

# The Found World: The Role of Findability in the History of Botany

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This study will investigate how a community of botanists used the findability inherent in botanical localities to rediscover species that were previously lost to botany. This article will look at the literature that announced the rediscovery of three species in the vicinity of White Sulphur Springs, West Virginia. These species are *Heuchera hispida*, *Phlox buckleyi*, and *Gaylussacia brachycera*. These three plants were rediscovered over a short period of time, about 13 years from 1919 to 1932. This study will draw from the announcement of these rediscoveries. In each of these cases there was a surrounding literature that preceded or followed these rediscoveries. This article will borrow the concept of findability from information science. Findability will show that these rediscoveries involved the use of an information storage and retrieval system, the botanical locality. If these localities acted as an information storage and retrieval system then we can understand how localities aided in the rediscovery of species.

## Introduction

Between 1919 and 1932 three species were found in the vicinity of Kate's Mountain in Greenbrier County, West Virginia. These were *Heuchera hispida* (Pursh) (American alum), *Phlox buckleyi* (Wherry) (swordleaf phlox), and *Gaylussacia brachycera* (Michaux) A. Gray (box huckleberry). Two of these species, *Heuchera hispida* and *Phlox buckleyi*, had been lost to botany. The third, *Gaylussacia brachycera*, was known by only three stations when it was found in Southeast West Virginia. This account can give the historian, the philosopher, and the botanist a glimpse into how localities aid in the finding of species in the wild. The following is a view of the historical practice of botanists through the lens of information storage and retrieval. This approach will bring to attention the integral importance of localities in the development of botany. This article will borrow much from Douglas Tuers' 2019 paper "A Very Glabrate Form" (Tuers 2019). In that article Tuers suggests that Kate's Mountain and its vicinity were not neutral but rather aided in botanical research. Kate's Mountain was particularly adept at facilitating the retrieval of botanical data. This article will pick up this line of reasoning and take it further by arguing for the following six theses.

1. The botanists who were seeking to make rediscoveries or find new stations were intentional in their seeking.
2. Continuing from Tuers (2019) I will provide greater evidence in favor of a diminished division between herbarium and locality.
3. Rediscovery could be social, human networks were used for seeking lost species.
4. This article will provide greater evidence for the thesis from Tuers (2019) that the descriptions of localities acted as a finding aid.
5. The taxonomy itself effected the findability through fracturing and subsumption.
6. This article will provide greater evidence for the thesis from Tuers (2019) that Kate's Mountain fulfilled the repository's role of preservation.

Ernst Mayr remarked about contemporary classification, that one of classification's roles was "to serve as the key to an information storage system" (Mayr 1982). Like Tuers (2019) this article will take Mayr's statement seriously as a description of how localities operate in botany.

### *Heuchera hispida*

The first case will concern the rediscovery of *Heuchera hispida*. *Heuchera hispida* first appeared in Frederick Pursh's *Flora Americi Septentrionalis* of 1814 (Pursh 1814). In this work Pursh offered a description of *Heuchera hispida*:

hairless on the stalk, petioles, and the underside of the leaves, the leaves have pointed lobes, bluntly serrated and hairy on top: very short teeth with somewhat rounded points, the branches having stems each of which having a few flowers, the calyxes are medium sized and somewhat

pointed, lengthwise the petals of the calyx are broad and flat, with bare stamens<sup>ii</sup> (Pursh 1814).

Pursh goes on to report that the species could be found "On high mountains of Virginia and Carolina" (Pursh 1814). Despite Pursh's description *Heuchera hispida* became lost to botany.

Botany would not remain silent on *Heuchera hispida*. A tantalizing hint as to the locality of *Heuchera hispida* was provided by Asa Gray. In a letter to John Torrey, while on a botanical expedition through the southeastern United States in September of 1843, Gray wrote that he had found *Heuchera hispida*, "not far from where Pursh discovered it, but more west, on the frontiers of a range of mountains where this very local species doubtless abounds" (Gray 1893). Gray said in his letter to John Torrey that he collected *Heuchera hispida* near where he believed Pursh had originally collected it. In an 1846 article in the *American Journal of Science and Arts* Gray wrote that he collected roots of *Heuchera hispida* in Giles County for later cultivation (Gray 1846).

