

collection of insects must soon find place of deposit elsewhere. These conditions of impermanence have placed a constant restraint upon the offering and acceptance of specimens, and of books for the expansion of the Society's library, over many years.

From its beginning, the members of the Society of Natural History of Delaware have been well aware that its full usefulness can never be attained without permanence of occupancy of suitable quarters, and for its collections the assurance of regular and intelligent care with provision for their use by the public as well as by its membership. From year to year frequent discussions and conferences have been held, but thus far these ends have failed of accomplishment. The present membership of the Society is the greatest in its long history, and undoubtedly there is a present increase of interest in local natural history and in effort, organized and individual, for the preservation of the diminishing representatives of our native flora and fauna, giving basis of greater hope for the future.

Old Dr. Herman Strecker of Reading, Pennsylvania, a lover of old books, possessing a true reverence for the past, but with a bitter tongue against the forgetfulness of the present and the needless desecration of the country-side he loved, in 1878 prefaced one of his books with a quotation from an old German poem whose repeated refrain expressed his attitude of protest and pessimism; but if in our interest and enjoyment of the present, we treasure the old and revealing records of the past; if we realize that what may seem the commonplace of today becomes significant history tomorrow: then of Delaware's natural heritage and of the lifetime labors of those who have preceded us, it need not be written, in the words of Strecker's old refrain, "*Hingegangen in den Wind*"—"Gone with the wind."

II. *Darlingtonia* Episodes

Over almost a century, the names of two men stood out as leaders in the encouragement in Delaware of organized interest in natural science: Dr. William Darlington of West Chester, Pennsylvania, and William M. Canby of Wilmington. Though their periods of greatest scientific activity scarcely overlapped, each proved himself a man of exceptional and wide-ranging ability; each received public recognition for distinguished civic service; and each, in the same chosen field (botany) attained more than national rep-

utation for significant accomplishment. By strange chance, a plant-species of unique interest, which neither of them ever saw alive in its distant habitat, marked for one of them the cherished honor of having his name conferred upon it by the foremost botanist of his day; for the other, the subject of his first long botanical paper, which immediately brought him permanent recognition throughout the botanical world.

Though *Darlingtonia* is not recognized to have any qualities of practical use to man, yet in its history, recorded and unrecorded, it has touched so many human lives, sometimes dramatically and unhampered by time or distance, tying plant and human participants together into such a strange and tangled web of circumstance, that some of the episodes of its history, here brought together, may fittingly be considered a memorial to the two men associated in its earlier history, whose names so well deserve remembrance in Delaware.

The recorded history of *Darlingtonia* began more than a century ago. On October 3, 1841, a long slow cavalcade of sixty or seventy horses, single file, was winding through a rugged mountain country. Week after week this little company of twenty-eight men, four Indian women, and seven half-breed children had been making its way through an unmapped and hostile country. The haze which hung over the wooded mountains was the smoke from burning forests, fired to impede their course; smoke-columns signalled their coming, to other enemies yet before them; and the great snow-peak rising above the forests on their left bore the name, Shasta, of a tribe whose announced intention was to bar their further passage. This was a United States exploring expedition under the command of Lieutenant Emmons, U. S. N. Titian R. Peale, a name well-known in Delaware, was the naturalist; James D. Dana, of later scientific prominence, the geologist. The expedition's object was to explore and map a route from the valley of the Willamette to Sacramento and San Francisco. On this day they dared hope that the worst of their dangers were over, for though Shasta still dominated their horizon to the east, they were winning past that point of greatest danger and soon they would be in a broader valley whose inhabitants had been in more frequent contact with the whites, and whose nature was more pacific. On this day, however, the assistant botanist, J. D. Brackenridge, temporarily separated from his fellows and not daring to linger, ran to rejoin them; and

as he ran, he spied a new and strange plant; even in his alarm, he snatched up a handful of its leaves and a broken seed-vessel. These, with other collections—mineral, vegetable, animal—eventually arrived in Washington, and for their study the plants were referred to Dr. John Torrey, often called “the father of American botany.”

