynie Chert bed, Aberdeenshire. Parts 4 and 5.** [Abstract.] Proc. Roy. Soc. Edinburgh 41²: 117–118. 1921.

649. MacBride, E. W. **The method of evolution.** Scientia 28: 23–33. 1920.

650. Mendiola, N. B. **On the evolution of the corn ear.** Philippine Agric. Rev. 13: 112–114. *Pl. 1–4.* 1920.—The author gives additional data, with illustrations, confirming Montgomery's theory that the ear of corn originated from the central spike of some tassel-like structure similar to the corn tassel.—*E. D. Merrill.*

651. Morellet, Lucien and Jean. **Nouvelle contribution à l'étude des Dasycladacées tertiaries.** [New contribution to the study of the Tertiary Dasycladaceae.] Compt. Rend. Sommaire Soc. Géol. France 10: 135–136. 1921.—Preliminary notice is given of a memoir on these algae which will be published in the Memoirs of the Society.—*E. W. Berry.*

652. Petronievics, Branislav. **Lois de l'évolution des espèces, des rameaux phylétiques et des groupes.** Rev. Gén. Sci. Pures et Appl. 32: 140–143. 1921.

653. Schuchert, Charles. **The evolution of primitive plants from the geologist's viewpoint.** New Phytol. 19: 272–275. 1920.—In the course of favorable comment on Church's Thallasiophyta and the Subaerial Transmigration, the author points out that there was never a universal ocean, that the amount of water in the hydrosphere has increased during the geological ages, and that the Archeozoic oceans had far less salts and probably a different salt combination than the ocean of today. [See also Bot. Absts. 7, Entry 2007.]—*I. F. Lewis.*

654. Seward, A. C. **The Cretaceous-Tertiary boundary in North America.** [Rev. of: Lee, Willis, T., and F. H. Knowlton. **Geology and paleontology of the Raton mesa and other regions in Colorado and New Mexico.** U. S. Geol. Surv. Professional Paper 101.] Nature 107: 282–283. 1921.—Conclusions are regarded as of great interest from a geological point of view. Both Vermejo and Raton formations are rich in fossil plants; the former is correlated with the Montana flora, the Raton is believed to be Eocene. It is unfortunate that little attempt is made to compare the plants with species other than American. The absence of conifers in Raton is interesting, but it is scarcely safe to assume the group was unrepresented in the contemporary vegetation of the district.—*O. A. Stevens.*

655. Seward, A. C. **Plant evolution.** [Rev. of: Scott, D. H. **Studies in fossil botany. 3rd ed. Vol. 1. Pteridophyta.** *3rd ed., xviii + 434 p.* A. and C. Black: London, 1920 (see Bot. Absts. 8, Entry 2092).] Nature 107: 197–198. 1921.

656. Vaulx, R. de la, et P. Marty. **Adjonctions à la flore fossile de Varennes.** [Additions to the fossil flora of Varennes.] Rev. Gén. Bot. 33: 238–243. *Pl. 45.* 1921.—Five species are added to the list of plants reported in the fossil flora of Varennes. They are: *Salix cinerea, Ulmus ciliata, Abronia Bronnii, Rubus niacensis* (*R. caesius*), and *Cotoneaster Boulayi*; the last is new to fossil floras in general. Of these, the first 4 exist in the Tertiary flora of the volcano of Cantal, and all but *Abronia Bronnii* are still found as part of the indigenous flora of Mont Dore. *Cotoneaster Boulayi* is Asiatic and *Abronia Bronnii* North American.—*J. C. Gilman.*

PATHOLOGY

G. H. COONS, *Editor*

C. W. BENNETT, *Assistant Editor*

(See also in this issue Entries 384, 397, 412, 414, 425, 438, 439, 444, 452, 509, 553, 575, 621, 764, 782, 783, 785, 786, 787, 788, 789, 848)

PLANT DISEASE SURVEY (REPORTS OF DISEASE OCCURRENCE AND SEVERITY)

657. WERTH, E. Phänologie und Pflanzenschutz. [Phenology and plant protection.] Zeitschr. Pflanzenkrankh. 31: 81–89. 1921.—This is a discussion of the organization of a plant pathological service based upon the relationship between plant diseases and weather.—*H. T. Güssow.*

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

658. CHIFFLOT, J. Communications écrites. [Written communications.] Bull. Soc. Path. Vég. France 8: 34–35. 1921.—It is reported that seeds of hollyhock taken from plants badly infected with *Puccinia malvacearum* were immersed in copper sulphate solution, 2 grams to 1 l. of water, for ½ hour; plants grown from these seeds were entirely free from the rust. This is given as evidence that the hollyhock may be grown without injury from the disease and also as contradicting the mycoplasm theory.—*C. L. Shear.*

659. DUCOMET, VITAL. Sur le Septoria antirrhini Desm. [Regarding Septoria antirrhini.] Bull. Soc. Path. Vég. France 8: 33. 1921.—This fungus is reported as a weak parasite on snapdragon (muflier), especially on plants in somewhat abnormal condition, as during the past season, which followed a very mild winter and resulted in the plants assuming a somewhat biennial character with weakened shoots and foliage.—*C. L. Shear.*

660. FOËX, ED. Les relations entre la leptonécrosse et l'enroulement. [The relations between leptonecrosis and leaf roll.] Bull. Soc. Path. Vég. France 8: 24–28. 1921.—A résumé is presented of Quanjer's observations on the potato diseases in France. A table is given showing the coördination between phloem necrosis and leaf roll as determined by Quanjer from the examination of stems from plants not seen by him. The few doubtful cases of identification are considered due to the disease not having developed sufficiently to show leaf-roll symptoms. In 2 other cases true leaf-roll symptoms were probably not present. In reference to the accumulation of starch in plants not yet showing phloem necrosis, the author concludes that this tends to prove that it is not necessary that the vessels be obstructed in order to stop the transportation of carbohydrates.—*C. L. Shear.*

661. MORETTINI, ALESSANDRO. Aumento della resistenza alla carie del frumento Noè mediante selezione. [Selection as a means of increasing the resistance of wheat (var. Noè) to stinking smut.] Staz. Sper. Agrarie Ital. 53: 399–413. 1920.—In experiments on resistance and susceptibility of wheat to *Tilletia tritici*, the author used the following methods: Mass selection in the first few years of investigation followed by pure line selection in later years. The variety (Noè) used was extremely susceptible. Infection of seeds was accomplished by moistening them with 1 per cent gum-arabic solutions and thorough dusting with spores. The results of the last 3 years of selection were as follows:

YEAR		PER CENT OF HEADS		
		Sound	Infected	Partially infected
1915	Selected plants	71.13	27.21	1.66
	Check plants	50.55	49.25	0.00
	Difference	20.58	22.04	1.66
1916	Selected plants	50.68	37.10	12.78
	Check plants	22.72	76.84	1.44
	Difference	27.96	39.74	11.34
1917	Selected plants	33.61	42.73	23.66
	Check plants	9.90	86.46	3.64
	Difference	23.71	43.73	20.02

It is concluded that aystematic selection increases resistance to stinking smut, even in very susceptible varieties, and may prove valuable in practical application.—*A. Bonazzi.*

662. PARDE, M. **Communications.** Bull. Soc. Path. Vég. France 8: 14. 1921.—In a letter to Et. Foëx the writer states that *Quercus cerris* is very resistant to powdery mildew, *Oidium*, which is so serious on most native species.—*C. L. Shear.*

663. PRITCHARD, FRED J., AND W. S. PORTE. **Relation of horse nettle (Solanum carolinense) to leafspot of tomato (Septoria lycopersici).** Jour. Agric. Res. 21: 501-505. *Pl. 95–99.* 1921.—Experimental data are presented to establish the identity of a leafspot disease of nettle with the leafspot disease of tomato.—*D. Reddick.*

664. SMITH, ERWIN F. **Effect of crowngall inoculations on Bryophyllum.** Jour. Agric. Res. 21: 593–597. *Pl. 101–110.* 1921.—The effect of *Bacterium tumefaciens* on *Bryophyllum calycinum* is like that on tobacco, geranium, etc. The paper controverts the report of M. Levine (see Bot. Absts. 4, Entry 1315) that the shoots found in leafy crowngalls originate from the tumor tissue, and that the organism has no stimulating effect on the formation of shoots, but rather an inhibiting effect.—*D. Reddick.*

665. WEIS, F., OG K. A. BONDORFF. **Kemisk-biologisk undersøfelse af skovjord under overernaerede graner i lyngby skov.** [Investigations relative to the cause of the hypertrophy of *Picea.*] *Forst. Forsogsv. Danmark* 5: 343–352. *1921.*—These researches, which are the continuation of previous work, deal with the cause of hypertrophy observed on *Picea excelsa.* Chemical analyses of the soil in which these plants were growing indicate a high nitrogen content in proportion to mineral elements. The author believes that the cause of the hypertrophy will be found to lie in this unbalanced condition of soil elements. It is found that the nitrogen in these soils, which are for the most part very acid, is quickly changed under favorable conditions to the nitric form. This change seems to be due to microörganisms since it does not occur in sterile soil. None of the common nitrifying bacteria have been isolated, but it is possible that in the forest soils, rich in humus and having a high acid content, other organisms may be instrumental in bringing about nitrification. [Abstract through Kohler, Rev. Gén. Bot. 33: 397. 1921.]—*C. W. Bennett.*

666. WEISS, FREEMAN, AND R. B. HARVEY. **Catalase, hydrogen-ion concentration and growth of the potato wart disease.** Jour. Agric. Res. 21: 589–592. 1921.—The overgrowths of *Solanum tuberosum* caused by *Chrysophlyctis endobiotica* were compared with healthy tissue. The hydrogen-ion concentration of the overgrowths is represented by P_H6 and of the healthy tissue by $P_H6.49$.—Catalase activity is much greater in the overgrowth tissue, the values being represented by 17.9 cc. of O_2 for diseased tissue and 7.8 cc. for healthy tissue. Catalase

activity is strongly correlated with growth notwithstanding the higher acidity of the proliferation.—Differences in acidity of the varieties of potatoes are not associated with immunity to wart disease.—*D. Reddick.*

THE PATHOGENE (BIOLOGY; INFECTION PHENOMENA; DISPERSAL)

667. MAINS, E. B., and H. S. JACKSON. Two strains of Puccinia triticina in the United States. [Abstract.] Phytopathology 11: 40. 1921.

668. MELCHERS, L. E. Ecologic and physiologic notes on corn smut, Ustilago zeae. [Abstract.] Phytopathology 11: 32. 1921.

669. REDDY, CHAS. H. Experiments with Stewart's disease of dent, flint, and sweet corn. [Abstract.] Phytopathology 11: 31. 1921.

670. THOMPSON, NOEL F. The effect of certain chemicals especially copper sulfate and sodium chloride on the germination of bunt spores. [Abstract.] Phytopathology 11: 37–38. 1921.

671. WEBER, G. F. Studies on corn rust. [Abstract.] Phytopathology 11: 31. 1921.

672. YOUNG, H. C., AND C. W. BENNETT. Studies in parasitism in the Fusarium group. [Abstract.] Phytopathology 11: 56. 1921.

DESCRIPTIVE PLANT PATHOLOGY

673. BETHEL, ELLSWORTH, AND GILBERT B. POSEY. Investigations to determine the identity of a Cronartium on Ribes in California. [Abstract.] Phytopathology 11: 46. 1921.

674. BROADBENT, W. H. Report of the barberry and the black rust of wheat survey in southwest Wales. Jour. Ministry Agric. Great Britain 28: 117–123. *1 fig.* 1921.—A popular account is given of the occurrence of black stem rust (*Puccinia graminis*) in Wales and the relation of the outbreak to barberry bushes (*Berberis vulgaris*).—*G. H. Coons.*

675. COLIZZA, CORRADO. Sopra una malattia porco nota del Giaggiolo prodotta da Septoria Iridis Massal. [Studies on a little-known disease of Iris caused by Septoria Iridis Massal.] Staz. Sper. Agrarie Ital. 53: 494–504. *Pl. 4, fig. 1–2.* 1920.—The author describes a disease of *Iris florentina* and *Iris germanica* which affects the leaves and flower stalk, invading the parenchymatous tissue but not the fibro-vascular bundles. Under special conditions necrosis due to secondary bacterial infection may set in. The origin is described and apparently is identical with *Septoria iridis*. No injury to the epidermis is necessary for infection to take place, the parasite gaining entrance by way of the stomatal apertures. Drainage and fertilization of the soil together with preventive sprays are suggested as control measures.—*A. Bonazzi.*

676. COOK, MEL. T. Blossom blight of the peach. [Abstract.] Phytopathology 11: 43. 1921.

677. DICKSON, JAMES G., HELEN JOHANN, AND GRACE WINELAND. Second progress report on Fusarium blight (scab) of wheat. [Abstract.] Phytopathology 11: 35. 1921.

678. GARD, MÉDÉRIC. Sur le dépérissement des noyers dans quelques régions de la France. [The destruction of walnuts in some parts of France.] Bull. Soc. Path. Vég. France 8: 41–44. 1921.—Two root rots are described, the 1st attributed to *Armillaria mellea* and the 2nd of unknown cause, the latter producing an effect somewhat similar to that of the 1st and sometimes confused with it, but characterized by gummosis and other distinct symptoms.—*C. L. Shear.*

679. GARDNER, MAX W., AND JAMES B. KENDRICK. **Bacterial spot of tomato.** [Abstract.] Phytopathology 11: 55. 1921.

680. GERRETSEN, F. C. **Die Bakterien der Coli-Aërogenes-Gruppe als Erreger von Pflanzenkrankheiten.** [Bacteria of the Coli-aërogenes group as the cause of plant diseases.] Zeitschr. Pflanzenkrankh. 30: 223–227. 1920.—Investigations of Wakker's disease of hyacinths revealed that, besides *Bacterium hyacinthi*, in some cases another specific bacterium occurred. The latter was grown in pure culture and used in inoculating a number of bulbs of *Hyacinthus orientalis*. After 40–60 days, in nearly all cases, 1 or more bulb scales had become infected. This bacterium was shown to be the cause of a disease in *H. orientalis* and *Galtonia candicans*, when introduced into the tissues through a wound. The bacterium was studied according to the schedule of the Society of American Bacteriologists, receiving the classification number 223.111.301. The author regards the bacterium as of the colon bacillus group which, however, has lost its power of gas production in passing through the plant.—*H. T. Güssow.*

681. GÜSSOW, H. T. **Correspondence écrite.** [A letter to Et. Foëx on rose canker.] Bull. Soc. Path. Vég. France 8: 30. 1921.—The writer states that Sorauer, Wulff, Foëx, and himself are all wrong in attributing the rose canker of Europe and Canada to frost or *Coniothyrium*. He believes after further study that it is due to *Bacterium tumefaciens*.—*C. L. Shear.*

682. HIMMELBAUR, W. **Heterosporium gracile (Wallroth) Saccardo auf Irisblättern.** [Hetersporium gracile (Wallroth) Saccardo on Iris leaves.] Zeitschr. Landw. Versuchsw. Deutsch Österreich 23: 131–141. *7 fig.* 1920.—A disease of iris leaves due to *Heterosporium gracile* is described. A description of the fungus, its life history, and mode of entrance into the host are given. The fungus is considered as only weakly parasitic, and is able to cause serious injury only on plants so closely placed as to prevent proper air circulation, and then only in wet seasons. Microchemical reactions of the diseased parts and of the fungous mycelium are given. The placing of plants far enough apart to allow proper circulation of air is recommended.—*John W. Roberts.*

