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Intriguing World of Weeds

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The first weed science textbooks in the United States (Part 1)

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Abstract

This article reviews the first textbooks focused on weed identification published in the United States. We go on to discuss those species considered the most troublesome weeds in agriculture. Common and scientific names written in the original texts have been cross referenced to current common and scientific names.

Introduction

Although peer-reviewed scientific evidence does not exist, Genesis 3:17-19 documents the reason weed science exists as a discipline. Many English translations of this biblical passage declare that humanity must labor ("In the sweat of thy face") and contend with "thorns" and "thistles" that emerge from cursed soil to produce food. There are far more weeds than only thorns and thistles that must be controlled to produce food and fiber to feed and clothe the world. If a translation of this biblical passage were written by farmers in the United States today, they might list crabgrass (*Digitaria* spp.), foxtail (*Setaria* spp.), morningglory (*Ipomoea* spp.), nutsedge (*Cyperus* spp.), pigweed (*Amaranthus* spp.), and ragweed (*Ambrosia* spp.), or many others, depending on location and commodities produced. If thorns and thistles were the only groups of weeds that interfered with the production of food and fiber, weed science as a discipline might not need to exist.

Value of Agriculture

Individuals that recognized the importance and value of agriculture formed groups to share ideas and experiences in the early developing years of the newly independent United States. These organizations were initially formed in the states of New York, Massachusetts, Pennsylvania, and South Carolina in the late 1700s (True 1925). In the city serving as the center for the federal government of the United States after the Revolutionary War (History.com 2009), the Philadelphia Society for Promoting Agriculture formed in 1785 (Anonymous 1808; True 1925). This organization compiled *Memoirs*, which were experiences and observations made by members as well as information conveyed to members from trusted sources that could be shared in attempts to improve land fertility and productivity, livestock management, forage production, seeding methods, animal and plant disease and insect management, hedge plants, crop processing, farm implements, kitchen design, and other aspects of agrarian life. Society membership was not restricted to residents of Pennsylvania but included individuals from other states as well as several foreign countries (Anonymous 1808).

Botany and Medicine Link

Dr. Benjamin Barton, Professor of Natural History, Materia Medica and Botany at the University of Pennsylvania, was a member of the Philadelphia Society for Promoting Agriculture (Anonymous 1811). As a student at York Academy, Barton's spare time was spent collecting and sketching plant, insect, and animal specimens (Swensen 1997). He developed an interest in medicine as a student at the College of Philadelphia and studied under the tutelage of Dr. Thomas Shippen (Swensen 1997). He continued the study of medicine abroad at the University of Edinburgh in Scotland. Swensen (1997) reported that Barton also studied medicine in Germany at the University of Göttingen, although evidence of a medical degree does not exist (Yokota 2001). After returning to the United States and practicing medicine, Barton joined the University of Pennsylvania to teach botany. In that position, he published the first botany textbook (Barton 1803) in the United States (Swensen 1997). In addition to other biological publications, Barton (1798) also published a series of texts on plants with medicinal properties indigenous to the United States titled *Collections for an Essay Towards a Medica Materia of the United States*. In the *Essay*, plants with similar medicinal properties were grouped



to create a reference for physicians to know which plants could be used as astringents, tonics, stimulants, errhines, salivation stimulants, emetics, cathartics, diuretics, and anthelmintics. One of Barton's collaborators was botanist and explorer William Bartram, who not only provided plant material to Barton, but shared ethnobotany of Native Americans he observed and gleaned during his explorations of the New World. One such example was food preparation from *Smilax* roots, which was originally printed in Bartram's book of explorations (Figure 1; Bartram 1793), then reprinted in Barton's *Essay* (Figure 2; Barton 1798).

One of Benjamin Barton's students who graduated from the University of Pennsylvania Medical Department was William Darlington. Like his mentor, Darlington was both botanist and physician, but he was also an elected official that represented Pennsylvania in the 14th, 16th, and 17th U.S. Congresses (Anonymous 2023a). Darlington's first significant botanical publication was a list and description of flowering plants and ferns of Chester County, Pennsylvania, which included notes of medicinal, economic, and artistic uses for plants (Darlington 1837). Ten years later, Darlington (1847) published Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice or Require the tention, of American Agriculturalists. In the Preface of the text, Darlington stated that one objective of writing the book was to encourage individuals involved in agriculture to better understand and appreciate the science of botany; therefore, he included 23 pages of botanical terms with definitions. He also stated in the Preface that although he appreciated the three economic aspects of botany (agricultural, medicinal, and artistic), his primary overall objective in writing the book was to systematically describe plants of immediate interest to the American agricultural community, especially those located in the middle states (his term; Darlington 1847). He stated that every intelligent agriculturalist should recognize the plants in Agricultural Botany regardless of whether they are encountered in fields, gardens, or woodlands.

Darlington's First Edition

To achieve his overall objective, Darlington (1847) followed the method of Linnaeus to describe 485 species of plants, which included about a dozen nonflowering ferns, mushrooms, lichens, seaweed, ergot, mold, rust, and other fungi. For each of the plants, Darlington (1847) provided both genus and specific epithet as well as English and foreign common names, taxonomic description, habitat, fruiting period, whether introduced or indigenous, and observations made of the plant. Observations written about these weed species were not limited to his personal experiences but included those of others as illustrated in the observations for butter and eggs (Linaria vulgaris Mill.) (Figure 3), information supplied by Mr. Watson. Darlington also included a reference list of the names of 106 botanical authorities of plants in his text. Little information was provided in the text on weed management, except for a few species, aside from encouraging agriculturalists to prevent seed production, increase seeding rates of cultivated crops, and be vigilant to remove weeds. However, Darlington (1847) shared management thoughts that Canada thistle (Cirsium arvense Scop.), which he called field thistle, could not be controlled by plowing. His conclusion about Canada thistle control was based on weed biology observations conducted and reported to the Society instituted at Bath by William Curtis (1780), then printed in Volume 2 of Curtis' Flora Londinensis (1798) with the scientific name Carduus arvensis.

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NORTH AMERICA.

tance, every day's excursion prefenting new scenes of wonder and delight.

