BIBLIOGRAPHICAL RECORD.

Authors and societies are requested to forward their works to the editors as soon as published. The date of publication, given in brackets [ ], *marks the time at which the work was received, unless an earlier date of publication is known to recorder or editor. Unless otherwise stated each record is made directly from the work that is noticed.*

Corrections of errors and notices of omissions are solicited.

[**Allen**, Grant.] The origin of flowers [by G. A.]. (Cornhill magazine, May 1878, v. 37, p. 534–550.)

Considers the color sense in animals, in its bearings upon the evolution of colored flowers, etc.
W: T. (2338)

Arcangeli, G. L'*amorphophallus titanum* Beccari. (Nuovo giorn. bot. ital., 7 July 1879, v. 11, p. 217–223.)

Shows that insects are attracted to the spathe, and discusses the pollination of the flowers.
W: T. (2339)

Austin, *Mrs.* R. M. Leaves of *darlingtonia californica* and their two secretions. (Bot. gazette, Nov. 1878, v. 3, p. 91, 9 cm.)

Describes the nectar and digestive fluid secreted by the Californian pitcher plant, and notes that insects are found in the leaves. *W: T.* (2340)

Axell, Severin. Om anordningarna för de fanerogama växternas befruktning. Stockholm, 1869. 116 p., 24×16, t 16.5×10.5; 58 fig.

Discusses the modes of pollination in flowering plants, describing the adaptation of many to crossing by aid of insects. *W: T.* (2341)

Bailey, W: Whitman. Cross fertilization of *baptisia tinctoria*. (Bot. gazette, Aug.–Sept. 1880, v. 5, p. 94, 2 cm.)

Humble bees [*bombus*] effect crossing of distinct flowers. *W: T.* (2342)

Banning, Mary E. Maryland fungi. (Botanical gazette, Apr. 1881, v. 6, p. 201.)

Remarks (8 cm.) on the dissemination of the spores of phalloids by insects which are attracted by the loathsome odor of these fungi. *W: T.* (2343)

Barber, *Mrs.* M. E. On the structure and fertilization of *liparis bowkeri*. (Journ. Linn. soc., Bot., 6 Feb. 1868, v. 10, p. 455–458.)

Describes the adaptation of the flowers of this orchid to cross-fertilization by hymenoptera and diptera, and figures a hypothetical insect in one flower; but does not mention having seen insects at work. *W: T.* (2344)

Barnes, C. R. The anthers of *clethra*. (Bot. gazette, Aug.–Sept. 1880, v. 5, p. 104–105.)

Cross-pollination in *clethra alnifolia* and *c. acuminata* "is effected almost altogether by honey bees" [*apis mellifica*], which visit the flowers for nectar secreted by epipetalous glands. *W: T.* (2345)

Batalin, A. Beobachtungen über die Bestäubung einiger Pflanzen. (Bot. Zeitung, 28 Jan. 1870, v. 28, p. 53–55.)

Describes the floral structure of *sagina*, *mimulus* and *syringa*. Notes insects which visit the second.
W: T. (2346)

Beal, W: James. Carnivorous plants. (Proc. Amer. assoc. advanc. sci., 1875, v. 24, p. 251–253.)

Describes the insect-catching of several genera of insectivorous plants. Records the capture of insects by viscid hairs of others, and by the sticky bud-scales of still other species. *W: T.* (2347)

Behrens, W. Die Bestäubungsmechanismus bei den Gattung *coboea*. (Flora, 11 Sept. 1880, v. 63, p. 403–410.)

Shows the adaptation of *coboea scandens* to fertilization by humble bees [*bombus*] and contrasts it with the sphingophilous *coboea penduliflora*.
W: T. (2348)

Belt, T: Bees and clover. (Nature, 11 Nov. 1875, v. 13, p. 26, 14 cm.)

Apropos of the sending of English humble-bees [*bombus*] to New Zealand to induce fruiting of clover [*trifolium*], the writer shows that *bombus terrestris* invariably pierces the clover flowers for their nectar, and is thus injurious instead of beneficial. The habits of this species when visiting other flowers are noted. It is suggested that bees could best be shipped in winter, during the hibernation of the fertilized queens.
W: T. (2349)

Belt, T: The importation of humble bees into New Zealand. (Science gossip, 1878, p. 89-90, 18 cm.)

Discusses the behavior of several English species of *bombus* when visiting flowers of *trifolium pratense* and believes that if bees are to be imported for the sake of securing clover-seed, the proper species is *b. lapidarius*, which "although it has the longest proboscis, has also the shortest temper and most virulent venom." *W: T.* (2350)

Bennett, Alfred W. Fertilization of the pansy. (Nature, 19 June 1873, v. 8, p. 143, 5 cm.)

Records observations on *viola calcarata*, *v. elatior* and *v. lactea* which he believes to be fertilized by bees; and on *v. tricolor* which he believes to be fertilized by *thrips*. *W: T.* (2351)

Bennett, Alfred W. The fertilization of the wild pansy. (Nature, 15 May 1873, v. 8, p. 49–50.)

Describes the structure of the flowers of *viola tricolor* var. *arvensis*, which he believes adapted to fertilization by *thrips*. Notes the presence of these insects in the flowers. *W: T.* (2352)

Bennett, Alfred W. Fertilization of *ruscus aculeatus*. (Journ. of botany, Jan. 1870, v. 8, p. 9-10, 11 cm.)

Inquires as to the mode of fertilization. Believes that the time of flowering, in midwinter, is against its fertilization by insects, and cannot see how it can be anemophilous. Criticizes a statement of M'Nab, as to the disposition and time of appearance of the flowers. *W: T.* (2353)

Bennett, Alfred W. Further observations on protandry and protogyny. (Journ. of botany, 1871, v. 9, p. 329-330.)

Notes that some of the species noted in his "Observations in protandry and protogyny" ... [Rec., 2356] as synacmic are protandrous, while a few noted before as protandrous are synacmic. Describes adaptation to cross-fertilization in one or two species, and adds to the list of plants observed with respect to protandry or protogyny. *W: T.* (2354)

Bennett, Alfred W. Note on the structure and affinities of *parnassia palustris*, L. (Journ. Linn. soc., Bot., 19 Nov. 1868, v. 11 [1871], p. 24-31.)

Includes a description of the flower and of its fertilization by insects, chiefly "a long-legged dipterous fellow." *W: T.* (2355)

Bennett, Alfred W. Observations in protandry and protogyny in British plants. (Journ. of botany, Oct. 1870, v. 8, p. 315-321.)

Abstract. (Rept. Brit. assoc. advanc. sci., 1870, p. 111, 4 cm.)

Describes the dichogamy of a number of plants, as a means of securing their cross-fertilization by insect agency. The abstract falsifies the text. *W: T.* (2356)

Bennett, Alfred W. Remarkable plants, 2. Some curious orchids. (Nature, 22 Feb. 1877, v. 15, p. 357-359.)

A review of C: Darwin's "The various contrivances by which orchids are fertilized by insects. 2d ed." [Rec., 2379]. Treats of the general structure of the orchid flower, and the pollination of *coryanthes macrantha*, *catasetum saccatum*, and *mormodes ignea* by aid of insects. *W: T.* (2357)

Berkeley, Miles J. Egg fungi. (Intellectual observer, July 1866, v. 9, no. 54, p. 401–406.)

States (p. 402) that the sporiferous mass of the stinkhorn (*phallus impudicus*) is a favorite food of flies. *W: T.* (2358)

Bessey, C: Edwin. Sensitive stamens in *portulaca*. (Amer. nat., Aug. 1873, v. 7, p. 464–465.)

