Botanical Society of Washington.

EDWARD PALMER

A BIOGRAPHICAL SKETCH READ AT THE MEETING OF
JANUARY 10, 1911, ON THE OCCASION OF THE
ANNIVERSARY OF DR. PALMER'S BIRTH

By

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EDWARD PALMER¹

By WILLIAM EDWIN SAFFORD

Than longen folk to gon on pilgrimages,
And palmers for to seken straunge strondes.

Chaucer, Gen. Prol. to Canterbury Tales.

9.11.11 13829
EDWARD PALMER is a man well named. A palmer of the olden time was one who had traveled to the Holy Land in fulfilment of a vow, and brought back with him a palm branch to be placed on the altar of his parish church. Afterwards the name was applied to pilgrims who traveled unceasingly from land to land, under a perpetual vow of poverty and celibacy.

This is what our Palmer has done. From the age of early manhood until now, the winter of his life, never content to remain inactive even for a short period, he has set out upon one pilgrimage after another, bringing back many palm branches and other strange and beautiful products of distant climes, reverently to lay them on the altar of science.

He is an Englishman by birth, born January 12, 1821, at Hockwold cum Wilton, near Brandon, in the county of Norfolk. His father was a professional florist and horticulturist; so that from his earliest childhood his associations have been with flowers and shrubs and trees. When a youth of eighteen he came to America and settled at Cleveland, Ohio. There it was his privilege to meet with Dr. Jared O. Kirtland, one of the most eminent and respected scientific men of his day, in whom there was combined a peculiar personal charm and magnetism with great zeal for the study of nature.

Dr. Kirtland was not only an accomplished botanist, but a practical horticulturist as well, and a man whose greatest pleasure it was to gather young people about him and instill into them a love for natural history. He was one of the earliest members of the American Academy of Sciences, and in connection with the Geological Survey of Ohio made extensive collections of plants and animals of that state. This kind and learned man found a willing disciple in young Palmer, whom he invited to his home and, inspiring him with the display of his zoological collections and herbarium, taught him to prepare bird skins and to dry and press plants, thus laying the foundation for his future career.

¹ A biographical sketch read at a meeting of the Botanical Society of Washington, D. C., on the occasion of the eightieth anniversary of Dr. Palmer's birth.

Yours Sincerely
Edward Palmer

While in Cleveland Edward Palmer made his home with Hon. John W. Taylor, formerly speaker of the House of Representatives, a man of national reputation, who after a long and active life had become a helpless paralytic and was living in that city with a married daughter. Mr. Taylor was visited by many eminent men, and young Palmer was present at many interesting discussions of current events.

At that time there was much talk of opening Paraguay, the hermit nation of South America, to the outside world. It had not been long since Commodore Perry had knocked at the door of Japan and gained entrance; and the scientific results of the United States Exploring Expedition, which appeared in print from time to time, were frequent topics of conversation. When the United States government decided to send an expedition to Paraguay, young Palmer applied for a position as collector of natural history specimens. A small vessel, the *Water Witch*, commanded by Thomas Jefferson Page, was fitted out for the purpose, and Edward Palmer's name was entered upon its rolls.

His duties at sea were to assist the ship's surgeon in caring for the sick and administering medicines. He was placed in charge of the ship's dispensary and was assigned to various stations at drills and quarters. On arriving in South America he was to collect and prepare specimens of birds, reptiles, mammals and plants, as well as objects of ethnological interest.

The *Water Witch* left the United States in February, 1853, reached the mouth of the Rio de la Plata without accident, and after a short stay at Buenos Ayres proceeded to Asunción, the capital of Paraguay. She then steamed up the river beyond into the territory of Brazil, where much interesting information and material were collected. A history of this memorable expedition and of the war with Paraguay which resulted may be found in Captain Page's work on *La Plata*.² Dr. Palmer's personal notes contain much of vivid interest, and I regret that there is not space in the present paper to give them in detail. It is sufficient to say that he was called upon not only to superintend the delivery of ammunition from the magazine of the vessel, but also to dress gunshot wounds and to attend to the burial of the dead.

No account of the scientific results of the expedition was published. There was no one at the time to identify and describe the plants collected, which for a time were lost; and we come upon them now and then in the collections of the national herbarium, many of them still unnamed.

One of the most interesting episodes of the *Water Witch* Expedition was the meeting of an officer sent from the ship on a reconnaissance with Bonpland, the companion of Humboldt on his travels in America.

