SPECIAL PUBLICATIONS.

EDWARD LEWIS STURTEVANT.

A Biographical Sketch.

BY C. S. PLUMB.

The gift of Dr. E. Lewis Sturtevant to the Missouri Botanical Garden of his extensive and valuable library of Prelinnean works, was an event in the history of this institution. This collection of books, which contains many rarities, was secured only through years of searching and at great expense. Its equal probably does not exist to-day in America.

The recent death of Dr. Sturtevant is a matter of more than passing moment to those interested in the work of this Garden. He was one of its benefactors, was interested in its work, and was a botanical student through many years of his life. In donating his library to this institution, he did it with the belief that here in future was to be one of the world's greatest botanical gardens, where such a collection of books would prove of far-reaching influence.

Edward Lewis Sturtevant was born in Boston, Mass., Jan. 23, 1842. His father and mother died within a short time of each other, in Philadelphia, Pa., shortly after the birth of his brother, Joseph N. When a small boy, with his aunt and guardian, Mrs. Benson, he moved to Winthrop, Maine, the birthplace of his father, where he resided for some time. He attended school there, and later went to New Jersey to a preparatory school. At 17 years of age he entered the class of '63 at Bowdoin College, in Maine, withdrawing in his senior year to enlist in the army. In

September, 1862, he was appointed First Lieut. of Co. G. of the 24th regiment of Maine Volunteers, and the next January was made Captain of his company. He served with the 19th army corps on the lower Mississippi, and was present at the siege of Port Hudson. A portion of his army service was on the staff of General Nickerson, 3rd brigade, 2nd division, with the rank of Captain. His career in the army was brought to a close by an attack of typhoid malaria, which necessitated his return home.

Soon after his return from the war, he entered the Harvard University Medical School, from which he received the degree of M. D. in 1866. The degrees of B. A. and A. M. were also conferred upon him by Bowdoin at different times in his early career.

Notwithstanding the degree of M. D. had been bestowed upon him, he never practiced medicine. After his graduation from Harvard, E. Lewis and his brother Thomas lived with their wives in the same home in Boston for a year or so. In 1867, with his brothers Joseph N. and Thomas, he purchased and resided on what afterwards became well known as "Waushakum Farm." Here with his brothers, he gave his attention to agricultural affairs. The farm became a field for practical research work, while his library offered another field of research, which he was not slow to make use of.

Waushakum Farm soon became celebrated as the home of Ayrshire cattle, and as the place of development of Waushakum Flint corn.

These two brothers became greatly interested in Ayrshire cattle, a large herd was maintained for some years, and extensive milk records kept. The writer doubts if there are in America milk records of twenty-five years ago, that are so extensive and cover so many milking periods, and different animals, as the Sturtevant Brothers kept. They made a careful study of the Ayrshire breed of cattle and finally in 1875 published a monograph of 252 pages

concerning this breed. This volume exists to-day as the only book of importance on Ayrshires outside of the herd book, that has been published in the English language.

With a herd of dairy cows at his disposal, Dr. Sturtevant became interested in the physiology of milk and the subject of milk secretion. He made active use of the microscope, and lectured early in the seventies before agricultural associations on this important topic. Among other things, his diagrams illustrating variations in size of fat globules in milk of different breeds of cows attracted much attention.

Dr. Sturtevant began his agricultural work in 1867, and among the first things to engage his attention was Indian corn, a plant he was constantly studying for 30 years, or nearly to the time of his death. He wrote many articles on Indian corn, addressed many agricultural societies and carried on extensive observations concerning it, both in farm practice and on the experimental field. One of the important pieces of corn work which he conducted in his early career on the farm, was to improve by selection and otherwise, a form of Canadian Yellow Flint which afterwards became widely known as Waushakum corn. This was bred with such care that 125 bushels of shelled corn to the acre have been grown on Waushakum Farm from its seed.

In addition to the work in developing this variety of corn, Dr. Sturtevant also improved a variety of muskmelon, which he called the New Christiana, a salmon fleshed melon of unusual sweetness, quality and amount of flesh.