After *Heuchera hispida* was found by Asa Gray the species saw an expansion in its distribution<sup>iii</sup>. In the *Plantæ Fendlerianæ* Gray decided that *Heuchera hispida* was identical to *Heuchera richardsonii* (Gray and Fendler 1849). Gray said that he was agreeing with the opinion of S.B. Mead from Illinois who had collected *Heuchera hispida* in that state. From Gray's words it sounds like the equation of *Heuchera hispida* and *Heuchera richardsonii* was made by Mead. Indeed a 1845 specimen of *Heuchera richardsonii* collected by S.B. Mead contains a note by Mead that reads:

*Heuchera richardsonii*  
 " " *hispida*, Pursh  
 Augusta  
 SB Mead Ill (Mead 00031085 BRU).

In 1856 Asa Gray would follow up his 1849 treatment of *Heuchera hispida* in *The Manual of the Botany of the Northern United States* (Gray 1856). Here Gray listed *Heuchera hispida* and remarked that it occurred in "Mountains of Virginia. Also Illinois (Dr. Mead) and northwestward" (Gray 1856). Forty-eight years later in *An Illustrated Flora of the Northern United States* Nathaniel Lord Britton and Addison Brown listed *Heuchera richardsonii* as a synonym for *Heuchera hispida* (Britton and Brown 1897). Here the range for *Heuchera hispida* was given as, "Virginia to western Ontario, west to Kansas, Manitoba and the Northwest Territory, south in the rocky mountains to Montana and Idaho" (Britton and Brown 1897). Per Axel Rydberg and John Kunkel Small split *Heuchera hispida* and *Heuchera richardsonii* up in their *North American Flora* (Small and Rydberg 1905). They gave *Heuchera hispida* a type location of "On high mountains of Virginia and Carolina" (Small and Rydberg 1905) and a very wide distribution bordered by Ontario, Saskatchewan, Wyoming, Kansas, and Virginia. They believed that *Heuchera hispida* and *Heuchera richardsonii* were separate species that had roughly the same distribution. Rosendahl et al. (1933) argued that most specimens that had been identified as *Heuchera hispida* were actually instances of a distinct *Heuchera richardsonii* species and its variants. This ended a period of taxonomic uncertainty.

Pursh's *Heuchera hispida* was not rediscovered until 1932. In that year the Greenbrier Independent newspaper of July 8 from Greenbrier County, West Virginia announced the rediscovery of *Heuchera hispida* by Edgar Wherry ("Finds Long Lost Plant" 1932)<sup>v</sup>. The Greenbrier Independent wrote that botanists renewed the search for *Heuchera hispida* a few years earlier. According to the Greenbrier Independent when curators in Berlin were moving plants from Frederick Pursh's garden they found the original specimen of *Heuchera hispida* with a label attached that stated that the specimen was collected in White Sulphur Springs, Virginia (West Virginia now). This location is close to Giles County, Virginia (around 25 miles) mentioned by Asa Gray in his 1846 article. Gray wrote in his letter to John Torrey that he believed Pursh had collected *Heuchera hispida* to the east of where he collected *Heuchera hispida* in Giles County. White Sulphur Springs is east but also further north than Giles County. Edgar Wherry's 1933 announcement of the rediscovery of *Heuchera hispida* appeared in the journal *Rhodora* (Wherry 1933) In the *Rhodora* article Wherry said that *Heuchera hispida* was found on Potts Mountain, about 15 miles south of Kate's Mountain. In this account Wherry contradicted accounts like the Greenbrier Independent story by depicting the rediscovery as not accidental but rather intentional. Wherry wrote that he had set out from Pennsylvania with another botanist for the purpose of finding *Heuchera hispida*. Wherry said in the *Rhodora* article that his search was informed by a specimen at the Academy of Natural Science in Philadelphia which stated the locality as Fincastle and Sweet Springs.

This was part of a pattern. Edgar Wherry had already figured prominently in the rediscovery of lost species near Kate's Mountain in the years preceding the rediscovery of *Heuchera hispida*.