Early in the morning our chief invited me with him on a vifit to the town, to take a final leave of the White King. We were gracioufly received and treated with the utmost civility and hofpitality: there was a noble entertainment and repait provided against our arrival, confisting of bear's ribs, venifon, varieties of fifh, roafted turkies (which they call the white man's difh), hot corn cakes, and a very agreeable, cooling fort of jelly, which they call conte: this is prepared from the root of the China briar (Smilax pfeudo-China; Smilax afpera, fructu nigro, radice nodofa, magna, lævi, farinacea; Sloan, tom. 1. p. 31. t. 143. f. 1. habit. Jamaica, Virginia, Carolina, and Florida): they chop the roots in pieces, which are afterwards well pounded in a wooden mortar, then being mixed with clean water, in a tray or trough, they ftrain it through baskets; the fediment, which settles to the bottom of the fecond veffel, is afterwards dried in the open air : and is then a very fine reddith flour or meal : a fmall quantity of this mixed with warm water and fweetened with honey, when cool, becomes a beautiful, delicious jelly, very nourifhing and wholefome. They also mix it with fine corn flour, which being fried in fresh bear's oil makes very good hot cakes or fritters.

On our taking leave of the king and head men, they entreated our chief to represent to the white people, their unfeigned defire to bury in oblivion the late breech of amity and intermifilion of commerce, which they trufted would never be reflected on the people of Talahaføtche; and, laftly, that we would

Figure 1. Page 239 from Bartram's (1793) Travels Through North and South Carolina, Georgia, East and West Florida, the Cherokee Country, the Extensive Territories of the Muscogules or Creek Confederacy, and the Country of the Chactaws.

Near the end of *Agricultural Botany*, Darlington (1847) summarized into lists plants he considered most important. He compiled a list of 57 plants already cultivated for human food production with an additional 27 species suitable, but not cultivated for that purpose. He listed 30 plants, of which only one-third were cultivated, as food for domesticated animals. A third list of 37 plants Dr. Darlington thought could be grown to produce condiments or beverage, whereas the fourth list of 35 plants contained medicinal properties but fewer than one-half were cultivated. Ninety-one plants he considered useful for domestic or rural commercial art.

The last two lists compiled by Dr. Darlington are of particular interest to weed scientists. Figure 4 is his list of the most troublesome weeds in U.S. agriculture at that time. In this list, Darlington (1847) wrote genus and specific epithets of the 73 plants he considered the most "pernicious and troublesome" weeds, assuming that these plants should be eradicated from U.S. agriculture. Webster (1828) defined pernicious as "destructive" with "the quality of killing, destroying, or injuring." Table 1 lists

(5)

THERE grows upon the river Mobile a fpecies of palm, which is but little known to naturalifts, but which promifes to be an important article of food to man. It has no flak or flem above ground. The leaves fpread regularly all round, and when fully expanded are flabelliform. In the centre of these leaves is produced the receptacle of the fruit, which is of the form and fize of a common fugar-loaf. This receptacle confifts of a vaft number of drupes, or berries, of the fize and fhape of common plumbs : each is covered with a fibrous, farinaceous, pulpy coating of confiderable thicknefs. This fubstance is faid to refemble manna in texture, colour and tafte; or, perhaps, it still more refembles moist brown fugar, with particles of loaf fugar mixt with it. It is a most delicious and nourifhing food, and is diligently fought after in the places where it grows. Upon first tasting it, it is fomewhat bitter and pungent.*

THE large tuberous roots of the Smilax China afford our fouthern Indians a nourifhing food. The fresh roots are well macerated in wooden mortars. The mass is then put into vessels nearly filled with clear water, where it is well mixed with paddles: It is decanted off into other vessels, where it is left to fettle, and after the subfidence is com-

* From the information of Mr. William Bartram. MS penes me. Vol. i.

pleted, the water is caft off, leaving the farinaceous fubftance at the bottom. When this is taken out and dried, it is an impalpable powder of a redifh colour. Mixed with boiling water, it becomes a beautiful jelly, which, when fweetened with honey or fugar, affords a most nourifhing and pleafant food for children or aged people. The Indians fometimes use it mixed with fine corn-flour, and fryed in fresh bears' oil.*

THE chemical hiftory of the maize, or Indian corn, the bleffing of our country, deferves to be farther inveftigated. Its importance as an article of diet is fufficiently established by the experience of whole nations.

MATERIA MEDICA.

I AM not very anxious, on this occafion, about my division of the materia medica. I have attempted, in my lectures, to make fome improvements upon the arrangement of Dr. Cullen; and, if I live, I hope to publish, in a few months, my strictures on the late arrangement of the ingenious Dr. Darwin. At prefent, in possession of only a small collection of original facts immediately relative to the materia

* From the information of Mr. William Bartram. MS penes me. Vol. i.

Figure 2. Pages 6 and 7 from Barton's (1798) Collections for an Essay Towards a Materia Medica of the United States.

these plants along with Darlington's proposed common name, popular common name as well as current scientific name and common name. Among the 73 pernicious and troublesome weeds, Darlington considered 15 the worst of the worst. These 15 plants, which he described as "eminently pernicious" are shown in Table 2, also with Darlington's proposed and popular common names and current scientific and common names. Figure 5 and Table 3 show Dr. Darlington's list of plants he described as "mere" weeds on farms. Although he listed only 39 weeds specifically by scientific name, among several genera described by Torrey and Gray (1838), Darlington (1847) opined that all species should be considered weeds: Aster, Carex, Cirsium, Cyperus, Equisetum, Erigeron, Eupatorium, Euphorbia, Juncus, Lobelia, Oenothera, Panicum, Polygonum, Pteris (and all ferns), Rubus (all wild species), Scirpus, Solidago, and Sphagnum (and all other mosses) should be viewed as weeds when emerged in agricultural habitats. Thus, he considered the total list "about" 120 species of plants.

The Second Edition

A second edition of Darlington's book was published in 1859. However, due to Darlington's failing health, updates to the text were done by George Thurber (Darlington and Thurber 1859), Lecturer of botany and materia medica at New York College of Pharmacy and later Chair of botany and horticulture at Michigan College of Agriculture (Anonymous 2023b). Thurber listed and described, in the same manner as the first edition, 164 additional plant species. Artists were used to sketch 140 images of plants or plant parts that were carved into wooden blocks for printing to aid botanical understanding and plant identification (Darlington and Thurber 1859). Drawings

TRIBE III. ANTIRRHINEAE. Chav.

