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## Botanists of the Mexican–United States Boundary Survey

Carolyn Dodson

### Introduction

The only good to have come out of the Mexican War “was the benefit it has done to Botany” (Rodgers 1942, p. 225). This was the opinion of John Torrey (1796–1873), the most eminent botanist of his day. Indeed, the war with Mexico did have an important impact on the study of the unique desert flora of North America.

By the mid-1800s little was known of this flora of the Southwest desert, although the botany of the eastern part of the continent was well-documented, and plants had been collected from the West Coast, Northwest, Rocky Mountains and Texas.

In large part the reason for this hiatus in botanical knowledge was political. New Mexico, which included Arizona and part of Colorado, was an integral part of Mexico, itself under Spanish administration. The Spanish government viewed this northern province as a buffer to protect Mexico from hostile American Indians and United States invasion. All foreigners, including scientists, were prohibited from entering Spanish lands and, since Spain was not pursuing scientific investigations in the frontier, the land between Texas and California remained scientifically unexplored (Dickerman 1985).

When Mexico severed its ties with Spain in 1821 and abandoned the policy of excluding foreign traders, the Santa Fe Trail opened. The commercial activity it spawned provided a means of sending botanical collectors into the area for the first time. Indeed, William Gambel and Friedrich A. Wislizenus, the earliest botanists in New Mexico, journeyed with commercial caravans (Dodson 1987).

The Mexican War furnished another means of access. Lieutenant William H. Emory collected plants in New Mexico while on military duty with the Army of the West, and Augustus Fendler traveled with the Army to collect plants in Santa Fe in the summer of 1846. Eastern botanists who were receiving the specimens that trickled in saw that the flora of the Southwest was new and distinctive, and they were eager for the opportunity for more samples (McKelvey 1955).

The Mexican–United States Boundary Survey provided that opportunity. I will briefly describe the Survey in the context in which the botanical collections were made, and then I will introduce the individual plant collectors who traveled with the Survey and conclude with an evaluation of the “benefit” to botany.

On 2 February 1848, the Mexican War ended with the signing of the Treaty of Guadalupe Hidalgo. The result was an expansion of the area of the United States by over one million square miles along a 1,800-mile-long border. To mark the precise line along the rugged terrain separating the two countries, a joint American-Mexican Commission was formed. Each government sent a survey team to work together on marking the boundary.

### The Boundary Survey

The Commissioner of the United States Survey Team was charged by his government with making a map of the unexplored land running along the Rio Grande River from the Gulf of Mexico to the boundary of New Mexico, north to the Gila River, down the Gila to the Colorado River and west to San Diego. In addition, he was directed to collect infor-

mation on precious metals and ores and to secure scientific data on flora and fauna. Finally, he was asked to make recommendations concerning the building of a road, canal or railway along the Gila River (Goetzmann 1959).

At the same time, the Mexican government instructed its Commissioner, Pedro García Conde, to determine the initial point on the Pacific Coast, then carry the survey east. He was also directed to collect information about Indian tribes on the frontier and to suggest solutions to the problem of defending the frontier from American encroachment. Initially, García Conde recommended the appointment of a botanist for the expedition, but financial constraints prevented the collection and study of botanical collections (Hewitt 1990).

The Americans, however, did organize a botanical survey. Torrey placed his former student Charles C. Parry in the position of official Botanist. Asa Gray, the influential Harvard botanist, had Charles Wright added to the team. Through the influence of W. S. Sullivant, the bryologist, John Bigelow was named Surgeon and Botanist. J. W. Bailey, the West Point botanist, recommended George Thurber as Botanist. Thus, the American Boundary Survey Team had four botanists in its ranks. To be sure, each had other duties as well. Charles Parry was "Assistant Surgeon," George Thurber was "Computer," John M. Bigelow's title was "Surgeon," and Charles Wright's was "Surveyor and Botanist." In the opinion of one historian, this was "too many botanists, certainly, for their own or the government's good" (Dupree 1959, p. 205).

The number of botanists was indeed disproportionate for a team of the size of this survey, but then so was the number of successive commissioners heading the six-year-long endeavor. As the historian A. Hunter Dupree pointed out, the "Mexican [-United States] Boundary Survey was a confused affair" (Dupree 1959, p. 205).