683. JANCHEN, ERWIN. **Der Kartoffelschorf.** [Potato scab.] Oesterreich. Zeitschr. Kartoffelbau 1^3: 11–12; 1^4: 14. 1921.—Three kinds of potato scab from the standpoint of symptoms are distinguished,—shallow scab, deep scab, and knobby scab; etiologically there are Actinomyces and Spongospora scabs. Following Wollenweber the different manifestations of Actinomyces scab are attributed to different species: Thus *Actinomyces incanescens* Wr. causes deep scab; *A. tricolor* Wr., shallow scab; *A. intermedius* (Krüg.) Wr. and *A. nigrificans* (Krüg.) Wr. produce shallow scab on potatoes and girdle scab of beets; *A. serugineus* Wr. causes knobby scab of potatoes; *A. xanthostroma* Wr. and *A. albus* (R. D.) Gasp. with its varieties *ochroleucus* (Neuk.) Wr. and *cretaceus* (Krüg.) Wr. produce girdle scab on beets, but may also attack potatoes. Scab of other root vegetables is caused by one or more of the species named.—Typically, knobby scab results from attack of *Spongospora subterranea*; the disease is also known as powdery or spongy scab. *Spongospora* and *Plasmodiophora* are referrred to the Chytridiales. The relation of soil type, moisture, and reaction to the development of different kinds of scab is discussed. Where potato fields are generally scab-infested the use of resistant varieties is recommended as the best means of control. Some varieties are both immune to wart and resistant to scab.—*F. Weiss.*

684. JANCHEN, ERWIN. **Die Dürrfleckenkrankheit der Kartoffeln.** [The dry-leaf-spot of potatoes.] Oesterreich. Zeitschr. Kartoffelbau 1^4: 24. 1921.—Distinctive characteristics of leaf blight of potatoes caused by *Macrosporium solani* and control measures for same are given; this disease is becoming of economic importance throughout central Europe.—*F. Weiss.*

685. JOHNSON, A. G., AND R. W. LEUKEL. **The nematode disease of cereals.** [Abstract.] Phytopathology 11: 41. 1921.

686. MCKINNEY, H. H. **The so-called take-all disease of wheat.** [Abstract.] Phytopathology 11: 37. 1921.

687. MELHUS, I. E. **Bremia on hothouse lettuce.** [Abstract.] Phytopathology 11: 54. 1921.

688. MIÈGE, EMILE. **Note preliminaire sur les principales maladies cryptogamiques observées au Maroc.** [Preliminary note on the principal fungus diseases of Morocco.] Bull. Soc. Path. Vég. France 8: 37–40. 1921.—A brief list, with notes, is presented of the common parasites of the principal farm crops.—*C. L. Shear.*

689. MILLARD, W. A. **Common scab of potatoes.** Jour. Ministry Agric. Great Britain 28: 49–53. *2 fig.* 1921.—Experiments, details as yet unpublished, show that scab in England, as in America, is caused by *Actinomyces scabies*. Planting diseased "seed" has produced only a very slight increase in scab. Control has been obtained by plowing under green crops.—*C. W. Bennett.*

690. MOLLIARD, M. **La galle de l'Aulax minor Hartig.** [The gall of Aulax minor Hartig.] Rev. Gén. Bot. 33: 273–294. *Pl. 46–53, fig. 1–9.* 1921.—The 2 types of galls caused by *Aulax minor* on *Papaver rhaeas* are described and their method of development traced. The galls differ from those produced on *Papaver dubium* by *Aulax papaveris*.—*J. C. Gilman.*

691. POOLE, R. F. **Recent studies on bacteriosis of celery.** [Abstract.] Phytopathology 11: 55. 1921.

692. RICHARDS, B. L. **A dry rot of sugar-beet caused by Corticium vagum.** [Abstract.] Phytopathology 11: 48. 1921.

693. RIVERA, VINCENZO. **Sopra l' azione del Fomes fulvus (Scop.) Fries sul mandorlo.** [The action of Fomes fulvus (Scop.) Fries upon Amygdalus.] Staz. Sper. Agrarie Ital. 54: 114–118. 1921.—The fungus appears to be a true parasite capable of growing for several years in the host without showing a tendency to form fruiting bodies, but capable instead of forming in the cambium layer a thick, tough mycelial mat. A general, premature ageing and a shortening of the internodes in the new branches are the first signs of the disease. It is only when the tree is in the final stages of alteration that the parasite gives rise to fruiting bodies. This form of the disease, which is apparently transmitted by pruning implements and which the author characterizes as the "biologic" form, is to be distinguished from the "chemico-biologic" form, which is responsible for the death within a short time from planting of large numbers of replacement plantings. The latter form of the disease, characterized by a complete lack of mycelial development either in the roots or branches, should be ascribed to an intoxication by some product arising from the final decomposition of the remains of the old infected tree under the saprophytic action of *Fomes fulvus*. Sterilization of pruning implements is recommended as the only rational measure for combatting the disease that in some regions is very destructive.—*A. Bonazzi.*

694. ROSEN, H. R. **A bacterial root and stalk rot of field corn.** [Abstract.] Phytopathology 11: 32–33. 1921.

695. SALMON, E. S. **Hop-"mould" and its control, I.** Jour. Ministry Agric. Great Britain 28: 150–157. *10 fig.* 1921.—Mildew, *Sphaerotheca humuli*, is reported as destructive to the leaf, "burr," and hop-cone of the hop plant. Dusting with flowers of sulphur, cleaning away trash, and removing infected parts from the vines are discussed as control measures.—*C. W. Bennett.*

696. SPIERENBURG, DINA. **Een onbekende ziekte in de iepen.** [An unknown disease of elm.] Tijdschr. Plantenz. 27: 53–60. *Pl. 3.* 1921.—This disease, which was seen in various parts of Netherland for the 1st time during the year 1920 and which seems to be becoming of very great importance, manifests itself by a more or less rapid wilting and dying of the tops of the trees or of single branches, while the whole tree takes on a sickly appearance as if it were suffering from lack of food and water. The branches and stem in cross section show small dark

spots in the rings adjoining the bark. In some cases they are found in the last 2 or 3 rings and it is supposed that the 1st infections must have taken place as early as 1917. The coloring matter from these spots seems to pass into the other portions of the rings so that all of the rings having dark spots are somewhat darker. The same symptoms are to be seen also in the lower portion of the stem and even in the roots. Cultures from discolored portions of the wood have yielded a number of fungi; the work on etiology is to be continued.—*D. Atanasoff.*

697. STEVENS, F. L. **Helminthosporium and wheat foot-rot.** [Abstract.] Phytopathology 11: 37. 1921.

698. TISDALE, W. H., AND J. MITCHELL JENKINS. **Rice straight head and its control.** [Abstract.] Phytopathology 11: 42–43. 1921.

699. UPHOF, J. C. TH. **Eine neue Krankheit von Cephalanthus occidentalis L.** [**A new disease of C. occidentalis L.**] Zeitschr. Pflanzenkrankh. 31: 100–108. *1 fig.* 1921.—The author describes a disease of *Cephalanthus occidentalis* from southeastern Missouri, U. S. A., which is believed to be a mosaic disease. Of 24 inoculations with juice from an affected plant 18 proved successful. Leaves, petioles, shoots, and roots may show effects of the attack. It is suspected that the disease is carried in the soil, the "virus" from infected roots being spread through the soil, principally by flooding.—*H. T. Güssow.*

700. VALLEAU, W. D. **Wildfire and angular leaf-spot of tobacco.** Kentucky Agric. Ext. Circ. 89. *16 p., illus.* 1921.—The author reports the severe outbreak of wildfire (*Bacterium tabacum*, and angular leaf-spot (*Bacterium angulatum*) of tobacco in Kentucky in 1920. A description of the diseases is given with the results of inoculation experiments in which it was shown that infection takes place primarily through the under side of the leaf. Preventive measures are discussed. Bagging seed heads is suggested as a means of control through preventing seed-pod infection; selection of seed from apparently disease-free fields is not considered a sure means of securing disease-free seed as numerous seed beds were affected in 1920 though the diseases were not present in 1919 to a noticeable degree.—*W. D. Valleau.*

701. WALKER, J. C. **The occurrence of dodder on onions.** [Abstract.] Phytopathology 11: 53. 1921.

ERADICATION AND CONTROL MEASURES

702. BEACH, F. H. *Results of apple blotch control in southern Ohio. Trans. Indiana* Hort. Soc. 1919: 63–72. *4 fig.* 1920.—The importance and distribution of blotch (*Phyllosticta solitaria*) in Ohio is given. The unsatisfactory control secured by a Bordeaux spray at intervals of 3, 6, and 9 weeks after petal fall in 1918 led to the trial of a 2-, 4-, 6-, and 10-week (after petal fall) program in 3 orchards in 1919. A 3–5–50 Bordeaux was used on the varieties Ben Davis and Smith Cider. Data are presented which show that an excellent control of blotch was obtained. It is concluded that the 2-, 4-, and 6-week schedule is far superior to the 3-, 6-, and 9-week schedule. The importance of the earlier application of the 1st spray is emphasized. In a 4th orchard, the relative importance of the 2- and 4-week applications was demonstrated. An account is given of the method of handling the spray gun in order to secure thorough coating of the fruit, foliage, and twigs. It was found that the upper side of the fruit in the top of a tree was commonly left unprotected. Recommendations for blotch control include, in addition to the spray program, dormant pruning to open up dense portions of the tree and to eliminate dead and cankered wood, and spring application of nitrate of soda fertilizers.—*Max W. Gardner.*

703. BERNATSKY, J. **Perozid sowie Kupfervitriol gegen Oidium.** [**Perozid and copper sulphate versus Oidium.**] Zeitschr. Pflanzenkrankh. 31: 94–96. 1921.—The author reports excellent results from the use of "perozid" against *Oidium* of pumpkins. He emphasizes that his experiments have no reference to the dreaded *Plasmopara cubensis*, only to *Oidium*. He employed sulphur dust, 1 per cent copper sulphate, and "perozid" (2 per cent) 3 times

during the summer. All 3 substances produced the desired effect, but the 2 liquids were superior to the dust. No difference was noticeable between copper sulphate and "perosid" spray.—*H. T. Güssow.*

704. BLODGETT, F. M., AND KARL FERNOW. **Testing seed potatoes for mosaic and leaf-roll.** [Abstract.] Phytopathology 11: 58–59. 1921.

705. ERWIN, A. T. **Control of downy mildew of lettuce.** Proc. Amer. Soc. Hort. Sci. 17: 161–168. 1920 [1921].—Twenty-seven varieties of lettuce representing the looseleaf cos and head types were found to be susceptible to lettuce mildew, *Bremia lactucae*. Attack was found to be most severe in the seedling stage, especially during the "unfolding of the cotyledons and the expanding of the first true leaf. If the plants can be kept free from mildew until they are half grown, the disease is of comparatively little importance." Several species of wild lettuce under observation were readily infected by cultures obtained from cultivated lettuce, and conversely the mildew of the wild lettuce grew readily on the cultivated varieties, showing the necessity of destroying wild lettuce in the vicinity of the greenhouses. Drenching the soil with formaldehyde solution (7 pints of formaldehyde to 100 gallons of water), applied at the rate of 1 gallon per square foot, did not control the disease. Bordeaux mixture of 2:2:50 strength sprayed on the seedlings just before the true leaves appear and a 2nd spraying 1 or 2 days before transplanting will readily control lettuce mildew.—*H. A. Jones.*

706. FROMME, F. D., AND S. A. WINGARD. **Treatment of tobacco seed and suggested program for control of wildfire and angular-spot.** [Abstract.] Phytopathology 11: 48–49. 1921.

707. KEITT, G. W. **Second progress report on apple scab and its control in Wisconsin.** [Abstract.] Phytopathology 11: 43–44. 1921.

708. KÖCK, GUSTAV. **Die wirtschaftliche Bedeutung der Kartoffelkrautfäule und die Möglichkeiten der Bekämpfung dieser Krankheit.** [The agricultural importance of potato late blight and the possibility of controlling this disease.] Oesterreich. Zeitschr. Kartoffelbau 1[5]: 20; 1[6]: 23. 1921.—A popular description is presented of late blight disease of potatoes, including control measures. A copper chloride-lime, proprietary preparation known as "Bosna-Pasta," is recommended as being equal to 1 per cent Bordeaux and as eliminating the necessity of filtering or adjusting the reaction of the mixture.—*F. Weiss.*

709. KROUT, WEBSTER S. **Treatment of celery seed for the control of Septoria blight.** Jour. Agric. Res. 21: 369–372. 1921.—Mycelium and spores of *Septoria apii* on or in the seeds of celery [*Apium graveolens*] are either dead or very low in vitality at the end of 2 years and both are dead at the end of 3 years, whereas the seeds are viable for 4 years or more.—The thermal death point (30 minutes) of the spores in tubes is between 38° and 40°C., that of mycelium in tubes about 45°; and that of seeds, 1 or 2 years old, is between 50° and 55°. Preferred temperature for treatment is 48 or 49°C. for 30 minutes.—*D. Reddick.*

710. MARTIN, WILLIAM H. **Inoculated vs. uninoculated sulfur for the control of common scab of potato.** [*Abstract.*] *Phytopathology 11: 58.* 1921.

711. MELHUS, I. E. **Coöperative potato seed treatment experiments (Committee Report).** [Abstract.] Phytopathology 11: 59–60. 1921.