² Page, Thomas Jefferson, "La Plata, the Argentine Confederation and Paraguay," New York, 1859.

This venerable naturalist had for many years been a prisoner of the Paraguayans, but he was now living like a patriarch on his own plantation, surrounded by a brood of sons and daughters and cared for by a devoted native wife.

On his return to the United States Edward Palmer first went to Cleveland to give his friends an account of his wanderings, and then to England to visit the home of his childhood, as well as the great World's Fair at the Crystal Palace. Coming back to America, he took a course of medical instruction, to supplement as well as possible the practical knowledge he had acquired on the *Water Witch*. He then received an appointment as collector in connection with the Geological Survey of California, working under the direction of Dr. Cooper, especially on the marine invertebrates of the California seacoast. He was thus engaged when the civil war broke out.

In 1862, when President Lincoln called for troops, Palmer returned east and applied for a position as acting assistant surgeon in the army, relying on his past experience as a voucher for his fitness for the work. He accompanied Colonel Leavenworth to Colorado, under the promise of an appointment, but for many months he served without appointment or pay in caring for sick soldiers at various posts. At Fort Lyon there was much sickness among the troops, and he was ordered to relieve the contract surgeon at that post. From this time until the close of the war he was engaged at various posts, often riding with the sick in ambulances, but not resisting the temptation en route to alight and gather up plants, reptiles and other objects which seemed to him of interest; for he was a born collector. One of his last stations was Kansas City, where he assisted the surgeon in the city hospital.

After the close of the war he was stationed at various posts in Arizona and the Indian Territory, where his work of attending the sick was pleasantly varied with his occupation as a collector, sometimes receiving scant sympathy from his commanding officers, sometimes encouraged by them to pursue his work in the cause of science; but always on his detachment from a post carrying with him testimonials as to the faithful performance of his duties, his tender care of the sick, and his remarkable success in using simple herbs and local remedies when his official supply of medicines was exhausted. His personal notes teem with interesting anecdotes, such as an account of a scouting expedition against the Apaches, on which he collected ethnological material while half-breed soldiers were bayonetting and scalping hostile Indians; and the story of his vicissitudes during an epidemic of sickness at Fort Grant, when he himself was stricken. He did not on that account cease to add to his collection, but while he lay in the little hut that served as his dispensary he was aided by a cat that brought in small animals to her kittens. He would seize her gently, take away her prey, and after

removing the skull and skin of the animal, allow her to proceed with its body to her little ones. In this way he secured specimens of several new rodents. He also gives an interesting account of a raid by a party of Indians in the Indian Territory, who were about to destroy his collections, but stopped short at the sight of snake-skins, evidently recognizing them as the property of a medicine man with whom it was dangerous to trifle.

Dr. Palmer's reputation as a collector having been established, he was sent by the commissioner of agriculture, in March, 1869, on a mission to New Mexico and Arizona, to report on the agricultural resources, the commercial products, the climate and fertility of the soil, and the general habitable features of the various localities to be visited by him.

He proceeded to Fort Wingate, N. M., and across the border to Fort Defiance, Ariz., whence he visited the Navajo Indians and the Hopis, or Moquis, of northeastern Arizona. Dr. Palmer in his notes describes the agriculture of the Hopis and gives an account of a feast at which the principal articles of food were thin, scroll-like cakes of blue corn-bread, which were used by the Indians for plates and spoons as well as for food; syrup made from the roasted crowns of an agave; peaches, which the Indians had begun to cultivate; and mutton from their flocks. At the village of Oraibi a rabbit hunt was organized in honor of his visit, and Dr. Palmer for the first time saw boomerangs used as weapons of the chase. Specimens of these were secured for the National Museum. Some of the cactaceæ collected in this region were described by Engelmann, and by Coulter in Vol. 3 of the Contributions from the U. S. National Herbarium.

After his return to Fort Wingate, Dr. Palmer was furnished with an army escort for his journey to Fort Whipple, Ariz. On his way thither he stopped to collect on the slope of San Francisco Mountain, a locality which had never before been visited by a botanist. From Fort Whipple he made various excursions to neighboring localities, securing much botanical material and objects of ethnological interest illustrating the habits and customs of the various tribes of Indians inhabiting the territory of Arizona. This was forwarded to San Francisco, by way of the Colorado River and the Gulf of California. It was shipped at San Francisco on the *Golden City* to go to New York by way of the Isthmus of Panama; but the vessel was lost, with everything on board. Only a collector can realize what a blow this was to Dr. Palmer. "When I heard of the disaster," said he, "every hardship and risk I had endured came to my mind; one by one I recalled some special object of beauty or of interest which I felt I could never replace."