In the fragments snatched up by the running botanist, Dr. Torrey recognized a new pitcher-plant, allied to the *Sarracenia*s of the east and south, but widely different from any of these; but from the imperfect material before him, he hesitated to describe and name this greatest botanical treasure brought back by the expedition. Not until 1853 was he able to write: “Long had I been hoping to receive the plant in more complete state, when it was at last brought to me by my friend, Dr. G. W. Hulse, who found it in flower in May . . . perhaps in the very spot where it was discovered many years before by Mr. Brackenridge.” Recognizing that though the plant belonged in the plant-family *Sarraceniaceae* but that a new genus must be created for its reception, Dr. Torrey published its description, with a beautifully engraved plate, naming it *Darlingtonia californica*, the genus dedicated “to my highly esteemed friend Dr. William Darlington, in Pennsylvania, whose valuable botanical works have contributed so largely to the scientific reputation of our country.” Throughout his remaining lifetime, Dr. Darlington prized that dedication as perhaps his greatest botanical honor, dying unaware that under the strict rules of botanical nomenclature that name would be superseded by another, though in popular literature it continues to bear the more familiar name, *Darlingtonia*.

Gold was discovered in California, and the weak grasp of Mexico was thrown off. From all over the world the hardy and the adventurous flocked into this country, pushing their way up every valley and canyon, following each river and stream to its remotest source. Before that inundation the Indian could make no stand; before the roaring life of the mining camps had commenced to wane, his race had dwindled away.

In the narrow valley of Black Hawk Creek, a small tributary of the Feather River, and about three hundred miles northeast from San Francisco, was a small mining camp; and into this, one day early in 1872, rode an itinerant book-agent. As was his custom, at the first house he asked to see any books owned by its occupants,

and he was handed an almanac, probably the entire library of its possessor. As he turned the pages, from between the leaves of the book fluttered out the dry pressed leaf of a plant; and from that moment, he tells us seriously, the whole course of his life was changed. The leaf, of course, was a dried leaf of *Darlingtonia*. He recognized it as a pitcher-plant, for he had seen *Sarracenia* in the Carolinas, years before. He writes: "I demanded its origin! No one could tell; I ran from house to house; no clew to the place of its growth! At last I bethought me of the children, and beset the first group I met. 'I know,' said little Mamie Austin; 'Uncle brought it down from Butterfly'" (an adjacent valley). Two months from that day, by appointment, he was guided to Butterfly Valley, and there for the first time he saw *Darlingtonia* in its home. The course of his life was changed, for the book-agent shortly became "Professor" J. G. Lemmon, a member of the California Academy of Sciences, a prolific writer on botanical subjects, and for the remainder of his life a professional collector of California plant material for American and foreign botanists. His name will appear again in this narration.

The decade 1870-1880 was one of great activity in the study of carnivorous plants, of which throughout the world several hundred species had been recognized. In 1874 Sir Joseph Hooker devoted his presidential address before the British Association for the Advancement of Science to this subject. Charles Darwin was working, chiefly on the Sundews, for his classic volume, *Insectivorous Plants*, which appeared in 1875. Other and highly technical studies were in progress in England and on the Continent. In this country, C. V. Riley, Henry Edwards, Asa Gray, Dr. Mellichamp, Mary Treat, had all done original work and had published their results. As early as 1866 William M. Canby of Wilmington had published an account of his observations and experiments on *Dionaea*, Venus's Fly-trap, these eventually leading to his historic correspondence with Charles Darwin. It was natural, then, that his attention should turn toward *Darlingtonia*, the showiest, most divergent, and least known among our American Pitcher-plants. Accordingly, he entered into correspondence with several western observers and plant collectors, and on the basis of their reports and of careful study of the material sent him, he prepared a long paper entitled "*Darlingtonia californica*, an insectivorous plant," which he read at the twenty-third annual meeting of the American Asso-