Late in the fall of 1875, a lysimeter embracing five thousandths of an acre in size and 25 inches deep, was put in on Waushakum Farm. This was, so far as I am aware, the first lysimeter built in America. Its purpose was to study the percolation of moisture through a given area of soil under agricultural conditions. The apparatus was completed Nov. 19, 1875, and up to Jan. 1, 1880, careful record was made of all the water of filtration. At the

Cincinnati meeting of the American Association for the Advancement of Science, in 1881, Dr. Sturtevant gave a statement of the records of this lysimeter for the years 1876–1879 inclusive.

So intense became his interest in things agricultural, and so fertile was he in suggestions relative to agricultural problems, that he came to be quite in demand as a speaker before agricultural societies. He delivered many addresses in the seventies before boards of agriculture, dairy associations, etc., and gradually his reputation as an advanced agricultural thinker and scientist spread over New England and the Middle States. So favorably was he known, that in 1882 the newly created board of trustees of the New York State Agricultural Experiment Station invited him to become Director and organizer of the station. This position he accepted, removing to Geneva with his family and taking up the development of this new work. There was but little for him to pattern after. None of the stations organized under the Hatch Act of Congress was then in existence. Connecticut, on July 11, 1877, had organized a modest station, which was mainly a chemical laboratory, and Massachusetts, New Jersey, North Carolina and perhaps one or two other States had begun the work of organization before New York, but the latter State was the first to plan on an extensive scale. Scarcely anything but chemical research work had been accomplished, unless we except some field and feeding experiments carried on in a small way by the agricultural departments of some of the State colleges. Dr. Sturtevant began to develop the Station as a several-sided institution. Chemical, botanical, horticultural, live stock and crop departments were established. Within two or three years a working plant was organized and put into operation, that at that time received much attention from agriculturally interested persons. The chemical work of Babcock and Ladd, the botanical work of Arthur, the horticultural work of Goff and the field and

feeding experiments of the Director, made the name of the Station and their investigations well and favorably known before Dr. Sturtevant's administration ceased. The work of these men was the foundation upon which has been erected the splendid station of to-day at Geneva.

In 1887, Dr. Sturtevant resigned his Directorship of the New York station, and returned to South Framingham to reside in the old home. Here, however, conditions were greatly changed. During his absence at Geneva, the growth of South Framingham had caused the brothers to plat off the farm into streets and building lots, where at the present time are many comfortable dwellings. And then Waushakum Farm passed out of existence. Here in the old home, however, he resided, devoted to his family and books. Near by the house he erected a small building for a library, which he designated as his "Den," and in which he wrote. In 1893, he became quite ill with la grippe, which finally assumed the phase of tuberculosis. Unable to secure relief in the Massachusetts climate, he spent three winters in southern California, part of the time entirely absent from his family and intimate friends. This absence while greatly beneficial, chafed him, so that he did not return after his third visit, preferring to remain at home and accept conditions as they were. But his hold upon life was not thereby strengthened, and he gradually failed until July 30, 1898, when he quietly dropped asleep forever.

On the back leaves of a volume of his Agricultural Essays, that he had bound in for annotation, are a number of definitions, aphorisms, or sayings in his own unique and characteristic handwriting, undoubtedly the product of his own thought. Some of these are worthy of record here, as for example: —

"Agriculture is a complex art. To be a good farmer requires varied abilities and a sound judgment."

"The farmer who deals so exclusively with nature in her varied moods,

must ever remember that he cannot originate but only turn to good account the results of thoughtful observations and studied experiences."

"The season is much, the farmer is more. Crops follow judgment more than the weather."

"Agriculture as an art and a science, must be progressive, otherwise it will fail to keep pace with the requirements of our age."

"Any class of men who have not thought-makers among them, must become hewers of wood and the drawers of water. This is a social law. In education must be the farmer's hope, in thought-power must be the reliance of farmers."

"The peril to agriculture is to come more from personal ignorance than from other's competition; not higher prices, but cheap food and intelligence are for the continued and best interests of the country, the farmer included. The farmer should consider himself, both for his own welfare and as a fact, a citizen rather than as belonging to a class."