From Arizona he entered the Mexican state of Sonora and proceeded southward to Guaymas, collecting on the way. After visiting the

Yaqui Indians in the interior, he crossed the Gulf of California to the peninsula of Lower California and went thence by sea to San Francisco. Among the plants collected in northern Sonora and along the shores of the Yaqui River, many proved to be species hitherto unknown. One of them, a columnar cactus, had fruit densely covered with spines, which was used by the Indians for brushing their hair. This was named *Cereus pecten-aboriginum* by Engelmann, and afterwards described by Sereno Watson in Volume 21 of the *Proceedings of the American Academy*.

Dr. Palmer next went to Utah. He carried with him a letter of introduction to Brigham Young, who assisted him most willingly in his work by giving him letters to the authorities in the southern part of the territory. His work was chiefly in the vicinity of St. George, in the southwest corner of the territory. This region, considerably lower than the great Utah basin, is remarkable for its semitropical products, such as pomegranates, cotton, etc., on which account it is sometimes called *Dixie Land*. From St. George he made a long and painful journey across what is now the southern corner of Nevada to Hardyville and Camp Mohave, on the Colorado River, and thence across southern California to San Francisco.

On his return to Washington, in November, 1870, he received a letter from Dr. Torrey, congratulating him on the successful accomplishment of his mission. "I had anticipated much pleasure," Dr. Torrey wrote, "in spending several days with you at the agricultural department, and in hearing from you an account of your doings and adventures.

"You have, in the last few years, done great service to North American botany, and I trust that we shall receive yet greater benefit from your explorations. There are many choice plants to be found in our little-explored states and territories.

"I should be delighted to look over your late discoveries, and I hope you will be able to spare me duplicates. It is of great importance that the herbarium of Columbia College should be as complete as possible in North American plants."

The commissioner of agriculture, Horace Capron, in his report for 1870, calls special attention to the collections of Dr. Palmer and states that the botanical material accumulated by him "is now in process of elaboration by the distinguished American botanists, Drs. Gray, Torrey and Engelmann, and includes a considerable number of plants new to science which will be greatly prized by scientific botanists, and eagerly sought by botanical institutions at home and abroad."

"The design of establishing at the seat of government a collection of plants worthy of the name of a national herbarium is thus in process of rapid accomplishment, at a comparatively small cost; and it is confi-

dently expected that this collection, now probably the third in point of size, will eventually exceed all others in the amount and value of its materials for illustrating North American botany.”³

In the same report was published a paper on the “Food Products of the North American Indians,” based upon Dr. Palmer’s field notes and observations.

During the next two years Dr. Palmer was engaged in making collections of marine invertebrates and algæ on the New England coast, and in going over his material at the Museum of Comparative Zoology at Cambridge.

From Cambridge, at the suggestion of Professor Gray, Dr. Palmer made a trip to Florida and the Bahama Islands. A list of the algæ collected by him at this time was published by Professor Daniel Cady Eaton, of Yale, but no list of the flowering plants was published. One of the most interesting plants found by him in Florida was a yellow waterlily, *Nymphaea flava*, which had been figured many years before by Audubon, but which had remained unknown except through Audubon’s figure until its rediscovery by Palmer. In Audubon’s figure the leaves of a *Nuphar* instead of those of a *Nymphaea* had been depicted, and Dr. Palmer’s specimens were the first to establish the true nature of the plant.⁴

In 1875 Dr. Palmer visited Guadalupe, an island lying some distance off the coast of Lower California, which had never before been visited by a botanist. His collections on this island revealed a fauna and flora of peculiar interest, connecting it rather with upper California than with the adjacent peninsula. Every bird in his collection except a single sea bird proved to be new to science, though represented by allied forms on the mainland; and among the plants there were twenty-one new species, the greater part of which proved to be peculiar to the island. The account of Dr. Palmer’s personal experiences on the island is most interesting, but unfortunately there is not space here to repeat it.