#### *Phlox buckleyi*

The July 8, 1932 Greenbrier Independent article remarked that *Phlox buckleyi* was found on Kate's Mountain. Edgar Wherry officially announced the rediscovery of the phlox in a 1930 article in The Journal of the Washington Academy of Science (Wherry 1930). He stated in this article that swordleaf phlox was rediscovered by Marian Franklin of Lewisburg, a neighboring town to White Sulphur Springs around 1919. The type locality was listed in the 1930 article as White Sulphur Springs, West Virginia. Wherry included photos of *Phlox buckleyi* in the field and pressed specimens and said that they came from "the locality southeast of Caldwell, West Virginia" (Wherry 1930) which would be in the direction of Kate's Mountain. Wherry also wrote that swordleaf phlox was found in several places including a quarter mile south of the "White Sulphur Springs station" (Wherry 1930). If this is the same location of the current station then this account would almost certainly place swordleaf phlox on Kate's Mountain. Wherry added that this may be the locality where swordleaf phlox was first collected. Through an additional triangulation with the description of the site as "3/4 mile southeast of Caldwell," (Wherry 1930) we can confidently say that *Phlox buckleyi* was rediscovered on Kate's Mountain.

*Phlox buckleyi* was first collected by Samuel Buckley in 1838, but "lay unnoticed" (Wherry 1936) in Buckley's herbarium for many years. Buckley's original specimen is today at the Missouri Botanical Garden herbarium. On this specimen is the note, "Phlox, undescribed Ed. Wherry, 1928. Might well be named *P. buckleyi*" (Buckley 694446 MO). Edgar Wherry followed this instinct in his 1930 paper and wrote:

The data obtained justify announcing it as an independent species, which seems appropriately named: *Phlox buckleyi* Wherry, sp. Nov (Wherry, 1930). No specific determination was made by Buckley, on his specimen he wrote only "Phlox no 2." as the identification.

Edgar Wherry would revisit *Phlox buckleyi* in a 1936 article in The Journal of the Southern Appalachian Botanical Club (Wherry 1936). In this 1936 paper Edgar Wherry made a call for botanists to collect botanical data on twelve rare phloxes. The sixth of these, which Wherry considered as "in several respects the most remarkable of our eastern Phloxes" (Wherry 1936) was swordleaf phlox<sup>v</sup>. Wherry wrote in his account that the original specimen collected by Buckley was lost in Buckley's herbarium for 75 years and only gained species-hood in 1930, eleven years after Marian Franklin rediscovered the plant. Wherry wrote that the species was originally collected in White Sulphur Springs by

Samuel Buckley and added that while it was lost *Phlox buckleyi* was not mentioned in the botanical literature or collected. Wherry went on to write that swordleaf phlox grows, "in open woods, but chiefly or wholly in those situated at the base of a shaly slope, where the soil contains slabs or flakes of the shale rock" (Wherry 1936).

#### *Gaylussacia brachycera*

*Gaylussacia brachycera* is held to be one of the longest living organisms on earth. However, in 1919 a warning was issued in the journal *Science* by Frederick V. Coville. Coville wrote, "The box huckleberry (*Gaylussacia brachycera*) is a rare and beautiful American shrub which is in process of extinction" (Coville 1919). Coville had surveyed herbaria in the United States to identify the recorded stations of *Gaylussacia brachycera*. He listed two stations for box huckleberry, one in Perry County, Pennsylvania and one in Sussex County, Delaware. Coville added that rumors of stations in Greenbrier County, West Virginia and surrounding counties were unsubstantiated. Coville estimated the age of the colony in Perry County, Pennsylvania to be about 1,200 years.

In 1920 a new station for box huckleberry was discovered by H.A. Ward, in Perry County, Pennsylvania (Ward 1920). After discovering this new station Ward wrote that he revisited the new station with John Kunkel Small and Edgar Wherry. John Kunkel Small had joined the search for stations of box huckleberry. The following year the Torrey Botanical Club made the following announcement in the proceedings of their meeting of November 24, 1921:

Dr. John K. Small told of his search for the rare box huckleberry, *Gaylussacia brachycera*. He visited the three known stations for the plant, on the coastal plain of Delaware and in the Blue Ridge Mountains of Pennsylvania. He expressed the opinion that each colony was really a single plant widely spread below ground with hundreds of ascending stems, covering in one case over a hundred acres (Proceedings of the Club, 1921).