ciation for the Advancement of Science, held at Hartford, Connecticut, August, 1874. This paper was published in full in the *Proceedings* of the Association, in at least one American botanical journal, and on the Continent, in German translation. It has been widely quoted in the literature of the plant-species, and is of course included in the bibliographies of the insectivorous plants. And once again the name of J. G. Lemmon, the book-agent turned "professor," appeared in the history of *Darlingtonia*; for to him Mr. Canby ascribed indebtedness for the material and field-notes upon which he based his paper.

More than forty years were to elapse, from the publication of William M. Canby's paper in 1874, until a continuation of the story of *Darlingtonia* was to become vividly a part of my personal experiences; and then, by a series of strange coincidences, some of the human participants in those earlier episodes of its history were to reappear. To explain how this came to pass, will require a brief digression.

In July, 1892, I made my first rail trip southward beyond Washington. From the car windows I watched the change to forests of long-leaf pines; to liveoaks; to the beginnings of canebrakes; and the occasional unsatisfactory glimpse of some unfamiliar flower or insect held promise for future interesting days among them. As dusk approached in North Carolina, I commenced to see in low places along the right of way masses of greenish-yellow foliage of whose nature I could distinguish just enough to tell me that here was something entirely beyond my past experience; so that the next morning at my destination in Richmond County, North Carolina, I was elated to find that those greenish-yellow patches were made up of the trumpet-shaped leaves of insect-trapping pitcher-plants, *Sarracenia flava*; among them a smaller and more highly colored species, *Sarracenia rubra*; and half buried in the sphagnum, the squat pitchers of *Sarracenia purpurea*.

For the next ten days of that summer, and for weeks at a time in many future years, I lived among these and related plants, studying especially their innumerable insect captures and the plant-mechanisms by which they were enticed, retained, and utilized; other insects which had become adapted to these structures, using them as homes, for food, or even habitually robbing the pitchers of their entrapped insects; the unique qualities of the pitcher-fluid, in volume responsive to the presence of nutrient ma-

terial; by its low surface-tension quickly terminating the struggles of entrapped insects; by its proteolytic enzyme preparing their products for absorption. These studies became the basis for numerous papers, some of them in collaboration with biological-chemist associates.

In 1892, when I first met with these plants, I knew nothing of their literature, not even their botanical names; but upon my return to Wilmington from that first trip, William M. Canby, from his own library and by borrowings from his friends, opened up to me their extensive botanical literature. Later the veteran Scotch botanist, John M. Macfarlane of the University of Pennsylvania, who in 1908 had monographed the *Sarraceniaceae* in Engler's *Pflanzenreich*, gave me his hand-drawn maps showing the headquarters for each of the known species as he had searched them out, thus enabling me to visit each, repeatedly and in turn, from Maine to Texas.

In 1918 I realized that though I had thus spent weeks in the field with each of the then known species of the genus *Sarracenia*, there was one divergent member of the family, *Darlingtonia californica*, which I had never seen in its native home or growing under natural conditions; and that although it was known to have insect associates, not one of these had been described or named. I determined to correct that condition by a trip to the California habitat of the plant; but exact information of where it might be found in full development and readily accessible for study, was lacking. After writing many letters of inquiry but without waiting for replies, I started westward, and upon arrival at San Francisco in the last week of May, found there awaiting me answers to many of the letters I had sent. Some of these were amusing but not profitably informative. "All kinds of plants grow here, and I'm sure you can find that one," wrote the keeper of a mountain camp; another, "Six miles from my place by horseback, three miles further on foot, it grows in abundance." Fortunately, three letters were in agreement, were definite and favorable: one from a professor of botany at a western university; one from a forest warden; one from the postmaster of a little town—all indicated that the plant was readily accessible from Keddie, Plumas County, California, at the edge of the Plumas National Forest and about three hundred miles northeast from San Francisco in the Feather River Country; and the