Corolla tubular,—the limb personate or ringent, bilabiate or rarely equally lobed. Stamens 4, didynamous; anthers approximated in pairs. Capsule 2-celled, opening with teeth or lids, rarely of several valves—sometimes irregularly ruptured.

118. LINARIA. Tournef. Endl. Gen. 3891. [Latin, Linum, flax; from the resemblance of the leaves.]

Calyx 5-parted. Corolla with the limb personate,—the upper lip bifd with the lobes folded back—the lower lip trifid, closing the throat by its prominent palate; tube inflated, spurred at base. Stamens 4, didynamous,—usually with a minute abortive rudiment of a fifth. Capsule ovoid or globose, chartaceous or membranaceous, 2celled, opening with several valves at apex, or sometimes with a lid. Seeds numerous, margined. Mostly Herbs, annual or perennial. Leaves alternate, rarely opposite or verticillate. Flowers usually racemose.

1. L. VULGARIS, Mill. Stem erect, simple; leaves lance-linear, acute, alternate, numerous; flowers imbricated, in a terminal raceme; spur of the corolla acute, about as long as the tube. DC. Prodr. 10. p. 273. Fl. Cestr. p. 368. Icon, Fl. Lond. 3. [Eggs. COMMON LINARIA. Vulgo-Toad-flax. Ranstead-weed. Butter and Fr. Muflier linaire. Germ. Das Flachskraut. Span. Linaria.

Plant smooth and somewhat glaucous. Root perennial, creeping, subligneous. Stem 1 to 2 or 3 feet high, slender, terete, leafy, sometimes branched at summit and bearing several racemes, generally growing in bunches or small patches. Leaves 1 to 2 inches long, narrow, irregularly scattered on the stem, but very numerous. Flowers pedunculate, in a dense bracteate raceme—the peduncles shorter than the bracts. Corolla pale greenish-yellow, smooth,—the palate of the lower lip bright orange-color, villous in the throat; spur subulate, about half an ineh long. Style shorter than the longest stamens; stigma obliquely truncate. Capsule ovoid-oblong, thin, smooth, longer than the calyx. Seeds with a dilated orbicular margin, roughish-dotted in the centre. Pastures; fence-rows, &c.: introduced. Native of Europe. Fl. June—Sept. Fr. Aug.—October.

Obs. This foreigner is extensively naturalized, - and has become a vile nuisance in our pastures and upland meadows. Mr. WATSON, in his annals of Philadelphia, says it was introduced from Wales, as a garden flower, by a Mr. Ranstead, a Welsh resident of that city ; and hence one of its common names. It inclines to form large patches, by means of its creeping roots,-and as far as it extends, takes almost exclusive possession of the soil. Although the flowers are somewhat showy, it is a fetid, worthless and very objectionable weed,-the roots very tenacious of life-and requiring much persevering effort to extirpate them. The remarkable variety called Peloria-with a regular 5-lobed ventricose corolla, 5 spurs, and 5 perfect stamens-is occasionally to be observed. Sometimes these Pelorias are tetramerous; i.e. the corolla 4-lobed, with 4 spurs, &c. They are frequently, if not always, late flowers,-situated at the summit of the raceme of full grown capsules, and apparently the latest floral developments of the plant.

ORDER XCII. VERBENACEAE. Juss.

Herbs, shrubs, and even trees within the tranic

Figure 3. Entry for butter and eggs (Linaria vulgaris L. (USDA 2023) showing botanical description and observations of this species (Darlington 1847).

1		. November and offereness and Is		
X	VI.	Pernicious and troublesome	e Plants-to be expelled . The	
		eminently pernicious o	nes in SMALL CAPITALS.	
	1	Ranunculus bulbosus, L.	131. Nepeta Cataria, L.	
	2.	. Delphinium Consolida, L.	133. Leonurus Cardiaca, L.	
	6.	Papaver dubium, L.	136. ECHIUM VULGARE, L.	
	13.	Camelina sativa, Crantz.	138. Cynoglossum Morisoni, DC.	and the second
*	17.	Hypericum perforatum, L.	140. CONVOLVULUS ARVENSIS, L.	
	18	LYCHNIS GITHAGO, Lam.	141. Cuscuta epilinum, Wich.	
	23	Abutilon Avicennae, Gaert.	143. Datura Stramonium, L.	
	29	Rhus venenata, DC.	145. Solanum nigrum, L.	
T	30	R-Toxicodendron, L. Ailanthus glandulosa, Desf	- S- CAROLINENSE, L.	
	54.	Rubus Canadensis, L.	T T T T T T T T	Barry Call
	1	R villosus, Ait.	155. Amaranthus albus, L.	.7:
	55.	Rosa Carolina, L.	- A hybridus, L. - A spinosus, L.	i i
	66.	Cicuta maculata, L.	157. Rumex crispus, L.	Supervise 18
- Aline	71.	Archemora rigida,, DC.	- R— obtusifolius, L.	
	73.	DAUCUS CAROTA, L.	- R- Acetosella.	
157.6	79.	Sambucus Canadensis, L.	158. Polygonum sagittatum, L.	
	81.	Dipsacus sylvestris, L.	- P arifolium, L.	Subsection Production
	02.	Vernonia Noveboracensis, Willd.	185. Urtica dioica, L.	
	87		199. Smilax rotundifolia, L.	
	88.	Ambrosia artemisiaefolia,L. Xanthium strumarium, L.	- S caduca, L.	11-2
	_	X SPINOSUM, L.	200. ORNITHOGALUM UMBELLA-	
	90.	Bidens frondosa, L.	TUM, L. 201. Allium vineale, L.	e e
	—	B chrysanthemoides,	203. Juncus communis, E. Mey'	
		Mx.	204. Carex acuta, Gooden.	
	-	B bipinnata, L.	206. CYPERUS REPENS, Ell.	
		Maruta Cotula, DC.	— C— Hydra, Mx.	
	94.	LEUCANTHEMUM VULGARE,	214. Panicum sanguinale, L.	6
	100	Lam.	217. CENCHRUS TRIBULOIDES, L.	T
	100.	Centaurea Cyanus, L.	229. Bromus secalinus, L.	
	102.	Cirsium lanceolatum, Scop.	232. TRITICUM REPENS, L.	
		C discolor, Spreng.	245. MERULIUS LACHRYMANS,	
N.Y.	-	C pumilum, Spreng. C horridulum, Mx.	Schum. 247 Ascophora Mucedo Link	
As a	-	C ARVENSE, Scop.	247. Ascophora Mucedo, Link. 248. Uredo segetum, Pers.	
	103.	Lappa major, Gaertn.	249. Puccinia Graminis, Pers.	
	104.	Cichorium Intybus, L.	Seventy-three in number; of	
	114.	Plantago lanceolata, L.	which some 16 or 18 are eminent-	1
	117.	Verbascum Thapsus, L.	ly pernicious.	
	118.	LINARIA VULGARIS, Mill.		
		A A A A A A A A A A A A A A A A A A A		The Carl
		6	9	1 M
				A PARTY AND A PARTY AND A