Shows how the irritability of the stamens in *portulaca grandiflora* and *p. oleracea* aids in cross fertilization. Records the visit of "a small wild bee" to the former. *W: T.* (2359)

Bonnier, Gaston. Les fleurs et les insectes. (Revue scientifique, 2 Apr. 1881, ser. 3, v. 27, p. 419–425.)

A popular lecture delivered before the "Association scientifique de France," in which the author discusses the origin and uses of floral and extrafloral nectar, and concludes that it is merely water transpired through tissues charged with sugar, and is in nowise an adaptation for securing the pollination of the flowers or the protection of the plant. *W: T.* (2360)

Breitenbach, W: Die Blütheneinrichtung von *arum ternatum* Thnbg. (Bot. Zeitung, 24 Oct. 1879, v. 37, c. 687-692.)

Crit. rev., by H. Müller, entitled "Berichtung der von W. Breitenbach gegebenen Erklärung der Bestäubungsvorrichtung von *arum ternatum*." (Bot. Zeitung, 19 Dec. 1879, v. 37, c. 838-839, 35 cm.) [Rec., 2450.]

Describes the floral arrangement for securing, as he believes, close fertilization by insect agency. *W: T.* (2361)

British association for the advancement of science — [*46th meeting*] — *Glasgow meeting*, *1876—Section of biology*. President's address. (Rept. British assoc. advanc. sci., 1876, p. 100-119.) (Nature, 7 Sep. 1876, v. 14, p. 403-412.) (Wallace, A. R. Tropical nature, chap. 7, p. 249-303.)

Rev., by H. Müller, entitled "Ueber die besonderen Beziehungen zwischen Pflanzen und Insecten, welche sich auf Inseln darbieten." (Bot. Jahresbericht ... Just, 1876, v. 4, p. 941–942.)

Address, by Alfred Russel Wallace, on by-paths in the domain of biology. Discusses, among other things, the peculiar relations of plants and insects as exhibited on islands; correlating the peculiarities of island floras with the character of the insect faunas of the same. *W: T.* (2362)

Brittain, T: Another insectivorous plant. (Science gossip, Mar. 1877, p. 18.)

States that the flowers of *apocynum androsaemifolium* capture flies: and evidently is not aware that the plant is not insectivorous, and that the capture of small insects in its flowers has been known for several generations. *W: T.* (2363)

Canby, W: M. *Darlingtonia californica*, an insectivorous plant. (Proc. Amer. assoc. advanc. sci., 1874, v. 23, pt. 2, p. 64-72.)

Shows the adaptation in the leaves of the Californian pitcher plant for the capture of flying insects, and records the observations of J. G. Lemmon on the insects captured. *W: T.* (2364)

Caruel, T. Illustrazione di una *rubiacea* del genere *myrmecodia*. (Nuovo giorn. bot. ital., July 1872, v. 4, p. 170-176.)

The seedlings of this epiphyte die unless the stem is pierced by a particular species of ant, but in case this happens, the stem enlarges to form a gall-like excrescence, in which the ants excavate galleries, and establish themselves, while the plant goes on to complete development. Similar relations with ants are indicated for species of *hydnophytum* and *clerodendron*.
W: T. (2365)

Comes, Orazio. Studii sulla impollinazione in alcune piante con tavola litografata. Memoria per laurea premiata dalla Facoltà di scienzi naturali della R. università di Napoli. Napoli, 1874. t.–p. cover, 25 p., 23 ×16, t 16×10.

Describes the floral structure of about 20 species of plants, and notes the insects seen to visit their flowers. Notes the perforation of the corolla of *salvia* and *tropaeolum* by *xylocopa* and *apis*. *W: T.* (2366)

Crüger, H. A few notes on the fecundation of orchids, and their morphology. (Journ. Linn. soc., Bot., 3 Mar. 1864, v. 8, p. 127-135, pl. 9.)

Describes the adaptations for fertilization in *catasetum*, *coryanthes* and *stanhopea*, which are visited by bees (*bombus* and *euglossa?*) for the purpose of gnawing their labella. Cockroaches [*blatta*] are also said to be fond of the same part of the flowers. *W: T.* (2367)

Darwin, Francis. Bees visiting flowers. (Nature, 8 Jan. 1874, v. 9, p. 189–190.)

Shows that where flowers grow in masses so many bees are attracted that a strong competition arises in the gathering of nectar, in consequence of which the bees are led to perforate the flowers, that they may obtain their sweets with the least possible expenditure of time. Records observations of the sort on *lathyrus sylvestris* and *phaseolus multiflorus*, showing that the perforations in question are made at exactly the proper point to be of greatest service. *W: T.* (2368)

Darwin, C: The effects of cross and self-fertilization in the vegetable kingdom. N. Y., D. Appleton and Co., 1877. 482 p., 20×12, t 15×8.5.

"Germ. tr., by V. Carus, entitled 'Die Wirkungen der Kreuz- und Selbst-befruchtung im Pflanzenreich.' Stuttgart, E. Koch, 1877."

"Fr. tr., by E. Heckel, entitled 'Des effets de la fécondation croisée et de la fécondation directe dans le règne végétal. Ouvrage traduit de l'anglais et annoté avec l'autorisation de l'auteur.' Paris, 1877. 15 +496 p."

Rev., by Hermann Müller, entitled "Die Wirkungen der Kreuzung und Selbstbefruchtung im Pflanzenreiche." (Bot. Jahresbericht . . . Just, 1876, v. 4, p. 936-938.)

Rev., entitled, "The effects of cross and self-fertilization in the vegetable kingdom." (Journ. of botany, Mar. 1877, v. 15, n.s., v. 6, p. 87-92.)

Rev., by Asa Gray, entitled "Notice of Darwin on the effects of cross- and self-fertilization in the vegetable kingdom." (Amer. journ. sci. and arts, Feb. 1877, v. 113, s. 3, v. 13, p. 125-141.)

Rev., by Hermann Müller, entitled "Darwin's Werk: 'Ueber die Wirkungen der Kreuzung und Selbstbefruchtung im Pflanzenreich' und seine Bedeutung für unser Verständniss der Blumenwelt." (Kosmos, Apr. 1877, v. 1, p. 57-67.)

Notice of Carus' Germ. tr., under same title as tr. (Kosmos, Aug. 1877, v. 1, p. 457, 9 cm.)

The author details a very extensive series of experiments in fertilizing flowers with their own pollen and with that from other flowers either on the same or on different plants, showing that the offspring from crosses are more numerous and in every way better adapted to existence than those resulting from in and in breeding. Detailed observations on the habits of flower-visiting insects are given. *W: T.* (2369)

Darwin, C: "Des effets de la fécondation croisée et de la fécondation directe dans le règne végétal. Ouvrage traduit de l'anglais et annoté avec l'autorisation de l'auteur par Edouard Heckel. Paris, 1877. 15 +496 p."

Fr. tr., by E. Heckel, of Darwin's "The effects of cross and self fertilization in the vegetable kingdom" [Rec., 2369]. *W: T.* (2370)

Darwin, C: On the existence of two forms, and on their reciprocal sexual relation, in several species of the genus *linum*. (Journ. Linn. soc., Bot., 5 Feb. 1863, v. 7, p. 69-83, 1 fig.)

Fr. tr. (Annales des sci. nat., Bot., 1863, ser. 4, v. 19, p. 229–247.)

Describes the heterogony of the flowers, which are fertilized chiefly by small diptera. *W: T.* (2371)

Darwin, C: Fertilization of the *fumariaceae*. (Nature, 16 Apr. 1874, v. 9, p. 460, 9 cm.)