712. MELHUS, I. E., J. C. GILMAN, AND J. B. KENDRICK. **The fungicidal action of formaldehyde.** Iowa Agric. Exp. Sta. Res. Bull. 59, *355–397, fig. 6.* 1920.—The studies reported in this bulletin deal with the toxic action of formaldehyde and other surface disinfectants as manifested in potato seed treatment. The organisms used were *Actinomyces scabies* and *Rhizoctonia solani*. Surface disinfection with formaldehyde for the control of scab was more complete at 20°C. than at lower temperatures. Formaldehyde at 48–50°C. for short periods of time was as toxic as mercuric chloride and formaldehyde of the standard formulae. Cover-

ing, after treatment with hot formaldehyde (50°C.), facilitates disinfection. Increasing the concentration increases the toxicity of this chemical to both scab and scurf. Surface disinfection is seldom complete, which introduces a variable factor into field treatment experiments. The extent of soil infestation is best measured in clean, treated seed. Untreated, clean seed in 1919 carried to the field a sufficient number of *Rhizoctonia* sclerotia to cause 6 per cent infection on the progeny. All of the methods of seed treatment reduced the percentage of infection over that of the checks, showing that seed treatment is worth while from a practical standpoint. It was found that the germination of seed tubers was injured with mercuric chloride 1–500 and formaldehyde 1–120, when the temperature was raised above 55°C. for more than 5 minutes. No injury was induced by formaldehyde 1–120 at 50°C. for 2½ minutes followed by covering for 1 hour. Laboratory methods were devised by means of which the value of a given seed treatment can be predicted without the necessity of field trials. The laboratory methods were confirmed in the field trials. The data obtained suggest that formaldehyde solutions used changed strength only slightly on being exposed at room temperature in an open container for 26 days. Dilute solutions of formaldehyde heated to 50°C. and held at this temperature from 5–60 minutes showed no appreciable change in concentration. The concentration of formaldehyde solutions is somewhat lowered when potatoes are treated at 48–50°C. The loss in concentration was greater when steam was used as a source of heat than when employing a heater. The greater loss is probably due to the condensation of the steam in the solution.—*J. C. Gilman.*

713. Pantanelli, E. **Azione fungicida e fisiologica degli anticrittogamici. [Fungicidal and physiological action of anti-cryptogamic compounds.]** Mem. R. Staz. Pat. Veg. Roma 1920: 1–54. 1920.—The paper is divided into 2 parts, the 1st dealing with the action of the anti-cryptogamic agents on the fungous parasites, the 2nd with the action upon the host plants. The action of Bordeaux mixture, calcium polysulphides (lime-sulphur), barium polysulphides, soap-silver mixtures, and copper oxychloride ("Caffaro paste") was studied upon *Plasmopara viticola, Oidium leucoconium, Fusarium niveum,* and *Botrytis cinerea.* The various functions of the mixtures were studied by 2 different methods. The toxic action was investigated by spraying the substances on glass slides; after drying these were sprayed with a suspension of conidia in 5 per cent saccharose. The antiseptic action, on the other hand, was studied by replacing the nutritive fluids, in which the spores had germinated, first with water and this in turn with the substance under investigation, the operations being carried out under the microscope. The results of the treatment based upon the viability of the spores were ascertained by staining with non-vital stains (of the aniline blue type), by plasmolysis reactions, and by swelling, by increase in granulation and other visible manifestations, and by germinations in a moist chamber after removal of the fungicidal substance. Sugar, as well as glycerine and mannite, when used as a suspension medium was found to increase the antiseptic properties of the dry films of material studied; this the author attributes to the solvent action. The principal results of the 1st part of the investigation lie in the demonstration of the fact that the salts of heavy metals possess a strong antiseptic power, while when once dried, the polysulphides under these same conditions failed to inhibit germination of the spores. Silver salts are the most active, followed by those of copper. The fungicidal power of the mixtures follows a different order, the polysulphides being sometimes far more effective than the others. As preventive agents copper sprays are efficient for long periods, since the hydroxide of the metal is slowly acted upon by CO_2 and rendered less basic and more soluble. Bordeaux mixture prepared by the commonly accepted formulae is acid although it will turn litmus blue. Soap-silver mixtures are also of value in preventive treatments since the silver carbonate, formed by a reaction similar to the reactions with copper, is distinctly soluble. The oxidation of the polysulphides is enhanced by the alkaline reaction of the mixtures so that under atmospheric conditions the dry crust on the sprayed leaves is made up of the following components: calcium carbonate, elementary sulphur, thiosulphates, sulphides, and sulphates. Even though sulphur may be slowly oxidized to sulphur di- and trioxides these products are not necessarily toxic at the low concentrations resulting. Barium polysulphides are always more effective than the corresponding calcium mixtures.—The 2nd part

of the paper deals with the action of the sprays upon the host plant. After washing the treated leaves of *Vitis* with HCl, to remove adhering substances, they were found to have absorbed detectable quantities of copper, calcium sulphate, and thiosulphate radicles. Copper was found to be immobile in the leaf while the calcium tended to migrate to the petiole. Copper sprays increased the turgidity of the cells while the osmotic pressure and molecular concentration of the cell sap (measured by cryoscopic methods) were not materially changed. Leaves treated with polysulphides or left untreated contained less protein nitrogen and insoluble phosphorus compounds than leaves treated with copper sprays, whereas they contained greater quantities of soluble nitrogenous compounds. All spraying materials favored the condensation of sugars into starch and the accumulation of the latter, but Bordeaux mixture was particularly beneficial. In general a parallelism was observed between induced physiological variations in the host cell and the anti-cryptogamic effect of the spray, to the extent that the more efficient chemicals were those which also produced the greater stimulation of the host.—*A. Bonazzi.*

714. PRICE, W. A. **Bees and their relation to arsenical sprays at blossoming time.** Purdue Univ. Agric. Exp. Sta. Bull. 247. *15 p., fig. 1–7.* 1920.—Bees were found to work freely on sprayed fruit trees and dead bees were found in abundance. Tests showed that a very small amount of arsenic (less than 0.0000005 gram As_2O_3) is a fatal dose for a bee. Bees caged on a tree sprayed when in full bloom with a spray of the formula 1 gallon lime sulphur + 1 pound lead arsenate to 50 gallons of water showed a mortality of 69 per cent. Bees caged on a tree dusted when in full bloom with 85 per cent flowers of sulphur + 15 per cent lead arsenate showed a mortality of 46 per cent. Chemical analyses of the dead bees showed the presence of arsenic. Bees caged on a check tree showed only 19 per cent mortality and no test for arsenic.—*Max W. Gardner.*

715. SCHAFFNIT, E. **Eiweisserdalkaliverbindungen als Zusatzstoffe für Bekämpfungsmittel zur Erhöhung des Haftvermögens.** [**Albumen-alkaline-earth combinations added to spray solutions to increase adhesion.**] Zeitschr. Pflanzenkrankh. 31: 19–22. 1921.—The author discusses the rôle of alkaline-earth-metal compounds with certain colloidal substances of the group of albuminoid bodies, such as albumens, globulins, etc. Casein-lime combinations have proved of excellent value in increasing the adhesion of spray substances.—*H. T. Güssow.*

716. SMITH, G. M., AND G. N. HOFFER. **Three methods of controlling the root, stalk, and ear rots of corn.** [Abstract.] Phytopathology 11: 34. 1921.

717. TOLAAS, A. G. **Seed certification makes great progress.** Potato Mag. 3^{12}: 9–11, 25. 1921.—The paper includes a tabular summary of rules and conditions regarding potato seed certification in North America in 1920. Plans for yield tests are described.—*Donald Folsom.*

718. VALLEAU, W. D. **Selection of disease-free seed and seed treatments as a possible means of control of corn root rot.** [Abstract.] Phytopathology 11: 35. 1921.

719. WEIMER, J. L. **Reduction in the strength of the mercuric chlorid solution used for disinfecting sweet potatoes.** Jour. Agric. Res. 21: 575–587. 1921.—A bushel of sweet potatoes (*Ipomoea*) submerged in 135 l. of mercuric chloride, 1 to 1000, for 5 minutes in the manner of common agricultural practice reduces the strength of the solution about 1 per cent. This decrease in strength is attributable to the potatoes themselves, to the dirt and fibrous roots adhering, and to the containers of the potatoes and of the solution.—Washed sweet potatoes and Irish potatoes (*Solanum*) remove substantially the same amount of mercuric chloride from solution.—A solution may be kept near its original strength by adding 11 to 14 gm. of mercuric chloride and water to make up original volume, after treatment of each 10 bushels.—

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*
E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 383, 388, 434, 503, 543, 553, 752)

720. ANONYMOUS. **Export of Buchu leaves.** Pharm. Jour. **106**: 459. 1921.—Exports decreased from 204,271 pounds, the average for 1910–1914 inclusive, to 130,161 pounds, the average for 1915–1919 inclusive. In 1909 the Cape Town average price per pound was 8 pence; in 1919, 5 shillings. In 1920 the best grade reached 11 shillings per pound. The world demand for Buchu leaves and oil is increasing and marked interest is being taken in the cultivation of the plant. Extensive experiments on a commercial scale are being carried on at the National Botanic Gardens in Kirstenbosch.—*E. N. Gathercoal.*

721. ANONYMOUS. **Note.** Nature **106**: 321. 1920.—Reference is made to an article by Willmot and Robertson in the Lancet for Oct. 23, regarding an outbreak of Senecio poisoning in South Africa in 1918. This, which is probably the first instance in man, was traced to toxic seeds of *Senecio ilicifolius* and *S. Burchelli* in wheat. Similar diseases have long been known in farm animals, and 2 toxic alkaloids, senecifoline and senecifoldine were isolated by H. E. Watt in 1911 from *S. latifolius*. This raises the question of the possible occurrence of the disease in Europe from *S. jacobæa*, which causes disease in sheep in Nova Scotia. Careful cleaning of wheat before milling probably makes risk negligible.—*O. A. Stevens.*

722. BAUDYŠ, E. **Die Sporen der Getreidebrandpilze sind nicht giftig. [Grain smut spores are not poisonous.]** Zeitschr. Pflanzenkrankh. **31**: 24–27. 1921.—The question whether spores of grain smut, including *Tilletia tritici*, are poisonous has often been asked, and as often answered,—but rarely satisfactorily. Chickens experimentally fed for 7 weeks with an amount of smutty grain such as would never be encountered in ordinary practice grew well, gained in weight, and showed no ill effects. Mice and rabbits behaved the same. The author then relates experiments conducted on himself in which he consumed considerable quantities of spores of stinking smut contained in biscuits without injurious influence on his health. The records of poisonous effects of *Ustilago longissima* on Sweet Grass by Eriksson and Sorauer led to the belief that this smut caused injury. Köpke insisted that intoxication corresponded to the ingestion of the fungi. The poisoning, the author explains, is not due to smut spores, but to certain glucosides present in the young plants of Sweet Grass, just as in sorghum and other grasses. The content of glucosides varies with climatic influences and ecologic and local factors.—*H. T. Güssow.*

723. DAVIES, EDWARD C. **The assay of colchicum by the phosphotungstic method.** Pharm. Jour. **106**: 480–481. 1921.—The drug is exhausted with alcohol, the alcohol recovered, the colchicine taken up with water, shaken out with chloroform, again dissolved with hot water, and precipitated as phospho-tungstate, from which the colchicine is liberated by alkali and chloroform. The great advantage of the method lies in the purity of the resulting alkaloid.—*E. N. Gathercoal.*

724. HAAS, PAUL. **On the nature and composition of Irish moss mucilage.** Pharm. Jour. **106**: 485. 1921.—Commercial *Chondrus crispus* yields to cold water a mucilaginous substance whose properties differ from those of the product obtained by a subsequent extraction with hot water. Emulsions of cod liver oil made with the dialysed cold-water extractive are much less stable than when made with the dialysed hot-water extractive. A cooled 5-per cent solution in hot water of the hot-water extractive forms a stiff jelly melting at 41°C. suitable for solid culture media. The gelatinizing power is not affected by prolonged boiling or autoclave sterilisation, but is destroyed by heating in the presence of acid. The cold-water extractive forms only liquid mucilages.—*E. N. Gathercoal.*

725. HOLMES, E. M. **Birch tar.** Pharm. Jour. 106: 508. 1921.—This article should be prepared in England from the bark removed from *Betula alba* poles, the latter so commonly used as hop poles in Kent and Sussex. The difficulty of obtaining from Russia a fine birch tar with fairly uniform constants, and the value of betulin anhydride as an antiseptic with an agreeable odor should render such a native industry feasible; or the industry might be developed in India, where immense forests of *Betula Bhojpattra* are available.—*E. N. Gathercoal.*

726. HOLMES, E. M. **Delphinium Staphisagria.** Pharm. Jour. 106: 265. 1921.—Seeds of *Delphinium Staphisagria, Anemone Pulsatilla* and other ranunculaceous plants are not likely to germinate unless well-developed, early-ripened seed are planted soon after they are ripened. The seed furnished by some botanical gardens are smaller than those of *D. Staphisagria* and produce plants of *D. pictum.*—*E. N. Gathercoal.*

727. HOLMES, E. M. **Henbane cultivation.** Pharm. Jour. 106: 248–249. 1921.—The seed should be carefully selected, only the largest and first ripened being retained, and should not be completely dried. The smaller, weaker seed tend to produce annual plants. Before planting the seed should be soaked in water over night and the floating portion removed. Soils rich in magnesia are preferred by the plant, the ash of the latter, it is noted, containing 21 parts of magnesia to 18 of potash, 6 of lime, and 5 of soda.—*E. N. Gathercoal.*

728. MCCORD, CAREY P., C. H. KILKER, AND DOROTHY K. MINSTER. **Pyrethrum dermatitis—a record of the occurrence of occupational dermatoses among workers in the Pyrethrum industry.** Jour. Amer. Med. Assoc. 77: 448–449. 1921.—Pyrethrum (Dalmatian or Persian insect powder, or "buhach") is the most commonly used household insecticide at this time. It is an efficacious and, at the same time, inexpensive agent; consequently, an extensive industry has grown up around the manufacture of the powder. The extent of its use in the U. S. A. is indicated by the importation in a single year (1917) of 1,504,000 pounds of the crude material. With the recent introduction of large-scale production methods in the manufacture of the powder has come the realization that the industry is subject to conditions of work that are inimical to the health of exposed workers. This powder is made from the flowers of 3 species of *Chrysanthemum* or *Pyrethrum:* (1) *cinerariaefolium,* (2) *roseum,* and (3) *Marshallii* or *carneum.* The principal sources of these flowers are the Caucasus, Persia, Dalmatia, Japan, Montenegro, and in recent years California. There are 3 grades of flowers which determine the value of the powder as an insecticide: (1) The open flowers, which make the poorest grade of powder; (2) the half-closed flowers, which yield a little better grade; (3) the closed flowers, which make the finest grade. The authors discuss: trade processes, substances responsible for the hazard, clinical characteristics, treatment and preventive measures.—*Wm. B. Day.*

729. MUSZYNSKI, JAN. **A new haemostatic: Polygonum hydropiper.** Pharm. Jour. 106: 269–270. 1921.—*Polygonum hydropiper* has been used by the Russian peasants from remote times for arresting bleeding and in the treatment of metrorrhagia. Since ergot and hydrastis have become so scarce and very expensive in Russia, repeated clinical successes have been had with the fluid extract of smartweed as a haemostatic in all cases of internal haemorrhage (pulmonary, gastric, haemorrhoidal, and uterine), even succeeding where ergot and hydrastis had failed.—*E. N. Gathercoal.*

730. SAMAAN, KARAM. **A contribution to the study of digitalis.** Pharm. Jour. 106: 481–482. 1921.—The relative toxicity and pharmacologic action of various concentrated infusions of digitalis, when perfused into the whole heart of the frog, are presented, with special reference to the solvent used in preparing the concentrated infusions as well as the effect of keeping the preparation. Concentrated infusions prepared by percolation of digitalis with 20 per cent alcohol tend to contain more digitoxin and to be more toxic than the aqueous infusion prepared by the British Pharmacopoeia (1914) method. The concentrated infusions presented, upon keeping for 4 weeks, a brown precipitate, about .07 per cent W/V when dried, which was powerfully toxic indicating the presence of digitoxin.—*E. N. Gathercoal.*

731. TATE, G. **Action of heat and moisture on the activity of Ergot and Extractum Ergotae Liquidum.** Pharm. Jour. 106: 485. 1921.—The activity was estimated on the isolated, virgin guinea-pig uterus suspended in 60 cc. of Locke solution at 37°C. Standardized liquid extract heated to 38°C. in an incubator for 25 days showed a loss in activity, and when so heated to 50°C. for 12 days the activity was decreased to a considerable extent. Dry ergot heated in a similar way showed no change but moist ergot so heated (mold developed) indicated a slight increase in activity. Whole ergot should be well dried and kept in air-tight containers. Liquid extract of ergot should not be stored at a temperature rising at any time above 80°F.—*E. N. Gathercoal.*

732. WALLIS, T. E. **The structure of Cocculus indicus.** Pharm. Jour. 106: 306–309. *Fig. 1.* 1921.—A detailed description, accompanied by well-executed drawings and references to the literature, is given of the anatomy of the fruit, which constitutes the commercial article.—*E. N. Gathercoal.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*
CARROLL W. DODGE, *Assistant Editor*

(See also in this issue Entries 393, 399, 445, 448, 453, 458, 460, 519, 575, 624, 627, 666, 670, 713, 790, 791, 793, 856)

PROTOPLASM, MOTILITY

733. ANONYMOUS. [Rev. of: SCHAEFFER, ASA A. **Amoeboid movement.** *vii + 156 p., 46 illus.* Princeton University Press and Oxford Press, 1920.] Sci. Prog. [London] 16: 163–164. 1921.