Figure 4. Image of Darlington's (1847) List VI Pernicious and troublesome plants from Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or Require the Attention, of American Agriculturalists.

used to illustrate this edition included 140 images, among which one was of an enlarged grass floret; 65 were plants useful for lumber, live hedges, ornamental, medicinal, food, or other benefits to humanity; and the remaining 74 images were plants considered weeds. An example is shown in Figure 6 of giant ragweed, called great ragweed in the text (*Ambrosia trifida* L.). This 2nd edition is likely the first weed identification guide with images printed in the United States. Perhaps because of the significance of revisions made to the second edition, the title of the book was changed to *American Weeds and Useful Plants*:

Being a Second and Illustrated Edition of Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice or Require the Attention, of American Agriculturalists (Darlington and Thurber 1859). Multiple publishers printed the revised edition, as the senior author has seen at least three different publishers listed on title pages of American Weeds.

American Weeds does not contain the lists of weeds nor plant uses published in Darlington's first edition. However, four pages of text titled "Weeds" that provide an overview of weed management

(Continued)

common names. Blank cells indicate no name provided. Proposed common Scientific name Popular common name Current scientific name Current common name name (USDA NRCS 2023)^a Darlington (1847) Ranunculus bulbosus L. Bulbous Butter-cups, crow-foot Ranunculus bulbosus L. St. Anthony's turnip ranunculus Delphinium consolida L. Solder delphinium Lark-spur Consolida regalis Gray Royal knight's spur Papaver dubium L. Dubious papaver Poppy, field poppy Papaver dubium L. Blindeves Wild flax, gold of pleasure Camelina sativa (L.) Crantz. Camelina sativa Crantz. Cultivated False flax camelina Hypericum perforatum L. Perforated St. John's wort Hypericum perforatum L. Common St. Johnswort hypericum Abutilon avicennae Gaert. Avicenna's Indian mallow, velvet-leaf Abutilon theophrasti Medik. Velvetleaf abutilon Rhus venenata DC Poisonous rhus Poison sumach, poison elder Toxicodendron vernix (L.) Kuntze Poison sumac (Govaerts et al. 2021) Rhus toxicodendron^b L. Poison-tree rhus Poison oak Toxicodendron pubescens Mill. Atlantic poison oak Rhus radicans L. Poison-tree rhus Poison vine, poison oak, poison Toxicodendron radicans (L.) Eastern poison ivy ivy Kuntze ssp. Radicans Ailanthus glandulosa Desf Ailanthus altissima (Mill.) Swingle Tree of heaven Glandular Chinese sumac, tree of heaven ailanthus Rubus canadensis L. Canadian rubus Dewberry, running brier Rubus canadensis L. Smooth blackberry Rubus villosus Ait. Villous rubus Blackberry, common brier, Rubus flagellaris Willd. Northern dewberry bramble Rosa carolina L. Rosa carolina L. Carolina rosa Swamp rose Carolina rose Spotted cow-bane, water Spotted water hemlock Cicuta maculata L. Spotted cicuta Cicuta maculata L. hemlock Archemora rigida DC Rigid or stiff Cow-bane, wild parsnep Oxypolis rigidior (L.) Raf. (WFO Stiff cowbane archemora 2023d) Sambucus nigra L. ssp. Sambucus canadensis L. Canadian Elder bush, common elder American black elderberry canadensis (L.) R. Bolli sambucus Dipsacus sylvestris L. Wild dipsacus Teasel, wild teasel Dipsacus fullonum L. Fuller's teasel Vernonia noveboracensis New York vernonia Iron-weed Vernonia noveboracensis (L.) New York ironweed Willd. Michx. Artemisia-leaved Ambrosia artemisiaefolia Bitter-weed, rag-weed Ambrosia artemisiifolia L. Annual ragweed L. ambrosia Xanthium strumarium L. Scrophulous Clot-bur, cockle bur Xanthium strumarium L. Rough cocklebur xanthium Frondose bidens Bidens frondosa L. Bur marigold Bidens frondosa L. Devil's beggarticks Chrysanthemum-Smooth beggartick Bidens chrysanthemoides Beggar-ticks Bidens laevis (L.) Britton, Sterns, like bidens & Poggenb. Mx. Bidens bipinnata L. **Bipinnate bidens** Spanish needles Bidens bipinnata L. Spanish needles Stinking chamomile, dog's Maruta cotula DC Anthemis cotula Anthemis cotula L. Stinking chamomile fennel, or May-weed Centaurea cyanus L. Blue centaurea Blue-bottle, ragged robin, blue Centaurea cyanus L. Garden cornflower bonnets Cirsium lanceolatum Scop. Lanceolate cirsium Common thistle Cirsium vulgare (Savi) Ten. Bull thistle Cirsium discolor Spreng. Two-colored Cirsium discolor (Muhl. ex Willd.) Field thistle cirsium Spreng. Cirsium pumilum Spreng. Low or dwarf Cirsium pumilum Spreng. Pasture thistle cirsium Cirsium horridulum Mx. Somewhat rugged Yellow thistle Cirsium horridulum Michx. Yellow thistle cirsium Lappa major Gaertn. Greater lappa Bur-dock Arctium lappa L. Greater burdock Cichorium intybus L. Wild succory, chiccory Cichorium intybus L. Chicory Narrowleaf plantain Plantago lanceolata L. Lanceolate English plantain, buckhorn Plantago lanceolata L. plantain plantago Verbascum thapsus L. Mullein, common mullein Verbascum thapsus L. Common mullein Thapsus verbascum Nepeta cataria L. Cat nepeta Cat-mint, cat-nep Nepeta cataria L. Catnip Cardiac leonurus Motherwort Leonurus cardiaca L. Leonurus cardiaca L. Common motherwort Cynoglossum morisoni DC Beggar's lice Hackelina virginiana (L.) I.M. Virginia stickseed, beggar's-lice, Morison's cynoglossum Johnst. (WFO 2023e) sticktight (USFW 2023) Cuscuta epilinum Wich. Flax cuscuta Flax-vine, dodder Cuscuta epilinum Weihe Flax dodder Datura stramonium L. Jamestown (corruptly Jimson) Datura stramonium L. Jimsonweed weed, thorn-apple Solanum nigrum L. Black solanum Night-shade Solanum nigrum L. Black nightshade Chenopodium album L. White Lamb's quarters, goose-foot Chenopodium album L. Lambsquarters chenopodium Amaranthus albus L. White amaranthus Amaranthus albus L. Prostrate pigweed