Records the behavior of insects about the flowers of certain *fumariaceae*, and discusses the change of color which the flowers of some species undergo, and its bearing upon the subject of cross-fertilization.
W: T. (2372)

Darwin, C: On the two forms or dimorphic condition in the species of *primula*, and on their remarkable sexual relations. (Journ. Linn. soc., Bot., 21 Nov. 1861, v. 6, p. 77–96.)

Fr. tr. (Annales des sci. nat., Bot., 1863, ser. 4, v. 19, p. 204–229.)

States that the flowers are visited by humble-bees [*bombus*], *thrips*, etc. *W: T.* (2373)

Darwin, C: Observations sur l'hétéromorphisme des fleurs, et ses conséquences pour la fécondation. (Annales des sci. nat., Bot., 1863, ser. 4, v. 19, p. 204–255, pl. 12.)

Fr. tr. of C: Darwin's "On the two forms or dimorphic condition in the species of *primula*" ... (Journ. Linn. soc., Bot., 21 Nov. 1861, v. 6, p. 77–96) [Rec., 2373], "On the three remarkable sexual forms of *catasetum tridentatum*..." (*op. cit.*, 3 Apr. 1862, v. 6, p. 151–157) [Rec., 2375], and "On the existence of two forms ... in several species of the genus *linum*" (*op. cit.*, 5 Feb. 1863, v. 7, p. 69–83) [Rec., 2371]. *W: T.* (2374)

Darwin, C: On the three remarkable sexual forms of *catasetum tridentatum*, an orchid in the possession of the Linnaean society. (Journ. Linn. soc., Bot., 3 Apr. 1862, v. 6, p. 151–157.)

Fr. tr. (Annales des sci. nat., Bot., 1863, ser. 4, v. 19, p. 247–255, pl. 12, figs. A, 1, 2, and 3.)

Shows that the plants formerly known as *catasetum tridentatum*, *monachanthus viridis* and *myanthus barbatus* are respectively the male, female and hermaphrodite forms of a single species. The mode of pollination by insect agency is indicated. *W: T.* (2375)

Darwin, C: On the sexual relations of the three forms of *lythrum salicaria*. (Journ. Linn. soc., Bot., 16 June 1864, v. 8, p. 169–196.)

The trimorphic flowers of this *lythrum* are cross-fertilized by hive and humble bees [*apis mellifica* and *bombus*], and by diptera. *W: T.* (2376)

Darwin, C: On the specific differences between *primula veris*, Brit. Fl. (var. *officinalis*, Linn.), *p. vulgaris*, Brit. Fl. (var. *acaulis*, Linn.), and *p. elatior*, Jacq.; and on the hybrid nature of the common oxlip. With supplementary remarks on naturally produced hybrids in the genus *verbascum*. (Journ. Linn. soc., Bot., 19 Mar. 1868, v. 10, p. 437–454.)

Shows among other things how bees or other insects may hybridize and deteriorate species of plants. Notes some of the insect visitors of the flowers studied. *W: T.* (2377)

Darwin, C: On the various contrivances by which British and foreign orchids are fertilized by insects, and on the good effects of intercrossing. With illustrations. Lond., J: Murray, 1862. 365 p., 18×12, t 13.5×7.5; 34 figs.

"Germ. tr., by H. G. Bronn, entitled 'Ueber die Einrichtungen zur Befruchtung britischer und ausländischer Orchideen durch Insecten, und über die günstigen Erfolge der Wechselbefruchtung.' Stuttgart, 1862."

Rev., by A. Gray, entitled "Fertilization of orchids through the agency of insects." (Amer. journ. sci. and arts, 1862, v. 84, s. 2, v. 34: July, p. 138-144; Nov., p. 420-429.)

Rev., by E. F[ournier?], under full English title. (Bull. soc. bot. de France, Aug. 1862, v. 9, p. 243–246.)

2d ed., entitled "The various contrivances by which orchids are fertilized by insects. 2d ed., rev., with il." N. Y., D. Appleton & Co., 1877. 300 p., 20×12, t 15×8.5.

An exhaustive study into the relations between orchids and insects. *W: T.* (2378)

Darwin, C: The various contrivances by which orchids are fertilized by insects. 2d ed., rev., with il. N. Y., D. Appleton & Co., 1877. 300 p., 20×12, t 15×8.5.

"Germ. tr., by V. Carus, entitled 'Die verschiedenen Einrichtungen, durch welche Orchideen von Insecten befruchtet werden. Aus dem Englischen. 2. durchgesehene Auflage. Mit 38 Holzschnitten.' Stuttgart, E. Koch, 1877. 259 p."

"Fr. tr., by Ed. Heckel."

Rev., by A. W. Bennett, entitled "Remarkable plants. 2. Some curious orchids." (Nature, 22 Feb. 1877, v. 15, p. 357-359.)

Rev., by Hermann Müller, under English title. (Bot. Jahresbericht ... Just, 1877, v. 5, p. 741-742.)

This work is in general the same as the 1st ed., "On the various contrivances by which British and foreign orchids are fertilized" ... [Rec., 2378], but is brought up to date, and includes a list of papers bearing on the fertilization of orchids which appeared between 1862 and 1876, inclusive. *W: T.* (2379)

Darwin, C: "Die verschiedenen Einrichtungen, durch welche Orchideen von Insecten befruchtet werden. Aus dem Englischen von V. Carus. 2. durchgesehene Auflage. Mit 38 Holzschnitten. Stuttgart, E. Koch. 1877. 259 p."

Germ. tr., by Victor Carus, of Darwin's "The various contrivances by which orchids are fertilized by insects. 2d ed." ... [Rec., 2379] *W: T.* (2380)

Darwin, C: "Die Wirkungen der Kreuz- und Selbst-befruchtung im Pflanzenreich. Aus dem Englischen von V. Carus. Stuttgart, E. Koch. 1877."

Notice, under full title. (Kosmos, Aug. 1877, v. 1, p. 457, 9 cm.)

Germ. tr., by Victor Carus, of Darwin's "The effects of cross and self fertilization in the vegetable kingdom" [Rec., 2369]. *W: T.* (2381)

Delpino, Federico. Sugli apparecchi della fecondazione nelle piante antocarpee, fanerogame. Summario di osservazioni fatte negli anni 1865-66. Firenze, 1867. 39 p., 22×13, t 17.5×10.

Discusses the pollination of flowers of many orders, and the part which insects take in it. *W: T.* (2382)

Delpino, Federico. Altri apparecchi dicogamici recentemente osservati. (Nuovo giorn. bot. ital., 1870, v. 2, p. 51–64.)

Shows the adaptation of a number of flowers to cross-fertilization by insects. *W: T.* (2383)

Delpino, Federico. Breve cenno sulle relazioni biologiche e genealogiche delle marantacee. (Nuovo giorn. bot. ital., Oct. 1869, v. 1, p. 293–306.)

Includes studies on the adaptation of species to fertilization by insects. *W: T.* (2384)

Delpino, Federico. Contribuzioni alla storia dello sviluppo del regno vegetale. 1. Smilacee. (Atti della R. università di Genova, 1880, v. 4, pt. 1, p. 1-91.)

In discussing the biological relations of the *smilaceae*, the author gives a full account of extrafloral nectar and its protective value in different groups of plants (p. 25-33), showing that the greater number of plants producing it are climbers. This association is not believed to be fortuitous, but due to the fact that the frequent contact of climbing plants with their supports brings them in the way of ants to a large degree, and thus renders any mutually beneficial adaptations between the two easy of realization. *W: T.* (2385)

Delpino, Federico. Dicogamia ed omogamia nelle piante. (Nuovo giorn. bot. ital., Apr. 1876, v. 8, p. 140-161.)