During all his life, Dr. Sturtevant was industrious with his pen. A great reader, and with an extensive private library at his command, he stowed away in his retentive memory, or in card note form, much to assist him in his subsequent work. An examination of his writings in pamphlet or book form will show foot-note references to an extent seldom seen. During his life, he had accumulated many thousand notes on cards, which he filed away and found of constant use. I counted in his library this summer over 170 small card catalogue boxes, each of which would hold about 75 cards. In these he gathered together an agricultural dictionary, and thousands of miscellaneous notes on things agricultural, botanical and historical. Later he had a large wooden case built, containing 30 drawers for cards, about 20 of which he filled with thousands of cards. Between 1883 and 1896 he inscribed notes on these cards, and among the last things he attended to a few weeks before his death, was to see that these were presented to the Missouri Botanical Garden, where he felt that they would meet with appreciative use.

While Director of the New York Station he became greatly interested in agricultural plants, and commenced to gather historical data concerning them. After exhausting

the library at his disposal, he began to purchase the works of old botanical writers and thus continued his search. This led to the expenditure of large sums of money and the gradual accumulation of the finest Prelinnean library in the United States. An extensive importing house in New York made him constant shipments of rare old botanical or agricultural works, and thousands of dollars were thus spent. Being desirous that this valuable collection should be kept intact and yet in a place where it might be available to students, in 1892 Dr. Sturtevant donated these volumes to the library of the Missouri Botanical Garden. The size of the collection is indicated somewhat from the fact that it numbers over 500 titles and many more volumes than that. A list of the books occupies 86 octavo pages in the seventh annual report of the Missouri Botanical Garden. In the words of Dr. Trelease, "No conditions were attached to this gift, though it was suggested that the collection be kept in a group by itself." It is accordingly kept by itself and is known as "The Sturtevant Prelinnean Library."

Dr. Sturtevant was an active member and one of the founders of the Society for the Promotion of Agricultural Science, and presented a number of papers before its sessions during his life. He served as its first secretary and fourth president. He was also a Fellow in the American Association for the Advancement of Science.

The pen contributions of Dr. Sturtevant cover about 30 years and number many titles. He was a facile writer, and, until sickness incapacitated him, found time to furnish contributions of a scientific character to *Science*, *American Naturalist*, *Botanical Gazette*, *Torrey Botanical Club Bulletin* and several learned societies.

In his library I found 12 scrap book volumes, some nine by seven inches, of about 100 pages each, filled with his writings, cut from agricultural and other journals, these extending from November 2, 1867, to October 6, 1896.

The last article was from *Science*, and was a brief note relative to some "new apples," and two different colored dahlias found growing on one stem. Besides these, there were two bound volumes of his own writings, one containing 22 pamphlets ranging from three or four to 67 pages, and all published prior to 1882 and mainly in the seventies, while the other contained 42 pamphlets, additional to some experiment station documents.

On June 1, 1875, the first number of the *Scientific Farmer* was published. In March, 1876, the subject of this sketch joined with E. H. Libbey, then editor, in editing that paper. In May, 1878, the first number of the *Scientific Farmer* with E. Lewis Sturtevant as sole editor and proprietor, was issued. This journal, however, which was rather in advance of the times, did not prove a success, and was discontinued in October, 1879. It contained a large amount of information in relation to agricultural science, and was contributed to by the prominent men of the day in agricultural investigation.

As a student of the history and botanical characteristics of maize, Sturtevant was without a peer in the world. During his whole life, after settling on the farm, this subject engaged his attention. At the New York Station he grew varieties of corn from seed secured from all over America and abroad, and made an extensive botanical classification from field study, which was fully illustrated, and published in the reports of that station.

A year or two before his death, at the request of the United States Department of Agriculture, he prepared and furnished the Department the manuscript concerning varieties of maize, which Director True of the Office of Experiment Stations of the Department, informs me will soon appear as Bulletin 57 of that Division.

Five children survive him, of whom two sons and two daughters were by a first wife, to whom he was married in 1864, and one son by a second wife, to whom he was mar-

ried in 1882. He took great pride in his family, to which he was much devoted, and rarely sought companionship outside their midst. While at Geneva his wife and eldest daughter took keen interest in his studies of agricultural plants, and made under his direction hundreds of beautiful colored and other drawings of varieties and types of ears of corn and other plants, many of which served to illustrate his writings and especially those on maize, as published in the New York Station report for 1884.

