



Harvested *padi* drying in the sun on a lichen-covered boulder, Mount Sesean. Photograph by T. Volkman.

of memory and ceremony held to insure the preservation of the wet-rice landscape by remembering ritual verses and the structure of agrarian ceremonies. They are indeed the Mothers of the Land, engendering through remembering.

Memory and Commemoration

Customs of the ancestors we perform
They refuse to be left behind
Returning to be remembered

—Ritual Song, Mount Sesean

Toraja ceremonies of the landscape do not represent neutral information or environmental "data." Nor are these rituals moving solely in that they are kinetic, occasionally frenetic. Toraja

ritual moves men through commemorating (re-committing to common memory) shared images and feeling about the wet-rice landscape, its community of spirits, plants, and persons, as well as irrigation channels and terraces. These cyclical ceremonies revivify Toraja understandings of the moral tissue of interconnections throughout the highlands environment.

Toraja rituals of the wet-rice landscape stir the senses and appeal through many channels: sight, hearing, smell, and a sharply focused sense of ordered beauty. And, through a multiplicity of expressive forms: the spoken arts of oratory, the animate arts of ritual architecture, the silent arts of mime, gesture, and simple pointing, the lively commotion of dogs yapping, smoke rising, and ritual speakers ceaselessly chanting.

If the rising column of smoke from offerings of

aromatic grass is a sign of the directionality of communication between men and the spirits of the land, the movements of Toraja rice and its rituals through the landscape are the tracks of a particle of belief in the cloud chamber of an agrarian landscape.

Toraja society is changing rapidly. Indonesian education and ideology, consumerism, and Western tourism, among other influences, are affecting Toraja conceptions of the role, audience, and efficacy of religious ceremonies and their relationship to agrarian practices. Agrarian ceremonies and the beliefs that inform them will probably not exist two decades from now, at least in the forms we know them. For now, Toraja landscape rituals, and those of numerous other small-scale societies throughout the world, encapsulate and communicate in symbolic form what post-industrial societies have been forced, belatedly, to acknowledge and specify in quantitative form—namely, that what is taken from the environment must be returned. Perhaps this moral, sensuously conceived model of sustaining ecological relationships, of lasting reciprocity between people and land, is the gift of simpler, changing societies to those more powerful, a metaphor and model of fruitful environmental relations. In ritual verse, the Toraja exhort the desired contents of the entire world to flow toward their isolated mountain villages through the golden water-channels of their wet-rice landscape:

We make a water-channel for you to come
We build a stone bridge for you
We make a golden waterworks

The bounty will arrive here
Like the sea encircling the earth
And there will be no brokenness.

—To *Minaa* Lumbaa of Buntu
Tagari village

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Thoreau studied the science of botany to communicate with botanists—
and to better express himself

Thoreau as Botanist: An Appreciation and a Critique

Ray Angelo

Thoreau was not the first to botanize in his hometown of Concord, Massachusetts. Two brothers, Drs. Edward and Charles Jarvis, of the generation before him collected many specimens in the town before Henry had graduated from Harvard in 1837. Thoreau certainly was not the last to botanize there. His writings have fueled an interest in the flora of Concord that extends uninterrupted over a century and a half to the present day. Probably no other town in New England has had such long-standing and continuous attention devoted to its plants. Adorned with rivers, lush meadows, ponds, bogs, and calcareous cliffs, the venerable settlement has rewarded botanists with a floral variety unmatched, perhaps, by any other area in New England of comparable size (1,190 species and counting).

The beginnings of Thoreau's exposure to the science of botany date back to his schooldays at the Concord Academy (1828–33), where botany was one of the disciplines taught by Phineas Allen. Also at this time he attended lectures at the Concord Lyceum which included botany among other topics. When Thoreau attended Harvard (1833–37), botany was not offered as a course in itself but was included under natural history taught by the noted entomologist Thaddeus W. Harris. About this time a boarder with the Thoreau family, Prudence Ward, shared with him her interest in botanical studies. Thoreau later recollected in his *Journal* (December 4, 1856) that during this period he began to use Jacob Bigelow's *Florula Bostoniensis, A Collection of Plants of Boston and its Vicinity* (no doubt the second edition of 1824). Primarily, he was looking for popular names of plants and references to localities.