Another day, similarly burdened, I had reached the level ground and the narrow road, and there I came face to face with an Indian woman—the only Indian I saw while at Keddie. Both of us stopped, and I interpreted the look upon her face as one of puzzled surprise, perhaps, that anyone should be bringing such a load down from the mountain-side. I thought of the meeting, however, as an opportunity. Not knowing her language, I pointed to the plants and asked her, slowly and distinctly, "What do you call these? What is your name for these?" Several times I asked that question before her face broke into a smile of understanding. "So-dah'-tee," she said. I said "So-dah'-tee" after her. Back and forth we said that word, but each time she said it, she laughed; and always more loudly when I said it. In Digger Indian language, is "sodahtee" the name of *Darlingtonia*, or does it perhaps mean something very different? I suspected it then, but what? Years later, I visited an old English entomologist, the Rev. C. R. N. Burrows, Vicar of Mucking, Stanford-le-Hope, Essex, and he told me that as a young man he had been sent into Africa as a missionary; that at first he knew not one word of the language of the tribe to which he went, but they called him by a name not his own. When he knew enough of the language to ask the meaning of that name, he was told that it meant "Red Beard." But, he told me, the women of the tribe called him by another name; and when I asked him what that name meant, he answered very solemnly: "I never asked; for each time the women called me by that name, they laughed." "Sodahtee"! I still wonder what that word really meant; whether in some way the joke was not on me; for I didn't entirely trust that Indian lady.

A third episode of our stay at Keddie involved an almost incredible coincidence. The day of our arrival, when we explained to our postmaster host the purpose of our coming to Keddie, he said, "You must talk with our schoolteacher; she knows more about that plant than anyone else in the world; she boards with me, and she will be here tomorrow." The next morning we met the schoolteacher. She proved to be an elderly gray-haired woman, a widow and a grandmother, named Mrs. M. A. Hail; but forty-six years earlier, she was that same "little Mamie Austin" who at Black Hawk mining camp, almost within sight of where we stood, had told the book-agent professor-to-be, J. G. Lemmon, that the pitcher-plant (no one there then knew its name) grew just over the moun-

tain in Butterfly Valley. Her next statements included even greater surprises: that her mother, Rebecca Merritt, born in the wilds of Kentucky in 1832, from her sixteenth year had been a schoolteacher in rural schools in mid-western states; that she had received some instruction in botany, and in her youth had made a collection of plants; at the age of thirty she married J. T. Austin, and with him had reached Plumas County, California, in 1865. Here, the hard life of a wilderness mining camp, the care of her young children, of a family which sometimes included several boarders, submerged her interest in botany under the exhausting struggle to meet her daily problems. If the leaf fluttering from an almanac at the door of a Black Hawk Creek cabin in 1872 changed the course of life for J. G. Lemmon, it did even more for Mrs. Austin. Until then, she had never heard of carnivorous plants, though she had already recognized that *Darlingtonia* and *Drosera* (Sundew) were adapted to the capture of insects, and she had supposed that these captures must be of use to the plants. The knowledge that such plants were the objects of intensive study throughout the world awoke her dormant interest in botany. Henceforth, by her own acknowledgment and sometimes to the resentment of her family, the study of *Darlingtonia* became a chief and an absorbing interest in her life. Beginning without any literature and with absolutely no scientific equipment, within three years she was in direct correspondence with Sir Joseph Hooker in England; with Keck in Austria, Kurtz in Germany; with Asa Gray, and with William M. Canby of Wilmington.

The story of her mother's work and the recital of these names were poured out to us by Mrs. Hail with such sincerity and pride that we could not doubt their substantial basis in fact, though our previous review of the literature of *Darlingtonia* had not shown us the name of Mrs. R. M. Austin.

