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On the cover: Taxus baccata in the churchyard of Painswick,
The Dahlia: An Early History

In 1934 Marshall Howe, of the New York Botanical Garden, compiled a list of *Dahlia* cultivars containing more than 14,000 names. This number represents an astonishing average of over 100 newly named cultivars during each of the 143 years since 1791, when dahlias were first brought into cultivation in the gardens of Spain following their arrival from Mexico. Today dahlias are among the most familiar and cherished subjects of gardens in all parts of the globe. Interest in the garden dahlia has, in its brief modern history, generated the founding of dahlia societies on both sides of the Atlantic, with memberships in the thousands; produced an industry with annual revenues in the millions of dollars resulting from the sale and exchange of living plants and seeds; spawned horticultural shows designed exclusively around home-grown and professionally grown dahlias on the local, reigonal, national, and even international levels; and created scores of books and hundreds of published articles covering dahlia history, cultivation, and the classification of the garden forms as well as the more formal taxonomy of the wild species.

Despite such intense interest and attention, the history of our garden dahlia has been treated in a sketchy and piecemeal manner. At the present time no definitive history exists which spans the entire period for which records are known. Many errors and much fiction lie scattered in the literature of the past and present, relating to the dahlia. Some of these have been picked up and repeated as fact by subsequent authors who have failed to authenticate their information by going to original source materials. Some writers of the past have made sweeping judgments of the validity of certain facts and details of dahlia history while providing not a word of reasoning in support of their conclusions.

During the past several years I have been concerned with preparing a treatise on the systematics and classification of the genus *Dahlia* as a whole, with particular emphasis upon the data from the wild species. While principally a "botanical" project, this effort has involved extensive reading in both the
botanical literature as well as in that literature otherwise deemed horticultural. Such a survey became necessary because there were times in the past when a careful distinction was not made between the naming and classification of wild and domesticated plants. Thus, I became inadvertently aware of many facts concerning the history of the *Dahlia* in cultivation. In several instances the sources of some of the errors alluded to above became apparent to me, and some interesting new facts were brought to light, which proved worthwhile in clearing up our view of the origin of *Dahlia* cultivation.

One may, for the sake of convenience, divide *Dahlia* history arbitrarily into several periods, each of which serves to focus attention upon one or a few major developments:

1) Prehistorical and early historical period (c. 1552–1790)
2) Period of early scientific description (1790–1796)
3) Early introduction and distribution of first modern cultivars and species (1796–1804)
4) Early breeding period (1804–1814)
5) Controlled breeding period (1814–1929)
6) Genetic breeding period (1929–present)
7) Period when nutritional control in cultivation was applied (? – present)

The present account is devoted to consideration of the first three periods. The first of these, as we shall see, concerns developments which took place in the dahlia’s native land, Mexico, while the second and third periods belong to Europe, as do the remaining periods. One must keep in mind that at times the dahlia has had a dual history, one relating primarily to botanical endeavors and the other to horticultural. The above periods emphasize the horticultural side of the genus.

Formal *Dahlia* history begins in the late 18th century in Spain, where Antonio José Cavanilles gave the genus its Latin name in commemoration of Andreas Dahl, a Swedish botanist and pupil of Linnaeus. Cavanilles, then a senior member of the staff of the Royal Botanic Garden in Madrid (not its director as often stated 2), had received seeds of Mexican plants.3 Plants grown from these seeds were cultivated in Madrid and comprised the materials upon which Cavanilles based his description of the first “dahlia,” *Dahlia pinnata*. Thus, even from the earliest days of the scientific period of its history, the dahlia was a cultivated plant. As we shall see, the cultivation of dahlias really begins much earlier. At the appropriate time I shall come back to further discussion of Cavanilles’ dahlias.
Our garden dahlia seems so familiar that few among us are aware of its nativity in Mexico. Most persons learning this for the first time express considerable surprise, usually having thought the dahlia to have originated in Europe (which, in a certain sense, it did, inasmuch as the great majority of our horticultural forms were created through various kinds of plant breeding in Europe by European plantmen). But all of the species known of the genus are native within the borders of Mexico and adjacent countries of Central America. Long before Cavanilles described the genus, these species—there are now twenty-seven known—existed as unmolested members of the flora occupying mostly the great central plateau or highlands of Mexico. Even today one can see them during the months of August and September in profusion along the highways, growing out of cliffs, among boulders, in cultivated fields alongside the milpa or maize which we call corn, and on open slopes of the volcanic mountains. If dahlias grew in New England and behaved here as they do in Mexico, we would surely regard them as weeds. These weeds of Mexico are the progenitors of our garden dahlias, and the early history of these garden plants is closely linked to the history of Mexico, especially that period which passed before and soon after the Spanish conquest.