DIFFUSION, PHYSICO-CHEMICAL RELATIONS

734. B. [Rev. of: BECHHOLD, HANS. **Die Kolloide in Biologie und Medizin. (Colloids in biology and medicine.)** *2nd ed.* Th. Steinkopff: Dresden and Leipzig, 1919. *Bound, 25 marks.*] Zeitschr. Phys. Chem. 196: 376–377. 1920.

735. BANCROFT, WILDER D. [Rev. of: CLARK, W. MANSFIELD. **The determination of hydrogen ions.** 23 × 16 cm., 317p. Williams and Wilkins Co.: Baltimore, 1920. $5.00 (see Bot. Absts. 8, Entry 1448).] Jour. Phys. Chem. 25: 87–88. 1921.

736. BURTON, E. F., AND E. BISHOP. **Coagulation of colloidal solutions by electrolytes: influence of concentration of sol.** Jour. Phys. Chem. 24: 701–715. 1920.—The authors reach the following general conclusions from their experiments with copper, arsenious sulphide, and gum mastic in the sol condition: For univalent ions the concentration of ion necessary to produce coagulation increases with decreasing concentration of the colloid; for divalent ions the coagulating concentration of these ions is almost constant and independent of the concentration of the colloid; for trivalent ions the coagulating concentration of the ion varies almost directly with the concentration of the colloid. There are at least 2 properties of the system, colloidal solution plus electrolyte, which influence the coagulating power of any ion; these 2 tend to counteract each other's influence. One dominates the action of univalent ions, the other that of trivalent ions, while the 2 influences seem to be somewhat equalized for divalent ions. It is suggested that an investigation of the influences of the hitherto ignored, but always present, ion that bears the same charge as the colloid (to an equal or greater degree than the coagulating ion in the case of univalent coagulants, and to a less degree in the case of trivalent coagulants) may greatly advance our knowledge of coagulation.—*H. E. Pulling.*

737. CASALE, LUIGI. **Applicazione del metodo elettrochimico per la determinazione dell' energia acida nei vini. [The application of an electrochemical method to the determination**

tion of work previously reported by the author (Staz. Sper. Agrarie Ital. 53: 233–243. 1920) and is a contribution in respect to the principle of the apparatus used in the determinations. [See also Bot. Absts. 10, Entry 739.]—*A. Bonazzi.*

738. CASALE, LUIGI. **Studio fisico chimico sul potere assorbente delle terre e sul modo con cui le piante assorbono i materiali nutritivi dal terreno. [A physico-chemical study of the absorptive power of soils and of the method whereby plants absorb nutritive materials from the soil.]** Staz. Sper. Agrarie Ital. 54: 65–113. 1921.—The soil colloidal particle is considered as if coated by a membrane developed by a process analogous to the one that leads to the formation of $Cu_2Fe(CN)_6$ membranes. The particles bear a positive or negative charge according to whether they have yielded to the surrounding solution their anions or cations. Differences of potential are thus established between the particles and a zone of ionic concentration surrounding them. The coagulating power of an electrolyte upon, and the degree of absorption of its ions by, a negative colloid is directly proportional to its ionic concentration and to the relative velocity of its cations, and it is inversely proportional to the solution tension of these same cations. Since the zone of ionic concentration surrounding a particle contains also negatively charged ions, these will also be entrained and, if capable of forming insoluble precipitates, retained on the surface of the particle. Since the relative velocity of the cations present in the zone of concentration regulates the position each one will hold in the shell surrounding the particle, their order will be in a centrifugal direction K, NH_3, Ca, Mg, and Na, and the last ones to reach this shell will also be the ones most easily yielded to a new solvent or electrolyte solution. Causes which vary the difference in potential at the particle-solution surface will also affect absorption; thus basic silicates and humates, treated with boiling HCl and washed free of the products formed therefrom, lose their absorptive powers because of the few cations capable of being yielded to the solution. Organic and other positively charged colloids act by virtue of the ion they yield, and can therefore act within certain limits as protective agents in the coagulation of negative colloids by electrolytes, beyond which limits they facilitate the phenomenon. They absorb both positively and negatively charged ions, but when treated with salts, the metal of which has a lower solution tension than H, they behave similarly to the negative colloids.—Absorption of soil constituents by plant roots takes place by a process analogous to the above. The ectoplasm yields to the soil solution H ions, and establishes thereby a difference of potential between the plant and the soil particles which, in a process of equalization of the unequal charges thus established, adhere to the root cell and yield to it some cations. A continuity is thus established between the soil and the plant, the more distant particles yielding cations to the nearest ones and these in turn yielding them to the ectoplasm. Thence, equilibrium being continually disturbed by the transfer of these materials to the interior of the cell and by their utilization therein, currents are established which, by a play of osmotic forces, regulates the water intake and the concentration of the zone of ionic concentration surrounding the cell. Absorption is enhanced by the transfer of the water from the soil to the plant. When a plant is grown in a nutrient solution the medium is found to increase in acidity, whereas if the solution is made to contain a colloid the H ions are neutralized by the negative charge of the colloid particles and the plant can endure far greater dilutions of nutrient salts. Besides, the removal by the plant of the cations from the suspended particles, increases the negative charge on these and hence also the degree of dispersion, with the result that the solution in the immediate vicinity of the roots becomes clear while it remains cloudy at greater distances. That this phenomenon is not due to a flocculation of the colloid is shown by the fact that equal quantities of solution taken from the 2 zones yielded the following quantities of dry matter: After 6 and 15 days respectively there were in the clear portion 28 and 48 mg., while in the turbid part there were 8 and 4 mg. The passage of ions from cell to cell leads to a partial utilization, the non-utilized portion being poured, together with water (when the osmotic pressure of the cell contents is lower than that of the bundles), into the vascular bundles. The latter, then, are not specific organs for the transportation of water but only regulating receptacles. Fertilizers act by changing the difference of potential between the plant root and the soil particle.—*A. Bonazzi.*

739. CASALE, LUIGI. **Un metodo per la determinazione dell' energia acida nei vini. [An electrochemical method for the determination of true acidity in wines.]** Staz. Sper. Agrarie Ital. 53: 298–308. 1920.—The method is based upon the fact that the affinity of acids for bases is a measure of their "strength," and that a base in presence of 2 acids will combine with them in a ratio proportional to their strength, so that an equilibrium will be reached when each acid is isohydric with its respective salt and also with the other acid present in the system. [See also Bot. Absts. 10, Entry 737.]—*A. Bonazzi.*

740. CAUDA, A., E C. MENSIO. **Concentrazione molecolare dei succhi di vite. [Molecular concentration of the sap of Vitis.]** Staz. Sper. Agrarie Ital. 53: 317–331. 1920.—The Ostwald-Luther method was applied in the determination of the conductivity of sap collected from the vines in the field or from the crushed young twigs of several varieties of *Vitis*. It was found that the index of conductivity varies throughout the season and that it increases up to a maximum and then decreases. Conductivity measurements are influenced by the presence, in the sap, of organic substances and especially those of an acid character. As a general rule the conductivity of a sap increases with the increase of mineral substances in solution, and for a constant quantity of mineral substances conductivity increases with the increase of extractive materials. Differences in the conductivity of sap from different branches of the same tree may sometimes be quite large, and again striking differences may be obtained in saps obtained from trees of the same variety but of different ages, from trees under different systems of culture, and from different graftings. The authors state that it is quite probable that conductivity of the sap may be proportional to the production of fruit.—*A. Bonazzi.*

741. D., C. [Rev. of: OSTWALD, WO. **Grundriss der Kolloidchemie. Erste Hälfte. (Outline of colloid chemistry.)** *5th ed.* Th. Steinkopff: Dresden and Leipzig, 1919. *16 marks.*] Zeitschr. Phys. Chem. 96: 379. 1920.

742. D., C. [Rev. of: OSTWALD, WO., UND PAUL WOLSKI. **Kleines Praktikum der Kolloidchemie. (Small manual of colloid chemistry.)** *159 p.* Th. Steinkopff: Dresden and Leipzig, 1920. *Kart. 15 marks.*] Zeitschr. Phys. Chem. 96: 379. 1920.

743. FRAZER, CHAS. G. **The action of methylene blue and certain other dyes on living and dead yeast.** Jour. Phys. Chem. 24: 741–748. 1920.—In an attempt to find a "criterion of death" the "behavior of nine dyes with living yeast and yeast killed by boiling or by the action of phenol" was studied. Of these dyes gentian violet, neutral red, and safranin are too toxic; congo red has too little effect on dead cells; fuchsin, neutral red, and safranin are too faint; while erythrosin, eosin, methyl green, and Kahlbaum's methylene blue 6B extra (Grübler's methylene blue and Merck's methylene blue being more toxic) could be used. Erythrosin is better than eosin while methyl green hinders reproduction in some media without staining.—On the whole, erythrosin and methylene blue seem to be the best. Data secured by using methylene blue with various reagents likely to be used in quantitative toxicological work with yeast are given.—*H. E. Pulling.*

744. FREUNDLICH, H. [Rev. of: PÖSCHL, VIKTOR. **Einführung in die Kolloidchemie. (Introduction to colloid chemistry.)** *5th revised and enlarged ed., 148 p.* Theodor Steinkopff: Dresden and Leipzig, 1919. *7 marks.*] Zeitschr. Phys. Chem. 94: 506. 1920.—The book is regarded as containing too many errors and too much material of only historical interest to be the good introductory text it was designed to be and which is needed.—*H. E. Pulling.*

745. HARRIS, J. ARTHUR, ROSS AIKEN GORTNER, AND JOHN V. LAWRENCE. **The osmotic concentration and electrical conductivity of the tissue fluids of ligneous and herbaceous plants.** Jour. Phys. Chem. 25: 122–146. 1921.—"Studies in the Arizona deserts, in the Jamaican montane rain forest, and in the mesophytic habitats of the north shore of Long Island have shown that the osmotic concentration, as measured by the cryoscopic method, is far higher in the leaf tissue fluids of ligneous than of herbaceous species. Because of the wide range, geographic and ecological, over which the data leading to this conclusion were obtained the

authors regard it as a statement of a general biological law. A large series of determinations in the various non-halophytic habitats of the north shore of Long Island" indicate "that while the concentration of ionized electrolytes is lower in ligneous than in herbaceous forms, the reverse is true for total solutes." This conclusion, it is stated, cannot be adjudged general unless confirmed by investigations now in progress.—*H. E. Pulling.*

746. HILL, A. V. **The application of physical methods to physiology.** Sci. Prog. [London] 16: 79–89. 1921.—A plea is made for the adoption of physical methods of investigating the physical manifestations of life. The progress made in the past few years in the physical and chemical sciences is discussed, and it is pointed out how this has been accompanied by additions to our knowledge of the physiology of living organisms.—*J. L. Weimer.*

747. MACDOUGAL, D. T. **The action of bases and salts on biocolloids and cell masses.** Proc. Amer. Phil. Soc. 60: 15–30. 1921.—The strong metalic bases used as hydroxides or as chlorides in concentrations of 0.01 M restrict the hydration of agar according to their relative positions in the electromotive series. The series runs Ca, K, Na, the greatest retardation being effected by calcium. Reversed effects on the hydration of agar were shown by the hydroxides at 0.001 M, and also by the chlorides of calcium, magnesium, potassium, and sodium at 0.001 M. Purified agar shows more swelling in HCl at P_H 4.2 than in water, and shows exaggerated swellings in a series of acid, salt, and hydroxide solutions of P_H 4.2–11. The maximum swelling of a gelatin-agar (3 parts gelatin and 2 parts agar) plate was found at 0.01 M for HCl, at 0.001 M for KCl, and at 0.0001 M for $CaCl_2$. Different ecological types of roots of maize show different hydration reactions to the solutions used. Roots of strawberry and of orange seedlings show differing hydration reactions when grown in saline soils, in sand, or in acid solutions. Effects as of balanced solutions are defined in the relation of certain salts to the hydration of agar, and some suggestions of similar action are noted in the biocolloids employed.—*Wanda Weniger.*

748. SCHADE, H. **Die Kolloide als Träger der Lebenserscheinungen.** [Colloids as carriers of life.] Naturwissenschaften 9: 89–92. 1921.

749. SPRECHER, A. **Recherches cryoscopiques sur des sucs végétaux.** [Cryoscopic investigations of plant juices.] Rev. Gén. Bot. 33: 11–33. *Pl. 35.* 1921.—The juices of variegated leaves, both yellow and dark red, showed less osmotic pressure than green varieties. Variegated nasturtium showed a large proportion of salts in the sap. Those with dark red foliage possessed the largest amount of dry residue in relation to the osmotic pressure, and the yellow and variegated foliage the least. The osmotic pressure of *Tropaeolum* varied during the day, being lowest in the morning and highest in the afternoon. Removal of the flower buds increased the amount of dry residue as well as the osmotic pressure, but this increase was less than in plants which had bloomed. The osmotic pressure was greatest in the sap of the leaf blades of *Tropaeolum*, less in the branches, and least in the petioles. In *Helianthus* the petioles showed the highest osmotic pressure, and then, in order, the leaf blade, the branches, the pith, and the petals. In the case of the brown variety of *Coleus Vershaffelti* and a yellow variety the difference in osmotic pressure was slight. The osmotic pressure of plants is more rapidly changed by the changes in the relative humidity of the environment than by temperature or light. Species with leaves characterized by large cells exhibit osmotic pressures equal to that of species with small cells.—*J. C. Gilman.*

750. WALLER, A. D., MRS. A. D. WALLER, F. O'B. ELLISON, AND T. B. FARMER. **Electromotive phenomena in plants.** Rept. British Assoc. Adv. Sci. 1920: 266. *Pl. 1.* 1920.—The following conclusions are drawn from experiments carried out upon *Iris germanica*: "I. The basal zone of the *Iris* leaf, in which alone active growth is in progress, is electrically active (zincative) in relation to parts where active growth has ceased. II. The zone of active growth is aroused to greater physiological activity (that is, is more zincable) than are parts in which growth is not proceeding."—*C. L. Wilson.*

WATER RELATIONS

751. MILLER, EDWIN C. **Water relations of corn and the sorghums.** Trans. Kansas Acad. Sci. 29: 138–141. 1920.—Sorghum, having only about ½ the leaf surface of corn and a root system approximately twice as great, is able to absorb water from the soil as fast as evaporation from the leaves necessitates replacement. It therefore has an advantage over corn under climatic conditions conducive to great water loss. "The sorghums can produce more dry matter for each unit of leaf area under severe climatic conditions than the corn plant."—*F. C. Gates.*

MINERAL NUTRIENTS

752. BRUNSWICK, HERMANN. **Über das Vorkommen von Gipskrystallen bei den Tamaricaceae. [The occurrence of crystalline calcium sulphate in Tamaricaceae.]** Sitzungsber. Akad. Wiss. Wien (Math.-Nat. Kl.) Abt. I, 129: 115–135. *1 pl., 1 fig.* 1921.—Crystals occurring in epidermal cells of species of *Tamarix* were found to be water soluble, hence not calcium oxalate as previously supposed. Their identity as calcium sulphate, $CaSO_4.2H_2O$, was established by microchemical and gross analysis and by their crystallographic properties. Similar crystals occur in the following genera of Tamaricaceae: *Reaumuria, Myricaria,* and *Hololachne.* They are not found in *Fouquieria,* which upon other grounds as well may be segregated in a separate family. The crystals occur most commonly in green and growing tissues, such as leaf mesophyll and veins, vascular bundles and sclerenchymatous elements in the stem, and the various flower parts. Their origin is related to the xerophytic habitat of these plants. The soil water with which the roots are in contact is rich in calcium and magnesium compounds. The excess of sulphate is deposited in the epidermal cells, owing to its slight solubility, while chlorides and carbonates are excreted and accordingly deposited as a crust on the outer surface. In cultivation these plants continue to show crystalline deposits in the epidermal cells, but the external crust is absent; this is attributed to selective absorption of SO_4 as an essential ion.—*F. Weiss.*

753. KOHLER, D. [Rev. of: WEIS, F. **Vandkulturforsog i forskellige naeringsoplosninger, specielt til belysning af manganets og brin-tion-koncentrationens betydning. (Culture experiments with different nutrient solutions, particularly the importance of manganese and the hydrogen ion concentration.)** Meddedel. Plantefysiol. Lab. København 239–280. 1919.] Rev. Gén. Bot. 33: 221–222. 1921.