Since he used no system, the Latin names he learned at this time were soon forgotten.

Upon graduation from Harvard Thoreau did some schoolteaching in his native town. Natural history was one of the subjects he taught. He told his pupils that he knew the blossoming times of the local flowers well enough that he could determine what month it was by what was in flower. In 1842 he was asked to review for *The Dial* a series of natural history reports commissioned by the Commonwealth of Massachusetts. Included in the series was the Rev. Chester Dewey's *Report on the Herbaceous Plants of Massachusetts*. The ostensible review, entitled "Natural History of Massachusetts," does not include a single Latin plant name, perhaps intentionally. Thoreau's concern was that mere lists of plants (which Dewey's work essentially was) were an inadequate expression of the state's floral resources. At this time Thoreau's botanical knowledge was insufficiently scientific for him to comment in detail on the technical merits of the report had he wanted to. Moreover, he had not travelled widely enough in Massachusetts to judge its completeness.

What survives of Thoreau's *Journal* and correspondence from the 1840s shows little stirring in the direction of scientific botany. In a letter to his sister, Sophia, on May 22, 1843, from Staten Island he writes, "Tell Miss Ward I shall try to put my microscope to a good use, and if I find any new and pressible flower, will throw it into my common place book." Thoreau's first use of a Latin name for a plant appears to be in his *Journal* (volume 2, page 9, of the new Princeton University Press edition of his *Journal*) where he refers



Portrait of Thoreau by Cynthia DeSando.

to "Mikania scandens," climbing hempweed, on September 12, 1842. This same passage in slightly modified form appears in Thoreau's *A Week on the Concord and Merrimack Rivers*, published in 1849 (page 44, Princeton edition).

The first use by Thoreau of a scientific name for a native plant in his published work appears to occur in 1848. The name "pinus nigra" is found in the original version of the "Ktaadn" essay that appeared in the *Union Magazine of Literature and Art* of that year. This was the name for black spruce (*Picea mariana*) used in Bigelow's manual. In a later version of the text Thoreau changed the name to that used in Asa Gray's manual, namely, "*Abies nigra*," and also inserted an additional Latin name, "*Vaccinium vitis-idaea*." Thoreau's background in classical languages and his delight in etymology naturally attracted him to the Latin (and Greek) names of science.

Two events in the later 1840s played a major role in stimulating Thoreau's interest in systematic natural history. The first was the arrival in 1846 of a "true giant" in the realm of science at the time—naturalist Louis Agassiz, who accepted

an appointment at Harvard. As A. Hunter Dupree has noted: "Not only his attainments but his remarkable personality created a sensation among the local scientists." The very next year Thoreau's correspondence with Agassiz's assistant, James Elliot Cabot, included frequent use of scientific nomenclature to discuss the collection of animal specimens.

The second event, which more directly crystallized Thoreau's botanical inclinations, was the publication in 1848 of the first edition of Asa Gray's *Manual of Botany*. The appearance of this work heralded the end of a long period during which New England botany had languished at a relatively rudimentary level. This manual for the identification of vascular plants, mosses, and liverworts of the northeastern United States was as dry as Dewey's report and Bigelow's manual, but it was far more comprehensive and accurate.

Two years earlier George B. Emerson's *A Report on the Trees and Shrubs Growing Naturally in the Forests of Massachusetts* had appeared. This work, while much more limited in scope, devoted more attention to the occurrence and usefulness of each species than any previous manual, and its descriptions were more detailed. Both Gray's manual and Emerson's report made use of a natural system to arrange their species rather than the artificial system of Linnaeus adopted by Bigelow. The availability of these two volumes, which were unlike any that had come before in New England, could not help but encourage a more systematic study of plants by Thoreau.

Thoreau's first work touching upon natural history after these events was *A Week on the Concord and Merrimack Rivers*, published in 1849. In this book Thoreau finally injects a measured dose of Latin nomenclature into his nature writing, particularly with respect to fishes. Agassiz is even mentioned. Thoreau's application of scientific names to plants, however, is sparing—limited to eight plants, all of them relatively common and easy to distinguish.