Initially President Polk appointed A. H. Sevier, a former Senator, to the post of Commissioner, but the unfortunate man died before taking office. Then Polk appointed John B. Weller, a proslavery Democrat politician, to the position. Obviously, the political implications concerned Polk more than the technical, since William H. Emory, a respected army engineer with a distinguished record in the Mexican War and Northeastern Boundary Commission, was passed over at this time (Hine 1968).

Some members of the team were engineers; others were political appointees. The latter were either advocates of slavery, who welcomed the expansion of slave territory, or proponents of a southern railroad route running through the newly acquired land.

In any event, in March 1849 Weller and his party sailed from the East Coast by way of Panama to San Diego to meet the Mexican component of the joint Survey team. Reaching the Isthmus of Panama, they found themselves among a horde of fortune seekers clamoring to join the Gold Rush. Emory described "a precipitation upon [Panama] of all the odds and ends of the inhabitants of the Atlantic Coast of North America and Europe" (Emory 1857, p. 2). The members of this official mission of the United States government were stranded for weeks before they were able to secure passage to California. By the time they finally arrived, the influx of prospectors into California had driven prices so high that the Commission soon ran out of funds, and on top of that they lost men to the more rewarding gold fields.

Furthermore, toward the end of April, the rainy season set in with its sicknesses. But the sensible ones "employed a good cook, and purchased light wines, and by a generous diet escaped all disease" (Emory 1857, p. 3).

Once the representatives from both governments were ready to begin, the first task was to define the starting point on the Pacific Coast. The treaty specified that the point be

located one "marine league" south of the southernmost point of San Diego Bay (Hewitt 1990). These seemingly straightforward instructions harbored pitfalls. The immediate problem was that the 1782 map in hand did not conform to the actual configuration of San Diego Bay. Moreover, the "marine league" was a unit of measure unfamiliar to the Americans, and the two sides had to work out a mutually acceptable definition of the unit (Hewitt 1990, p. 185).

Meanwhile Amiel Whipple and Charles C. Parry established an astronomical camp at the confluence of the Gila and Colorado Rivers, an orientation point of the boundary. They too had problems, namely that the Gila River constantly shifted in its course and was impossible to pin down.

Then the Whigs came into power. In 1849 President Taylor relieved Weller of the post and offered it to John C. Fremont, who mercifully declined. Had Fremont accepted, Emory, the most competent member of the Commission but also Fremont's political enemy, would have had to resign. Next, John Russell Bartlett, an ethnologist and book dealer, was offered the post. Unfortunately for the operation of the Survey, Bartlett accepted.

For this bookish, artistic Commissioner, the post promised opportunity "for exploring unknown regions" and "to be thrown among the wild tribes of the interior" (Goetzmann 1959, p. 168). By now the stretch of the border from San Diego to the Gila River was mapped. Thus, Bartlett began his survey at El Paso.

He arrived at El Paso from the port of Indianola with a large, luxuriously equipped party that included friends and relatives. Assuming that the astronomical and surveying equipment shipped from San Diego would be sufficient for his survey, he took with him no scientific equipment. He did not, however, stint on general supplies, including four iron boats accompanied by a Lieutenant of the U.S. Navy for use on the Rio Grande and Gila

Rivers (Hewitt 1990, p. 179). In connection with Bartlett's supplies, James D. Graham complained that not a single zoological or botanical specimen was sent out before he arrived in El Paso. The equipment for preserving botanical collections was left at Indianola and in its place the wagons were loaded with whiskey (Graham 1852).

Soon after taking charge, Bartlett commanded the surveying party to rescue a Mexican girl from her New Mexico slave owners, a mission that took them to various parts of northern Mexico for over a month. Subsequently, Bartlett made exploratory side trips to California and Mexico. While these excursions detracted from the surveying, they afforded unparalleled opportunities for the botanists. Here is an example of the Commissioner's excursions, from Torrey: "Mr. Bartlett, with most of his party (including Thurber) had gone to parts unknown & leaving the remainder of his people without funds or work—or anything else except provisions. Major Emory [will] organize a small party & start in pursuit of Mr. B." (Rodgers 1942, p. 222).

Of course, this kind of shenanigan hampered the progress of the surveying. But a more serious problem arose from errors in the map on which the treaty was based. This map showed El Paso to be 30 miles north of its true position. Bartlett incorporated this mistake into his surveying in spite of the objections of his surveyors.