754. MICHEELS, H. **Note au sujet de l'action des sels de sodium et de potassium sur la germination. [The action of salts of sodium and potassium upon germination.]** Rec. Inst. Bot. Léo Errera (Bruxelles) 10: 161–167. 1921.—Very dilute solutions (1/100 and 1/1000 M.) of KCl, KNO_3, NaCl, and $NaNO_3$ differ very little in electrolytic dissociation, so that in this study a favorable comparison may be made of these salts. In reference to toxicity, and when no current is passed through, it is found that Cl>No_3 and Na>K. A favorable influence in respect to length of leaves and weight of plantlets produced is exerted by NO_3, likewise this ion induces an elongation of the root hairs not observed with Cl. Although more toxic than K, Na augments the length of roots more than the former. Equivalent results are obtained when the solutions are electrolyzed. The action of the anions occurs in the cathodized solutions, and that of the cathions in the anodized. It is to special physiological properties of the ions, not measurable as chemical properties, that it is necessary to attribute the differences observed.—*Henri Micheels.*

PHOTOSYNTHESIS

755. MOORE, BENJAMIN. **Light as the source of life.** Scientia 28: 361–371. 1920.—Inorganic colloids activated by radiant energy are to be regarded as a stage in the evolution of the microorganism.—*William W. Diehl.*

756. REGNIER, M. [Rev. of: HENRICI, M[ARGUERITE]. **De la teneur en chlorophylle et de l'assimilation du carbon des plantes des Alpes et des plaines. (The chlorophyll content and the assimilation of carbon in plants in the Alps and on the plains.)** Verhandl. Naturf. Ges. Basel 30: 48–136. 1919 (1920).] Rev. Gén. Bot. 33: 222–224. 1921.

METABOLISM (GENERAL)

757. BANCROFT, WILDER D. [Rev. of: HARVEY, E. NEWTON. **The nature of animal light.** *x + 183 p.* J. B. Lippincott Co.: Philadelphia, 1920. *$2.50.*] Jour. Phys. Chem. **25**: 82–87. 1921.

758. DEZANI, S. **Ricerche sulla diffusione dell' acido solfocianico nei vegetali. Nota II.** [**The distribution of thiocyanic acid in plants. Second contribution.**] Staz. Sper. Agrarie Ital. **53**: 438–450. 1920.—The present contribution is a continuation of an earlier paper (Biochimica e Terapia Sperimentale Fasc. III. 1919). The work of Werenskiold, Pollacci, and of Kooper is here severely criticized on the ground that the methods used by these authors for the detection of SCNH (precipitation of Hg from Hg_2Cl_2 and the green coloration in presence of $CuSO_4$) are not reliable when used upon plant extracts which have not been previously purified.—In a study of *Allium cepa* L., *Castanea vesca* Gaertn., *Phaseolus vulgaris* L., and *Pisum sativum* L., Dezani could obtain the same results as were obtained by the above mentioned investigators only when the tests were made upon the pressed juices and extracts, but he failed to obtain positive results when these plant materials were made alkaline, evaporated to small volume, acidified, extracted with ether, the ether extract thus obtained washed with weak ammonia, and the washings in turn evaporated to small volume and tested for SCNH. In the present investigation the method of extraction was as follows: The fresh material, after crushing, was immediately dropped into boiling water and allowed to stand for 24 hours, after which period the extracts were removed by pressure. The results, given in tabular form, show that, of all the families examined, only members of the Cruciferae appear to contain SCNH, although by no means all the members of this family contain this compound. The author concludes that SCNH is a normal product of metabolism and not one resulting from the breakdown of glucosides of the sinigrin type, nor yet one formed by the post-mortem decomposition of esters of isothiocyanic acid.—*A. Bonazzi.*

759. HARDEN, A. [Rev. of: EULER, H., UND P. LINDNER. **Chemie der Hefe und der alkoholischen Gärung.** (Chemistry of yeast and of alcoholic fermentation.) *x + 350 p., 2 pl.* Akad. Verlagsges. Gustav Fock: Leipzig, 1915.] Nature **107**: 485–486. 1921.

760. KLASON, P. **Beiträge zur Kenntnis der Konstitution des Fichtenholz-Lignins.** [**The constitution of pine wood lignin.**] Ber. Deutsch. Chem. Ges. **53**: 1864–1873. 1920.—Two distinct complexes are recognized in the lignin molecule. One of these contains the acroleïn group and is called α-lignin, the other contains a carboxyl group and is called β-lignin. The former has the general formula $C_{22}H_{22}O_7$, the latter $C_{19}H_{18}O_8$. It is believed that lignin is not a secondary product of cellulose, but that it is formed directly in the assimilation process.—*Henry Schmitz.*

761. KLASON, P. **Über Lignin und Lignin-Reactionen II.** [**Concerning lignin and lignin reactions II.**] Ber. Deutsch. Chem. Ges. **53**: 1862–1864. 1920.—Working with lignin obtained from various woods, Klason finds that the lignin molecule is not necessarily always the same, but it always contains the acroleïn complex, R·CH:CH·CHO, and that the various color reactions are dependent upon the presence of this complex.—*Henry Schmitz.*

762. KOHLER, D. **Étude de la variation des acides organiques au cours de la pigmentation anthocyanique.** [**The variation of organic acids during anthocyanic pigmentation.**] Rev. Gén. Bot. **33**: 295–315, 337–356. *Fig. 1.* 1921.—The author first considered plant organs in which the pigmentation occurred normally. She found that in the corolla of *Cobaea scandens*, as well as in the leaves of *Ampelopsis tricuspidata*, the formation of anthocyan is correlative with an increase in the amount of organic acids. It was noted that as long as the organ in question was not pigmented, the amount of organic acids did not vary appreciably, and that the increase was produced only at the moment of pigmentation (corollas of *Cobaea scandens*). Further, the amount of acid increased regularly as the pigmentation became more intense (leaves of *Ampelopsis tricuspidata*). In the hypocotyl axes of buckwheat, however, the formation of

anthocyan is accompanied by a decrease in the amount of organic acids.—Secondly, the relation of pigmentation and organic acids was studied in organs cut from the plant which produced them. In the 3 cases studied, corollas of *Cobaea scandens*, leaves of *Ampelopsis tricuspidata*, and the hypocotyl axes of buckwheat, the formation of anthocyan was never accompanied by an increase of acid.—*J. C. Gilman.*

763. MINOR, JESSIE E. **The reactions of cellulose.** Paper 26: 584–587. 1920.—Data are given to show that certain theories of the relation of dyes to cellulose are not tenable.—*H. N. Lee.*

764. WEIMER, J. L., AND L. L. HARTER. **Glucose as a source of carbon for certain sweet potato storage-rot fungi.** Jour. Agric. Res. 21: 189–210. 1921.—*Fusarium acuminatum*, *Diplodia tubericola*, *Rhizopus Tritici*, *Mucor racemosus*, *Sclerotium bataticola*, *Penicillium* sp., *Botrytis cinerea*, and *Sphaeronema fimbriatum*, all of which cause decays of sweet potato (*Ipomoea batatas*), were grown on modified Czapek solution for 2 weeks at 28°C., a carbon source being supplied by differing amounts of glucose. All the organisms except *Sphaeronema fimbriatum* utilized glucose in considerable amounts. The amount of glucose actually consumed at any concentration differed with the organism, and in general the greatest consumption occurred in the weaker solutions (10 per cent), decreasing progressively with increasing concentration. Five of the organisms grew in solutions containing 42–50 per cent glucose, but *Penicillium* sp. alone grew in a 58 per cent solution.—Dry weight of fungous material varies with the species and with the concentration of glucose, for example, *Botrytis cinerea* produced a maximum (1.0215 gm.) on 30 per cent glucose and *Rhizopus Tritici* a maximum (0.4716 gm.) on 10 per cent. There is similar variation in the amount of glucose required to produce 1 gm. of dry material. The "economic coefficient" for *Mucor racemosus* is greatest (28.88) on 30 per cent solution and lowest (1.44) on 50 per cent solution, while for *Rhizopus Tritici* it is greatest (17.67) on 50 per cent solution and least (3.70) on 10 per cent solution.—*Fusarium acuminatum*, *Sclerotium bataticola*, and *Sphaeronema fimbriatum* affect the hydrogen-ion concentration of the medium very slightly, while the remaining 5 organisms increase the acidity appreciably.—All the fungi grow in solutions with maximum osmotic pressure varying from 81.33 to 101.46 atmospheres. *Fusarium acuminatum* and *Mucor racemosus* show an increase in total osmotic concentration, while the remaining fungi, in general, decreased the concentration.—*D. Reddick.*

765. WITZEMANN, EDGAR J. **The law of probability applied to the formation of fats from carbohydrates.** Jour. Phys. Chem. 25: 55–60. 1921.—From data on the occurrence of the various fatty acids in nature the author constructs a curve. This he considers from the standpoints of probability, the general facts concerning fats in plants and animals, and the 2 general types of hypotheses dealing with the chemical steps in fatty-acid formation from carbohydrates, as follows: (1) The fatty acids "are built up mainly from short carbon chains (less than 6)." (2) "They are built up mainly from units of 6 carbon atom chains." The author concludes that the evidence is in favor of the second hypothesis.—*H. E. Pulling.*

METABOLISM (RESPIRATION, AERATION)

766. HARTER, L. L., AND J. L. WEIMER. **Respiration of sweet potato storage-rot fungi when grown on a nutrient solution.** Jour. Agric. Res. 21: 211–226. 1921.—The fungi included in the study are: *Fusarium acuminatum*, *Sclerotium bataticola*, *Diplodia tubericola*, *Penicillium* sp., *Mucor racemosus*, *Botrytis cinerea*, and *Rhizopus Tritici*. A modified Czapek solution, in which ammonium nitrate was substituted for sodium nitrate, and with the addition of 10 per cent dextrose, was used as a culture medium. *Penicillium* sp., *Botrytis cinerea*, and *Sclerotium bataticola*, which grew slowly, produced a maximum of more than 2 gm. of carbon dioxide in 24 hours. The other organisms, which grew rapidly, produced a comparatively small amount of carbon dioxide and reached their maximum soon after the culture flask was inoculated. The 3 slow-growing fungi produced a relatively large amount of dry matter and consumed nearly all of the glucose; the reverse is true of the remaining organisms. The quantity

of carbon dioxide evolved does not necessarily correlate either with the amount of dry matter formed or with the amount of glucose reduced. The 3 slow-growing fungi produced more than 1 gm. of carbon dioxide for each gm. of glucose. For the remaining organisms the ratio was less than unity, while the dry weight of material produced for each gm. of glucose consumed was in all cases less than unity. The coefficient of respiration varies from 0.83 to 2.01, the economic coefficient from 3.86 to 22.86. The amount of carbon dioxide produced is not the amount theoretically possible from the sugar consumed. Alcohols and acids are possible products, and alcohol production is definitely established for *Fusarium acuminatum*, *Rhizopus Tritici*, and *Diplodia tubericola*.—*D. Reddick.*

GROWTH, DEVELOPMENT, REPRODUCTION

767. ANDRE, HANS. **Über die teleologische und kausale Deutung der Jahresringbildung des Stammes.** [**On the teleological and causal meaning of annual ring formation in stems.**] Naturwissenschaften 8: 998–1006, 1021–1027. 1920.—This is a brief discussion largely on the basis of general observations and of earlier, published, experimental work. In the treatment of causal relations the author considers the factors to be (a) physical, such as the changing pressure of the cortex; (b) physico-chemical, illustrated by the influence of mineral substances and organic nutrients in determining the sizes of the vessels; and (c) "stimuli," notably such formative stimuli as water and the variable pull and pressure on the cells of the cambium.—*Orton L. Clark.*

768. DOWLING, JOHN J. **Observations of plant growth with the recording ultramicrometer.** Nature 107: 523. *1 fig.* 1921.—This is a description of the apparatus which has shown "pulsations of growth" as described by Bose.—*O. A. Stevens.*

769. EREKY, K. **Die Steigerungsmöglichkeiten der landwirtschaftlichen Lebensmittelproduktion.** [**The possibility of increasing the production of agricultural foods.**] Naturwissenschaften 8: 1033–1038. 1920.—The relative efficiency of the different crops grown under the same conditions is shown by a comparison of the number of calories which the products represent. Sugar beets are 1st with a production of 22.3 million calories per hectare, followed by potatoes, 9.5, barley, 6.8, oats, 6.2, wheat, 5.4, and rye, 4.9. This account is designed to convey general information concerning the capacity of the plant to utilize light and CO_2 in the production of agricultural foods. Other aspects of food production are discussed.—*Orton L. Clark.*

770. FITTING, HANS. **Das Verblühen der Blüten.** [**The withering of flowers.**] Naturwissenschaften 9: 1–9. *Fig. 1–11.* 1921.—The mechanics of leaf fall brought about by an abscission layer applies also to the fall of many flowers. There are several distinctive types. There is, however, a significant reaction concerned which is considered a true stimulation process and termed "chorism." Important is the effect of fertilization, which is elaborated by many striking examples. The function of hormones from the pollen and pollen tubes is treated in some detail. Often the same process (fertilization) will prolong the life of flowers of one species (*Listera ovata*) while it shortens the life of those of other genera and species.—*Orton L. Clark.*

771. LEVY, FRITZ. **Neuere Untersuchungen auf dem Gebiete der Zellteilungs-Physiologie.** [**Recent experiments in the field of the physiology of cell division.**] Naturwissenschaften 9: 105–110. 1921.—The author considers in a general way the influence of growth factors and of division factors in the physiology of cell division.—*Orton L. Clark.*

772. MACDOUGAL, D. T. **Growth in trees.** Proc. Amer. Phil. Soc. 60: 7–14. *Pl. 1.* 1921.—This paper, read before the American Philosophical Society, was presented as a synopsis of a more extensive manuscript to be published by the Carnegie Institution. Two new instruments, the dendrograph and dendrometer, designed for obtaining measurements of growing trees, are described and illustrated. Measurements made in 1919 and 1920 of a number of evergreen and deciduous trees in various habitats are listed and generalizations summarized.—*Wanda Weniger.*

GERMINATION, RENEWAL OF ACTIVITY

773. Jones, Henry A. **Preliminary report on onion dormancy studies.** Proc. Amer. Soc. Hort. Sci. 17: 128–133. 1920 [1921].—The onion bulb, when harvested just after the top has fallen, has a true dormant period. Yellow Globe Danvers onions grown from seed in 1919 were found to have a dormant period of 2–3 months, varying with the individual specimens. The dormant period can be abbreviated and top and root growth initiated by transversely bisecting the bulb. In dormant bulbs a light wounding of the basal end (root region) will initiate root growth, but not top growth. Transversely cutting the bulb,—thereby removing the upper portion of the scales over the entire bulb,—may allow the escape of a gas or gases toxic to growth or it may permit the entrance of the oxygen necessary for growth. Removal of a longitudinal portion of several outside scales does not induce root or top growth.—*H. A. Jones.*