At the time of the Proceedings there were only three known stations of box huckleberry.

The next year in 1922 stations of box huckleberry were discovered in three counties in West Virginia by Fred W. Gray (Gray 1922). Gray, in his 1922 article in *Torrey*, said he found *Gaylussacia brachycera* near Dorr, WV in Monroe County which borders Greenbrier County to the south. Gray was able to locate several other locations for *Gaylussacia brachycera*, he wrote:

In a few days I set to work by items in the local papers and by personal correspondence to try and determine the extent of the occurrence of *Gaylussacia brachycera* in this section (Gray 1922).

The 1932 Greenbrier Independent article mentioned in passing that Fred Gray made another trip with Edgar Wherry in 1925 and found box huckleberry on Kate's Mountain. The Greenbrier Independent said that the plant found by Gray and Wherry on this trip was between 5,000 and 7,000 years old.

*Gaylussacia brachycera* was born in print in Andre Michaux's *Flora boreali-Americana* (Michaux 1803). Michaux gave box huckleberry the name *Vaccinium brachycerum*. He wrote in the *Flora boreali-Americana* that *Vaccinium brachycerum* occurred around Winchester, Virginia and wrote the following description:

A boxwood, the leaves are egg shaped, with occasional and distinct rounded teeth: flowers grow in small bundles close to the ground: the petals are short: stamens have filaments that are full of glands; the anthers are very short and horn shaped (Michaux 1803)<sup>vi</sup>.

Two years later, in 1805, Richard Salisbury gave a description of *Vaccinium brachycerum* in *Paradisus Londinensis* (Salisbury 1805). In this work Salisbury renamed box huckleberry *Vaccinium buxifolium*. The next year *Curtis' Botanical Magazine* continued using the name *Vaccinium buxifolium* from Salisbury (Sims 1806). In that volume the

author, John Sims, did not mention *Vaccinium buxifolium*'s occurrence in Winchester, Virginia from the *Flora boreali-Americana*. In the *Flora Americi Seprtrionalis* of 1814 Frederick Pursh continued using the name *Vaccinium buxifolium* from the *Paradisus Londinensis* and wrote that it occurred in, "In dry woods, on limestone rocks: western parts of Virginia, near Winchester and the Sweet Springs" (Pursh 1814)<sup>xiii</sup>. Fred Gray mentioned Pursh's collecting of box huckleberry in Sweet Springs in Monroe County, West Virginia in his 1922 paper. It is interesting that this locality seems to have been lost in those years intervening Pursh and Fred Gray, or perhaps Pursh's listing was the source of the rumors that Coville mentioned in his 1919 *Science* article.

The current name, *Gaylussacia brachycera*, was introduced in 1848 and communicated to the The American Academy of Arts and Sciences<sup>xviii</sup>. In the 1848 announcement Asa Gray wrote that the Dickinson College naturalist Spencer Baird had sent him specimens of *Gaylussacia brachycera* found in Pennsylvania (Gray 1848). The naming controversy would not end here however. John Kunkel Small introduced yet another name for box huckleberry, the name *Buxifolium brachycera* in his *Manual of the Southeastern Flora* of 1933 (Small 1933). This designation did not catch on in the literature, however.

The occurrence of box huckleberry in southeastern West Virginia and western Virginia was an open question in this history until the discovery by Fred Gray around Dorr, West Virginia. In the *Flora boreali-Americana* Michaux said that box huckleberry occurred near Winchester, Virginia. But Asa Gray said that Michaux's specimen actually indicated that it was collected in Warm Springs, Virginia<sup>x</sup> and gave evidence that other specimens may have been collected in nearby Greenbrier County, West Virginia (Gray 1848). This, along with Pursh's listing a locality in Sweet Springs, may be the source of the rumors Coville was talking about in 1919. It is interesting that both Salisbury and Michaux listed box huckleberry as occurring in Winchester, Virginia. On the other hand, neither Ward, Coville, nor Fred Gray mentioned Winchester, Virginia as a locality. Ward said there were only two known localities in his day, those in Delaware and Pennsylvania. Botanists who followed Asa Gray's lead may have said that Michaux's type locality was Warm Springs, Virginia and not Winchester, Virginia. But it is curious then that Coville said that the rumors of *Gaylussacia brachycera* occurring around Greenbrier County were unsubstantiated. This may also be because Coville only searched American herbaria, Michaux's specimen, Gray tells us, was in Paris. Asa Gray was not the only botanist to place box huckleberry in southeastern West Virginia and western Virginia. Frederick Pursh, before Gray, listed Sweet Springs as a locality of the box huckleberry. Fred Gray, in his 1922 article, followed Asa Gray's line of reasoning locating the type location of *Gaylussacia brachycera* at Warm Springs. Fred Gray also said that *Gaylussacia brachycera* occurred in Greenbrier County.