The chief Surveyor, Andrew B. Gray, was one of the dissenters. He considered it "a great misfortune that the officer of the topographical engineers put his signature to an agreement. . . . Thus signing away a large piece of territory belonging to New Mexico, a portion of which is of splendid character" (Gray, A. B., 1854, p. 46).

To be fair, it must be admitted that Bartlett's interpretation was compatible with his instructions to use the inaccurate map and to maintain a conciliatory attitude toward Mex-

ico. Nevertheless, the fact that the 30-mile-wide stretch in question would be the route of any southern railway elevated the matter to the realm of politics.

Bartlett's "wide field for new exploration" (Goetzmann 1959, p. 168) ended when Congress, prompted by Senator Weller, the former Commissioner, called for an investigation of Bartlett's conduct. This review resulted in the impoundment of the Commission's funds and dismissal of Bartlett for the "great land giveaway" (Goetzmann 1958, p. 185).

Even so, had he not been dismissed for his position of the latitude of the line, Bartlett eventually would have lost his post due to poor management, corruption, drunken binges, and the suicide and murders that occurred during the colorful months he headed the organization.

By the time Bartlett left, in 1852, the Commission had only surveyed the Texas and California portions of the boundary. William H. Emory was called up from the West Coast to carry on the work. When he arrived in El Paso, he found "no money, no credit . . . the large party subdivided . . . amongst themselves and the bitterest feelings between the different parties. Little or no work has been done, and yet the appropriation is all gone" (Goetzmann 1958, p. 180).

Taking charge in 1853, Emory proved to be as efficient as his predecessor was disorganized. He swiftly and competently completed the mission five years after the Treaty of Guadalupe Hidalgo. Only one interruption in this phase of the Survey occurred, when the Mexican Commissioner was jailed for a month by his government.

### The Botanists

As the surveying progressed in its erratic course, the accompanying botanists zealously collected plant specimens. Who were these field collectors? They came to their posts knowing how to identify plants and able to

discern the new and interesting ones. Exploring new lands and discovering new plants under arduous conditions was a labor of love. Their only reward was having their names permanently impressed in botanical science on the plants named in their honor.

What did the collectors do? A mid-nineteenth-century letter to a Corps of Engineers biologist instructed the collector carefully to note locality, latitude, longitude and date of collection on labels connected with the specimens. The collector was told to

save all plants not recognized as common U. States species. The flower leaves and if possible the seed vessels and seed should be saved. Tin boxes will preserve specimens fresh for several days, until opportunity occurs to dry them. Dry plants under strong pressure, between folds of bibulous paper which must be changed daily at least. A botanical press may be made easily with two boards, four cords and a lever for tightening . . . Memoranda should be made of the color, size and place of growth of all plants. Collect all land shells, also the bivalve and univalve fresh water species, no matter how unattractive their appearance (Bailey 1850?, pp. 1-2).

A common thread uniting botanists was a medical background. After all, until recently, plants were the chief source of drugs. By necessity, the study of plants was an important component of the medical school curriculum.

### Charles C. Parry

In fact, the official Survey Botanist Charles Christopher Parry (1823-1890) studied botany at Columbia Medical College. His interest in botany continued while he was practicing medicine in Iowa. At that time this state was on the frontier, certainly in the botanical sense, so that Parry began collecting plants to send to his former professor, Torrey. Finding such delight in the discovery of new species, he joined the Geological Survey of the Northwest in 1848 as Surgeon-Naturalist for the experience of botanizing in unexplored regions of Minnesota.

Then, rather than resume his practice, he accepted Torrey's appointment as official Botanist of the United States Survey Team in 1849 (Parry 1878). Parry traveled to San Diego by ship, then accompanied a group across the California desert to the Gila River during the latter half of the year. The collection he made in the unexplored territory suffered a fate that was common enough on the frontier. It was lost in a fire in Panama on route to Washington D.C.

Parry made up this loss by extensively collecting again along the survey line the following year. He even worked along the coast as far as Monterey, where he described a new species of pine named *Pinus torreyana*, or Torrey pine, in honor of his mentor.

In 1851 Parry was transferred to El Paso. For a year he followed the expedition, collecting plants between Big Bend and the Pimo settlements to the west.

Parry actively participated in botanical exploration throughout the West for the rest of his life. He served as botanist of the Pacific Railroad Survey along the 35th parallel in 1867 and then was appointed Botanist of the Department of Agriculture. Most of his summers during the rest of his life were spent in the West, exploring the Rocky Mountain flora. In fact, Joseph Ewan, the eminent botanical historian, concludes that Parry "did more than any other single person to make known the plant life of the Central Rocky Mountains" (Ewan 1950, p. 278).