774. Lopriore, G. **Sulla germinazione dei semi verdi.** [Note on the germination of green seeds.] *Staz. Sper. Agrarie Ital. 53: 414–418. 1920.*—The present note deals with the phenomenon of chlorophyll retention by the cotyledons of various seeds. The author found that the germination of seed of *Faba*, which presented a green pigmentation, was only 20 per cent as compared to the normal behavior of normal seed. As a contrast to these findings the author mentions some results which he obtained on the retention of chlorophyll by the cotyledons of *Pistacia*. Some developing fruits were enclosed in black sacks in early spring while others were left in the open, and all were examined in September when the seed growing in a normal environment had attained maturity. A weight comparison of the 2 groups showed a marked advantage in the case of the seed normally exposed. The seed of the darkened drupes when placed in conditions favoring germination failed to germinate and actually decomposed. Moreover, such seed, unlike normal seed, were lacking in true chlorophyll. Other analogous cases are found among citrus plants, the seed of which are often found to germinate within the fruit with the formation of true chlorophyll. The author limits himself, however, to the enumeration of interesting cases.—*A. Bonazzi.*

775. Parkin, John. **Vitality of gorse seed.** Nature 107: 491. 1921.—The author reports that seed dormant in soil for 26 years germinated and grew to maturity. (Supplementary to report in Nature 102: 65. 1918.)—*O. A. Stevens.*

TEMPERATURE RELATIONS

776. Hooker, Henry D. **Pentosan content in relation to winter hardiness.** Proc. Amer. Soc. Hort. Sci. 17: 204–207. 1920 [1921].—The author advances a new theory of hardiness. He suggests, "The pentosans, or rather some specific pentosan, function in the plant tissue by holding water which is in the nature of absorbed or colloidal water, and that this type of water actually does not freeze when the plant is subjected to ordinary winter conditions. The greater water content of tender tissue as compared with hardy tissues would be due, therefore, to an excess of free water. Though hardy tissues contain less free water they contain more absorbed or colloidal water."—Shoots of hardy varieties of apple, like Wealthy and Yellow Transparent, had higher pentosan content than the more tender varieties, like the Missouri Pippin and Stayman Winesap. In most cases the base of the shoot had a higher pentosan content than the tip. Investigations on long, immature green shoots and short, well-matured shoots of Ben Davis, showed that the latter had a much higher pentosan content. Results of analyses on the currant and raspberry, also, show a correlation between pentosan content and ability to resist low temperatures. Samples for analysis were taken on November 8, and December 2; the results are expressed in percentages on the basis of fresh weight.—*H. A. Jones.*

777. Kenoyer, L. A. [Rev. of: Coville, Frederick V. **The influence of cold in stimulating the growth of plants.** Jour. Agric. Res. 20: 151–160. 1920 (see Bot. Absts. 8, Entry 378).] Jour. Indian Bot. 2: 154–155. 1921.

778. ROSA, J. T., JR. **Pentosan content in relation to hardiness of vegetable plants.** Proc. Amer. Soc. Hort. Sci. 17: 207–210. 1920 [1921].—A close correlation is shown to exist between pentosan content and vegetable plants in various conditions of hardiness. Plants hardened by exposure to low temperature or by withholding moisture showed much higher pentosan content than non-hardened plants. There is a gradual increase in pentosan content accompanying the hardening process. The following data, expressed in percentages in terms of fresh weight, show how much the pentosan content increases in going from the non-hardened to the hardened state: Cabbage, 0.207 to 0.604; cauliflower, 0.191 to 0.403; leaf lettuce, 0.106 to 0.402; and tomato, 0.091 to 0.362.—The author advances the theory, "that hardened plants contain a greater proportion of 'absorbed' water in colloidal combination with the pentosans of the protoplasm, which is not frozen upon exposure to moderate freezing temperatures. The protoplasm of hardened plants apparently possesses a greater water-holding power than non-hardened plants, which may be accounted for by the fact that hardened plants have been found to contain increased amounts of pentosans roughly proportional to the degree of hardiness."—*H. A. Jones.*

RADIANT ENERGY RELATIONS

779. KAYSER, E. **Influence des radiations lumineuses sur l'Azotobacter. [The influence of luminous radiations on Azotobacter.]** Compt. Rend. Acad. Sci. Paris 172: 491–493. 1921.—In 2 previous papers [Compt. Rend. Acad. Sci. 171: 969–971. 1920 and 172: 183–185. 1921]; the author has reported the influence of different generations of the organism upon the capacity of *Azotobacter* to fix nitrogen, also the influence of different colored lights and of darkness; likewise the relation to carbohydrate consumed. The experiments reported in the present paper constitute a study of nitrogen fixation by *Azotobacter* of the 12th generation, likewise the effect of changing the color of the radiations. Organisms which had been cultivated to the 12th generation under green rays, were placed in 2 separate glasses containing the nutrients; one was exposed to green and the other to yellow rays. This was repeated for the other colors. The 12th generation in all cases fixed less total N than the 6th. In all cases, except the one where blue was replaced by yellow, an increase of the total N fixed followed a change of color in the light. Likewise in 4 of the 6 cases, white to blue and green to yellow being the exceptions, change of color in the rays was responsible for the increase in N fixed per gram of carbohydrate decomposed.—*L. J. Klotz.*

TOXIC AGENTS

780. B. [Rev. of: WINTERSTEIN, HANS. **Die Narkose in ihrer Bedeutung für die allgemeine Physiologie. (The significance of narcosis in general physiology.)** *310 p.* J. Springer: Berlin. 1919. *Unbound, 16 marks; bound, 18 marks.*] Zeitschr. Phys. Chem. 96: 377. 1920.

781. BURGESS, KENNETH E. **The toxicity towards Staphylococcus of dilute phenol solutions containing sodium benzoate.** Jour. Phys. Chem. 24: 738–740. 1920.—The author concludes that the phenomena observed by Lemon (see Bot. Absts. 10, Entry 786), which were not in accord with Miller's hypothesis (see Bot. Absts. 10, Entry 787) of the alteration of chemical potential of phenol solutions by salts, were produced by injury of the Staphylococcus cells due to low concentration of the medium, thus confirming the results of Laird (see Bot. Absts. 10, Entry 784).—*H. E. Pulling.*

782. FRAZER, CHAS. G. **Methylene blue as indicator in determining the toxicity of phenol and phenol-salt solutions towards yeast.** Jour. Phys. Chem. 25: 1–9. 1921.—Solutions containing phenol and sodium chloride, of such compositions as to be in equilibrium with the same solution of phenol in toluene or in kerosene, are isotoxic towards yeast if the ability of the cells to stain with methylene blue be adopted as a criterion of death. If inability to form colonies on wort-agar be adopted, the solutions containing salt are more toxic than the phenol solutions of the same chemical potential (see Bot. Absts. 10, Entry 787). It is suggested that cells may lack the power to form colonies and yet not be "dead," since "emaciated" cells are generally believed to lack this power, thus less poisoning would be required to produce this condition

than that indicated by the methylene blue test. The use of "other media would undoubtedly lead to other data, and by their use milestones could be marked along the road to death, and the rates of loss of vitality and of recovery could be followed quantitatively."—*H. E. Pulling.*

783. FULMER, ELLIS I. **The effect of alcohol on the toxicity of phenol towards yeast.** Jour. Phys. Chem. **25**: 10–18. 1921.—If inability to grow colonies on wort-agar be taken as the criterion of death, solutions containing water, phenol, and 3.75 per cent alcohol are more toxic than the chemically equivalent solutions (see Bot. Absts. 10, Entry 787) without alcohol; but if inability to stain with methylene blue be taken as the criterion, they are equally toxic. A method for obtaining cultures free from "resting cells" (those more resistant to hot water and to toxins than are actively growing cells) is described.—*H. E. Pulling.*

784. LAIRD, J. STANLEY. **The chemical potential of phenol in solutions containing salts; and the toxicity of these solutions towards anthrax and Staphylococcus.** Jour. Phys. Chem. **24**: 664–672. 1920.—The irregular results obtained by Lemon (see Bot. Absts. 10, Entry 786) induced the author to repeat the experiments and to re-determine the chemical potential of the solutions. Lemon's results are stated to be due to injury of the cells because of the low concentration of the medium, 2 atmospheres being the lowest osmotic pressure that the organisms could withstand without injury. Ten salts were used with results in harmony with Miller's hypothesis (see Bot. Absts. 10, Entry 787). Solutions of phenol to which acetic acid was added were, however, more toxic than expected.—*H. E. Pulling.*

785. LAIRD, J. STANLEY. **The toxicity of mercuric chloride and its solubility in aqueous alcohol.** Jour. Phys. Chem. **24**: 736–737. 1920.—Paul and Krönig (Zeitschr. Phys. Chem. **21**: 448. 1896) using anthrax found a maximum toxicity of solutions of mercuric chloride in water that contained about 25 per cent of alcohol by weight. The author finds a pronounced minimum in the solubility of mercuric chloride in aqueous solution at an alcohol content of 24 per cent, thus supporting Miller's hypothesis (see Bot. Absts. 10, Entry 787) of the relation of chemical potential to toxicity.—*H. E. Pulling.*

786. LEMON, J. S. **The toxicity towards anthrax and Staphylococcus of solutions containing phenol and sodium chloride.** Jour. Phys. Chem. **24**: 570–584. 1920.—There are given here the details of part of the investigation on the relation between increased toxicity and increased chemical potential, due to the addition of salt to aqueous solutions of phenol (see Bot. Absts. 10, Entry 787). Experiments with anthrax were in accord with Miller's hypothesis of increase in chemical potential, but in those with Staphylococcus the degree of approximation of hypothesis to result appeared to vary with the concentration of phenol employed.—*H. E. Pulling.*

787. MILLER, W. LASH. **Toxicity and chemical potential.** Jour. Phys. Chem. **24**: 562–569. 1920.—The observations are recalled (Scheurlen, Arch. Exp. Path. Pharm. **37**: 74. 1895; Paul und Krönig, Zeitschr. Phys. Chem. **21**: 414. 1896) that when salts are added in non-toxic concentrations to aqueous solutions of phenol they increase the toxicity of the solution. This increase is explained by the change in chemical potential of the phenol when salt is added to its aqueous solution. A solution of phenol to which salt had been added would have the same toxic effect as the (more concentrated) solution of phenol in pure water that would be in equilibrium with the solution of phenol in a solvent immiscible with water in equilibrium with the first (salt-phenol) solution. The general results of the investigations of several men using anthrax spores, *Staphylococcus*, and yeast are given, the details of which are to be presented by the several investigators.—*H. E. Pulling.*

788. MOLL, FRIEDRICH. **Untersuchungen über Gesetzmässigkeiten in der Holzkonservierung. Die Giftwirkung anorganischer Verbindungen (Salze) auf Pilze. [The principles of wood conservation. The toxic action of inorganic compounds (salts) on fungi.]** Centralbl. Bakt. II, Abt. **51**: 257–286. 1920.—*Penicillium glaucum* and a species of *Merulius* grown on agar containing different toxic salts develop in inverse ratio to salt concentration. With similar salts the results are much alike. As long as the combined salts do not yield an insoluble

:e or a complex compound, the single ions retain unchanged their specific influence. :eservative value of any salt can be measured by the sum of the effectiveness of the in- al ions into which the molecule dissociates. The poisonous effect is additive. The ing are toxic in a descending scale: Ag, Cd, Cn, Zn, Fe, Co, Cr, Fl.—*Fred S. Wolpert.*

9. WILLE, JOHANNES. **Chlorpikrin als Schädlingsbekämpfungsmittel in seinen Wirkun- f Tier und Pflanze.** [Picric chloride as an insecticide and its effect on animals and plants.] wissenschaften 9: 41–47. *Fig. 1–4.* 1921.—The author reviews recent work on the use ic chloride for the extermination of insects and other animals. The benefits of using the al while the plant is in a dormant condition and the effects of the material on yeast and plants are noted.—*Orton L. Clark.*

SOIL SCIENCE

(See also in this issue Entries 393, 394, 562, 573, 738)

0. BHATNAGAR, SHANTI SWARUPA. **The effect of adsorbed gases on the surface tension** er. Jour. Phys. Chem. 24: 716–735. 1920.—The values of the surface tension of water esper centimeter in a vacuum and in various gases at 15°C. are: Vacuum, 71.3; hydrogen, nitrogen, 73.00; carbon dioxide, 72.85; carbon monoxide, 73.00; air, 73.1.—*H. E. Pulling.*

1. BRECKENRIDGE, J. E. **Boron in relation to the fertilizer industry.** Jour. Indust. ng. Chem. 13: 324–325. 1921.—Evidence is presented which shows that certain per- es of borax are detrimental to plant growth, but under favorable conditions, such as im moisture, good drainage, etc., rapid recovery is noticeable. Corn shows borax ing with 6 pounds of borax per acre; potatoes show a stimulating effect when 4 pounds ax are added per acre, but 8–10 pounds cause injury.—*Henry Schmitz.*

2. CUTLER, D. WARD. **Observations on soil protozoa.** Jour. Agric. Sci. 9: 430–444. -The direct counting method (grating etched on slide) for soil protozoa in liquid gives s entirely comparable to those obtained by dilution cultures. Three species of *Amoeba* :ach of *Monas, Bodo, Cercomonas,* and *Oicomonas* were employed.—The factors governing ation between the protozoa and the soil particles are those of surface action. The ca- of various soils for retaining these organisms is specific and constant and is independent concentration of the suspension, the time of action, or whether the suspension contains or active forms.—*D. Reddick.*

3. GRIFFITH, J. W. **Influence of mines upon land and livestock in Cardiganshire.** Jour. Sci. 9: 366–395. *Pl. 4–16.* 1919.—Lead and zinc compounds (galena and blende) the land in deleterious amounts. Physically, the capacity of the soil to retain water is reduced; and chemically, the nitrogen content is lowered as a result of contamination. sive experiments were performed on the effect of galena and blende upon oats and crim- over. Clover is more susceptible to injury than oats, but both are affected.—Of the ial measures tried, heavy liming is best, but the use of sodium silicate tends to reduce jury.—*D. Reddick.*

4. JURITZ, C. F. **The agricultural soils of the Union.** South African Jour. Indust. 4. 1921.—The grain soils of southwest Cape Province are grouped as follows: one, Malmesbury, and Bokkeveld soils. The Sandstone and Malmesbury soils are nt in plant food and humus and are quite often acid; Bokkeveld soils are much richer in food. The soils from each region are described geologically and their origin is given.— lerable variety of soils exists in Cape Province. The grey and reddish loams of the Karroo cover the largest portion of the country. The coastal belt in the southwest ises gravelly clays of a drab color. On the South Coast the soil contains more humus frequently acid. Alkali soils, resulting from bad drainage, occur in some parts. In a sion of the Orange Free State soils it is pointed out that Na_2CO_3 was almost absent from hter soils but present in the low lying places.—*J. J. Skinner.*

795. KEEN, BERNARD A. **A note on the capillary rise of water in soils.** Jour. Agric. Sci. 9: 396-398. 1919.—The following formula is derived: $h = \frac{0.75}{r}$, in which h is the capillary rise and r the radius of the soil grain. This is for an ideal soil in which the grains are all of one size, spherical, and packed in the closest possible manner.—*D. Reddick.*

796. KEEN, BERNARD A. **A quantitative relation between soil and the soil solution brought out by freezing-point determinations.** Jour. Agric. Sci. 9: 400-415. 1919.—An examination was made of the experimental data of Bouyoucos and his associates on the freezing point depression of soil solution at varying moisture contents. The data, which are mathematical in character, do not lend themselves to abstracting; the reader is therefore referred to the original.—*J. J. Skinner.*

797. MICHEL-DURAND, E. [Rev. of: WAYNICK, D. D., AND L. T. SHARP. **Variations in nitrogen and carbon in field soils and their relation to the accuracy of field trials.** Univ. California Publ. Agric. Sci. 4: 121-139. 1919 (see Bot. Absts. 3, Entry 870).] Rev. Gén. Bot. 33: 77. 1921.