In the 1906 ("Walden") edition of Thoreau's

Journal, the first Latin name for a native plant occurs in an entry from May 1850—"Prunus depressa" (now *Prunus susquehanae*, sand cherry). From August 31 of this year onward, the use of scientific plant names becomes a regular feature of the spring, summer, and autumn pages of the *Journal*. Thoreau recalled later (December 4, 1856, *Journal*) that this was about the time he returned to the study of plants with more method. The year 1850 is also that to which the earliest specimens in his organized herbarium belong.

Over the next two or three years Thoreau undertook an intensive program to develop his mastery of Concord's flora. He read botanical works by François André Michaux, Edward Tuckerman, John Loudon, Asa Gray, and Carolus Linnaeus. In his *Journal* he noted comparisons of the artificial Linnaean ordering of plants with natural systems, but always with the comment that neither addressed the poetical aspects of plants. When he sought the literature rather than the science of plants he was told to his dismay by naturalist and Harvard librarian, Thaddeus W. Harris, that he had already read all there was.

His efforts in the field during these years produced complaints of too much observation:

I have the habit of attention to such excess that my senses get no rest, but suffer from constant strain. . . . When I have found myself ever looking down and confining my gaze to the flowers, I have thought it might be well to get into the habit of observing the clouds as a corrective; but no! that study would be just as bad. (September 13, 1852, *Journal*)

I feel that I am dissipated by so many observations. . . . I have almost a slight, dry headache as the result of all this observing. (March 23, 1853, *Journal*)

In the winter of 1852, when there were no flowers to observe, he undertook the study of lichens.

Not surprisingly, the conflict between Thoreau the Artist and Thoreau the Naturalist began to surface: "What sort of science is that which enriches the understanding, but robs the imagination?" (December 25, 1851, *Journal*); "I have be-

come sadly scientific" (July 13, 1852, letter to Sophia Thoreau).

It is somewhat startling to realize what Thoreau did *not* know at the start of his program in 1850—particularly with respect to woody plants. Thoreau, three years after his stay at Walden Pond, had never distinguished the first native tree to blossom in spring, silver maple (*Acer saccharinum*) (May 1, 1852, *Journal*); was unaware that but one type of spruce, black spruce (*Picea mariana*), occurred in Concord (May 25, 1857, *Journal*); could not distinguish poison ivy (*Rhus radicans*) from poison sumac (*Rhus vernix*) (May 25, 1851, *Journal*); and did not know the common witherod (*Viburnum cassinoides*) (September 11, 1851, *Journal*). Thoreau later recalled this state of ignorance:

I remember gazing with interest at the swamps about those days and wondering if I could ever attain to such familiarity with plants that I should know the species of every twig and leaf in them, that I should be acquainted with every plant (excepting grasses and cryptogamous ones), summer and winter, that I saw. Though I knew most of the flowers, and there were not in any particular swamp more than half a dozen shrubs that I did not know, yet these made it seem like a maze to me, of a thousand strange species, and I even thought of commencing at one end and looking it faithfully and laboriously through till I knew it all. I little thought that in a year or two I should have attained to that knowledge without all that labor. (December 4, 1856, *Journal*)

During the early 1850s Thoreau's passion for recording flowering dates and leafing of woody plants dawned. He described the great lengths he



The sketches accompanying this article are taken from the "Walden" edition of Thoreau's *Journal*.

went to at times to ascertain the exact date a particular flower opened—"running to different sides of the town and into neighboring towns, often between twenty and thirty miles in a day" (December 4, 1856, *Journal*). Understandably, he noted: "One has as much as he can do to observe how flowers successively unfold" (June 15, 1852, *Journal*). His fascination for flowering dates never abated. It was always a victory to discover a new station for a plant with an earlier blossom time:



"It will take you half a lifetime to find out where to look for the earliest flower" (April 2, 1856, *Journal*). In his last years Thoreau organized this and other phenological data spanning a decade into elaborate monthly charts. These may represent the skeleton of a contemplated volume portraying a representative year in Concord.