Accounts in both *Curtis' Botanical Magazine* and the *Paradisus Londinensis* suggested that box huckleberry was cultivated in Britain. Considering Coville's warning about its possible extinction any cultivation of box huckleberry may have been very limited<sup>x</sup>. This is likely, for H.A. Ward mentioned in his 1920 paper that there had been numerous attempts to cultivate box huckleberry, but that most had failed. Still it is an open question then how widely box huckleberry was cultivated. As we will see later there were many vernacular names and identities for *Gaylussacia brachycera*, so it is possible that it was widely cultivated under one of these identities.

Edgar Wherry would return to this history to provide a capstone to box huckleberry. In 1934 Edgar Wherry recounted the taxonomic development of box huckleberry in order to make a call to the botanical community to carry out more field work (Wherry 1934). In this paper Wherry mentioned the same degradation of the Perry County locality mentioned by Frederick Coville but added that by 1934 the locality had been included in a state preserve. Wherry said that the Sussex County, Delaware locality was believed for years to have been obliterated, but that he had rediscovered it in 1919. According to Wherry, after Fred Gray's 1922 article box huckleberry was discovered in several other localities when botanists began querying local populations who had regional names for the edible plant. This is what Wherry's justification for more field work consisted of and its justification took shape with Fred Gray's investigation in Monroe County, West Virginia and

surrounding counties where he came across the first of these local names for *Gaylussacia brachycera*, "Juniper Berry" (Gray 1922). Wherry's 1934 paper acts as a good capstone to the story of the early localities of *Gaylussacia brachycera*. With the end of the third of the three case studies we will now turn to larger questions of what these histories can tell us about how botany was practiced when species were lost.

## Analysis

We will now begin an analysis of the preceding history. This analysis takes the view that botanical localities operate as information storage and retrieval systems. The concept of findability is of particular utility in this project because it frames how information is found across many contexts. Peter Morville is widely considered the inventor of findability. In a 2007 interview Morville posited the following three questions of findability in relation to a website:

1. Can your users find your website?
2. Can your users find their way around your web site?
3. Can your users find your products and content despite your web site (Marcos 2007)?

What Morville points out here is that content not only must be findable within the storage system, but also the storage system itself must be findable in the world, and the storage system must be internally navigable (Morville 2005). If we view botanical localities as information storage and retrieval systems we can rewrite Morville's three questions as:

1. Could botanists find the locality?
2. Could botanists find their way around the locality?
3. Could botanists find occurrences of species in the locality?

Within these questions there are two levels to findability. This can be seen in Peter Morville's three part definition of findability from *Ambient Findability*. Morville wrote:

- a. The quality of being locatable or navigable.
- b. The degree to which a particular object is easy to discover or locate.
- c. The degree to which a system or environment supports navigation and retrieval (Morville 2005).

This definition and the three questions splits findability into two levels: object and environment<sup>xi</sup>. One could divide further the findability of an environment into external and internal findability. That is, the ability to locate the environment from the outside and the ability to navigate the environment from the inside. For our purposes here we can say that there is the ability to find a locality in the world, the ability to find your way around a locality, and the ability to find an occurrence of a species within a locality.

Peter Morville draws on Kevin Lynch's concept of *Legibility* as a way to think about what makes an environment and object findable (Morville 2005). In Lynch's *The Image of the City* (Lynch 1960) legibility is a character of the layout of a city. Morville offers five terms from *The Image of the City* for use in discussing legibility. This article will make use of the following three terms:

### Paths

The streets, walkways, transit lines, canals, railroads, and other channels through which people occasionally or regularly move.