Discusses cross and self-fertilization, indicating many adaptations for securing the latter by insects and in other ways. *W: T.* (2386)

Delpino, Federico. Difesa della dottrina dicogamica. (Nuovo giorn. bot. ital., July 1878, v. 10, p. 177-215.)

Caruel having attacked the laws of cross-fertilization in flowering plants, as established by the researches of Darwin, Hildebrand, Müller, and others, the writer gives many details supporting the Darwinian belief, discussing it in its morphological, physiological and taxonomical bearings. *W: T.* (2387)

Delpino, Federico. Rapporti tra insetti e tra nettarii estranuziali in alcune piante. Estratto dal Bullettino entomologico, anno 6. Firenze, Murate, 1874. 22 p., 22×15, t 17 ×10.5.

Describes the extrafloral nectar glands in some twenty or more genera of plants, and their use to the plant by maintaining a body guard of insects (ants and wasps) which protect the plant from various enemies. The author quotes from Ratzeburg and others, to show the influence these insects may have. *W: T.* (2388)

Delpino, Federico. Rivista botanica dell' anno 1879. [Estratto dall' Annuario scientifico italiano. Anno 16: 1879.] Milano, Fratelli Treves, 1880. 163 p., 19×13, t 16 ×9.

Part 3, Biologia vegetale (p. 30-94). Contains reviews, with such comments as are suggested by the writer's own studies, of 2 papers on insectivorous plants, and of 15 papers on the fertilization of flowers. *W: T.* (2389)

Delpino, Federico. Rivista botanica dell' anno 1880. [Estratto dall' Annuario scientifico italiano. Anno 17: 1880.] Milano, Fratelli Treves, 1881. 100 p., 19×13, t 16 ×9.

Part 3, Biologia vegetale (p. 21-52). Contains reviews of 11 papers on the relations between plants and animals, and the fertilization of flowers, to which are added original observations by the reviewer. *W: T.* (2390)

Delpino, Federico. Ulteriori osservazioni sulla dicogamia nel regno vegetale. Parte 1a. [Dagli Atti soc. ital. sci. nat. (Milano), Oct. 1868, v. 11, p. 265-332; Aug. 1869, v. 12, p. 21-141, p. 179-233. Seduta del 28 giugno, 1868.] Milano, Giuseppe Bernardoni, 1868-1869, 243 p., 22×16, t 16×10.

Reprint of p. 189-223, entitled "Rivista monographica della famiglia delle *marcgraviaceae*." (Nuovo giorn. bot. ital., Oct. 1869, v. 1, p. 257-290.)

Dichogamy with this author and Italian writers in general is synonymous with cross-fertilization, and not with lack of synchronism in the maturity of the genitalia of flowers, as with Sprengel and most German and English writers. In the present paper the various means of securing crossing, largely by aid of insects, are discussed, the adaptations of many flowers being described. *W: T.* (2391)

Earley, W: Hive bees vs. mechanism. (Nature, 25 July 1872, v. 6, p. 242, 17 cm.)

The writer finds the weight of hive bees [*apis mellifica*] insufficient to depress the wings and keel of the sweet pea [*lathyrus*] which they visit for nectar: hence these bees do not fertilize the flowers. To obtain pollen from these flowers the bees crowd the petals in question down enough to expose the anthers. *W: T.* (2392)

Engelmann, G: The flower of *yucca* and its fertilization. (Bull. Torrey bot. club, July 1872, v. 3, p. 33, 8 cm.)

Correction, by G: Engelmann, entitled "Note from Dr. Engelmann." (Bull. Torrey bot. club, Aug. 1872, v. 3, p. 37, 13 cm.)

Describes the arrangement for fertilization, and states that this is effected by "a white moth of the genus *tortrix*." *W: T.* (2393)

Engelmann, G: Note from Dr. Engelmann. (Bull. Torrey bot. club, Aug. 1872, v. 3, p. 37, 13 cm.)

Correction of the author's "The flower of *yucca* . . ." [Rec., 2393]. States that the insect which fertilizes *yucca* is "*allied* to *tortrix*." *W: T.* (2394)

Ernst, A. Fertilization of *coboea penduliflora*. (Nature, 17 June 1880, v. 22, p. 148-149.)

Shows how the flowers are pollinated by nocturnal moths. *W: T.* (2395)

Evans, M. S. Notes on some Natal plants. (Nature, 19 Sept. 1878, v. 18, p. 543, 25 cm.)

Shows how an unidentified rubiaceous plant, a *polygonum*, and *tecoma capense* are adapted to cross-fertilization: the two former by insects, the last-named by honeysuckers. *W: T.* (2396)

Evans, M. S. Plant fertilization. (Nature, 30 Mar. 1876, v. 13, p. 427, 12 cm.)

Reprint. (Field and forest, July 1876, v. 2, p. 15-16.) [Rec., 912.]

Describes the fertilization by ants of the flowers of a plant related to coffee. *W: T.* (2397)

Farrer, T. H. *Lotus corniculatus.* (Nature, 26 June 1873, v. 8, p. 162, 9 cm.)

Makes some additions to his "On the fertilization of a few common papilionaceous flowers" (Nature, 17 Oct. 1872, v. 6, p. 499) [Rec., 2297] concerning this plant. *W: T.* (2398)

Forbes, H: O. The fertilization of orchids. (Nature, 7 June 1877, v. 16, p. 102, 10 cm.)

Notice, by Hermann Müller, entitled "Die Befruchtung der Orchideen . . ." (Bot. Jahresbericht . . . Just, 1877, jahrg. 5, p. 742, 2 cm.)

Noted that in Portugal the orchids — chiefly species of *ophrys* — were not fertilized, although there were numerous insects to be found. *W: T.* (2399)

Forbes, W. A. Fertilization of orchids. (Nature, 12 June 1873, v. 8, p. 121, 3 cm.)

Answer, by Hermann Müller, entitled "Probosces capable of sucking the nectar of *anagraecum sesquipedale.*" (Nature, 17 July 1873, v. 8, p. 223, 16 cm.)

Inquires if a moth with proboscis long enough to fertilize *anagraecum sesquipedale* has ever been found in Madagascar. *W: T.* (2400)

Fuckel, Leopold. Ueber die Honigabsonderung der Nebenblättchen (stipulae) bei *vicia sativa* L. (Flora, 21 July 1846, p. 417-418.)

States that his father had earlier noticed that bees gather nectar from the nodes and not from the flowers of the vetch. Describes the secreting glands. *W: T.* (2401)

Gentry, T: G: The fertilization of certain flowers through insect agency. (Amer. nat., May 1875, v. 9, p. 263-267.) [Rec., 297.]

Crit. rev., by T: Meehan, entitled "Mr. Gentry's paper on fertilization through insect agency." (Amer. nat., June 1875, v. 9, p. 374-375.) [Rec., 301].

Describes the pollination of *cucurbita*, *wistaria*, and *trifolium pratense* by insects, and the production of natural hybrids in the first mentioned genus through the agency of bees. *W: T.* (2402)

Gerard, W. R. Correlation between the odor of the phalloids and their relative frequency. (Bulletin Torrey bot. club, Mar. 1880, v. 7, p. 30-33.)

Traces the frequency of certain species of phalloids about dwellings to their dissemination by flies which feed upon the spores; records his own observations and those of others on the use of the sporiferous mucus as food by flies, ants and beetles. *W: T.* (2403)

Gerard, W. R. Spurious fungi. (Bull. Torrey bot. club, Oct. 1876, v. 6, p. 114, 3 cm.)

States that the objects on leaves of *solidago* and *aster* described by Schweinitz as fungi under the name of *rhytisma* are the galls of *cecidomyia carbonifera* O. S. *W: T.* (2404)

Goodale, G: Lincoln. Fertilization and cross-fertilization. (Trans. Mass. horticultural soc., 20 Jan. 1877, p. 23-28.)