As Thoreau's botanical acumen rapidly developed, he accepted the role of town botanist. It was important to him to know the location of plants rare in Concord. He made one of his most noteworthy finds while surveying in November 1851—the climbing fern (*Lygodium palmatum*), a peculiarly attractive fern that is regionally scarce. In May 1853 he discovered the showy painted cup (*Castilleja coccinea*) and marvelled "how long some very conspicuous ones [flowers] may escape the most diligent walker, if you do not chance to visit their localities the right week or fortnight." In the same month he related in the *Journal* an amusing account of extracting the locality of the fragrant roseshell azalea (*Rhododendron roseum*) or pinxter-flower from a local hunter. He saw allegorical significance in the fact "that, when I

thought I knew the flowers so well, the beautiful purple azalea or pinxter-flower should be shown me by the hunter who found it" (May 31, 1853, *Journal*). Part of his argument used to persuade the hunter, Melvin, was that "I was a botanist and ought to know."

Thoreau's botanical interest in Concord naturally overflowed into his travels away from his native town. The accounts of his earliest significant trips—*Ktaadn and the Maine Woods* (1848), *A Week* (1849), and *An Excursion to Canada* (1853)—contain for the most part references only to common plants with relatively little use of Latin names. The same is essentially true for *Walden* (1854). A trip to Mt. Wachusett, Massachusetts, in October 1854 is represented in his *Journal* primarily by a list of common names of trees and shrubs seen there. This is a forerunner of more extensive lists, primarily in Latin, prepared for later excursions. For example, plants collected on a journey to Vermont and New Hampshire in September 1856 were carefully listed in the *Journal*. Similarly, notes in the *Journal* on his July 1855 trip to Cape Cod are littered with the Latin names for those flowers peculiar to the coast. By contrast, his articles on Cape Cod that appeared in *Putnam's Magazine* that year contain only two scientific plant names.

By 1857 Thoreau had clearly progressed beyond the fledgling stage and was perhaps one of the more competent amateur botanists in Massachusetts. In this year he made one of the most detailed lists of plants recorded for one of his journeys—the Allegash trip to Maine. This occurs in the *Journal* (not published in the 1906 "Walden" edition) and as an appendix to *Maine Woods* (1864). This list also notes species seen on his Chesuncook trip to Maine in September 1853.

In July 1858 Thoreau made possibly his most significant contribution to New England botany. That month he ascended Mt. Washington, New Hampshire—the highest peak in New England—and prepared the most detailed list of plants by zones that had ever been made for this site, one not to be surpassed until the twentieth century. The month before he had similarly listed plants

found on Mt. Monadnock, New Hampshire; he supplemented this list with more botanical notes after a return visit in August 1860. The listing of plants by zones was probably inspired by Alexander von Humboldt's famous correlation of altitudinal plant zones with those of latitude.

Thoreau's journey to Minnesota in 1861 was made at a time when his botanical prowess was considerable but when his health was failing. His enthusiastic companion, Horace Mann, Jr., was a young naturalist whose promising career in botany at Harvard was cut short by tuberculosis within the decade. Thoreau's notebooks for the journey are liberally sprinkled with scientific plant names—old friends and new. Included also were the customary lists of plants seen. This was to be essentially Thoreau's last botanical foray.

Although Thoreau demonstrated much botanical curiosity on his excursions, it was always Concord's flora that was dearest to him: "Many a weed here stands for more of life to me than the big trees of California would if I should go there" (November 20, 1857, *Journal*). On February 4, 1858, Thoreau was astonished to find Labrador tea (*Ledum groenlandicum*) in Concord. He had, however, anticipated the discovery a year and a half earlier: "But why should not as wild plants grow here as in Berkshire, as in Labrador? . . . I shall never find in the wilds of Labrador any greater wildness than in some recess in Concord" (August 30, 1856, *Journal*).

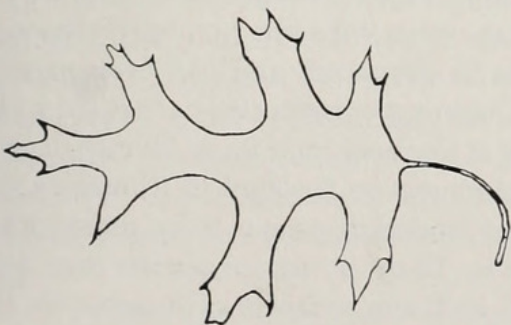
In the same swamp that harbored the Labrador tea, Thoreau noticed some curious growth on the black spruce there. Here he missed the opportunity to describe a plant at that time unknown to

science: the locally rare parasite, dwarf mistletoe (*Arceuthobium pusillum*).