While on the island he lived in a dug-out with a roof of poles covered with dirt. His explorations were attended with much difficulty and for several weeks he was seriously ill. Sometimes in order to secure plants growing on the faces of cliffs, which had been preserved on account of their inaccessible position from the greed of goats, he made use of a noose at the end of a long pole, much to the amusement of the herders, who laughed at the doctor’s attempts to “lasoo plants.” Many of the species could have been secured in no other way. “Goats,” he says, “were my only rivals; but they made a clean sweep of everything in reach, not discriminating between what was common and what was rare.”

³Report of the Commissioner of Agriculture for 1870, pp. 11, 12, 1871.

⁴See *Am. Journ. Science*, No. 65, 416, 1876.

An account of the vegetation of the island based upon his collection was published by Sereno Watson in Volume 11 of the *Proceedings of the American Academy*, 1876; and a description of the birds by Robert Ridgway in a bulletin of the Hayden Survey.⁵

Immediately after his return from Guadalupe Island Dr. Palmer began to collect botanical and ethnological material in southern California for the approaching Centennial Exposition at Philadelphia. It was at this time that he crossed the boundary line into Mexican territory and made his famous collection of plants in the great canyon of the Cantillas Mountains, in the northern part of Lower California, a locality never before visited by a botanist, which yielded a number of new and interesting species. The collections were of special importance, and added much to the knowledge of the botany of the region. Many of Dr. Palmer's notes were embodied by Gray and Watson in their "Botany of California," which was then in preparation. He also visited the Diegueño Indians of southern California and obtained valuable material illustrating their arts and habits of life; their weapons, baskets, pottery, foods and medicines.

On one of his collecting expeditions near the Lower California boundary line he came upon a party of almost naked Cocopa Indians gathering their annual supply of pine nuts, the fruit of *Pinus quadrifolia*.

"It was an interesting sight," said he, "to see these children of nature with their dirty laughing faces, parching and eating the pine nuts. They had already filled many bags and were eating them by the handful. Indeed we found the piñones to be rich and well-flavored, and we were not satisfied with few. We realized that these happy free people were in their natural habitat here beneath the pines. At last we had the privilege of seeing primitive Americans gathering their uncultivated crop from primæval groves."

Another plant collected by Dr. Palmer proved to be the type of a new genus, which Professor Gray named *Palmerella* in his honor, stating that he did so in acknowledgment of Dr. Palmer's "indefatigable and fruitful explorations of the botany of the southwestern frontiers of the United States, from Arizona to the islands off Lower California, in which region he has accomplished more than all his predecessors."

Dr. Palmer sent a fine collection of woods to Dr. Vasey, who was preparing an exhibit of forest trees of America for the Centennial Exposition.

⁵ Ridgway, Robert, "Ornithology of Guadalupe Island, Based on the Notes and Collections made by Dr. Edward Palmer," *Bull. Hayden Survey*, No. 2, p. 183, 1876. See also by the same author, "The Birds of Guadalupe Island, Discussed with Reference to the Present Genesis of Species," *Bull. Nuttall Ornithology. Club*, Vol. 2, p. 58, 1877.

The months of November and December, 1875, were spent in southwestern Utah, where he made a collection of the principal plants and the plant products of the Paiutes. An account by Dr. Palmer of "Indian Food Customs" was afterwards published in Volume 12 of the *American Naturalist*, and reprinted in the *American Journal of Pharmacy* in 1878. Several burial mounds in the vicinity were opened by Dr. Palmer, and a valuable collection of pottery, beads, etc., resembling similar objects of Pima and Hopi Indians of Arizona, was made and sent to the National Museum.

From St. George, Utah, Dr. Palmer went to San Bernardino, California, for necessary supplies, and then back to Arizona, where he visited the Mohave Indians of the Colorado River, concerning whose arts and customs he obtained valuable notes, describing their methods of fishing, trapping, pottery-making, food preparing, their navigation on balsas made of bundles of reeds and their primitive methods of agriculture. He also collected a number of living cactaceæ characteristic of the vegetation of the region, including the giant *Cereus*, for exhibition at Philadelphia.

From Camp Mohave he crossed the desert to San Bernardino, discovering on the way a beautiful little plant which proved to be the type of a new genus of the poppy family, and to which Professor Gray gave the name *Canbya*.