In 1918, William M. Canby was no longer living; but upon our return to Wilmington we asked his son, Henry M. Canby (then president of the Society of Natural History of Delaware, which his father had founded in 1891) to make search for his father's botanical correspondence. In a locked and forgotten trunk he found hundreds of these letters, and I spent a winter sorting them and arranging those relating to carnivorous plants in an indexed loose-leaf volume, of which I made and retained a typed copy. Forty-nine pages of that copy are taken up with the letters and day by

day records of Mrs. Austin, relating to her observations and experiments on *Darlingtonia*.

That is, without knowing our destination on starting, we had travelled four thousand miles across the continent; had been directed to the obscure little town, Keddie, there to find in our chance table-companion the one person in all the world who most surely remembered the years of patient observation upon *Darlingtonia*, made by her mother almost half a century before, in the mountain-slopes and little valleys within walking range of Keddie; then another four thousand miles, back home in Delaware, to find there the yellowing pages of Mrs. Austin's letters and day by day journal, descriptive of those studies, and including evidence of William M. Canby's generous assistance which had made them possible. From time to time her letters to him acknowledged the gift of magnifying glasses; copies of his American Association paper; of Mellichamp's on *Sarracenia*; of Hooker's British Association address; finally, of Darwin's *Insectivorous Plants*, and of other literature not identifiable from the context, together with queries and replies to suggestions which had often influenced the course of her observations and experiments.

She spent hours and days, watching for the insect-pollenizers of the flowers of *Darlingtonia*; mapping the distribution on the pitchers of their gland secretions and their exuding nectar-bait; measuring the pitcher-fluid in the maturing pitchers, and noting its sudden and great increase as soon as they made insect captures; concluding that this fluid has neither digestive nor stupifying powers, but that after a pitcher has made insect captures, it possesses a wetting property which almost instantly terminates the struggles of insect captures—a fact which escaped my detection, in two months among the plants. When it dawned upon her that the age of a plant can be determined by the leaf-scars and whorls of its rootlets, in her own words she "forgot the family dinner" and hastened to the plants for confirmation; she sat through one of the infrequent thunder-storms, thus determining that no rain-water gains access to the pitchers unless they are deflected from the vertical by wind.

On June 11, 1876, she wrote "my dear house is sold. I have concluded to camp in the wildwood with *Darlingtonia* for the season, while my husband goes elsewhere to seek us a home." Near her new home in American Valley she found *Darlingtonia* growing, but not so large and vigorous as at Black Hawk Creek. Her last

communication, dated March 6, 1877, announced that she was sending a copy of her notes made the previous year; apparently then her real work on *Darlingtonia* had come to an end. Dated specimens referred to in her letters to Mr. Canby are still preserved in the herbarium of the Society of Natural History of Delaware.

More careful search of the literature of *Darlingtonia* has revealed occasional mention of her name by several authors, and sometimes even brief quotations from her letters; but no adequate recognition of the extent of her researches seems to have been published.

From Keddie, in August, we went to Sisson, the town nearest to Mount Shasta. From Sisson, we drove to the last ranch on the lower slopes of Mount Eddy; thence on foot, guided by the snows of Shasta at our backs, and following rough cattle-paths up those slopes until we came to *Darlingtonia*, which here exhibited the same intricate plant-insect relations we had been observing at Keddie, including even the presence of the two plant-robbing species over which Mrs. Austin had puzzled so long. We like to believe—perhaps it is true—that here we found the very bog from which Brackenridge, seventy-eight years before, had snatched his handful of *Darlingtonia* pitchers, as he ran from hostile Indians.

Below us were farms, fenced fields, and human dwellings. It was hard to realize that less than a century before, the inhabitants of this land were fur-clothed savages of the stone age, living by the chase, fighting their battles with obsidian-headed arrows, barring the way against all intruders upon this their immemorial domain. Whatever changes still lie before this land, may these uniquely wonderful plants, these glorious wooded mountains, be preserved to posterity inviolate.