A man of less than average height and weight, and nervous temperament, Dr. Sturtevant was a thinker of the most active type. He was gifted with great fertility of thought, as his coworkers at Geneva and intimate friends well know. Said one of those who had known him long, "Dr. Sturtevant was one of the most remarkable men I ever knew, to suggest new ideas to others and set them to thinking."

His early training had given him liberal views, and he was well informed on topics of the time outside of his own special sphere of work. Such an industrious reader and lover of books could hardly be otherwise. He was not a great mingler with men, but he had a wide circle of friends, whose friendship he prized. Without a distinctive agricultural education, such as may be secured in the agricultural colleges of to-day, he had such a natural trend of mind in this direction, that he readily accomplished by the aid of his University training, what but few men in his generation could have done. Unquestionably the world is richer for his life, and mankind is his beneficiary.

BIBLIOGRAPHY.

The following so far as I have been able to learn is a complete list of the principal writings of Dr. Sturtevant, not including many short communications in agricultural and other journals.

Why the Ayrshire Cow should be the Dairyman's Choice. Trans. Vermont Dairymen's Association, 1872, pp. 150-159.

Cost of a Crop of Corn to the Massachusetts Farmer. Agriculture of Massachusetts, 1872–73, part II, pp. 80–89.

Ayrshire Points. Ohio Agricultural Report, 1872, pp. 261–270. Reprinted in *Mark Lane Express*, London, Eng., Feb. 3, 1873; in *Farmers' Magazine*, London, May, 1873, p. 230; and in the *North British Agriculturist*, Edinburg, Scotland, July 16, 1873.

The Claims of the Ayrshire Cow upon the Dairy Farmer. Trans. N. Y. State Agr. Society, 1872–76, pp. 266–279. Copied in *Gardeners' Chronicle* and *Agricultural Gazette*, England, May 3, 1873, p. 624.

Food, Physiology and Force. N. H. Agriculture, 1874, p. 157. Also in *Scientific Farmer*, July, 1879, p. 89, and *Scientific American* Supplement, No. 186.

Milk: Physiological and Miscellaneous. A Prize Essay. Transactions New York State Agricultural Society, 1872–76, pp. 91–124, plates III.

Milk: Some Considerations concerning its Morphology. Report Massachusetts State Board of Agriculture, 1873–74, pp. 374–388.

Milk: Its typal Relations, etc. A lecture before the Vermont Dairymen's Association, Jan. 21, 1874. Printed for the author, 1874, pp. 20, figs. 3. Also in 9th Report American Dairymen's Association.

Physiological Considerations concerning Feeding for Butter and Cheese. Report Connecticut Board of Agriculture, 1874, pp. 67, figs. 4.

Cream. American Dairymen's Association Report, 1874, p. 39. Also in *New England Farmer*, Jan. 23, 1875.

Associate Dairying. The Appendix to Flints' "Milch Cows and Dairy Farming." No name signed.

The Wild Cattle of Scotland, or White Forest Breed. *American Naturalist*, Vol. VIII, March, 1874, pp. 135–145.

The Law of Inheritance; or the Philosophy of Breeding. Twenty-second Annual Report Massachusetts State Board of Agriculture, 1875, pp. 48.

Chemical Corn Growing. Trans. Middlesex South Agricultural Society, 1875, pp. 11–32.

The Dairy Cow. A Monograph of the Ayrshire Breed of Cattle. By E. Lewis Sturtevant, M. D., and Joseph N. Sturtevant, of Waushakum Farm, South Framingham, Mass. With an appendix on Ayrshire, Jersey and Dutch Milks; their Formation and Peculiarities. Boston, Mass. A. Williams & Co., 1875. Cloth, 12mo., pp. 252. Illustrated.

The Dairy Cow — What she is and whence she came. Report Maine State Board of Agriculture, 1875–76, pp. 112–125.

Plant Food and Agriculture. Report Connecticut Board of Agriculture, 1876, pp. 14.

American Agricultural Literature. Proc. Fifth annual session National Agr. Congress, Philadelphia, Sept. 12–14, 1876, pp. 30–37.

Agriculture. Report Massachusetts State Commissioners to the Centennial Exhibition at Philadelphia, 1876, pp. 49–53.

Philosophy of Dairying. Trans. American Dairymen's Association, 1876, pp. 90.