On May 29, accompanied by Dr. Parry, Professor Lemmon and Mr. Craft, of Crafton, and several others, Dr. Palmer set out to climb Mount San Bernardino. The next day Dr. Palmer fell from his horse and severely injured his spine. He was obliged to lie until the following day on an improvised bed, when he was carried to the bottom of the mountain to a carriage in which Dr. and Mrs. Parry had come to take him home. In the meantime an account of the expedition had been published at San Bernardino, in which it was stated that the doctor had been left "on the mountain *without grass or water*, with a man to look after him." "Wherever I went for some time afterward," said Dr. Palmer, "I was pointed out as the man who had been left on Grayback Mountain without grass or water; sometimes I was jocosely addressed: 'Hello, old grass-and-water, how's your back?'"

Dr. Palmer next visited the region surrounding San Luis Obispo, California, where he secured several new species, and thence he returned with Dr. Parry and Mrs. Parry to their home in Davenport, Iowa.

In December, 1876, he returned once more to the vicinity of St. George, Utah, this time for the purpose of making archeological explorations for the Peabody Museum of Harvard University. Accounts of the discovery of remarkable tablets bearing signs of the zodiac, conventional figures of the planets, etc., had been recently published, and

they were given serious consideration by many archeologists of good standing. Dr. Palmer's researches, however, proved that the remains of ancient occupation of the region were in no way distinguishable from those of similar character in Arizona and New Mexico. The plates were undoubted forgeries.

In addition to his archeological explorations he assisted Dr. Parry, who accompanied him, in completing a collection of the spring-flowering plants of the region.

It was now decided to invade Mexico in prosecution of botanical and ethnological work, and plans were formulated by which Dr. Palmer and Dr. Parry were to go together. The expenses were to be borne by several institutions as well as by individual botanists, who were to receive sets of plants. The two collectors accordingly proceeded to the city of San Luis Potosi, going by sea to Veracruz, and thence by rail to the City of Mexico. After visiting the National Museum in that city they turned northward, Dr. Palmer stopping on the way at the city of Zacatecas and at Aguascalientes.

After making extensive collections in the mountains of San Luis Potosi, Dr. Parry fell ill and was obliged to return home. Dr. Palmer continued the work, and after collecting on the tableland and mountains, returned by way of Tampico, descending into the more tropical lowlands near the gulf coast, and greatly supplementing the collections made in the higher altitudes.

Sets of plants were sent to the various subscribers to the expedition, but the most complete set was sent by Dr. Parry to the Kew Herbarium, which caused not a little dissatisfaction among some of the American subscribers. The results of the expedition were for the most part embodied in the great work by Hemsley, the "Botany of the Biologia Centrali-Americana."

The latter part of the following year, 1879, Dr. Palmer made extensive collections in western Texas, and in 1880 he returned to Mexico to supplement his previous collections, exploring chiefly certain localities in the states of Coahuila, Nuevo Leon and a part of San Luis Potosi. He sent a nearly complete set of the plants collected at this time to Kew, and they too were included by Hemsley in the "Biologia." A more complete set went to the herbarium at Cambridge, Mass., and were the basis of two papers published by Sereno Watson, in Volumes 17 and 18 of the *Proceedings of the American Academy*, in which a complete list of the plants collected by Parry and Palmer in 1878 and by Palmer in 1879 and 1880 was given.

The archeologists at Cambridge and in the Bureau of Ethnology becoming interested in the relationship between the aboriginal inhabitants of the tablelands of Mexico and of the great region of the Mississippi Valley, Dr. Palmer was engaged to make researches. Accordingly

from 1881 to 1884 he was almost continuously at work opening prehistoric mounds and graves in the states of Tennessee, Arkansas, Indiana, North Carolina, Georgia and Alabama.

In the latter part of 1885 he was sent to southern Florida to make a collection of corals, echinoderms, mollusca and other invertebrates for the approaching exposition at New Orleans. He gathered a wealth of valuable material, which, after the closing of the Exposition, became the property of the United States National Museum.

He was sent once more to the southwestern region of the United States, where he made a very complete collection of material illustrating the arts of the Cocopa, Pima and Yuma Indians. Much of his material was of an ethno-botanic nature, including a long list of food-plants, medicinal plants, fiber plants, etc., of the Indians, together with notes on the methods of cooking, brewing, extracting fibers, basket-making and the like.