### John Milton Bigelow

Another physician among the border botanists was John Milton Bigelow (1804-1878). He maintained his botanical interests while practicing medicine and raising a family in Ohio by collecting plants for Dr. Torrey.

Private practice and botanizing were not always compatible, he found: "Many times some of my most interesting specimens are brought home in my hat and probably before

I have time to smooth out some of the wrinkles consequent upon their cramped position in the hat, a call is made post haste and my poor plants are obliged to suffer the withering influences of a hot summer day" (Waller 1942, p. 317).

His correspondence with Torrey led to his appointment as Surgeon and Botanist on the Boundary Survey in 1850. Bigelow traveled with Bartlett's group by ship to Indianola, then overland to El Paso, collecting along the way.

Along the border he discovered *Parthenium argentatum*, or Guayule, the subject of intense interest today for its potential to yield rubber. As the oldest of the Survey botanists, Bigelow was somewhat hampered by his outmoded botanical concepts. He continued to see botany from a medical standpoint. In fact, his first publication was a catalogue of the plants of his Ohio county, with notes on their medicinal value.

Immediately upon leaving the Survey in 1853, Bigelow joined the Whipple Pacific Railroad expedition for a two-year opportunity to collect plants from Arkansas to California. When that ended he devoted the rest of his long and active life to medicine. In his honor, Asa Gray named the genus *Bigelovia* of Compositae (the aster family). *Clematis bigelovii*, *Aster bigelovii*, *Linosyris bigelovii* and *Senecio bigelovii*, among many other new plants, were named for him.

### George Thurber

The medical connection also extends to George Thurber (1821-1878), whose introduction to botany came in his studies of pharmacology. After a pharmacist's apprenticeship, he became a lecturer on chemistry (Rusby 1890, p. 208). Botany soon became a passion with him, and he eagerly seized the opportunity to become associated with the Survey as Botanist, Quartermaster and Commissary. For four years he traveled with the Survey,

collecting plants chiefly in New Mexico and Sonora as a member of "the scientific brain trust of the Border Commission" (Wallace 1955, p. 82).

Thurber discovered *Robinia neomexicana*, the New Mexico Locust, which he recognized as a desirable addition to ornamental shrubs. Indeed, this lovely flowering tree is now a prominent garden plant in Southwestern landscapes.

Near the copper mines he discovered a particularly striking dark red cinquefoil that Gray named after him: *Potentilla thurberi*. His botanical specialty was Gramineae, the grass family, and in his honor the English botanist George Bentham named a genus of grass *Thurberia*.

When the Survey was completed, Thurber returned east to become Editor of *American agriculturist*, a position he held until the end of his working life. In this capacity he devoted a considerable portion of his time and effort to the exposure of business and professional frauds. H. H. Rusby called him "a terror to quacks, charlatans, and swindlers of every description" (Rusby 1890, p. 208).

### Charles Wright

Charles Wright (1811–1885), on the other hand, was not schooled in medicine. Indeed, he emphatically stated he was "no doctor or son of a doctor and neither have nor wish any handle to my name but plain Mr." (Dupree 1959, p. 165). Graduating with a liberal arts degree from Yale, he accepted the position of tutor to the children of a wealthy Mississippi planter. When his employer's business failed, Wright went to east Texas where he supported himself by surveying and teaching. At the same time he collected plants for Asa Gray and soon became the distinguished botanist's most trusted collector in the Southwest.

When the United States Survey Team was organized, Gray tried, unsuccessfully, to name

Wright the official Botanist. Eventually he raised funds for Wright to travel with the military across Texas to San Antonio. Wright traveled by ship to Galveston, then overland to El Paso with the Army. Despite Gray's arrangement with the Secretary of War, the Army afforded Wright only free transportation for his collections. Wright had to walk the 700 miles from San Antonio to El Paso.

His funds being limited, food was a problem. He wrote, "I may have to . . . join some of the messes of the privates unless some of the officers should take a liking to me as . . . it may diminish my expense" (Geiser 1937, p. 239). But the officers seemed to look upon Wright as an odd character. He complained that they would be pleased if his collections "were sunk in the river and their load would be lightened" (Geiser 1937, p. 243).