798. SCOFIELD, CARL S., AND FRANK B. HEADLEY. **Quality of irrigation water in relation to land reclamation.** Jour. Agric. Res. 21: 265-278. 1921.—The soils of certain irrigated areas in western U. S. A. are not readily permeable to water and may be unproductive because of slow absorption from periodic irrigation. This impermeability of soils is due to the effect of sodium on the contained clay. This injurious action does not occur in the presence of appreciable quantities of soluble forms of calcium and aluminum. The use of such substances applied to the land or in the irrigation water serves as a corrective.—*D. Reddick.*

799. VOELCKER, J. A. **The Woburn experimental station of the Royal Agricultural Society of England. Field Experiments, 1921.** Jour. Roy. Agric. Soc. England 81: 253-267. 1920.—The annual reports are made on the continuous growing of wheat and barley under different fertilizer treatments. The highest yield of wheat was secured on the plot receiving superphosphate, sodium nitrate, sulphate of ammonia, and lime. Sulphate of ammonia alone has markedly reduced crop yield, but when used with lime good yields are secured.—Lump lime produced less yield than did ground limestone.—Reports are made on the relative value of chalk and lime and the effect of different forms of lime on grass.—*J. J. Skinner.*

800. VOELCKER, J. A. **The Woburn experimental station of the Royal Agricultural Society of England. Pot culture experiments.** Jour. Roy. Agric. Soc. England 81: 267-277. 1920.—Pot experiments with corn to determine the effect of stannous and stannic oxides, chlorides, and sulphates were made. In general it is shown that the effect of stannic salts is decidedly more marked than that of stannous in either stimulating the crop or producing a toxic effect, and that the chlorides have a more marked effect than the oxides. Tin as a metal appears to have no direct effect upon vegetation. Where differences are shown it is due to the acid radical and not to the metal. Tin oxide showed no effect in amounts up to 0.10 per cent Sn. Chlorides of tin have a favorable effect up to 0.1 per cent Sn as stannous chloride, but with stannic chloride only up to 0.05 per cent Sn; 0.1 per cent Sn as stannic chloride was distinctly harmful. Stannous sulphate has no effect when used up to 0.1 per cent Sn, but stannic sulphate at this concentration is distinctly beneficial.—Chromate and bichromate of potash proved very harmful to barley, 0.005 per cent effectually preventing growth.—Experiments with wheat in pots with iron sulphate showed that there was a marked retardation where 0.2 per cent iron was used. The toxic effect of iron was overcome by lime.—Calcium silicate in quantities up to 4 tons per acre produced a beneficial effect upon wheat on soil from the stockyard field. Magnesium silicate and aluminum silicate had no influence.—Sulphur in amounts of 100 and 200 pounds per acre produced only a slight increase with mustard and a slight decrease with clover and lucerne. Experiments were conducted to determine the relative effects of lime and chalk. Lime produced substantial increases with wheat and barley, while chalk produced practically no increased growth.—*J. J. Skinner.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*
E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 399, 400, 451, 482, 488, 491, 642, 752)

GENERAL

801. BENOIST, R. **Contribution a l'étude de la flore des Guyanes; plantes recoltées en Guyane Francais en 1913 et 1914 (suite).** [A contribution to the study of the flora of Guinea; plants collected in French Guinea in 1913 and 1914.] Bull. Soc. Bot. France 66: 357–370, 381–398. 1919.—One hundred and twenty-three genera and 220 species are listed, including the following new species: *Protium plagiocarpium, Sclerolobium albiflorum,* and *Inga tubaeformis.*—*M. A. Raines.*

802. BEWS, J. W. **An introduction to the flora of Natal and Zululand.** *8vo, vi + 248 p.* City Printing Works: Pietermaritzburg, 1921.—This work is introduced by a brief history of botany in Natal and a selected bibliography. A key to the families precedes the enumeration of genera and species, which are without description. Habit, habitat, and general distribution are recorded in most cases.—*J. M. Greenman.*

803. CRYER, JOHN. **Adventive plants on waste ground, Bradford, York, 1919.** Bot. Soc. and Exchange Club British Isles Rept. 5: 719. 1919 [1920].

804. DRUCE, G. C. **Additions to the Berkshire flora.** Bot. Soc. and Exchange Club British Isles Rept. Suppl. 5: 443–480. 1918 [1919].

805. DRUCE, G. C. **Hayward's botanists' pocket book, containing the chief characteristics of British plants, with botanical name, common name, soil or situation, colour, time of flowering of every plant arranged under its own order.** *15 ed., xlv + 292 p.* G. Bell & Sons: London, 1919.

806. [DRUCE, G. C.] [Rev. of: SCULLY, REG. W. **Flora of the County of Kerry.** *lxxxi + 406 p., 6 pl. and map.* Hodges, Figgis & Co.: Dublin, 1916.] Bot. Soc. and Exchange Club British Isles Rept. 5: 64–66. 1917 [1918].

807. GRIERSON, R. **Adventive plants of the Glasgow area.** Bot. Soc. and Exchange Club British Isles Rept. 5: 719–721. 1919 [1920].

808. HAINES, H. H. **The botany of Bihar and Orissa. An account of all the known indigenous plan s of the province and of the most important or most commonly cultivated exotic ones with map and introduction.** Part 2. *Small 8vo, 224 p.* Adlard & Son & West Newman: London, 1921.—The order of the families in this work is essentially that of Hooker in the "Flora of British India;" the present part includes the families Ranunculaceae to Anacardiaceae. Keys are given to genera under the various families and to the species of the larger genera. Brief descriptions are presented and rather full notes are recorded particularly on distribution, habit, habitat, and time of flowering and fruiting. The following new species and new combinations are included: *Homonoia intermedia, Cedrela brevipetiolulata, Vitis vitiginea* (*Cissus vitiginea* L.), and *V. alcicorne* (*Tetrastigma alcicorne* Haines). Several new varietal combinations are also mentioned.—*J. M. Greenman.*

809. MARSDEN-JONES, E. **Plants of Harbury Cutting, Warwickshire.** Bot. Soc. and Exchange Club British Isles Rept. 5: 721–722. 1919 [1920].

810. SPRAGUE, T. A. **Plant nomenclature: some suggestions.** Jour. Botany 59: 153–160. 1921.

PTERIDOPHYTES

811. BARNHART, JOHN HENDLEY. **Aetopteron as a generic name.** Amer. Fern Jour. 10: 111–112. 1920.—The author protests against changing the generic name *Polystichum* to *Aetopteron* as proposed by House (see Bot. Absts. 7, Entry 501).—*F. C. Anderson.*

812. HIERONYMUS, G. **Kleine Mitteilungen über Pteridophyten III.** [Short communications on pteridophytes III.] Hedwigia 62: 12–37. 1920.—In continuation of previous similar articles, the author presents miscellaneous notes concerning the identity, synonymy, and nomenclature of ferns of the genera *Humata, Leptolepia, Tapeinidium, Lindsaya, Pellaea, Notholaena, Cheilanthes, Adiantum, Pteris* and *Elaphoglossum.* The following new combinations are made: *Humata perdurans* (*Davallia perdurans* Christ.), *Leptolepia maxima* (*Leucostegia maxima* Fourn.), *Tapeinidium Moorei* (*Davallia Moorei* Hook.), *Pellaea allosuroides* (*Cheilanthes allosuroides* Mett.), *Notholaena Greggii* (*Pellaea Greggii* Mett.), *Elaphoglossum pallidum* (*Acrostichum pallidum* Beyrich).—*E. B. Payson.*

813. MAXON, W. R. **A neglected fern paper.** Proc. Biol. Soc. Wash. [D. C.] 34: 111–114. 1921.—The writer points out the significance of a paper on ferns published long ago. It appeared in the Canadian Naturalist, Series II, 13: 157–160. 1867, under the title "Review. Ferns: British and Foreign; by John Smith, A. L. S." A list of the transferred names is given.—*J. C. Gilman.*

814. MAXON, WILLIAM R. **New Selaginellas from the western United States.** Smithsonian Misc. Collections 72[5]: 1–10. *Pl. 1–6.* 1920.—Six new species of the *Selaginella rupestris* group from the southwestern United States and Montana are described and each is illustrated by a plate showing the habital characters. The new species are *S. neomexicana, S. eremophila, S. arizonica, S. asprella, S. leucobryoides,* and *S. Standleyi.*—*S. F. Blake.*

815. MAXON, WILLIAM R. **Notes on American ferns—XVI.** Amer. Fern Jour. 11: 1–4. 1921.—The author notes changes and corrections. *Selaginella humifusa* Van Eseltine is renamed *Selaginella floridana* Maxon on account of the former name being invalidated by *S. humifusa* Hieron., applied several years earlier to a plant from Borneo. The species *Lycopodium obscurum* L. was reported in the Amer. Fern Jour. 10: 81. 1920, as *L. dendroideum* Michx. An earlier (Oct. 1900) collection from the same place (De Kalb County) is in the Mohr Herbarium, but was not included in the "Plant Life of Alabama."—The range is extended for *Lycopodium annotinum* L., *Pteretis nodulosa* (Michx.) Nieuwland, and *Pellaea longimucronata* Hook. Distinguishing foliage characters and range are given for *Dryopteris arguta* (Kaulf.) Watt, and *D. filix-mas* (L.) Schott.—*F. C. Anderson.*

SPERMATOPHYTES

816. AMES, OAKES. **Notes on New England orchids. I. Spiranthes.** Rhodora 23: 73–85. *Pl. 127–129.* 1921.—The author discusses the distinguishing characters of the genus, its variations and its range; also the difficulties encountered in distinguishing between *S. cernua* L. C. Rich., *S. odorata* Lindl., and *S. vernalis* Engel. & Gray, and states that he is convinced that *S. odorata* is conspecific with *S. cernua.* The latter species exhibits a surprising range of variation and, as far as has been observed, presents a different habital and floral aspect until the limit of vigor of the vegetative system is attained; the present author believes that the attempts to segregate new species from it have resulted from a misunderstanding of the life history of this species. He expresses it as his opinion that the range of variation exhibited represents different stages of development. The situation in this species at different stages in its growth is described. Polyembryony is found to be the only sure guide for distinguishing *S. cernua* var *ochroleuca* from the true species, in which the seeds are normal. The species is always found in upland meadows or woodlands and the variety in bogs. The author feels that it would be well worth while to ascertain by cultural experiments whether or not this is due to the nature of the soil in which the plants grow, and whether or not it prevails throughout the range of the species. The situation in *S. vernalis* is discussed. As far as northern forms are

concerned, it may be simply a hybrid between *S. cernua* and *S. gracilis*. In Texas, however, great difference in the seasons of anthesis of the supposed parents appears to render such a crossing improbable. The hybrid form is fully described and illustrated. Pollination in *Spiranthes* is discussed. The writer comments upon Rudolf Schlechter's revision of the *Spiranthеae* as related to the American species, discussing the nomenclature of *S. Ameciana* Schltr., *S. ovalis* Lindl., *S. plantaginea* (Raf.) Torr., and tabulates the changes made necessary by this revision in the nomenclature of several American species that are native of the U. S. A. These species as they now stand are: *Mesadenus lucayanus* (Britton) Schltr., *Cyclopogon cranichloides* (Griseb.) Cogn., *Centrogenium setaceum* (Lindl.) Schltr. *Stenorrhynchus* is retained in the original conception of that genus; representatives are found in the southern U. S. A.—*James P. Poole.*

817. BLAKE, S. F. **A new Aspilia from Trinidad.** Proc. Biol. Soc. Washington [D. C.] 34: 119–120. 1921.—*Aspilia nigropunctata* is described as a new species.—*J. C. Gilman.*

818. BLAKE, S. F. **New Meliaceae from Mexico.** Proc. Biol. Soc. Washington [D. C.] 34: 115–118. 1921.—*Cedrela ciliolata, Guarea chiapensis, G. excelsa dubia, G. hetrophylla,* and *G. polyantha* are described as new species.—*J. C. Gilman.*

819. BLATTER, E., F. HALLBERG, AND C. MCCANN. **Contributions towards a flora of Baluchistan.** Jour. Indian Bot. 1: 344–352. 1920.—This is the final installment of the flora of Baluchistan which the authors have been working up according to Bentham and Hooker's classification from collections made by Col. J. E. B. Hotson, and includes the families Urticaceae to Coniferae. Throughout the entire work localities of collections are detailed, and time of flowering and fruiting, vernacular names, and uses of the plants are given when known. The entire flora includes:

	FAMILIES	GENERA	SPECIES AND VARIETIES	NEW SPECIES
Dicotyledons	57	222	406	11
Monocotyledons	9	43	59	0
Gymnosperms	2	2	4	0
Total	68	267	469	11

The largest families are: Cruciferae, 12 genera and 23 species; Leguminosae, 28 genera and 55 species; Compositae, 23 genera and 37 species; Asclepiadaceae, 11 genera and 13 species; Labiatae, 11 genera and 18 species; Chenopodiaceae, 9 genera and 20 species; and Gramineae, 30 genera and 41 species. The Gymnosperms are represented by *Ephedra*, 3 species; and *Juniperus*, 1 species. [See also Bot. Absts. 6, Entries 342, 343.]—*Winfield Dudgeon.*

820. DANSER, B. H. **Bijdrage tot de kennis van eenige Polygonaceae.** [Contribution to the knowledge of some Polygonaceae.] Nederland. Kruidk. Arch. 1920: 208–250. *1 fig.* 1921.—This article contains notes about Dutch Polygonacese and the description of a new *Rumex, R. obovatus,* closely allied to *R. pulcher,* which is only adventive in the Netherlands. Besides, the following new varieties are described: *Polygonum amphibium* var. *brachystylum,* var. *macrostylum,* var. *pallidiflorum,* var *roseiflorum; P. Persicaria* var. *glabripes; Rumex Acetosa* var. *albida,* var. *androgyna,* var. *feminea,* var. *mascula,* var. *rubida,* var. *rubra; R. Acetosella* var. *rubella,* var. *rubida,* and a new name, *R. callianthemus* (*R. obtusifolius* × *maritimus*).—*W. H. Wachter.*

821. DRUCE, G. C. **Potamogeton Drucei Fryer in Fryer's correspondence.** Bot. Soc. and Exchange Club British Isles Rept. 5: 713–718. 1919 [1920].

822. DRUCE, G. C. [Rev. of: BEAUVARD, GUSTAVE. **Monographie du genre Melampyrum.** Mem. Soc. Phys. et Hist. Nat. Genève 38: 290–656. *25 fig.* 1916.] Bot. Soc. and Exchange Club British Isles Rept. 5: 66–68. 1917 [1918].

823. [DRUCE, G. C.] [Rev. of: LINDMAN, C. A. M. **Svensk Fanerogamaflora.** viii + *639 p.* 1918 (see Bot. Abstr. 8, Entry 727).] Bot. Soc. and Exchange Club British Isles Rept. **5**: 599–603. 1919 [1920].

824. DRUCE, G. C. [Rev. of: ROLFE, R. A. **The British marsh Orchises.** Orchid Rev. **26**: 162–166. 1918.] Bot. Soc. and Exchange Club British Isles Rept. **5**: 608–612. 1919 [1920].