Table 1. Darlington's (1847) list of "pernicious and troublesome" weeds from Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or Require the Attention, of American Agriculturalists with proposed and popular common names of the period and current nomenclature and common names. Blank cells indicate no name provided.

Table 1. (Continued)

Scientific name	Proposed common name	Popular common name	Current scientific name	Current common name
Amaranthus hybridus L.	Hybrid amaranthus		Amaranthus hybridus L.	Slim amaranth
Rumex crispus L.	Curled rumex	Sour dock, curled dock	Rumex crispus L.	Curly dock
Rumex obtusifolius L.	Obtuse-leaved rumex	Bitter dock, broad-leaved dock	Rumex obtusifolius L.	Bitter dock
Rumex acetosella L.		Sheep sorrel, field sorrel	Rumex acetosella L.	Common sheep sorrel
Polygonum sagittatum L.	Sagittate polygonum	Arrow-leaved tear-thumb	Polygonum sagittatum L.	Arrowleaf tearthumb
Polygonum arifolium L.	Arum-leaved polygonum	Halbert-leaved tear-thumb	Polygonum arifolium L.	Halberdleaf tearthumb
Urtica dioica L.	Dioicous urtica	Nettle, stinging nettle	Urtica dioica L.	Stinging nettle
Smilax rotundifolia L.	Round-leaved smilax	Green-brier, rough bind-weed	Smilax rotundifolia L.	Roundleaf greenbrier
Smilax caduca L.	Caducous smilax	Green-brier	Smilax rotundifolia L. (WFO 2023f)	Roundleaf greenbrier
Allium vineale L.	Vine (or vineyard) allium	Garlic, field garlic, crow garlic	Allium vineale L.	Wild garlic
Juncus communis E. Meyer	Common juncus	Rush, soft rush	Juncus effusus L. (WFO 2023g)	Common rush
Carex acuta Gooden.	Acute (or sharp- angled) carex	Tussock sedge	Carex nigra (L.) Reichard	Smooth black sedge
Panicum sanguinale L.	Bloody (or purple) panicum	Crab-grass, finger-grass	Digitaria sanguinalis (L.) Scop.	Hairy crabgrass
Bromus secalinus L.	Rye brome	Cheat, chess, brome-grass	Bromus secalinus L.	Rye brome

^aUnless otherwise stated.

^bOnly *R. toxicodendron* stated in Darlington's (1847) list of pernicious weeds; however, in the text it is combined with *R. radicans* as Torrey and Gray (1838) list as a single species of climbing and not climbing in The Flora of North America.

Table 2. Eminently pernicious weeds from Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or Require theAttention, of American Agriculturalists (Darlington 1847) with proposed and popular common names of the period and current nomenclature and common names.Blank cells indicate no name provided.

Scientific name	Proposed common name	Popular common name(s)	Current scientific name	Current common name
Darlington (1847)			(USDA NRCS 2023) ^a	
Lychnis githago Lam.		Cockle, corn cockle	Agrostemma githago L. (WFO 2023c)	Common corn cockle
Daucus carota L.	Carot daucus	Carrot, wild carrot	Daucus carota L.	Queen Anne's lace
Xanthium spinosum L.	Spinose xanthium	Thorny clot-bur	Xanthium spinosum L.	Spiny cocklebur
Leucanthemum vulgare Lam.	Common leucanthemum	Daisy, oxeye daisy, white weed	Leucanthemum vulgare Lam.	Oxeye daisy
Cirsium arvense Scop.	Field cirsium	Canada thistle, cursed thistle	Cirsium arvense (L.) Scop.	Canada thistle
Linaria vulgaris Mill.	Common linaria	Toad-flax, ranstead-weed, butter and eggs	Linaria vulgaris Mill.	Butter and eggs
Echium vulgare L.	Common echium	Blue-weed, viper's bugloss, blue devils	Echium vulgare L.	Common viper's bugloss
Convolvulus arvensis L.	Field convolvulus	Bind-weed	Convolvulus arvensis L.	Field bindweed
Solanum carolinense L.	Carolinian solanum	Horse nettle	Solanum carolinense L.	Carolina horsenettle
Amaranthus spinosus L.	Thorny amaranthus		Amaranthus spinosus L.	Spiny amaranth
Ornithogalum umbellatum L.	Umbellate ornithogalum	Ten o'clock	Ornithogalum umbellatum L.	Star of Bethlehem
Cyperus repens Ell.	Creeping cyperus	"Nut-grass" of Florida	<i>Cyperus esculentus</i> L. (WFO 2023h)	Yellow nutsedge
Cyperus hydra Mx.	Hydra cyperus	"Nut-grass" of South Carolina, "coco- grass"	Cyperus rotundus L. (WFO 2023i)	Purple nutsedge
Cenchrus tribuloides L.	Tribulus-like cenchrus	Bur-grass, hedge-hog grass	Cenchrus tribuloides L.	Sanddune sandbur
Triticum repens L.	Creeping triticum	Couch-grass, quitch-grass	Elymus repens (L.) Gould	Quackgrass

^aUnless otherwise stated.

suggestions were included in the second edition. Whether this section was written by William Darlington or George Thurber is not stated. Many of these concepts are basic weed management principles, but this book may be the first to put these in print. In this section titled "Weeds" is provided the best definition for a weed is "the old one", "a plant out of place" (Darlington and

