may always modify a homozygous character. The reviewer, taking a middle ground, believes that the pure line work least subject to criticism, that on self-fertilized material, does prove homozygotes to be sufficiently constant in succeeding generations to make this constancy a basis for mathematical description, but he believes it to be unbiological to assert this constancy as absolute.

As the basis of his assertion that there has been no proof of variation independent of crossing, the author notices only the work of DEVRIES. Undoubtedly there is a great deal in favor of the idea that the *Oenothera* mutants are the results of segregation from crosses, though the phenomena have not been fitted into present Mendelian concepts. But that the very fine contributions of DAVIS and HERIBERT-NILSSON on this subject have clinched the matter, as LOTSY believes, would not be asserted, I venture to say, by the authors themselves. It is pointed out very clearly that both the constructive work of GATES in defense of the *Oenothera* mutations and his criticism of HERIBERT-NILSSON are not so conclusive as that author so confidently asserts, but this is only negative evidence. Moreover, the work of MORGAN, JENNINGS, BATESON, and others on the occurrence of mutations in controlled cultures is complacently neglected.

LOTSY'S own extensive work on specific crosses in the genera *Nicotiana*, *Petunia*, *Pisum*, and *Antirrhinum*, the constructive work of the paper, is exceedingly interesting, and his detailed accounts, which are in press, will be eagerly awaited. In brief, all the inter-specific crosses that he has undertaken have shown true Mendelian segregation. The conclusion of DEVRIES, drawn from the peculiar behavior of the *Oenothera* species, that inter-specific and intra-specific crosses obey different laws of heredity, is shown, therefore, not to be of general validity.—E. M. EAST.

Cecidology.—Among the very important contributions to European cecidology are HOWARD'S papers on the collection in the Museum of Natural History in Paris[9] and from Western Africa,[10] all of which are taxonomic in character and well illustrated. The author uses the modern method of grouping the galls with reference to the host plants, which makes the data available to those botanists who are interested in the study of malformations of plants and in the relation of plants to other forms of life.

ROLL HOWARD[11] presents an exceptionally good paper on the anatomy of the galls on the margins of leaves. He divides these malformations into four groups; those caused (1) by hypertrophy and hyperplasia, (2) by hyperplasia,

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[9] HOWARD, C., Les collections cécidologiques du laboratoire d'entomologie du muséum d'histoire naturalle de Paris: Galles de Burséracées. Marcellia **12**:57–75. 1913; also Galles d'Afrique et Asie **12**:102–117.

[10] ———, Les Galles de l'Afrique occidentale française. VI. Cécides du haut Sénégal-Niger. Marcellia **12**:76–101. 1913.

[11] HOWARD, ROLL, Recherches anatomiques sur les Cécidies foliaires marginales. Marcellia **12**:124–144. 1913.

(3) by hypertrophy, (4) by atrophy. This paper is well illustrated and leads the thoughtful American botanist to realize the enormous amount of research work that could be carried on in this country on this one branch of cecidology or plant pathology.

The recent American literature presents a paper by PARROTT and HODGKINS[12] in which the authors describe the pathological condition caused by the false tarnished plant-bug (*Lygus invitus*). This pest attacks the fruits before they are one-half inch in diameter, causing many of them to fall. The injury is said to be quite characteristic. "As the pears grow, the outer layer of the skin about these spots becomes ruptured, and a light-yellow, mealy-appearing growth of the inner layers of skin protrudes, making more or less triangular, granular spots; or when two or more spots run together a patch or crack lined and bordered with corky tissue. The yellowish, protruding growth at first makes a marked contrast with the smooth green skin of the little pear; and later the cessation of growth at these points causes depressions and marked general deformity of the fruit. In the flesh beneath, also, hard, gritty granulations are produced, through which it is difficult to cut with a knife." This paper illustrates another broad field of plant pathology and physiology which is practically untouched by American botanists.