Inter Cultural Tillage. Report Connecticut State Board of Agriculture, 1877–78, pp. 42.

Dairying *vs.* Thoroughbred Bulls. Trans. Vermont Dairymen's Association, 1876, pp. 60.

Fertilizer Laws. Agriculture of Pennsylvania, 1877, pp. 108.

Corn Culture. *Ibid.*, 1878, pp. 252–256.

Seed Breeding. Report Connecticut Board of Agriculture, 1878, pp. 149–187. Reprinted in *Monthly Journal of Science*, Aug., 1879.

Seed Corn. Report Maine State Board of Agriculture. 1878–79, pp. 30–47.

Fertility. Journal American Agricultural Association, vol. 1.

Corn Culture at Waushakum Farm. Trans. New York State Agricultural Society, vol. 32, 1872–76, pp. 170–176.

Indian Corn. Trans. New York State Agricultural Society, 1872–76, pp. 37–74.

Some Thoughts and Facts concerning the Food of Man. Report Connecticut Board of Agriculture, 1880, pp. 114–155.

Seedless Fruits. Trans. Mass. Horticultural Society, part I, 1880, pp. 29.

Deerfoot Farm Centrifugal Dairy. Report United States Commissioner of Agriculture, pp. 629–651, plates III. Reprinted in Journal of Royal Agricultural Society of England, Second Series, vol. XVIII, 1882, pp. 475–495.

Thoughts on Agricultural Education. Report Connecticut State Board of Agriculture, 1881, pp. 19.

The Growing of Corn. Twenty-eighth Annual Report of the Massachusetts State Board of Agriculture, 1881, pp. 77–130.

Lysimeter Records. Proc. American Assoc. for Advancement of Science, 1881, pp. 37–39.

Experimental Observations on the Potato. Trans. N. Y. State Agricultural Society, 1877–1882, pp. 261–265.

The Need of a Better Seed Supply. *Ibid.*, pp. 286–289.

Conditions Necessary to Success in Dairying. Report New York State Dairymen's Association, 1883, pp. 56–60.

Relations between Seeding and Quality in certain Vegetables and Fruits. Proc. Society for the Promotion of Agr. Science, vol. I, 1883, pp. 109–118.

Different Modes of Cutting Potatoes for Planting. *Ibid.*, pp. 77–78.

Agricultural Botany. Proc. Society for the Promotion of Agri. Science, 1883, p. 7. Also Trans. American Association for the Advancement of Science, 1883, pp. 293–295, Abstract.

History of Cereal Plants. Sibley's Grain and Farm Seeds Annual, 1883, pp. 5–14.

Maize: An Attempt at Classification. Rochester, N. Y., 1884, pp. 9. Illustrated. Printed for private distribution only.

Agricultural Botany. *American Naturalist*, June, 1884, pp. 573–577, fig. 3.

Hungarian Grass. Trans. N. Y. State Agricultural Society, vol. 33. 1877-82, pp. 208–220.

Experiment Stations. *Ibid.*, pp. 235-243.

The Feeding of Spoiled Brewer's Grains. Report New York State Dairymen's Association, 1884, pp. 46-64.

Influence of Insulation upon Vegetation. Proc. American Association for the Advancement of Science, 1884.

Dairy Interests in General. Report New York State Dairymen's Association, 1884, pp. 102-108.

The Work of the Station. Ninth Annual Report New York State Dairymen's Association, 1885, pp. 25-29.

A List of Edible Fungi. Trans. Mass. Horticultural Society, 1881, pp. 322-348.

Germination Studies. Proc. Amer. Assn. for the Advancement of Science, 1885, pp. 287-291.

An Observation on the Hybridization and Cross Breeding of Plants. Proc. Amer. Assn. for Adv. of Science, vol. 34, 1885, pp. 283-287.

Germination Studies. *Ibid.*, pp. 287-291.

Lowest Germination of Maize. *Botanical Gazette*, April, 1885, pp. 259-261.

Cultivated Food Plants. Proc. Society for the Promotion of Agricultural Science, 1885, pp. 59-72.

Indian Corn and the Indian. *American Naturalist*, March, 1885, pp. 225-234.