Thurber 1859). The authors also stated that the weeds most problematic in American agriculture were those that either migrated from the Old World or warmer parts of the United States (Darlington and Thurber 1859). The authors introduce the text by asserting that farmers primarily want two questions about weeds answered: how weeds get on the farm and how to get them

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- VII. Plants which are chiefly mere Weeds, upon Farms,-and ought to be expelled, or superseded by more useful ones.
 - 9. Sisymbrium officinale, Scop.
 - 15. Capsella Bursa-pastoris, Moench.
 - 19. Portulaca oleracea, L.
 - 20. Malva rotundifolia, L.
 - 29. Rhus glabra, L.
 - 43. Trifolium arvense, L.
 - 52. Potentilla Norvegica, L.
 - P- Canadensis, L.
 - 54. Rubus (all the wild species).
 - 59. Oenothera biennis, L. (and all others).
 - 65. Saxifraga Pennsylvanica, L.
 - 83. Eupatorium (all the species)
 - 84. Aster ericoides, L. (and all others).
- 85. Erigeron (all the species).
- 86. Solidago nemoralis, Ait. (and all others).
- 87. Ambrosia trifida, L.
- 93. Achillea Millefolium, L.
- 97. Gnaphalium polycephalum, Mx.
- 98. Erechtites hieracifolia, Raf.
- 99. Senecio aureus, L.
- 103. Cirsium (all the species). 106. Taraxacum Dens-leonis,
- Desf. 108. Lobelia (all the species).
- 111. Andromeda Mariana, L.
- 114. Plantago major, L.
- 119. Verbena urticaefolia, L.

- 130. Prunella vulgaris, L.
- 131. Nepeta Glechoma, Benth.
- 132. Lamium amplexicaule, L.
- 135. Teucrium Canadense, L.
- 137. Lithospermum arvense, L.
- 148. Asclepias tuberosa, L.
- 158. Polygonum (all the species).
- 160. Phytolacca decandra, L.
- 166. Euphorbia (all the species).
- 176. Alnus serrulata, Willd.
- 194. Symplocarpus foetidus, Salisb.
- 197. Sagittaria sagittaefolia, L.
- 203. Juncus (all the species).
- 204. Carex (all the species).
- 205. Scirpus (all the species).
- 206. Cyperus (all the species).
- 207. Leersia oryzoides, Swartz.
- 215. Panicum (all the species).
- 215. Setaria glauca, Beauv.
- S- viridis, Beauv.
- 216. Oplismenus Crus-galli, K'th
- 220. Phragmites communis, Trin
- 237. Andropogon scoparius, Mx. A— furcatus, Muhl. A— nutans, L.
- 238. Equisetum (all the species).
- 240. Pteris (and all other Ferns).
- 241. Sphagnum (and all other Mosses).

About 120 species, which infest the farm, as mere Weeds.

Figure 5. Image of Darlington's (1847) List VII Plants that are chiefly mere Weeds, from Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or Require the Attention, of American Agriculturalists.

off the farm (Darlington and Thurber 1859). To help address these questions, the authors offered several recommendations. For the first weed management recommendation, these physicians drew a parallel to a healthy human body fighting disease: weeds cannot be avoided by good farming methods, but good farmers remove weeds when they appear on the farm. The authors present the concept that soil not occupied with desirable plants provides open space for weeds to emerge; therefore, make every effort to maximize areas

occupied with desirable plants and use production practices that enable desirable plants to compete with weeds (Darlington and Thurber 1859). The authors declare that some weeds emerge because crop seed or manure is contaminated with weed seed, whereas other weeds produce seed equipped with natural dispersal mechanisms that facilitate movement by wind or animals (Darlington and Thurber 1859). They affirm that weed seeds remain viable when buried in soil at depths unfavorable for

 Table 3.
 Darlington's (1847) list of "mere" weeds from Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or

 Require the Attention, of American Agriculturalists with proposed and popular common names of the period and current nomenclature and common names. Blank cells indicate no name provided.