### Edges

The walls, shores, fences, barriers, and other boundaries that create linear breaks in continuity, both separating and relating two distinct regions.

### Districts

Major sections of the city that possess a common identifying character (e.g., The Financial District, The North End, China Town) (Morville 2005)

Here we have a vocabulary for framing the navigability within the locality. For example, Tuers (2019) tells of the creation of the trail system at Greenbrier State Forest. The new trail system, Tuers says, increased accessibility to Kate's Mountain. This is an example of paths. Paths improve the environmental internal findability of the locality.

Many times the description of a habitat acts as a finding aid. As an instructive case let us take Wherry's 1936 paper. In that paper Wherry ends each account of a phlox with a sentence telling the reader the type of habitat the plant could be found in. For swordleaf phlox Wherry said the plant grew in "open woods" (Wherry 1936) at the bottom of "shaly slopes" (Wherry 1936). This description was on the environmental level of findability. Tuers (2019) mentions how botanical accounts of Kate's Mountain often broke up the locality and provided the ability to locate stations within the locality. One example of this breaking up is when Carl Keener writes that shale barrens exist on, "a generally southern exposure" (Keener 1967). For a locality like Kate's Mountain this is likely to divide a locality into two districts at least. Here we can see something like the making of districts in a botanical locality. Districts provided findability on the environmental internal level. We see edges in the distinct demarcation that Coville mentions and in the fact that Kate's Mountain was a mountain in the first place. Tuers (2019) makes a similar point to this and we see support for that view here. This shows how Kate's Mountain provided findability on the environmental external level.

What strikes the reader of these accounts is that whenever this storage and retrieval system is queried by the botanist it is always purposely, search was intentional. This is seen in the story of the rediscovery of *Heuchera hispida* where Wherry stated that he came to Greenbrier County to look specifically for *Heuchera hispida*<sup>xii</sup>. We saw this also in Wherry (1936) where he called on botanists to actively seek out rare phloxes. We also saw intentional seeking from John Kunkel Small in Proceedings of the Club (1921) where his search for stations of box huckleberry was announced. In his 1934 paper Edgar Wherry used the case of box huckleberry, particularly the discovery of the commonality of the plant discovered in the years following 1921 to make another call for field work to botanists. It may be that rediscovery is not as often fortuitous as discovery is. Compare the above accounts of rediscovery with, for example, John Kunkel Small's discovery of Kate's Mountain Clover (Small 1893). In Small (1893) John Kunkel Small recounts an 1892 expedition he made to Kate's Mountain. This account has the feeling of a botanist visiting a locality and simply recording the species that were present. The accounts of rediscovery above represent a very different sort of querying of a locality.

A question that occurs is how the taxonomic changes that species underwent impacted upon the findability of species. Asa Gray mentioned in his letter to John Torrey that *Heuchera hispida* was a "very local species" (Gray 1893). Because *Heuchera hispida* was rare and endemic it was more likely to see an expansion of distribution, which we saw above. This is because if there had existed a specimen in an herbarium of such a rare plant that was lost to botany then an investigator could either believe that the species didn't exist, an impossibility due to the existence of the specimen itself, they could determine that specimen to be equivalent to a near species that is more easily found, or they could search. Often botanists would opt for the second option. This would make it more difficult to find these lost species as they would become taxonomically invisible. As we saw above *Heuchera richardsonii* became synonymous with *Heuchera hispida* and so took on a distribution that was quite different from Gray's characterization of it as a "very local species" (Gray 1893). When *Heuchera hispida* and *Heuchera richardsonii* came together in synonymy it was no longer possible to find the rare endemic *Heuchera hispida*. What reason would a botanist have to travel to the mountains of Virginia to find an occurrence of a species that is distributed from Saskatchewan to Wyoming to Kansas, to Virginia, to Ontario? What we see here is a phenomenon I will term *subsumption*. Subsumption is the tendency for species that are lost to be subsumed under another taxa and thus becoming even more difficult to find. We did not see subsumption in the cases of swordleaf phlox or box huckleberry. This is because swordleaf phlox was not named by Buckley to begin with when it was discovered. There was no determination to be subsumed. *Gaylussacia brachycera* was never subsumed, perhaps

because of its cultivation. Because box huckleberry had become cultivated it was no longer a serious matter to the botanical community where box huckleberry occurred in North America. It is not surprising then that localities for box huckleberry became lost to botany. Because box huckleberry was cultivated, though be it perhaps to a very limited extent, there were ready examples of it in gardens. *Curtis's Botanical Magazine* mentioned that the included illustration was drawn from a cultivated plant in England (Sims 1806). Cultivation may have also undercut the botanical community's motivation to find lost species. It may be a general rule that cultivation made it more likely that species would be lost outside the garden.