Starting about 1858 Thoreau undertook the study of grasses and sedges in earnest. These groups are relatively unfamiliar even to most modern botanists. Within two or three years he attained a substantial knowledge of those species that occur in Concord. His collections include nearly 100 species from the town (nearly half of those recorded in the town to date.) Other difficult plants groups such as lichens, mosses, and fungi resisted study owing to the absence of good regional manuals. Consequently, excepting lichens, his scientific references to these plant groups are minimal. Even with lichens he never came close to acquiring expertise comparable to what he achieved with vascular plants. In a short article entitled "Thoreau, the Lichenist" lichenologist Reginald Heber Howe, Jr., commented that Thoreau's observations of lichens showed "only a slight knowledge of species, and no technical grasp whatsoever." But Howe, who studied lichens in Concord about sixty years after Thoreau, noted that Thoreau knew the varied morphological types and appreciated their place in Nature. (See *The Guide to Nature*, volume 5, pages 17–20, 1912.) Any collections he might have made of lichens, mosses, and fungi are not known to have survived.

In his day there were relatively few regional botanists for Thoreau to share his observations with. The most notable New England botanist, Asa Gray (1810–88), at Harvard, was apparently not very accessible and was known to be primarily a herbarium botanist rather than a field botanist. A. Hunter Dupree, Gray's biographer, states that neither Ralph Waldo Emerson nor Thoreau crossed Asa Gray's path and attributes this to the empiricist Gray's hostility towards Transcendentalism.

Aside from Asa Gray, virtually all other botanists in New England at this time were amateurs. The most knowledgeable of these that Thoreau met was the Rev. John Lewis Russell (1808–73) of Salem, Massachusetts. Russell, a Unitarian minister, was for forty years professor



of botany and vegetable physiology at the Massachusetts Horticultural Society and became a fellow of the American Academy of Arts and Sciences. He was well acquainted with men who described new plant species and for whom species were named. Russell was particularly interested in mosses, liverworts, and lichens. Since Russell was a classmate of Ralph Waldo Emerson's brother, Charles, at Harvard, it is likely that Thoreau first learned of Russell through Emerson. Russell visited Emerson in September 1838, at which time Emerson noted in his *Journal* that he was "A man in whose mind things stand in the order of cause & effect & not in the order of a shop or even of a cabinet."

What may have been Thoreau's first meeting with Russell occurred in Concord in August 1854. Thoreau's appetite for authoritative botanical identifications is evidenced by his notes for the three days he showed Russell around the town, which included a visit to the climbing fern. Russell made a second visit on July 23, 1856, to see a small yellow pond lily (*Nuphar* sp.). Russell must have noted Thoreau's increasing botanical proficiency and certainly was made aware of his new interest in grasses and sedges at the time of their last meeting on September 21, 1858.



That day Thoreau visited Russell at Cape Ann and the Essex Institute in Salem, Massachusetts. The day was divided between a morning with the Institute's collections and an afternoon in the field. Thoreau made the most of the opportunity to confirm identifications in difficult groups like willows (*Salix*) and lichens.

Other published botanists, such as Jacob Bigelow (1787–1879), professor of materia medica at Harvard, and George B. Emerson (1797–1881), both in the Boston area, apparently

moved in social circles too rarefied ever to permit personal acquaintance with Thoreau. Schoolmaster and botanist Emerson was president of the Boston Society of Natural History, of which Thoreau was elected a corresponding member in 1850 (for contributing an American goshawk). According to A. Hunter Dupree, Emerson was dean of the scientific community in Boston and responsible for Asa Gray's appointment at Harvard in 1842. Though Thoreau made frequent visits to the collections and library of the Society, his interest there was primarily in fauna. Not being a regular member, he did not rub shoulders with members Gray, Bigelow, and Emerson. Consequently, Thoreau's meetings with Russell represent his closet contact with a botanist of professional caliber.