				Current common
Scientific name	Proposed common name	Popular common name(s)	Current scientific name	name
Darlington (1847) Sisymbrium officinale Scop. Capsella bursa-pastoris Moench.	Officinal sisymbrium Shepherd's purse capsella	Hedge mustard Shepherd's purse	(USDA NRCS 2023) ^a Sisymbrium officinale (L.) Scop. Capsella bursa-pastoris (L.) Medik.	Hedgemustard Shepherd's purse
Portulaca oleracea L. Malva rotundifolia L.	Pot-herb portulaca Round-leaved malva	Purslane Running mallows, low mallows	Portulaca oleracea L. Malva neglecta Wallr. Malva pusilla Sm.	Little hogweed Common mallow Low mallow
Rhus glabra L.	Glabrous rhus	Common, or smooth sumac	Rhus \times borealis Greene [glabra \times typhina]	Hybrid sumac
Trifolium arvense L.	Field trifolium	Stone clover, Welsh clover, rabbit-foot	Rhus glabra L. Trifolium arvense L.	Rabbitfoot clover
Potentilla norvegica L.	Norwegian potentilla		Potentilla norvegica L.	Norwegian cinquefoil
Potentilla canadensis L. Rubus (all the species)	Canadian potentilla	Cinquefoil, five-finger	Potentilla canadensis L.	Dwarf cinquefoil
Rubus odoratus L.	Odorous rubus	Rose-flowering raspberry	Rubus odoratus L.	Purpleflowering raspberry
Rubus occidentalis L.	Western rubus	Wild or black raspberry, thimble-berry	Rubus occidentalis L.	Black raspberry
<i>Denothera biennis</i> L. (and all others)	Biennial oenothera	Evening primrose, night willow-herb	Oenothera biennis L.	Common evening primrose
Saxifraga pennsylvanica L.	Pennsylvania saxifrage	Tall saxifrage	Saxifraga pensylvanica L.	Eastern swamp saxifrage
Eupatorium (all the species) Eupatorium perfoliatum L.	Perfoliate eupatorium	Thorough-stem, bone-set,	Eupatorium perfoliatum L.	Common boneset
As <i>ter ericoides</i> L. (and all others)	Erica, or heath-like aster	Indian sage	Symphyotrichum ericoides (L.) G.L. Nesom var. ericoides	White heath aster
Erigeron (all the species) Erigeron canadense L.	Canadian erigeron	Horse-weed, butter-weed	Erigeron canadensis L. (WFO 2023j)	Canadian
Erigeron annuum Pers.	Annual erigeron	Flea-bane, daisy	Erigeron annuus (L.) Pers.	horseweed Eastern daisy fleabane
Erigeron strigosum Muhl. Solidago nemoralis Ait. (and all others)	Strigose erigeron Wood or grove solidago	Flea-bane, daisy Golden rod	Erigeron strigosus Muhl. ex Willd. Solidago nemoralis Aiton	Prairie fleabane Gray goldenrod
Ambrosia trifida L. Achillea millefolium L. Gnaphalium polycephalum Ax.	Trifid ambrosia Thousand-leaf achillea Many-headed gnaphalium	Yarrow, milfoil Life-everlasting	Ambrosia trifida L. Achillea millefolium L. Gnaphalium L.	Great ragweed Common yarrow Cudweed
Erechtites hieracifolia Raf.	Hieracium-leaved erechtites	Fire-weed	Erechtites hieraciifolius (L.) Raf. ex DC.	American burnwee
Senecio aureus L. Cirsium (all the species)	Golden senecio	Groundsel, squaw-weed	Packera aurea (L.) Á. Löve & D. Löve	Golden ragwort
Faraxacum dens-leonis Desf.	Lion-tooth taraxacum	Dandelion	<i>Taraxacum campylodes^b</i> G.E.Haglund (WFO 2023k)	Common dandelio
obelia (all the species) obelia inflata L. Andromeda mariana L.	Inflated lobelia Maryland andromeda	Eye-bright, Indian tobacco Stagger-bush	Lobelia inflata L. Pieris mariana ^c (DC.) Benth. & Hook.f. (WFO 2023l)	Indian-tobacco Piedmont staggerbush
Plantago major L.	Greater plantago	Common plantain, way- bread	Plantago major L.	Common plantain
/erbena urticaefolia L. Prunella vulgaris L. Vepeta glechoma Benth. .amium amplexicaule L.	Nettle-leaved verbena Common prunella Stem-clasping lamium	Common vervain Heal-all, self-heal Ground-ivy, ale-hoof, gill Dead-nettle, hen-bit	Verbena urticifolia L. Prunella vulgaris L. Glechoma hederacea L. Lamium amplexicaule L.	White vervain Common selfheal Ground ivy Henbit deadnettle
eucrium canadense L. ithospermum arvense L. Isclepias tuberosa L. Polygonum (all the species)	Canadian teucrium Field lithospermum Tuberous asclepias	Wood sage, germander Stone-weed, gromwell Butterfly-weed, pleurisy-root	Teucrium canadense L. Buglossoides arvensis (L.) I.M. Johnst. Asclepias tuberosa L.	Canada germander Corn gromwell Butterfly milkweed
Polygonum hydropiper L.	Water-pepper polygonum	Water-pepper	Polygonum hydropiper L.	Marshpepper knotweed
Polygonum persicaria L.	Peach-leaved polygonum	Lady's-thumb, spotted knot- weed	Polygonum persicaria L.	Spotted ladysthum
Polygonum pennsylvanicum 	Pennsylvania polygonum		Polygonum pensylvanicum L.	Pennsylvania smartweed

(Continued)

Table 3. (Continued)

Scientific name	Proposed common name	Popular common name(s)	Current scientific name	Current common name
Phytolacca decandra L.	Decandrous phytolacca	Poke, poke-weed, pigeon- berry	Phytolacca americana L. var. Americana	American pokeweed
Euphorbia (all the species)		2		
Euphorbia hypericifolia L.	Hypericum-leaved euphorbia	Eye-bright, spurge	Chamaesyce hypericifolia (L.) Millsp.	Graceful sandmat
Alnus serrulata Willd.	Serrulate alnus	Common alder, candle alder	Alnus serrulata (Aiton) Willd.	Hazel alder
<i>Symplocarpus foetidus</i> Salisb.	Fetid symplocarpus	Swamp cabbage, skunk- weed	<i>Symplocarpus foetidus</i> (L.) Salisb. ex W.P.C. Barton	Skunk cabbage
Sagittaria sagittaefolia L. Juncus (all the species) Carex (all the species)	Arrow-leaved sagittaria	Arrow-head	Sagittaria sagittifolia L. [excluded]	Arrowhead
Carex multiflora Muhl.	Many-flowered carex	Sedge, sedge-grass	Carex vulpinoidea Michx. (WFO 2023m)	Fox sedge
Carex tentaculate Muhl.	Tentaculate or many- beaked carex		Carex baileyi Britton (WFO 2023n)	Bailey's sedge
Scirpus (all the species)				
<i>Scirpus triqueter</i> L. <i>Cyperus</i> (all the species)	Three-cornered scirpus	Chair-maker's rush	Schoenoplectus triqueter (L.) Palla	Streambank bulrush
Cyperus strigosus L.	Srigose cyperus	Bristle-spiked galingale	Cyperus strigosus L.	Strawcolored flatsedge
Leersia oryzoides Swartz. Panicum (all the species)	Oryza or rice-like leersia	Cut-grass or wild rice	Leersia oryzoides (L.) Sw.	Rice cutgrass
Panicum capillare L.	Capillary or hair-like panicum		Panicum capillare L.	Witchgrass
<i>Setaria glauca</i> Beauv.	Glaucous setaria	Fox-tail grass	Setaria pumila (Poir.) Roem. & Schult. ssp. Pumila	Yellow foxtail
Setaria viridis Beauv.	Green setaria	Green foxtail, bottle-grass	Setaria viridis (L.) P. Beauv.	Green bristlegrass
Oplismenus crus-galli Kunth	Cockspur oplismenus	, 6	Echinochloa crus-galli (L.) P.Beauv. (WFO 20230)	Barnyardgrass
Phragmites communis Trin	Common phragmites	Reed-grass	Phragmites australis (Cav.) Trin. ex Steud.	Common reed
Andropogon scoparius Mx.	Broom andropogon	Indian grass, purple wood- grass	<i>Schizachyrium littorale</i> (Nash) E.P. Bicknell	Shore little bluestem
Andropogon furcatus Muhl. Andropogon nutans L.	Forked andropogon Nodding andropogon	Finger-spiked wood grass Wood-grass, oat-like Indian grass	Andropogon gerardii Vitman Sorghastrum nutans (L.) Nash	Big bluestem Indiangrass
Equisetum (all the species)		8.000		
Equisetum hyemale L.	Winter equisetum	Scouring rush	Equisetum hyemale L.	Scouringrush horsetail
Pteris (and all other ferns)				
Pteris aquilina L.	Aquiline or eagle pteris	Brake, bracken	<i>Pteridium aquilinum</i> (L.) Kuhn (WFO 2023p)	Western brackenfern
Sphagnum (and all other mos	ses)		- •	
Sphagnum palustre L.	Marsh sphagnum	Bog-moss	Sphagnum palustre L.	Prairie sphagnum

^aUnless otherwise stated.