Later he was appointed Assistant Computer, "with a compensation of five hundred dollars per annum and one ration per day," a "comfortable maintainance [*sic*]" according to Gray (Geiser 1937, p. 245). In July 1851, Wright left El Paso with Colonel James D. Graham and traveled to Santa Rita del Cobre, near present-day Silver City. On this mission to catch up with the elusive Bartlett, they covered a large area of New Mexico and Sonora, with Wright collecting plants along the way (Shaw 1987).

In the fall of 1852 he delivered his extensive cactus collection to Dr. George T. Engelmann in St. Louis and then took the remainder of his specimens to Dr. Asa Gray (Geiser 1937, p. 245). Engelmann dedicated a cactus to Wright, *Opuntia wrightii*, that "bears a name which is forever inseparably connected with the botany of our southern boundary" (Engelmann 1859, p. 60).

### The Report

The specimens collected by the "small but esoteric brain trust of species-mongering sci-



entists" accompanying Bartlett (Wallace 1955, p. 82) were identified and published by Torrey in "The Botany of the Mexican Boundary," which is published in volume 2, part 1, of the *Report on the United States and Mexican Boundary Survey*. The publication of the botanical material did not run a smooth course. The botanists generally worked well together, but a glimpse of the jockeying for position among the botanists is apparent in a letter from Torrey to Gray: "The commission has left it to themselves to settle the question of botanical rank but Bigelow [who, at the age of 46, was the oldest of the botanists] writes to Thurber as his assistant. Thurber says he will not play second fiddle to such a poor stick" (Waller 1942, p. 325).

They had no problems until Wright's plants, which he had sent as arranged to Gray, were published in the appendix to Gray's *Plantae Wrightianae*. In April 1853, Bigelow received a copy of *Plantae Wrightianae* and immediately wrote to Gray: "[Y]ou & Mr Wright have anticipated me in the publication of 30 or 40 new species. . . . I went to the copper mines about the middle of April 1851; he did not come until the following July. *And Mr Wright may recollect that Mr Thurber gave me the right to collect in that neighborhood?!!!!* [Underlined in original] . . . All I claim is the simple negative merit of not being anticipated in credit by one engaged in the same expedition with me" (Bigelow 1853, p. 1).

Bigelow also laid out his complaint to Emory: "I have been completely fleeced and see not how I am to get relief except you . . . are able to give it to me" (Bigelow 1853, p. 2). Bigelow suggested that all the plants collected along the border be published in one place so that due credit would be ensured to all who contributed, even "the humble collector who undergoes much fatigue & privation as well as danger . . . for, if we cannot make the music, we are necessary in raising the wind so essen-

tial in successfully playing the organ of fame" (Rodgers 1942, p. 225).

Emory then strongly protested to Torrey the separate publication of Wright's material on the grounds that Wright "was liberally paid" and "provided with all the means of collecting and the express condition was that the Boundary Survey should be credited with all the work" (Emory 1853, p. 1).

He announced to Torrey: "I desire you will at once withdraw from Dr Gray all the collections placed in his hands by Wright and if necessary commence a legal process to recover them" (Emory 1853, p. 1). But the furor died down, for there was no way to "unpublish" descriptions of plants. The rest of the plants were sent to Torrey to be described in the official government report.

Meanwhile, Torrey was receiving a steady stream of Southwest plants. By 1856, with Emory's pressure to finish, Torrey was feeling "buried" in the plant material and asked Gray to help with the Compositae and Scrophulariaceae (the aster and snapdragon families) and Engelmann to describe the Euphorbiaceae and Cactaceae (the spurge and cactus families).

C. C. Parry's contribution to the *Report*, besides making a superb collection of plants, was to write the introduction, which is a description of the agricultural capacities of the region. In his opinion the potential for farming was severely limited by the low rainfall.

Altogether, the "Botany of the Mexican Boundary" contains over 2,000 species, of which 235 were new to science. Torrey's monumental systematic account of the general botany, with 61 plates, constitutes the greatest part of the volume, which is completed by Engelmann's "Cactaceae of the Boundary," describing 92 species, of which 40 were new, with 75 plates.

Thorough, precise, and admirably illustrated, the report documents for the first time the unique botany of the borderlands. No less an

authority than Asa Gray ranked it "as the most important publication of the kind that has ever appeared" (Gray, A., 1860, p. 292).

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