Although Benjamin Marston Watson (1820–96) was, strictly speaking, a horticulturist, his friendship with Thoreau provided an important opportunity to share botanical notes. Watson established his Old Colony Nurseries in Plymouth, Massachusetts, in 1845. This estate became a favorite retreat for the Transcendentalists of Concord. Thoreau in the same year (and only one month after setting up at Walden Pond) forwarded to Watson some fruit and seeds from some of Concord's uncommon trees and shrubs. The evident purpose was to assist Watson in his horticultural enterprise. Watson in turn sent Thoreau unusual specimens from his nursery, hired him to survey his farm, and invited him to lecture in Plymouth. Thoreau's *Journal* records regular visits to Watson in Plymouth where he could see living examples of plants foreign to New England.

A mutual friend of Thoreau and Marston Watson was George P. Bradford (1807–90), a teacher, who for a time did some market gardening with Watson in Plymouth and had been part of the Brook Farm experiment. He had taught a class in botany at a school for girls in Plymouth in 1830. The references to Bradford in Thoreau's *Journal* are brief, touching primarily on unusual botanical finds. There is the suggestion that Bradford shared a Transcendentalist interest in botany

when Thoreau notes Edward Hoar's proposal that a leaf of the climbing fern be sent to Bradford "to remind him that the sun still shone in America" (August 14, 1854, *Journal*). Oddly, there is but one inconsequential reference to Bradford in Thoreau's published correspondence.

Bradford, Russell, and Austin Bacon of Natick are acknowledged in the preface to George B. Emerson's report on the trees and shrubs of Massachusetts. This preface approximates a directory of Massachusetts botanists in 1846. Austin Bacon (1813–88) was a surveyor–naturalist. Thoreau paid a visit to him on August 24, 1857, and was shown a number of Natick's botanical highlights. Thoreau's interest in Natick no doubt arose from his reading of Oliver N. Bacon's *History of Natick*, which included a list of unusual plants (January 19, 1856, *Journal*).

Among Concordians there were only Edward S. Hoar, Minot Pratt, and sister Sophia with whom Thoreau spoke about botany in any depth. Edward S. Hoar (1823–93), a retired lawyer, accompanied Thoreau on his trips to the White Mountains of New Hampshire and Maine's Allegash and Penobscot Rivers. He was also Thoreau's accomplice in the accidental burning of the Fairhaven Woods in Concord in 1844. Like Thoreau, Hoar collected plant specimens and pressed them. Indeed, Hoar's collections are much superior in quality, particularly with respect to the legibility and detail of his collection data. The majority of his specimens were collected from 1857 to 1860 and included many grasses and sedges. These were the years during which Thoreau undertook a study of the same difficult groups, but curiously the *Journal* offers no support for the idea that they studied together. The references to Hoar in the *Journal* do show that Hoar brought to Thoreau's attention various botanical curiosities that he found. It is evident that for Thoreau's northern journeys Hoar was the companion of choice because of his enthusiasm for natural history, particularly of the botanical variety.

Minot Pratt (1805–78), a farmer–horti-

culturist, moved to Concord after four years at the Brook Farm experiment. If there was anyone as intimately familiar with Concord's wild flowers as Thoreau, it was Minot Pratt. Apparently he was just as independent, since Thoreau's references to him in the *Journal* suggest only limited communication between the two about the location of Concord's rarities. On three occasions Pratt gave Thoreau a botanical tour of his neck of the woods—Punkatasset Hill and Estabrook Woods, some of the richest areas in the town botanically (August 17, 1856; May 18, 1857; and June 7, 1857, *Journal*). Pratt later engaged in a practice that has earned him a degree of notoriety among latter-day botanists, namely, the establishment of alien plants in Concord. Thoreau rarely did the same, but his introduction of *Nasturtium officinale* is an example (April 26, 1859, *Journal*).