In Tuers (2019) the author makes the point that Kate's Mountain aided in the preservation of endemic flora because Kate's Mountain became enclosed within Greenbrier State Forest and thus Clematis [Kate's Mountain] was preserved<sup>xiii</sup>. Wherry's 1936 account of swordleaf phlox adds weight to this argument, he wrote that, "Unfortunately some of these colonies have been destroyed by vandals, by grazing animals, etc" (Wherry 1936). Greenbrier State Forest was formed in 1938, two years after Wherry's warning (Tuers 2019). This station would soon be protected. The role of preservation of an information storage system was fulfilled by Kate's Mountain for swordleaf phlox. Wherry, in his 1934 article in *The Journal of the Torrey Botanical Club*, quoted Coville's concern about the Perry County locality. But Wherry added a footnote to that quote that the locality had since been enclosed in a state preserve. Wherry felt that the enclosing of the Perry County locality in a state preserve would solve the problem of the degradation of the locality. Wherry mentioned in the same article that for many years botanists had believed that the Sussex County, Delaware locality had been destroyed but that he had rediscovered it in 1919. Locality degradation was a real concern for botanists searching for these lost species. Localities could offer preservation of these species through the creation of public lands.

It is notable that these searches had social elements. Take for instance *Gaylussacia brachycera*. In 1920 H.A. Ward announced the discovery of a station of *Gaylussacia brachycera* in Pennsylvania. He then revisited the site in the company of John Kunkel Small and Edgar Wherry. In 1921 the *Proceedings of the Torrey Botanical Club* mentioned that John Kunkel Small spoke to the club about his search for stations of *Gaylussacia brachycera*. In 1921 Fred Gray discovered stations in West Virginia and sent a specimen to Edgar Wherry (Gray 1922). Fred Gray wrote that Edgar Wherry then traveled to West Virginia to inspect the stations for himself. The botanical community was leveraged in the search for stations of box huckleberry by furnishing botanists for the search. In reference to the discovery of *Gaylussacia brachycera* in Greenbrier County Fred Gray said that he had found more instances of *Gaylussacia brachycera* by putting ads in the local newspaper and through correspondence. There was a point in the search for early localities of *Gaylussacia brachycera* when botanists had to change how they queried the environment by starting to ask local populations using the vernacular names of *Gaylussacia brachycera*. Fred Gray wrote of his discoveries:

This could never have been done without the common name "Juniper Berry" (Gray 1922).

In Wherry's 1934 article this turn in how botanists searched for box huckleberry was taken as a justification for more field work. Social searching was necessary for finding *Gaylussacia brachycera*, social searching had revealed that *Gaylussacia brachycera* was far more common than had been believed. Both searching and finding were social and were enhanced by human networks. Although, as Tuers (2019) says, the botanical stations had limitations, the leveraging of social networks could make up for these deficiencies. Wherry and Small were central to the search for stations of *Gaylussacia brachycera*. Around these two men were arranged a cast of botanists working at the time such as Frederick Coville, Fred Gray, and H.A. Ward. Although Wherry and Small were central neither discovered the early stations of *Gaylussacia brachycera* that we discuss. Human networks improved findability on the environmental external level.

## Conclusion

According to the Greenbrier Independent (1932) White Sulphur Springs was identified as the location where Frederick Pursh collected *Heuchera hispida* because long lost specimens were found in Pursh's garden that had labels noting where they were collected. The original specimen was lost in a botanical garden which is supposed to be a stalwart of taxonomic defense. In Frederick Coville's 1919 paper the search for box huckleberry stations began in the herbarium and moved to the field when Coville visited the Perry County, Pennsylvania station. This suggests support for Tuers (2019)'s suggestion that the division between herbarium and locality is perhaps not a strong division from an information viewpoint. That is, the herbarium here acted as an aid for finding stations of *Gaylussacia brachycera* in the field. Coville used the localities written on the specimens to query the world. The localities could support this effort as a findable location composed of findable districts, filled with findable plants. The rediscovery of these lost species demonstrates how some localities aided in the finding of stations. Taking off from Tuers (2019) this paper treats Kate's Mountain in West Virginia as just such a locality. Sufficient examples have been given between Tuers (2019) and this article to suggest what an information view of botanical practice might look like.