A popular lecture on the cross-fertilization of flowers by insects, and the benefits thereby derived. *W: T.* (2405)

Gray, Asa. Arrangement for cross-fertilization of the flowers of *scrophularia nodosa.* (Amer. journ. sci. and arts, Aug. 1871, ser. 3, v. 2, p. 150-151, 9 cm.) (Journ. of botany, 1871, v. 9, p. 375.)

Describes the floral structure of *scrophularia*, and states that, according to Dr. W: G. Farlow, the flowers are fertilized by *apis mellifica.* *W: T.* (2406)

Gray, Asa. Botanical text book. Part 1. Structural botany. N.Y. and Chic., Ivison, Blakeman, Taylor & Co., 1880. 442 p., 21×14, t 17.5×9.5.

Chapter 6, Section 4. Certain adaptations of the flower to the act of fertilization, p. 215-242. Describes and figures many flowers, showing their adaptation to fertilization by insects. Appended is a brief list of works on the subject.

Chapter 3, Section 4, § 3. Leaves specialized for the utilization of animal matter. Discusses insectivorous plants, and gives a few references. *W: T.* (2407)

Gray, Asa. Botany for young people. Part 2. How plants behave. N. Y. and Chic., Ivison, Blakeman, Taylor & Co., 1875. 46 p., 19.5×15.5, t 15×12.

Rev., by H. T., under same title. (Journ. of botany, 1872, v. 10, n. s., v. 1, p. 278-279, 12 cm.)

A popular book, showing "how plants employ insects to work for them" (p. 19-40), and "how certain plants capture insects" (p. 41-46). *W: T.* (2408)

Gray, Asa. Fertilization of *gentiana andrewsii.* (Amer. nat., Feb. 1877, v. 11, p. 113, 8 cm.)

Shows that the closed gentian is adapted for cross-fertilization by humble-bees [*bombus*] which visit it. In case of their failure to visit, close fertilization is effected as previously shown in M. W. Van Denburg's "*Gentiana andrewsii*" (Amer. nat., May 1875, v. 9, p. 310-311). *W: T.* (2409)

Gray, Asa. Fertilization of orchids through the agency of insects. (Amer. journ. sci. and arts, 1862, v. 84, s. 2, v. 34: July, p. 138-144; Nov., p. 420-429.)

Notice, under same title. (Nat. hist. rev., Oct. 1863, v. 3, no. 12, p. 590-591, 7cm.)

Review of C: Darwin's "On the various contrivances by which British and foreign orchids are fertilized"... [Rec. 2378], with observations on the fertilization of American species. *W: T.* (2410)

Gray, Asa. Flycatching in *sarracenia*. (Amer. journ. sci. and arts, Aug. 1873, ser. 3, v. 6, p. 149-150.)

Correction, by A. Gray, with same title. (*op. cit.*, Dec. 1873, p. 467-468.)

Mentions the saccharine secretion of the leaves and its reputed stupefying effect on insects, which are macerated within the pitchers. *W: T.* (2411)

Gray, Asa. Flycatching in *sarracenia*. (Amer. journ. sci. and arts, Dec. 1873, ser. 3, v. 6, p. 467-468.)

Corrects errors in earlier paper of same title (*op. cit.*, Aug. 1873, p. 149-150) [Rec., 2411], and quotes statements of correspondents as to the insectivorous habits of the plants in question. *W: T.* (2412)

Gray, Asa. *Gentiana andrewsii*. (Bull. Torrey bot. club, Oct. 1877, v. 6, p. 179, 5 cm.)

The flowers of the plant named are cross-fertilized by *bombus*. *W: T.* (2413)

Gray, Asa. Notice of Darwin on the effects of cross- and self-fertilization in the vegetable kingdom. (Amer. journ. sci. and arts, Feb. 1877, v. 113, ser. 3, v. 13, p. 125-141.)

Notice, by H. Müller, entitled "Asa Gray. Darwin's Werk über die Wirkungen der Kreuz- und Selbst- Befruchtung im Pflanzenreiche." (Bot. Jahresbericht . . . Just, 1877, v. 5, p. 743, 5 cm.)

A very complete review of C: Darwin's "The effects of cross and self fertilization"... [Rec. 2369], with the addition of many observations made by the reviewer. *W: T.* (2414)

Gray, Asa. Sarracenias as flycatchers. (Amer. journ. sci. and arts, Apr. 1874, ser. 3, v. 7, p. 440-442.)

References to early literature on the insectivorous habits of pitcher plants [*sarracenia*]. *W: T.* (2415)

Gray, Asa. *Sarracenia variolaris*. (Amer. journ. sci. and arts, June 1874, ser. 3, v. 7, p. 600, 13 cm.)

Quotes a letter from Dr. J. F. Mellichamp, on the effect of the secretions of this pitcher plant on insects. *W: T.* (2416)

Gray, Asa. Structure and fertilization of certain orchids. (Amer. journ. sci. and arts, Sept. 1863, ser. 2, v. 36, p. 292-294.)

Describes the adaptations to insect fertilization of *platanthera flava* and *gymnadenia tridentata*, but records no insects as visiting the flowers. *W: T.* (2417)

Hall, I. H. Note on *hepatica acutiloba*. (Bull. Torrey bot. club, Mar. 1870, v. 1, p. 11-12, 9 cm.)

States that hive bees [*apis mellifica*] visit the flowers for nectar very early in spring. *W: T.* (2418)

Hall, I. H. *Opuntia ficus-indica*, DC. (Bull. Torrey bot. club, Feb. 1878, v. 6, p. 201-202.)

Found ants and an unknown insect in the unopened flower buds, attracted by nectar. *W: T.* (2419)

Hall, J: P. Vegetable fly trap. (Science gossip, 1879, p. 15, 10 cm.)

State that "moths, bees, &c." are captured by the flowers of the arauja [*physianthus*] and may live in this captivity for two or more days, the effect of the plant being merely mechanical detention. *W: T.* (2420)

Hart, W. E. Fertilization of *corydalis claviculata*. (Nature, 7 May 1874, v. 10, p. 5, 6 cm.)

Believes the flower slightly proterogynous, and shows how it might be fertilized by insects — which he has not seen at work. *W: T.* (2421)

Hart, W. E. Fertilization of *viola tricolor* and *v. cornuta*. (Nature, 24 July 1873, v. 8, p. 244-245, 16 cm.)

Believes the flowers of *viola tricolor* adapted to cross-fertilization by larger insects than *thrips*. Has seen them visited by *bombus* and *pieris rapae*. *V. cornuta* is adapted to fertilization by *noctuidae*, though the flowers are also visited by bees, flies, and butterflies, in the daytime. *W: T.* (2422)

Hart, W. E. Fertilization of the wild pansy. (Nature, 12 June 1873, v. 8, p. 121, 19 cm.)

Describes the structure of the flowers of *viola tricolor*, and states that they are visited by *bombus muscorum;* corrects a statement in T. H. Farrer's "On the fertilization of a few common papilionaceous flowers" (Nature, 17 Oct. 1872, v. 6, p. 499) [Rec., 2297], as to the floral structure of *lotus corniculatus*. *W: T.* (2423)

Hart, W. E. Pollen eaters. (Nature, 2 Jan. 1873, v. 7, p. 161, 7 cm.)

Has often watched flies belonging or allied to the *syrphidae*, while eating pollen of various flowers, "which they effected by a quick jerking and grinding movement of the mandibulae." *W: T.* (2424)

Hart, W. E. Pollen eaters. (Nature, 30 Jan. 1873, v. 7, p. 242, 6 cm.)