Much pleased with Dr. Palmer's success, Professor Baird, director of the U. S. National Museum, decided to send him to the mountains of southwestern Chihuahua, a part of the western Sierra Madre of Mexico, for the purpose of studying the Tarahumara Indians of that region, an interesting tribe inhabiting caves and dwellings of the most primitive kinds; with the object of comparing them with the Cliff Dwellers of Arizona and New Mexico. Letters were sent to Governor Alexander R. Shepherd, then vice-president and general manager of the Silver Mining Company at Batopilas, informing him of Dr. Palmer's purposed visit, and asking such assistance as Governor Shepherd might be willing to give him in the prosecution of his work. Professor Baird's request met with a cordial and prompt response from Governor Shepherd, who did everything in his power to aid him.

Much botanical work was done in the immediate vicinity of Batopilas, especially at the Hacienda de San Miguel, situated at an altitude of 1,600 feet above the sea-level, the Hacienda San José, about twenty-five miles farther down the narrow gorge of the Rio Batopilas; at the Cumbre, or summit of the ridge above Batopilas, 8,850 feet above sea-level, where he found columbines, lupines, *Gaultheria*, gentians, alders, and *Ceanothus*; and at the Indian village of Norogachic, about 150 miles north of Batopilas, in the Sierra Madre, at an elevation of about 8,500 feet. This place is surrounded by mountain peaks more or less covered by junipers, madroños, manzanillas, pines and oaks, with a considerable snowfall during the winter months.

Among the plants collected in this region several proved to be new to science, and many were of economic importance. A list of them was published by Sereno Watson in the *Proceedings of the American Academy*, Vol. 21, 1886. The ethnological material was sent to the U. S. National Museum.

Among the plants used by the Tarahumara Indians was one of special interest, a small, turnip-shaped, spineless cactus called *Hikuli*, in quest of which they made long journeys to the mountains of eastern Chihuahua. It proved to be the narcotic "mescal-button" (*Lophophora williamsii*), also known in Mexico by the name *Peyote*, or *Peyotl*. This plant causes delightful visions and strange hallucinations, and the Indians regard it with great veneration. Like their cousins, the Huicholes of the Nayarit Mountains of Jalisco, they observe certain rites or ceremonies in collecting it, bringing it home, and preparing it for use, which recall the superstitious practises of the *rhizotomi*, or root-gatherers, of ancient Greece.

Dr. Palmer's next expedition was to the state of Jalisco, where he made extensive collections, especially in the vicinity of Guadalajara. Not far from this city he descended into a wonderful barranca, or canyon, never before visited by a botanist. The account of his discoveries at this time recalls Schiede's description of his descent into the Barranca of Teocelo, near Jalapa, in the state of Veracruz.⁶ His collection of this year included about 675 species, many of which proved to be new. A preliminary report of the botanical results was quickly prepared by Sereno Watson and published in the *Proceedings of the American Academy*.⁷

The following year he collected near Guaymas, the seaport of Sonora, on the island of San Pedro Martir, in the Gulf of California, and at Mulejé and Angeles Bay, on the gulf coast of Lower California. The results were also published by Watson in Vol. 24, *Proceedings of the American Academy*, 1889.

During June and July, 1888, he collected for the U. S. Department of Agriculture in the counties of Kern, Tulare and San Bernardino, California. A list of his collections at this time, published by Vasey and Rose, is the initial paper of the "Contributions from the U. S. National Herbarium," Vol. 1, 1890. The next year he returned to Lower California, collecting at San Quentin and Lagoon Head, on the Pacific coast, Cedros and San Benito Islands, and once more on the interesting island of Guadalupe, some distance off the coast. An account of the plants collected at San Quentin and a partial report of those collected at Lagoon Head were published in Vol. 11 of the *Proceedings of the U. S. National Museum*, 1889. An account of the remaining plants from Lagoon Head together with those collected on the coast islands above mentioned was published by the same authors in Vol. 1 of the "Contributions from the National Herbarium," to-

⁶ "Botanische Berichte aus Mexico, mitgetheilt vom Dr. Schiede," *Linnaea*, Vol. 4, p. 233, 1829.

⁷ "List of Plants collected by Dr. Edward Palmer in the State of Jalisco, Mexico, in 1886," *Proc. Am. Acad.*, Vol. 22, pp. 396-465, 1887.

gether with a short list of plants from Lerdo, in the state of Sonora, Mexico, at the head of the Gulf of California. At the latter place he collected great quantities of a parasitic fleshy plant, *Ammobroma sonora*, the "oyutch," or sand-food, of the Cocopa Indians.