Judging from her herbarium, which is now at the Concord Free Public Library, Sophia Thoreau (1819–76) had an interest in botany that was considerably less scientific than her brother's and more in the aesthetic vein. Many of her pressed plants consist of several species to a sheet, with an eye to attractive arrangement. There is rarely any information recorded as to their identity or location. Thoreau mentions three flowers in his sister's herbarium that he had not seen in Concord—whorled pogonia (*Isotria verticillata*), painted trillium (*Trillium undulatum*), and perfoliate bellwort (*Uvularia perfoliata*) (September 22, 1852, *Journal*). All are locally rare. Strangely, there is no evidence that Thoreau ever saw any of these within the bounds of Concord (where Sophia found them). This suggests a bit of sibling rivalry.

The general scarcity of botanists in New England in Thoreau's time undoubtedly arose from a virtual absence of illustrated manuals and popular field guides treating the flora of the region. These were to appear only later in the nineteenth century. Thoreau complained of this lack (compared to what the British had) indirectly: "A few pages of cuts representing the different parts of

plants, with the botanical names attached, is worth volumes of explanation" (February 17, 1852, *Journal*). He found the plant descriptions available unsatisfactory, and they were: "I quarrel with most botanists' description of different species, say of willows. . . . No stress is laid upon the peculiarity of the species in question, and it requires a very careful examination and comparison to detect any difference in the description" (May 25, 1853, *Journal*); "You cannot surely identify a plant from a scientific description until after long practice" (April 26, 1857, Letter to B. B. Wiley).

Thoreau's library (as listed by Walter Harding in 1957) reflects the relative dearth of botanical references of the time. He owned almost all the volumes that would pertain to Concord's vascular flora and a number that were only marginally relevant. Harding's catalog includes the following botanical works:

The Vegetable Kingdom: or, Handbook of Plants and Fruits (Chapin)

Report on the Herbaceous Plants of Massachusetts (Dewey) and *Report on the Quadrapeds of Massachusetts* (Emmons) [both issued by the Massachusetts Zoological and Botanical Survey]

A Report on the Trees and Shrubs Growing Naturally in the Forests of Massachusetts (Emerson)

Culture of the Grasses (Flint)

Manual of Botany, 1st and 2nd editions (Gray)

A Popular History of British Lichens (Lindsay)

Arboretum et Fruticetum Britannicum (Loudon)

Encyclopaedia of Plants (Loudon)

Enchiridion botanicum; or, A Compleate Herball (Lovell)

Ferns of Great Britain (Sowerby)

A Popular History of British Mosses (Stark)

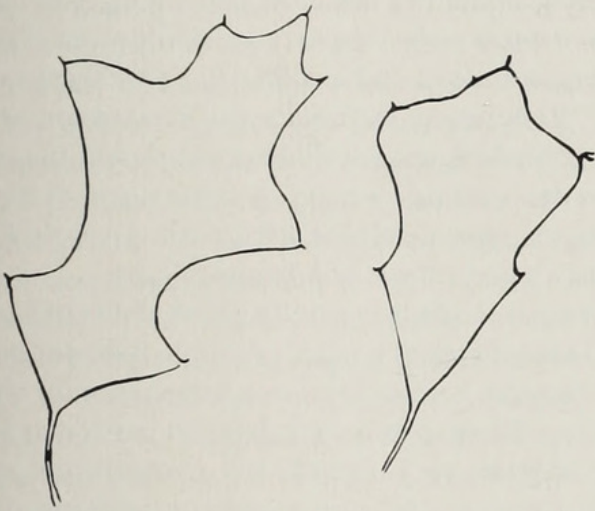
To this list should be added Jacob Bigelow's *Florula Bostoniensis* (various editions), which Thoreau must have owned, judging from the frequent *Journal* references to it. Three well-known manuals that Thoreau consulted from time to time were Amos Eaton's *A Manual of Botany for the Northern and Middle States* (various editions), John Torrey's *Flora of the Northern and Middle Sections of the United States* (1826), and Torrey and Gray's *A Flora of North America* (1838–43). None of these offered much more than

could be found in the manuals of Bigelow and Gray. Torrey and Gray's work was the most thorough of the three but was unfinished and covered too much geographical territory to be convenient. If modern field guides and botanical manuals had been available to Thoreau, his expertise would have developed much earlier and much more rapidly. It is surprising that he managed as well as he did.