^bSynonym of Taraxacum officinale F.H. Wigg. ssp. officinale on USDA NRCS 2023.

^cSynonym of Lyonia mariana (L.) D. Don on USDA NRCS 2023.

germination; therefore, weeds should be controlled before seeds form (Darlington and Thurber 1859). The concept published by Jethro Tull (1733) more than a century before Thurber revised Darlington's book, that weeds that spread vegetatively by roots and underground stems are more difficult to control than annual weeds, is stated for agriculturalists in the United States. The authors suggested that the best strategy to conquer perennial weeds is to control them before they develop underground stems capable of producing new shoots (Darlington and Thurber 1859). In addition, they suggested that every piece of perennial root or stem fragmented by tillage be removed from fields to reduce weed spreading caused by scattering plant parts. They went on to suggest that the only effective method to control perennial weeds is to completely exhaust reserves stored in vegetative fragments (Darlington and Thurber 1859). The final suggestions offered by the authors for weed management is preventing plants from breathing by keeping the leaves removed and preventing flowering, thereby eliminating seed production (Darlington and Thurber 1859).

Weeds of American Agriculture

A posthumous article by Dr. William Darlington (1866) on the most common and troublesome weeds in American agriculture was published in Report of the Commissioner of Agriculture for the Year 1865. This article, titled "Weeds of American Agriculture," asserted that the goal was for every young, aspiring, and intelligent farmer to recognize these 100 weeds and know their weedy characteristics (Darlington 1866). Whereas most of the weeds and weedy characteristics listed in this article had appeared in the two earlier publications, a few new weeds were listed: wild radish (Raphanus raphanistrum L.), oneseed bur cucumber (Sicyos angulatos L.; possible typographical error in Report, should be Sicyos angulatus L.), bishop's goutweed (Égopodium podagravia L.; potential typographical error in Report, should be Aegopodium podagraria L.), European stickweed [Echinospermum lappula Lehm. = Lappula squarrosa (Retz.) Dumort.], and Canadian waterweed [Anacharsis canadensis Planchon, Udora, Nutt] = Elodea canadensis Michx.] (WFO 2023a).



Figure 6. Drawn image of giant ragweed (*Ambrosia trifida* L.), which the authors called great ragweed, from American Weeds and Useful Plants: Being a Second and Illustrated Edition of Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or Require the Attention, of American Agriculturalists (Darlington and Thurber 1859).

Selective weed management options were limited at the time all three of these documents were originally published. In addition to a list of 100 weeds in the article Weeds of American Agriculture (Darlington 1866), general weed management suggestions were made as well as specific control suggestions for a few weeds, such as the importance to prevent seed production for weeds such as blindeyes (*Papaver dubium* L.), which had the common name field poppy in the article, common mullein (*Verbascum thapsus* L.), wild carrot (*Daucus carota* L.), and spiny cocklebur (*Xanthium spinosum* L.), which had the common name thorny clot-bur. Various forms of mechanical control were suggested for some weeds: close grazing by sheep in the spring to control St. Anthony's turnip *Ranunculus bulbosus* L.); annual plowing to control false flax [*Camelina sativa* (L.) Crantz]; production of crops conducive to cultivation, such as hand hoeing, to control Canadian horseweed [*Erigeron canadense* (L.) = *Conyza canadensis* (L.) Cronquist.] (WFO 2023b), oxeye daisy (*Leucanthemum vulgare* Lam.), and Canada thistle. Severing the perennial rhizome with a chisel-shaped spud below the soil

surface was recommended to control common corncockle (Darlington called cockle or rose campion) (Agrostemma githago L.), Canada thistle, common thistle [Cirsium lanceolatum (Savi) Ten.], and New York ironweed [Vernonia noveboracensis (L.) Michx.], which Dr. Darlington called wild iron weed. Addition of lime to soil was suggested to control bitter dock (Rumex obtusifolius L.), which was called broad-leaved dock. A drastic control recommendation compared to hoeing or cultivation was given for arrowleaf tearthumb (Polygonum sagittatum L.): ditching to drain the site, meaning change the soil hydrology where populations existed, perhaps the most laborious recommendation of all that were made (Darlington 1866). Control of upright sedge (Carex stricta Lam.), called tussock sedge in the article, included digging plants, incinerating dried plants, then applying the ash for fertilizer. Darlington's (1866) recommendation for purple nutsedge (Cyperus rotundus L. = Cyperus hydra Mx), called coco in the article, was

referenced to and quoted directly from Elliott's (1821), A Sketch of the Botany of South Carolina and Georgia: "to plough or hoe the spots in which it grows every day through the whole season." Fortunately, other management options now exist.

Electronic copies (pdf) of all three of these documents and others can be downloaded from the Weed Science Society of America website at Antique literature | Weed Science Society of America (wssa.net). Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice or Require the Attention, of American Agriculturalists (Darlington, 1847) is at https://wssa.net/wp-content/uploads/antique/Darli ngton_1847_Useful%20plants%20and%20weeds.pdf; American Weeds and Useful Plants: Being a Second and Illustrated Edition of Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice or Require the Attention, of American Agriculturalists (Darlington and Thurber 1859) is at https://wssa.net/wp-content/ uploads/antique/americanweedsandusefulplants1859.pdf; Weeds of American Agriculture (Darlington 1866) pages 509-519 in Report of the Commissioner of Agriculture for the Year 1865 is at https:// wssa.net/wp-content/uploads/antique/Report_of_the_Commissio n_of_Agriculture_for_the_Year_1865.pdf.

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