Believes that *syrphidae* in gathering pollen from *taraxacum* and other *compositae* may effect fertilization, but believes their visits injurious to some other flowers. Inquires if his former use of the word "mandibulae" (*op. cit.*, p. 161) is correct. *W: T.* (2425)

Hart, W. E. Winter fertilization. (Journ. of botany, 1872, v. 10, n. s., v. 1, p. 25-26, 11 cm.)

Crit. rev., by F. B. White, entitled "Winter fertilization by agency of insects." (Journ. of botany, 1872, v. 10, n. s., v. 1, p. 48, 8 cm.)

Notes the self fertilization of *geranium robertianum* in November. Believes, however, that insect fertilization of certain flowers may occur in winter. *W: T.* (2426)

Hayden, Christopher J. Fertilization of *dictamnus*. (Nature, 23 May 1872, v. 6, p. 60, 5 cm.)

Shows that bees fertilize the flowers.

W: T. (2427)

Henslow, G: Note on the structure of *genista tinctoria*, as apparently affording facilities for the intercrossing of distinct flowers. (Journ. Linn. soc., Bot., 16 Apr. 1868, v. 10, p. 468, 15 cm.)

Shows that the flowers are self sterile; but had no opportunity to observe the insects which fertilize them.

W: T. (2428)

Henslow, G: Note on the structure of *indigofera*, as apparently offering facilities for the intercrossing of distinct flowers. With additional notice of Dr. Hildebrand's paper on *medicago*, *indigofera* and *cytisus*, in the Botanische Zeitung, March 1866; and a communication from Mr. Darwin on the common broom, *cytisus scoparius*. (Journ. Linn. soc., Bot., 19 Apr. 1866, v. 9, p. 355-358.)

Describes the actions of bees while visiting the last-named species, and shows their probable influence in crossing the others. *W: T.* (2429)

Henslow, G: Note on the structure of *medicago sativa*, as apparently affording facilities for the intercrossing of distinct flowers. (Journ. Linn. soc., Bot., 16 Nov. 1865, v. 9. p. 327-329.)

Only observed *apis mellifica* on the flowers, and these insects did not have power to set free the staminal tube.

W: T. (2430)

Hepworth, J. Notes on the rhododendron. (Science gossip, 1878, p. 177-178.)

Describes the flowers of *rhododendron* and shows their adaptation to bees, as pollinating agents, which have been observed to visit them. *W: T.* (2431)

Hildebrand, Friedrich, *see* HENSLOW, G:, Note on the structnre of *indigofera* ... [Rec., 2429].

Hildebrand, Friedrich. Ueber die Befruchtung von *aristolochia clematitis* und einiger anderer Aristolochiaarten. (Pringsheim's Jahrbücher für wiss. Botanik, 1866, v. 5, p. 343-358, pl. 43.)

Describes the attraction of small flies into the flowers of *aristolochia* and their detention there while the flower changes functionally from pistillate to staminate, when they are released, pollen-laden, to enter another newly opened pistillate flower, where they go through the same performance. *W: T.* (2432)

Hildebrand, Friedrich. Ueber die Befruchtung von *asclepias cornuti*. (Bot. Zeitung, 30 Nov. 1866, v. 24, p. 376-378.)

Shows how the flowers are fertilized by *apis mellifica* and *bombus;* notes the occasional capture of the former by the flowers. *W: T.* (2433)

Hildebrand, Friedrich. Ueber die Befruchtung der Salviaarten mit Hülfe von Insekten. (Pringsheim's Jahrbücher für wiss. Botanik, 1865, v. 4, p. 451-478, pl. 33.)

Describes the flowers of 14 species, taken from most of the large groups into which the genus *salvia* is divided. The species studied show a very interesting gradation between species capable of self-fertilization, or of close-fertilization by insects, and such as are self-sterile, and adapted to crossing by insects [and birds].

W: T. (2434)

Hildebrand, Friedrich. Ueber die Bestäubungsvorrichtungen bei den Fumariaceen. (Pringsheim's Jahrbücher für wiss. Botanik, 1869, v. 7, p. 423-471, pl. 29-31.)

Describes the structure of the flowers of *fumariaceae*, and the pollination of many by insects.

W: T. (2435)

Hildebrand, Friedrich. Die Geschlechter-Vertheilung bei den Pflanzen und das Gesetz der vermiedenen und unvortheilhaften stetigen Selbstbefruchtung. Mit 62 Figuren in Holzschnitt. Leipzig, Engelmann, 1867. 92 p., 24×16, t 18×10.5.

Rev., by F. Delpino, entitled "Sull' opera 'La distribuzione dei sessi nelle piante e la legge che osta alla perennità della fecondazione consanguinea' ... Note critiche." (Atti della soc. ital. di sci. nat. [Milano], 1867, v. 10, p. 271-303.)

Shows the adaptation of many flowers to cross-fertilization by insect agency. *W: T.* (2436)

Hildebrand, Friedrich. Ueber die Nothwendigkeit der Insektenhülfe bei der Befruchtung von *corydalis cava*. (Jahrb. wiss. Botanik, 1866, v. 5, p. 359-363.)

Shows that although the stigma of a given flower is well covered with pollen which emits its tubes, no fruit is produced unless pollen is brought from another flower. This is effected by bees. *W: T.* (2437)

Hildebrand, Friedrich. Ueber die Vorrichtungen an einigen Blüthen zur Befruchtung durch Insektenhülfe. (Bot. Zeitung, 9 Mar. 1866, v. 24, p. 73-78, pl. 4.)

Describes the adaptation of *pedicularis sylvatica*, *indigofera*, *medicago*, *cytisus*, *lopezia coronata*, *schizanthus pinnatus* and *siphocampylus bicolor* to cross-fertilization by the aid of insects. *W: T.* (2438)

Hubbard, H: Guernsey. Cross fertilization of *aristolochia grandiflora*. (Amer. nat., May 1877, v. 11, p. 303-304.)

A record of observations in Jamaica. Finds this — like other species of the genus — an admirable fly-trap, detaining insects which enter the flowers in the first (♀) stage of development until after the stigmas have withered and the stamens matured, when they are allowed to escape, pollen-laden, to effect the fertilization of other and younger flowers. *W: T.* (2439)

Jackson, Jos., *jr.* *Sarracenia purpurea*, L. (Botan. gazette, July 1881, v. 6, p. 242, 4 cm.)

Flowers are fertilized through the agency of flies, "as large as the common house-fly", which visit them for pollen. *W: T.* (2440)

Kitchener, F. E. On cross-fertilization as aided by sensitive motion in musk and *achimenes*. (Journ. of botany, Apr. 1873, v. 11, n. s., v. 2, p. 101-103.) (Amer. nat., Aug. 1873, v. 7, p. 478-480.)

Shows the adaptation of these flowers to insect fertilization, but records no insect visitors. *W: T.* (2441)

Kitchener, F. E. Fertilization of the pansy; ground ivy. (Nature, 19 June 1873, v. 8, p. 143, 18 cm.)

Believes *viola tricolor* to be fertilized by *thrips:* notes two forms in the flowers of *nepeta glechoma*. *W: T.* (2442)

Kuntze, Otto. Die Schutzmittel der Pflanzen gegen Thiere und Wetterungunst und die Frage vom salzfreien Urmeer. Studien über Phytophylaxis und Phytogenesis. (Gratisbeilage zur botanischen Zeitung.) Leipzig, Arthur Felix, 1877. t-p. cover, 150 p., 23×15, t 19×11.5.

Rev., by S. M., under full title. (Journ. of botany, 1878, v. 16, n.s., v. 7, p. 121-123.)

Rev. of the first section (p. 1-91), by Hermann Müller, under same title. (Bot. Jahresbericht . . . Just, 1877, v. 5, p. 751-753.)