In 1890 he spent three months in Lower California, collecting at La Paz, Santa Rosalia and Santa Agueda, as well as upon Raza Island and the island of San Pedro Martir, in the Gulf of California; and three months in southern Arizona, collecting at Camp Huachuca, Fort Apache, and Willow Springs. He also made two trips to Alamos in the mountains of southern Sonora, the first during the latter part of March and beginning of April, the second in the month of September. The results of these expeditions were published by Dr. Rose in the "Contributions from the U. S. National Herbarium, Vol. 1, pp. 91-128, 1891. In 1893 he collected in southern Idaho.

He afterwards collected in the more tropical regions of Sinaloa and Colima; at Acapulco, the seaport of Guerrero, from which the galleons of the ancient conquistadores sailed to the Philippines; and in the Territory of Tepic. Several times he has revisited the interior states of Coahuila and San Luis Potosí, collecting among the pines and oaks of the mountains, as well as on the arid plateau and in the warm moist region of the lower land near the Gulf of Mexico. He has penetrated into the heart of Durango, making two trips to the Sierra Madre of that state, once in 1896 and again ten years later, in each case going as far as the newly built railroads would take him and making extensive and often painful journeys to lumber camps and mining regions in the mountains. In 1907 he revisited Tamaulipas, collecting especially near Victoria and Gomes Farias. In 1908 he revisited Chihuahua, this time collecting near the capital and at the neighboring stations of Santa Eulalia and Santa Rosalia.

His last trip, in 1910, was to the gulf coast, in the vicinity of Tampico, Tamaulipas.

From all of these expeditions he returned laden with a wealth of material, his specimens remarkable among those of all collectors, not for their prettiness, though they were often beautiful, but for their completeness, showing when possible bark, root, wood and seed-pods or fruit, as well as leaves and flowers. He did not content himself with a single example, but in spite of difficulties would often bring a whole series, to illustrate vegetative foliage and branches as well as flowering branches, knowing that the aspect of the foliage might vary on different parts of the same plant, and that entire plants might differ according to their situation. He accompanied the specimens by accurate notes as to locality, habitat and season, not disdaining to give local names however barbarous they might sound to ears tolerant only of classic Greek and Latin; and he noted the taste and odor of bark and wood and leaves

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as well as the color of flowers and the uses of fruits, seeds, herbs and roots, together with the virtues attributed to them by the simple natives, no matter how foolish such information might appear to the eyes of the learned.

And now, as his busy life is nearing its close, enfeebled by hardships and almost incessant physical suffering, he sits close to the fire with his great coat around him. His last set of plants has been disposed of. Is his task finished? He can not bear to think so. He had planned to do so much more. As he closes his eyes he has visions of palm trees reflecting their crests in the still lagoon; or perhaps he hears the tinkling of bells as flocks of goats wander across the sunny plain and climb rocky hillsides dotted with cactus, maguey and yuccas; or perhaps he is once more among pines and oaks on a mountain top, or in moist forests gathering orchids and creeping arums. His old enthusiasm comes back; his pulse throbs with renewed vigor. No, the end is not yet. Once more he prepares his pack; his staff stands in the corner. He unfolds the map. To-morrow he will start off, but to what fresh field he can not yet decide.

It has been impossible within the limits of this paper to do more than enumerate many of the localities explored by Dr. Palmer. To give a detailed account of his work would fill hundreds of pages. Every student of North American botany can bear witness to its value. We have already heard the testimony of the distinguished botanists, Professor Gray and Dr. Torrey, given in the early part of his career. He has added hundreds of species to science and many more of his collecting remain to be described. Scarcely a monograph of a family or genus appears, including representatives in Mexico and the southwestern United States, but among the species described are new ones based upon types collected by Edward Palmer. My list thus far reaches 1,162 new species of flowering plants discovered by him, but I am sure that this does not include all. The composites lead with 259 species. It is not possible to tell definitely how many well-established species bear his name. I have counted 200. It is pleasant to think they will continue to bear his name for centuries to come, eternal witnesses to his wonderful activity, forming a monument more lasting than sculptured marble, recording the services he has rendered to science and his fellow men. And in all the years to come no history of American botany will be complete without an account of the work of Edward Palmer.