Kitchen Garden Esculents of American Origin. *American Naturalist*, I, May, 1885, pp. 444-457. II, June, 1885, pp. 542-552. III, July, 1885, pp. 658-669.

Horticultural Botany. Proc. Western New York Hort. Society for 1886, pp. 25-32.

A Study of the Dandelion. *American Naturalist*, Jan. 1886, pp. 5-9. Illustrated.

A Study of Garden Lettuce. *American Naturalist*, March, 1886, pp. 230-233.

History of Celery. *American Naturalist*, July, 1886, pp. 599-606, figs. 3.

History of Garden Vegetables. *American Naturalist*, 1887, vol. 21, pp. 49-59; 125-133; 321-333; 433-444; 701-712; 826-833; 903-912; 975-985. 1888, vol. 22, pp. 420-433; 802-808; 979-987. 1890, vol. 24, pp. 30-48; 143-157; 629-646; 719-744.

The Dandelion and the Lettuce. Proc. Society for Promotion of Agricultural Science, 1886, vol. 3, pp. 40-44.

A Study in Agricultural Botany. *Ibid.*, 1886, vol. 4, pp. 68-73.

Atavism the Result of Cross Breeding in Lettuce. *Ibid.*, 1886, vol. 4, pp. 73-74.

History of the Currant. Proc. Western New York Hort. Society, 1887.

Seed Germination — A Study. *Agricultural Science*, Feb., 1887.

Capsicum umbilicatum. *Bull. Torrey Botanical Club*, April, 1888.

Capsicum fasciculatum. *Ibid.*, May, 1888.

Notes on the History of the Strawberry. Trans. Mass. Horticultural Society, 1888, pp. 191-204.

Seedless Fruits. *Memoirs Torrey Botanical Club*, vol. 1, part 4. 1890.

Ensilage Experiments in 1884–1885 at the New York State Agricultural Experiment Station. Trans. New York State Agr. Society, 1889, pp. 116–120.

Forage Crops: Maize and Sorghum. *Ibid.*, pp. 135–143.

Agricultural Botany. *Ibid.*, pp. 335–338.

Edible Plants of the World. *Agricultural Science*, vol. 3, no. 7, 1889, pp. 174–178.

The Tomato. Report Maryland Experiment Station, 1889, p. 18.

Huckleberries and Blueberries. Trans. Mass. Hort. Society, 1890, pp. 17–38.

Concerning some names for Cucurbitae. *Bull. Torrey Botanical Club*, October, 1891.

Notes on Maize. *Bull. Torrey Botanical Club*, vol. 21, 1894, pp. 319–343; 503–523.

Paramount Fertilizers. Report Mass. State Board of Agriculture, 1888, pp. 37–55.

Report of the New York State Agricultural Experiment Station, 1882–1887, first six volumes. The following are the special topics reported on by Dr. Sturtevant:

1882. Organization of Station work. Experiments with wheat, barley and oats. Studies on Maize. Experiments with potatoes. Forage crops.

1883. Botanical notes. Studies on Maize. Station grown seeds. Weight of seeds. Relation of feed to milk. Experiments with potatoes. Experiments with corn. Experiments with grasses.

1884. Feeding experiments and milk analysis. Study of milk. Experiments with potatoes. Wheat improvement. Experiments with corn. Germination of seeds. Study of maize, including sweet, pop and dent corn.

1885. Starch waste as cattle food. Ensilage and forage crops. Studies on corn. Fertilizers on potatoes. Tests on germination of maize and other seeds. The sweet corns.

1886. Cattle feeding experiments. Temperature and crops. Vitality of seeds as influenced by age. Experiments with cabbage. Studies of Indian corn.

1887. Feeding for beef. Experiments with potatoes. Seed germinations.

While at the New York Station, between July 24, 1882, and March, 1887, Dr. Sturtevant published from the Station under his own name 124 newspaper bulletins, from one half to two columns long, covering many different subjects in a brief way and relative to work in progress at the Station.

In one of the bound volumes of essays of Dr. Sturtevant, is a list of titles and sources of publication of 97 "newspaper contributions that I desire to remember, to date, Jan. 1, 1882." These include many topics, but notably on dairying and dairy cattle, agricultural education and experiment stations, corn growing, farm wastes, etc.