825. GAY, J. **Channel Island plants.** Bot. Soc. and Exchange Club British Isles Rept. **5**: 138–142. 1917 [1918].—*Senecio erraticus* Bertol. and *Jasione perennis* Lam. are given.—*G. C. Druce.*

826. GREGORY, E. S. **Some notes on British violets, with additional localities.** Bot. Soc. and Exchange Club British Isles Rept. **5**: 148a–148g. 1917 [1918].

827. HENRARD, J. TH. **Bijdrage tot de kennis der Nederlandsche Adventiefflora.** [Contribution to the knowledge of the Dutch introduced flora.] Nederland. Kruidk. Arch. **1920**: 251–257. 1921.—Critical remarks are given on the following grasses introduced in the Netherlands: *Panicum barbipulvinatum* Nash, *Cenchrus pauciflorus* Benth., *Sporobolus Berteroanus* Hitch. & Chase.—*W. H. Wachter.*

828. HOLM, THEO. **Chionophila Benth. A morphological study.** Amer. Jour. Sci. **1**: 31–38. *15 fig.* 1921.—The genus *Chionophila* is closely related to *Chelone* and *Pentstemon*. As now characterized the genus is monotypic with the species *Chionophila Jamesii* Benth. of the higher mountains of Colorado and Wyoming. Formerly the genus included *C. Tweedyi* Henders, of Montana and Idaho, but this species is now placed in the genus *Pentstemonopsis*, intermediate between *Chionophila* and *Pentstemon*. *Chionophila Jamesii* is characterized at length, also the internal structure of the roots, the flower-bearing stem, and the leaf, receives special attention. Ten figures illustrate the flower, fruit, and the internal structure of the vegetative organs. *Pentstemonopsis* is contrasted and the conclusion is reached that it is a good genus. Five figures give the details of flower and fruit.—*T. J. Fitzpatrick.*

829. HOLM, THEO. **Studies in the Cyperaceae. XVII. Notes on Carex podocarpa R. Br., C. montanensis Bailey, C. venustula Holm, C. Lemmoni W. Boott, and C. aequa Clarke.** Amer. Jour. Sci. **48**: 17–26. *Fig. 1–12.* 1919.—Robert Brown's *Carex podocarpa* has been entirely misunderstood, and according to C. B. Clarke (in litt.) the specimen so named by R. Brown has proved to be a young specimen of *C. rariflora* Sm. *C. montanensis* has been referred to *C. podocarpa* by Kükenthal, but erroneously so, since *C. rariflora* is phyllopodic. A brief discussion is given relative to the systematic position of *C. montanensis* being a near ally of *C. venustula* and *C. spectabilis* Dew.; furthermore of *C. Lemmoni*, which for the last 30 years has been identified as *C. ablata* Bail.; it is a member of the *Stenocarpae* Holm. *C. aequa* is the species which W. Boott enumerated as *C. fulva* var. *Hornschuchiana* (Bot. of California); its affinity is with *C. diluta* M. Bieb. of the *Spirostachyae* Drej.—*Theodore Holm.*

830. HOLM, THEO. **Studies in the Cyperaceae. XXVIII.** Amer. Jour. Sci. **49**: 195–206. *15 fig.* 1920.—An extended study and diagnosis of *Carex Franklinii* Boott and *C. spectabilis* Dewey is presented. *C. Franklinii* was first found by Drummond in the Rocky Mountains at about latitude 59°. It was not again collected until recently by James M. Macoun in Alberta. A conspectus of the section *Stenocarpae*, to which the species belongs, is given. *C. spectabilis* belongs to the section *Melananthae*. Of this species 2 new forms and 3 new varieties are delimited.—*T. J. Fitzpatrick.*

831. HOLM, THEO. **Types of Canadian Carices.** Canadian Field Nat. **33**: 72–77. 1919.—Among the 39 greges enumerated by the writer in "Greges Caricum" (Amer. Jour. Sci. **16**: 1903) only 5 are absent from Canada, namely: *Psyllophorae* (Europe and Azores), *Chionanthae* (Europe), *Leucocephalae* (Virginia), *Echinochlaenae* (Australia), and *Podogynae* (Japan). In Canada the *Microrhynchae, Acorastachyae, Echinostachyae,* and *Physocarpae* are the best represented, being rich in species and widely distributed. Considered altogether the genus

Carex in Canada is rich in types, some being confined to this continent, others being known also from Eurasia. The arctic element Canada shares mostly with Europe, and several species are circumpolar; many of the Canadian Carices represent alliances analogous to those of the Old World, exemplified by types of a corresponding habit and structure. Canada besides is the home of certain ancestral types which are absent from Europe. In other words several of the greges are more amply represented in Canada by possessing these types in connection with the *centrales*, and passing gradually into some more or less deviating *desciscentes*. The presence in Canada of the *Lejochlaenae*, mostly sylvan types of rare morphological structure, and of southern origin, indicates the enormously wide distribution of the genus on this continent, and its ability to adapt itself to the environment, far north and far south.—*Theodore Holm.*

832. Jansen, P., en W. H. Wachter. **Floristische aanteebeningen. XVII.** [**Floristical notes XVII.**] Nederland. Kruidk. Arch. **1920**: 145–163. 1921.—This article contains notes about some Orchises of the Netherlands: (1) *Orchis latifolia dunensis* Reichl. f., probably an extreme form of *Orchis incarnata* × *latifolia*. The description in Ascherson-Graebner's "Synopsis" is absolutely wrong, as is shown from the original diagnosis in Reichenbach's "Icones" and the type in the herbarium of the Dutch Botanical Society. (2) *Orchis Traunsteineri*, mentioned from the Netherlands, has always proved to be *Orchis incarnata* × *latifolia* or *Orchis incarnata* × *maculata*. Further notes are given about the small-leaved forms of *Orchis latifolia* and the forms of *Orchis maculata*.—*W. H. Wachter.*

833. Jansen, P., en W. H. Wachter. **Floristische aanteebeningen XVIII: Festuca Schlickumii.** [**Floristical notes XVIII.**] Nederland. Kruidk. Arch. **1920**: 164–169. *1 fig.* 1921.—This hybrid, new for the Netherlands, is described, and the divergences from the parents, *Festuca gigantea* and *F. pratensis*, are stated, with an enumeration of the Dutch forms of *F. pratensis*, among which the new form *aristata* is characterized.—*W. H. Wachter.*

834. Jepson, Willis Linn. **The long-lost Carpenteria.** Sierra Club Bull. **1921**: 151–153. *2 fig.* 1921.

835. Kloos, A. W., Jr. **De Nederlandsche Euphrasia.** [**The Dutch Euphrasia.**] Nederland. Kruidk. Arch. **1920**: 170–207. *1 fig.* 1921.—A synopsis of, and a key to, the Dutch species of this genus is given. As the Netherlands are not mentioned in the monograph of von Wettstein, the Dutch species may be given here: *Euphrasia lutea* L. (only adventive), *E. litoralis* Fr., *E. odontites* L., *E. montana* Jord., *E. Rostkoviana* Hayne, *E. stricta* Host., *E. nemorosa* Pers., *E. curta* Fr., and *E. gracilis* Fr.—*W. H. Wachter.*

836. Lester-Garland, L. V. **The maritime forms of Matricaria inodora.** Jour. Botany **59**: 170–174. 1921.—The various maritime forms of *Matricaria inodora* are grouped under 3 heads. *M. maritima* L. is considered as a variety of *M. inodora*.—*S. H. Burnham.*

837. McKechnie, H. **Notes on some new hybrid orchids.** Bot. Soc. and Exchange Club British Isles Rept. **5**: 180–183. *Pl. 14–18.* 1917 [1918].

838. McKechnie, H. **Notes on the genus Orchis.** Bot. Soc. and Exchange Club British Isles Rept. **5**: 183–189. 1917 [1918].

839. Pennell, Francis W. **Fagelia diversifolia.** Addisonia **4**: 73, 74. *Pl. 157* (*colored*). 1919.—This is an ornamental herbaceous plant native of Colombia, at high altitudes, and is cultivated in gardens in Colombia. It was collected by F. W. Pennell and here described as new.—*T. J. Fitzpatrick.*

840. Pugsley, H. W. **The Jersey Herniaria.** Jour. Botany **59**: 179–180. 1921.

841. Ricôme. [Rev. of: Beauvisage, M. **Contribution à l'étude anatomique de la famille des Ternstroemiacées.** (**Contribution to the anatomical study of the family Ternstroemiaceae.**) **Thése** de la Faculté des Science de Poitiers. 1920.] Rev. Gén. Bot. **33**: 78. 1921.

842. RIDDELSDELL, H. J. **The British Rubus-list.** Jour. Botany 59: 174–175. 1921.—Comments are presented on a small manuscript note book completed by the late Rev. W. Moyle Rogers, containing a list of British Rubi, revised and rearranged to April, 1917.—*S. H. Burnham.*

843. SARGENT, OSWALD H. **A new Caladenia from West Australia.** Jour. Botany 59: 175–176. 1921.—*Caladenia Doutchae* is described as new to science.—*S. H. Burnham.*

844. SEDGWICK, L. J. **New Bombay species.** Jour. Indian Bot. 2: 123–131. *5 fig.* 1921.—*Leucas angustissima, Christisonia flammea, Phyllanthus Talboti, Ceropegia fantastica, Boucerosia truncato-coronata,* and *Canscora stricta* are described as new species from the Bombay Presidency, India.—*Winfield Dudgeon.*

845. SOEST, J. L. VAN. **Anthoxanthum odoratum L.** Nederland. Kruidk. Arch. 1920: 140–144. 1921.—The author gives a summary of the principal forms found in the Netherlands. The subvar. *subglabrum* and the subvar. *eu-villosum,* into which the var. *villosum* Loisel, is divided, are new.—*W. H. Wachter.*

846. TRELEASE, WILLIAM. **A natural group of unusual black oaks.** Proc. Amer. Phil. Soc. 60: 31–33. *Pl. 2–4.* 1921.—Three black oaks of the southern Mexican mountains were found to bear their fruit in racemes, or, more properly, spike-like clusters. These possess the characters of the section *Erythrobalanus* but differ from most black oaks and agree with all white oaks in maturing their fruit in the course of the season of flowering, instead of deferring fertilization and maturing for a year. These 3 new species, *Quercus Urbani, Q. radiata,* and *Q. Conzattii,* are described and grouped in the new section *Racemiflorae.*—*Wanda Weniger.*

847. WOLLEY-DOD, A. H. **Rosa spinosissima × rubiginosa × f. cantiana forma nova.** Jour. Botany 59: 178. 1921.

848. YUNCKER, THURMAN GEORGE. **Revision of the North American and West Indian species of Cuscuta.** Illinois Univ. Biol. Monogr. 6: 1–141. *Pl. 1–13.* 1920.—A critical study of the material of the genus available in the larger herbaria of this country was made. Fifty-four species are treated, of which 26 are found in the U. S. A. Fourteen species and 16 varieties are described as new. The classification of Engelmann was closely followed by the author. The morphology of the different organs is treated in detail. It was found that the flower offered the best characters for the differentiation of species since it was least affected by the parasitic habits of the plant. Many detailed drawings of flower parts are presented in the 13 plates. Notes are given on the habits of the species. It was found that although some species more commonly occur on certain host plants there is no constancy in this respect and that species cannot be based on their occurrence on specific hosts. Self parasitism was noticed. The genus is divided into 3 subgenera on the basis of style and stigma characters. Engelmann's subgenus *Monogyna* has the styles united; this subgenus contains a single species. The subgenus *Succuta* is used as a designation to include those species having linear-elongated stigmas as distinguished from the capitate stigmas of the subgenus *Grammica.*—The specific treatment includes, in addition to an analytical description, a complete synonymy and references to the specimens examined. A complete bibliography is appended. An index of collections with the name of the collector and number of the species collected is presented at the end of the thesis.—*H. W. Anderson.*

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*
SAM F. TRELEASE, *Assistant Editor*

849. ASHWORTH, J. H. **The Edinburgh meeting of the British Association—local arrangements.** Nature 107: 590–591. 1921.

850. BANCROFT, WILDER D. [Rev. of: CLAYTON, WILLIAM. **Margarine.** *22 × 14 cm., xi + 187 p.* Longmans, Green and Co.: New York, 1920. $4.75.] Jour. Phys. Chem. 25: 175–177. 1921.

851. BOTTAZZI, FILIPPO. **Le finalisme de la vie.** [The finality of life.] Scientia 29: 23–28. 1921.

852. CUNNINGHAM, J. CLINTON. **Products of the Empire.** *19 × 12.5 cm., 299 p., 73 illus.* Clarendon Press: Oxford, 1921.—Part I. An account of food, drink, oil-seeds, drugs, and tobacco. Part II. Raw materials and the produce of mines.—*Publisher.*

853. HUEBNER, J. **Dyes and dyeing.** [Rev. of: MATHEWS, J. MERRITT. **Applications of dyestuffs to textiles, paper, leather and other materials.** *xvi + 768 p.* John Wiley and Son: New York; Chapman and Hall: London, 1920.] Nature 107: 421–422. 1921.

854. KAISER, GEORGE B. **Little journeys into mossland. III.—Bryologizing in early spring.** Bryologist 24: 19–20. 1921.—A popular account is presented of the more common mosses met with upon a walk near Crosswicks, New Jersey.—*E. B. Chamberlain.*

855. PALMA, STEFANO DI. **Uso del rifatto nella fabbricazione della cellulosa per carta.** [The use of residues from the manufacture of licorice [from Glycyrrhiza glabra L.] in the production of cellulose for paper manufacture.] Staz. Sper. Agrarie Ital. 53: 393–394. 1920.—The fiber, decolorized with calcium hypochlorite or other bleaching substance, becomes light colored without losing its consistency, contains 6 per cent of ash and about 50 per cent of cellulose, and constitutes, according to the author, a valuable substitute for wood and rags in the manufacture of paper.—*A. Bonazzi.*

856. PANTANELLI, E. **Produzione di alcool dal fico d' India.** [The production of alcohol from Opuntia.] Staz. Sper. Agrarie Ital. 53: 451–470. 1920.—After a review of the literature on the subject the author attempts to study the course of natural alcoholic fermentation in the untreated pulp of the fruit of *Opuntia vulgaris* and *O. amyclea*. He found the fermentation to be unsatisfactory owing to the development of a large number of organisms injurious to the fermentation, among them the *Saccharomyces opuntiae* of Ulpiani and Sarcoli. Boiled pulp, or pulp to which had been added 0.03 per cent of potassium metabisulphite, when inoculated with what appears to be a bottom yeast, yielded an excellent liquor with a slightly aromatic ethereal odor and a high alcoholic content (9000 cc. of anhydrous ethylic alcohol for each 100 kg. of pulp). The best results were obtained with the must treated with bisulphite; and the fact was ascertained that, in the fermentation of this corrected raw pulp by a selected culture, a certain quantity of glucoside sugar was utilized for alcohol production—the fermentation thus yielding a greater quantity of alcohol than could be predicted by a consideration of merely the reducing sugars, as such, contained in the fruit. The bisulphite-treated pulp appears to give a better product than the boiled pulp since in the process of boiling the changes caused by the enzymes of the mature fruit are interfered with. Fruit attacked by *Ceratitis capitata* give an unsatisfactory product.—*A. Bonazzi.*

857. RIGNANO, EUGENIO. **Le finalisme de la vie.** [The finality of life.] Scientia 29: 23–40. 1921.

858. WILLARD, J. T. **Some nutritional characteristics of corn.** Trans. Kansas Acad. Sci. 29: 187–201. 1920.—The author furnishes a popular presentation, comparing the food value of corn with that of other cereals, particularly with reference to stock.—*F. C. Gates.*