Considers among other things, the agency of insects in pollinating flowers, and in the dissemination of seeds; and shows how plants are protected against noxious insects. *W: T.* (2443)

Lefroy, E. C. Insects and flowers. (Science gossip, 1871, p. 258, 7 cm.)

States that butterflies have a decided preference for flowers colored similarly to themselves. *W: T.* (2444)

Lefroy, E. C. Insects and flowers. (Science gossip, 1872, p. 21, 7 cm.)

States that butterflies are largely guided in their choice of flowers on which to settle, by color, choosing such as are protective, as when alighting on leaves, etc. *W: T.* (2445)

Leggett, W: H. *Apocynum.* (Bull. Torrey bot. club: 1872, v. 3, p. 46, 49-50, 53-55; 1873, v. 4, p. 1-2, 23.)

Describes the adaptation of flowers of *apocynum* to fertilization by insects, and the capture of such as are too small to remove the pollen-masses. *W: T.* (2446)

Leggett, W: H. Bees puncturing flowers. (Bull. Torrey bot. club, July 1872, v. 3, p. 33-34, 10 cm.)

Notes the perforation of flowers of several species of *dicentra* by *bombus*, which steals their nectar through the openings thus made. *W: T.* (2447)

Leggett, W: H. *Cassia.* (Bull. Torrey bot. club, Aug. 1877, v. 6, p. 171, 3 cm.)

States that the flowers are visited by *bombus*. *W: T.* (2448)

Leggett, W: H. [*Ctenucha virginica* captured by flowers of *apocynum androsaemifolium.*] (Bull. Torrey bot. club, July 1874, v. 5, p. 32.) [Rec., 145 *a.*] *W: T.* (2449)

Müller, Hermann. Berichtigung der von W. Breitenbach gegebenen Erklärung der Bestäubungseinrichtung von *arum ternatum.* (Bot. Zeitung, 19 Dec. 1879, v. 37, c. 838-839, 35 cm.)

Crit. rev. of W: Breitenbach's "Die Blütheneinrichtung von *arum ternatum*" (Bot. Zeitung, 24 Oct. 1879, v. 37, c. 687-692) [Rec., 2361]. Shows that the plant is adapted to cross-fertilization and not to close-fertilization by insects. *W: T.* (2450)

Newlyn, G: The development of specially adaptive appliances in plants. (Science gossip, 1878, p. 156-158.)

Describes the protandry and structure of the flowers in *schizanthus papilionaceus*, and their adaptation to insects as agents in their cross-fertilization. *W: T.* (2451)

Pim, Greenwood. A remarkable garden plant. (Science gossip, 1878, p. 55-57.)

Describes the adaptation of the flowers of *thunbergia alata* to cross-fertilization by insects with long proboscides. *W: T.* (2452)

Plarr, Mary J. Bees and flowers. (Nature, 28 Jan. 1875, v. 11, p. 248-249, 5 cm.)

Notes the perforation of flowers of the snap-dragon by [humble?] bees [*bombus?*]. *W: T.* (2453)

Ráthay, E. Ueber nectarabsondernde Trichome einiger Melampyrumarten. Mit 1 Tafel. Aus dem 81. Bande der Sitzb. der K. Akad. der Wissensch., 1 Abth., Feb.-Heft, Jahrg. 1880. 23 p., 1 pl., 24×16, t 18×10.

Abstract, by H. Müller, under same title. (Bot. Jahresbericht . . . Just, 1879, v. 7, p. 127-128.)

From a study of the extrafloral nectar glands and the insects which feed on their secretion, the writer is led to reject the views of Kerner, Belt and Delpino, as to the use of such organs — at least so far as *melampyrum* is concerned. He has no hypothesis of his own to substitute for those rejected. *W: T.* (2454)

Ricca, Luigi. Alcune osservazioni relative alla dicogamia nei vegetali, fatte sulle Alpi di Val Camonica nell'anno 1870. (Atti della soc. ital. di sci. nat. [Milano], 18 Dec. 1870, v. 13, p. 254-264.)

Describes the floral structure of a considerable number of species, and their fertilization by insects. *W: T.* (2455)

Ricca, Luigi. Contribuzioni alla teoria dicogamica. Osservazioni sulla fecondazione incrociata de' vegetali alpini e subalpini fatte nelle Alpi della somma Val Camonica l'anno 1871. (Atti della soc. ital. di sci. nat. [Milano], 31 Dec. 1871, v. 14, p. 245-264.)

Additional observations on the pollination of some of the plants noted in the author's "Alcune osservazioni relative alla dicogamia . . ." (*op. cit.*, 18 Dec. 1870, v. 13, p. 254-264) [Rec., 2455], and added observations on others. *W: T.* (2456)

Riches, J. T. The arrangements for cross-fertilization in the *delphinium*. (Science gossip, Nov. 1877, p. 248-249.)

Describes the structure of the flowers as an adaptation to fertilization by bees. States that the nectar spur is perforated by ants and by short-tongued *bombus*. *W: T.* (2457)

Riches, J. T. Fertilization in *cypripedium*. (Science gossip, 1876, p. 125-126.)

Describes the adaptation of the flowers to pollination by flies, as had previously been done by Delpino. *W: T.* (2458)

Riley, C: Valentine. On the oviposition of the yucca moth. (Amer. nat., Oct. 1873, v. 7, p. 619-623) [Rec., 1992].

Abstract, by the author, under same title. (Trans. St. Louis acad. sci., 1873, v. 3, p. 208-210.)

Shows how the flowers are pollinated while *pronuba yuccasella* is engaged in piercing the ovary and laying her eggs. *W: T.* (2459)

Rohrbach, Paul. Ueber den Blüthenbau und die Befruchtung von *epipogium gmelini*. Mit zwei lithographirten Figurentafeln. Eine von der philosophischen Facultät der Georg-August-Universität zu Göttingen gekrönte Preisschrift. Göttingen, 1866. t.-p., 21 p., 1 pl., 26×22, t 20×14.

Describes the structure of the flowers of this orchid, and their pollination by insects. *W: T.* (2460)

Rusby, H: H. Cross-fertilization in *cereus phoeniceus*. (Bull. Torrey bot. club, Aug. 1881, v. 8, p. 92-93, 16 cm.)

Describes the structure of the flowers, and the actions of ants and grashoppers which visit them. *W: T.* (2461)

Slater, J. W. On insects destroyed by flowers. (Trans. entom. soc. Lond., 2 Apr. 1879, Proc., p. 9-10.)

Notes the noxious effect of the nectar of *dahlia*, *passiflora*, *fritillaria* and *nerium* on insects. *W: T.* (2462)

Smith, Sidney Irving. Fertilization of *cypripedium spectabile* and *platanthera psycodes*. (Proc. Bost. soc. nat. hist., 4 Nov. 1863, v. 9, p. 328-329.)

Small flower-beetles visit the first for nectar; the second is fertilized by *sesia* and by *papilio asterias*. *W: T.* (2463)

Sprengel, Christian Konrad. Das entdeckte Geheimniss der Natur im Bau und in der Befruchtung der Blumen. Mit 25 Kupfertafeln. Berlin, bei Friedrich Vieweg dem aeltern, 1793. 222 p. (double columns), 26×22, t 21×17.

Discusses the fertilization of many genera of flowering plants by insect agency. *W: T.* (2464)

Spruce, A. Insect fertilization. (Science gossip, 1872, p. 89, 7 cm.)

Describes the cross-fertilization of *mauritia carara* by insects attracted by nectar. *W: T.* (2465)

Taylor, J. E. Flowers, their origin, shapes, perfumes and colors. Il. with 32 col. fig. by Sowerby, and 161 woodcuts. Bost., Roberts Bros., 1878. 347 p., 18×12, t 14.5×8.5.