A well-identified herbarium is the ultimate all-season botanical reference work. Unfortunately, regional herbaria were also in their infancy in Thoreau's time. It is understandable that Thoreau did not miss the opportunity to examine the meager plant collections at the Boston Society of Natural History rooms (June 19, 1856, *Journal*) and the Essex Institute (September 21, 1858, *Journal*). The best collections, however, were in the custody of individuals and were private.

Thoreau's own herbarium (numbering in the end more than 900 specimens) was no doubt one of the larger collections in eastern Massachusetts at the time. Thoreau himself realized this, commenting in a letter to Mary Brown (April 23, 1858): "I should be glad to show you my Herbarium, which is very large." From a modern viewpoint the data he recorded for his collections are, on the whole, poor. Approximately one-half of the specimens note only the identity of the plant, omitting the most important bit of information—the locality. This detracts significantly from the scientific value of the collection. In the difficult groups like grasses, sedges, and willows his data are generally much better than the remainder of the collection but frequently difficult to decipher (written small, in pencil, and hurriedly or carelessly). His habit of using his straw hat as a botany box to bring home plants collected in the field tended to encourage the gathering of small, inadequate, or incomplete samples.

Thoreau evidently started his organized herbarium (as opposed to casual collections placed in commonplace books or manuals) about 1850, judging from the earliest dated specimens. This



was the same period when he began to study botany with more method. Clearly Thoreau created his herbarium as an aid in sorting out the identities of plants he found in Concord and on his travels and not as a vehicle for preserving his memory among future botanists (a common purpose of private herbaria).

The disposition of his herbarium following his death was that, at his request, about 100 grasses and sedges were given to his botanical companion, Edward Hoar, and the remainder (some 800 specimens) were given to the Boston Society of Natural History. Thoreau's grasses and sedges in the possession of Hoar, along with most of Hoar's own collection, were eventually given to the New England Botanical Club by Hoar's daughter, Mrs. M. L. B. Bradford, in 1912. The Club's herbarium is currently housed at Harvard University. The Thoreau specimens have been carefully mounted on standard-sized herbarium sheets together with Thoreau's pencil-scribbled scraps of data and Hoar's transcription of them. This is the most scientifically useful part of Thoreau's herbarium owing to the presence of collection data, the difficulty of the plant families involved, and the addition of annotations by later botanical experts such as M. L. Fernald.

The bulk of Thoreau's herbarium stayed with the Boston Society of Natural History until 1880, when it was given to the Concord Free Public Library. In 1959 the Library turned the collection

over to Harvard University's Gray Herbarium, where it resides currently separate from their main collection. Unlike Thoreau's grasses and sedges, this part of the collection appears for the most part to be in the condition in which he left it at his death. Because of its relative inaccessibility and lesser scientific value, it has received relatively little critical attention by later botanists. The specimens are somewhat insecurely attached with pieces of tape to elephant folio-sized sheets of flimsy paper. Occasionally smaller sheets of paper are used. There is usually more than one specimen to a sheet, sometimes six or more, and frequently more than one species to a page. Typically, only the Latin name for the species is written in pencil near the specimen. Locality data such as "Truro '55," "Brattleboro," and "Maine '57" are sometimes noted in pencil beside particular specimens or scribbled on small scraps of paper slipped under the specimens. The sheets are numbered in pencil and arranged in systematic order according to Gray's *Manual of Botany* (second edition). The collection is divided into six parts, each kept in a large, worn cardboard portfolio. A listing of species was made by the Boston Society of Natural History in a separate notebook.

In contrast to his sister's herbarium, Thoreau's collection is well organized and the placement of specimens on the sheets is determined by practicality rather than aesthetics. In spite of some careless handling and neglect, the specimens at present are generally in good condition. There is surprisingly little evidence of insect damage. A few specimens retain enough of their original bright tints that they appear to have been pressed within the past year. The fragility of the collection will continue to leave it vulnerable to inadvertent mistreatment by those unfamiliar with the proper manner of handling pressed specimens.

Within his lifetime Thoreau published but one work concerned with the world of plants. This is his essay "The Succession of Forest Trees," delivered as an address before the Middlesex Agricultural Society in Concord in September 1860 and



Angelo, Ray. 1985. "Thoreau as Botanist: An Appreciation and a Critique." *Arnoldia* 45(3), 13–23.

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