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## Notes

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<sup>i</sup>Currently *Heuchera americana* var. *hispida* (Pursh) E.F. Wells (Tropicos.org 2019).

<sup>ii</sup>Author translation. I also made use of the account of *Heuchera hispida* in Asa Gray and John Torrey *A Flora of North America* 1838-1840 (Torrey and Gray 1838-1840). The Missouri Botanical Garden's Grammatical Dictionary of Botanical Latin Eckel (2011) was of great utility during the translation.

<sup>iii</sup>For more on Asa Gray's expedition through the Southeastern United States see Core (1940).

<sup>iv</sup>I was directed to the following discussion on (Gray 1856), (Britton and Brown 1897), and (Small and Rydberg 1905) by (Rosendahl, et al 1933).

<sup>v</sup>This article was likely based upon interviews with these botanists since many of the facts and opinions in this article are nowhere to be found in the academic literature.

<sup>vi</sup>Tuers (2019) makes particular study of the concept of closeness and we see it come in here with Wherry's comment that *Phlox buckleyi* is "most closely related" to *Phlox ovata*.

<sup>vii</sup>Author translation. The Missouri Botanical Garden's Grammatical Dictionary of Botanical Latin was of great utility during the translation (Eckel 2011).

<sup>viii</sup>I was directed to this by Wherry (1934).

<sup>ix</sup>Asa Gray mentioned that one specimen of *Gaylussacia brachycera* in the herbarium of Muhlenberg that was collected by Matthew Kin and reads the words "Krien Preyer" (Gray 1848) on its label. Both Asa Gray and Fred Gray believed "Krien Preyer" (Fred Gray spelled it "Kriem Prier") locates the specimen as coming from Greenbrier (Gray 1922). Edgar Wherry in 1934 agreed with Asa Gray and Fred Gray that Mathew

Kin (Wherry writes Matthias Kinn) had collected box huckleberry in Greenbrier (Valley), he added that it was collected east of Lewisburg (Wherry 1934). Kate's Mountain does fit this description. Gray goes on to say that a piece of this specimen was sent By Muhlenberg to the German botanist Carl Ludwig Willdenow. I suspect this fragment is the specimen BW07348000 housed at the Berlin Botanical Garden. However, a note on this specimen says "Habitat in Pennsylvania." I will leave it to future scholars to investigate this matter (Curators Herbarium B 2000+).

<sup>x</sup>Wherry said that the Warm Springs locality likely refers to Berkeley Springs, West Virginia near the Pennsylvania border (Wherry 1934). I am not sure why Wherry is suggesting this, it may have been the inability to find box huckleberry in Warm Springs in the absence of obvious locality destruction. I will leave it to others to investigate this.

<sup>xi</sup>It was not likely that botanists were just differentiating between a widely cultivated species and its rare occurrence in nature. Wherry (1934) says that there was a call for cultivation of box huckleberry by Coville in order to save the species.

<sup>xii</sup>This distinction may have also been made by Brynko (2005). However, she uses the terms "object" and "system" for the two levels. Brynko does not elaborate on the distinction beyond this though.

<sup>xiii</sup>The Greenbrier Independent reported the rediscovery of *Heuchera hispida* as accidental. It is strange that the two accounts would differ if the Greenbrier Independent did indeed interview Edgar Wherry. It may have been that the Greenbrier Independent made it seem fortuitous for dramatic effect.

<sup>xiv</sup>See Tuers (2019) for an explanation of his notation, Tuers writes, "I will also refer often to a confluence of place and plant by giving the genus followed by the location in square brackets. For example, *Clematis* [Kate's Mountain] was the *Clematis* on Kate's Mountain specimens of which were collected by Anna Murray Vail and Nathaniel Lord Britton and later by John Kunkel Small."

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