Rev., by H. Müller, entitled "J. E. Taylor über Blumen, ihren Ursprung, ihre Gestalten, Gerüche und Farben." (Kosmos [Leipzig], May 1879, bd. 5, p. 149-157, 289 cm.) [Rec., 2113].

A semi-scientific discussion of the development of flowers as we find them at the present time, and their different modes of pollination: with chapters on the dispersion of colored and fleshy fruits, etc., and the means of protection of plants against injurious animals. *W: T.* (2466)

Thomé, O: Wilhelm. Das Gesetz der vermiedenen Selbstbefruchtung bei den höheren Pflanzen. Mit in den Text gedruckten Illustrationen. Cöln und Leipzig, Mayer, 1870. t.-p. cover, t.-p., 46 p., 20×13, t 15×8.

A brief popular résumé of the work of Sprengel, Darwin, Hildebrand, Delpino and others. *W: T.* (2467)

Todd, James E. On certain contrivances for cross-fertilization in flowers [Rec., 1709].

Extract, entitled "Cross fertilization in *lobelia syphilitica*." (Bot. gazette, Feb. 1879, v. 4, p. 124-125, 18 cm.)

Describes the arrangements tending to secure crossing in *iris*, *martynia*, *pentstemon*, *gladiolus* and *lobelia* by insects. *W: T.* (2468)

Trelease, W: On the fertilization of *calamintha nepeta*. (Amer. nat., Jan. 1881, v. 15, p. 11-15, 2 fig.)

Shows how the flowers are adapted to profit by the visits of hymenoptera, and enumerates insects collected on them. *W: T.* (2469)

Trelease, W: On the fertilization of *euphorbia* (*poinsettia*) *pulcherrima*. (Bull. Torrey bot. club, Sept. 1879, v. 6, p. 344-345.)

Abstract, by H. Müller, entitled "Ueber die Befruchtung von *euphorbia* (*poinsettia*) *pulcherrima*." (Bot. Jahresbericht . . . Just, 1879, v. 7, p. 137-138, 5 cm.)

Describes the adaptation of the flowers to fertilization by insects. Finds their nectar very attractive to ants in a greenhouse. *W: T.* (2470)

Trelease, W: Flowers and their visitors. (Cornell review, Feb. 1880, v. 7, p. 194-196.)

A popular essay on the adaptations of flowers to cross-fertilization by insects and other animals, with notes on the habits of the latter. *W: T.* (2471)

Trelease, W: The foliar nectar glands of *populus*. (Bot. gazette, Nov. 1881, v. 6, p. 284-290, 6 fig.)

Describes the nectar glands at the base of the leaves of many poplars, discussing their structure and homology, and their biological significance. Enumerates the insects attracted by the secretion of these organs, and records his observations on their actions while on the plant. *W: T.* (2472)

Trelease, W: *Impatiens fulva*, action of bees toward. (Bull. Torrey bot. club, Feb. 1880, v. 7, p. 20-21, 12 cm.)

Describes the behavior of bees while collecting nectar normally, and when taking advantage of perforations in the corolla. *W: T.* (2473)

Trelease, W: Insects as unconscious selectors of flowers. (Amer. nat., Apr. 1879, v. 13, p. 257-260.)

Abstract of H. Müller's "Die Insecten als unbewusste Blumenzüchter" (Kosmos, 1878, v. 3: July, p. 314-337; Aug., p. 403-426; Sept., p. 476-499). *W: T.* (2474)

Trelease, W: Nectar, its nature, occurrence, and uses. Extracted from the Report on cotton insects by J. Henry Comstock, Entomologist to the U. S. Department of agriculture. [Washington, 1880.] t.-p. cover, p. 319-343, pl. 3, 23×18, t 20×11.

Abstract, by H. Müller, with same title. (Bot. Zeitung, 29 Oct. 1880, v. 38, c. 748-749, 24 cm.)

Abstract, by F. Delpino, entitled "Nettarii estranuziali" (p. 23-24), and "Impollinazione e fecondazione nel cotone e in altre specie" (p. 41-42). (Rivista botanica, 1880.)

Abstract, by H. Müller, entitled "Nectar, was er ist, und einige seiner Verwendungen." (Bot. Jahresbericht . . . Just, 1879, v. 7, p. 123-125.)

Considers nectar and nectaries, floral and extrafloral, and their use in attracting insects and other animals which cross-fertilize the flowers, serve as a body-guard for the protection of the plant against injurious animals, or are captured and digested or macerated for the nutrition of the plant. A list of papers on the mutual relations between flowers and insects, etc., is appended. *W: T.* (2475)

Trelease, W: Note on the perforation of flowers. (Bull. Torrey bot. club, June 1881, v. 8, p. 68-69, 25 cm.)

Records the perforation of the corollas of certain flowers by bees, ants and wasps, which rob them of their nectar. *W: T.* (2476)

Trelease, W: Where honey comes from. (Amer. bee journ., 1880, v. 16: Mar., p. 137-139; Apr., p. 184; May, p. 232-233; June, p. 271-272; Aug., p. 386-387.)

Brief description of the nectar producing parts—floral and extrafloral—of several plants; with observations on the habits of insects when collecting nectar, and on honey-dew. *W: T.* (2477)

Treviranus, Ludolph Christ. Ueber Dichogamie nach C. C. Sprengel und Ch. Darwin. (Bot. Zeitung, Jan. 1863, v. 21, p. 1-7, 9-16.)

Discusses the cross-fertilization of flowers by insects, going into details especially in the *papilionaceae*, *primulaceae* and *orchidaceae*. *W: T.* (2478)

Trimen, Roland. On the fertilization of *disa grandiflora*. (Journ. Linn. soc., Bot., 4 June 1863, v. 7, p. 144-147.)

Describes the structure of the flowers, and believes them to be fertilized by "some day-flying hymenopterous or lepidopterous insect," which was extremely rare in its visits where his observations were made (So. Africa). *W: T.* (2479)

Trimen, Roland. On the structure of *bonatea speciosa*, with reference to its fertilization. (Journ. Linn. soc., Bot., 1 Dec. 1864, v. 9, p. 156-160, pl. 1.)

Describes the adaptation of the flowers to fertilization by insects, but has never seen the latter at work, his studies having been made on greenhouse plants. *W: T.* (2480)

Unger, Fr. Ueber Zuckerdrüsen der Blätter und einige von den Blättern überhaupt ausgehende Zuckerabsonderungen. (Flora, 7 Nov. 1844, p. 703-714.)

Notes on honey dew, p. 710-714. *W: T.* (2481)

Weale, J. P. Mansel. Notes on some species of *habenaria* found in South Africa. (Journ. Linn. soc., Bot., 3 Nov. 1870, v. 13, p. 47-48.)

Shows the adaptation of the flowers to fertilization by nocturnal insects. *W: T.* (2482)

Weale, J. P. Mansel. Notes on a species of *disperis* found on the Kageberg, South Africa. (Journ. Linn. soc., Bot., 3 Nov. 1870, v. 13, p. 42-45.)

Believes the flowers adapted to fertilization by small bees or beetles, but has not observed them at work. *W: T.* (2483)

Weale, J. P. Mansel. Observations on the mode in which certain species of *asclepiadeae* are fertilized. (Journ. Linn. soc., Bot., 3 Nov. 1870, v. 13, p. 48-58.)

Describes the fertilization by insects of the African genera *gomphocarpus*, *xyomalobium?*, *cissus*, *eucormis*, *pachycarpus*, *periglossum* and *cordylogyne*. *W: T.* (2484)