One of the most satisfactory pieces of scientific cecidology of recent years is TRIGGERSON'S[13] work on *Dryophanta erinacei*. The author begins his study with the well known *Acraspis erinacei* or hedgehog-gall which occurs on the white oak, and proves it to be caused by a dimorphic species of insect. The insects from this gall are agamic and oviposit on the leaf and flower buds of the same host, causing an entirely different gall giving rise to the sexual form which belongs to the genus *Dryophanta*. The author also gives the results of some very interesting studies of the parasites and inquilines, and finally some studies leading to the conclusion that the stimulus is due to a fluid secreted by the malpighian vessels of the larva. However, comparative studies indicate that this is not necessarily true in the case of other galls. The physiological side of this paper will be of great interest to those plant physiologists and pathologists who can overcome their prejudice long enough to give it careful consideration.

Another exceptionally good piece of work which is strictly botanical is by STEWART[14] and treats of the anatomy of the black knot (*Plowrightia morbosa*). The author finds that these knots may originate from spore infection from

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[12] PARROTT, P. J., and HODGKINS, H. E., A pear-deforming plant bug. New York Agricultural Experiment Station (Geneva) Bull. 368. 1913.

[13] TRIGGERSON, C. J., A study of *Dryophanta erinacei* (Mayr) and its galls. Annals Ent. Soc. America 7:1–34. *pls. 11.* 1914.

[14] STEWART, ALBAN, The anatomy of other features of the black knot. Amer Jour. Bot. 1:112–125. 1914.

mycelium spreading from old knots; the fungus during the first year penetrates nearer to the pith in the distal than the proximal end, and the greatest disturbance is in the vicinity of the leaf gaps; in the case of the choke cherry, which was the host used in these studies, the multiseriate rays become broadened, the production of xylem elements is greatly inhibited, and the production of parenchyma stimulated. There is also a stimulation of the cambium accompanied by the misplacing of certain elements. The reviewer will add that many of the data given in this paper are homologous with those derived from the study of insect cecidia. The American botanical literature is very deficient in studies of pathological tissues, and it is to be hoped that this paper will stimulate research in this long-neglected field.

COSENS[15] gives a paper which is very suggestive to botanists, in which he says: "One fundamental and far-reaching principle of gall-production by insects is that the stimulus does not endow the protoplasm of the host with power to produce new types of organs, tissues, etc. Structures are in many cases originated that are not found on the same part of the normal host, but invariably their prototypes are present on another part of the plant or nearly related species. The protoplasm is so stimulated that not only are dormant characteristics strengthened, but also in certain cases latent properties are called into activity, and thus the apparently new type of production appears in the host." The author gives evidence from the study of several galls supporting this principle.

Among other American papers which should be mentioned is a valuable key for determination of the midge galls on the hickory by FELT;[16] and a very interesting biological paper by the same author[17] on adaptations; and also several systematic papers by the same author.[18] There should also be noted three valuable taxonomic papers by BEUTENMÜLLER on the acorn galls[19] and on new species of the Cynipideae.[20]—MEL T. COOK.

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[15] COSENS, A., Insect galls. Canad. Ent. **45**:380–384. 1913.

[16] FELT, E. P., Table of hickory leaf midge galls. Bull. Brooklyn Ent. Soc. **8**:98–99. 1913.

[17] ———, Adaptation in gall midges. Canad. Ent. **45**:371–379. 1913.

[18] ———, Three new gall midges. Canad. Ent. **45**:305–308. 1913.

———, Description of gall midges. Jour. N.Y. Ent. Soc. **21**:213–219. 1913.

———, Gall midges in an aquatic or semi-aquatic environment. Jour. N.Y. Ent. Soc. **21**:62, 63. 1913.

———, The gall midge fauna of New England. Psyche **20**:133–146. 1913.

[19] BEUTENMÜLLER, WILLIAM, The North American acorn galls with descriptions of new species. Bull. Brooklyn Ent. Soc. **8**:101–105. 1913.

[20] ———, A new species of *Neuroteras* from Washington. Canad. Ent. **45**:280–282. 1913.

———, Descriptions of new Cynipidae. Trans. Amer. Ent. Soc. **39**:243–248. 1913.