Our interest centers on the Aztecs and Moctezuma.* This young prince gained the throne in 1502 and ruled for eighteen years before his fall when he was made a captive of the Spanish conquerors led by Hernán Cortés in 1520.4 A few extant eyewitness accounts indicate that the Aztecs of this period engaged in horticultural practices. Recently, Zelia Nuttall has written about the gardens of Mexico.5 In her review we learn that the construction of gardens was one of the principal activities to which the ruling classes devoted themselves. As in our own society, Aztec gardens were each specialized to fulfill a single purpose. There were gardens for ornamental plants, special

* The name has several variations, including the more familiar Moctezuma.
ones for plants which gave off a pleasing fragrance, gardens for medicinal plants, some for cut flowers, orchards, and vegetable gardens. Gardening in Aztec society was an activity conducted solely at the behest and pleasure of the noblemen, the labor being carried on by slaves. Moctezuma himself owned many gardens. Hernán Cortés, in a letter to his Emperor, Charles V, describes one of Moctezuma's gardens at Iztapalapa, a town several miles from the capital, Tenochtitlán: “There are... very refreshing gardens with many trees and sweet-scented flowers, bathing places of fresh water... He also has a large orchard... Toward the wall of the garden are hedges of lattice work made of cane, behind which are all sorts of plantations of trees and aromatic herbs.” Bernal Díaz, Lieutenant of Cortés, wrote about Iztapalapa saying: “The garden and orchard are most admirable. I saw and walked about in them and could not satiate myself sufficiently looking at the many trees and enjoying the perfume of each. And there were walks bordered with the roses of this country and flowers and many fruit trees and flowering shrubs.”

The most wonderful of all Moctezuma's gardens was the tropical one at Huaxtepec. It was with the use of this garden that Moctezuma's father instituted an elaborate program of plant introduction. Huaxtepec lay in the tropical valley south of the Valley of Mexico and occupied an elevation 2,000 feet lower, with a climate somewhat ameliorated from that of the capital, which was about 7,400 feet above sea level. It made an ideal place in which to try out the cultivation of introduced plants. Requests were dispatched to all the lords of the empire, especially to those who ruled settlements along the coasts, that they send a selection of plants from their regions for cultivation in Huaxtepec. Great ceremony accompanied the planting of each introduction, which arrived “balled and burlapped!” their roots enclosed in earth and the whole wrapped with richly decorated mantles. Priests were summoned to make animal sacrifices for each planting, spilling blood of the offering as well as some drawn from their own ears onto the soil prepared for the plant.

Cortés visited the garden in Huaxtepec and reckoned its size at two leagues, or six and one-half miles, in circumference — roughly two times the size of the Arnold Arboretum in Jamaica Plain. When he and others in his company saw it “and promenaded in it for a while they were filled with admiration and said that even in Spain they had never seen a finer kind of pleasure garden.” It's a pity that precious little remains of this
horticultural splendor. At Huaxtepec there could be seen, as recently as 1925, a few aging monarchs of Taxodium, or cypress trees, which had been planted in long colonnades. By now even these may be gone.

As a natural corollary to developing skills in the horticultural arts, the Aztecs also devoted much effort to the practice of medicine utilizing remedies prepared from plants.

In the years following the Spanish conquest of Mexico, which was completed in 1552, many Europeans came to the New World from the monastic schools of Spain and France to teach in the new convents and schools which had been established for the education of the sons of Aztec noblemen. Some of the friars recognized that Aztec medical arts contained many remedies superior to those they had learned in Europe. Some of them endeavored to study the uses of native medicines and to acquire the skills of the Aztecs in their preparation. Others became engaged in learning the Aztec language, Nahuatl, and eventually they contrived a Nahuatl grammar which greatly aided in their grasp of Aztec culture. At the same time the development of a Nahuatl grammar had the result of hastening the instruction of Aztec pupils in their study of Latin and Spanish. With this the stage was set for an important event which relates to our review of dahlia history.

The Earliest Record of a “Dahlia”. One of the earliest institutions of learning in the New World dedicated to improving the education of Aztec boys was established in 1536. The college of Santa Cruz was constructed in the native quarter of the ancient city of Mexico at the Convent of Tlaltelulco. It attracted many gifted teachers. An Aztec pupil at the college, given the name Martinus de la Cruz, there learned to write his native Nahuatl and, through his interest in medicine, eventually rose to become “Physician of the College” and to give instruction in medicine to other native sons. Also among the Indian boys who distinguished themselves by their ability was a young man from Xochimilco, a place which then, as today, was a horticultural and agricultural center. This young man had been given the name Juannes Badianus. He had mastered Latin sufficiently to be made a “Reader of Latin” at the college.

Having been reared in the region of the horticulturally important Xochimilco, an area south of the city of Mexico, Juannes Badianus brought to the college an intimate familiarity with the plants cultivated by the Aztecs. Badianus and Martinus — the one skilled in the cultivation of plants and fluent in the Latin
language, the other trained in medical knowledge and practices — co-authored an illustrated herbal, considered the first book written about the medicinal plants of the New World, *The Badianus Manuscript, An Aztec Herbal of 1552*. This important manuscript was written first in Nahuatl by Martinus de la Cruz and then translated into Latin by Juannes Badianus. It lay forgotten and unknown for nearly 400 years until its rediscovery at the Vatican Library in 1931. The fascinating historical events attending the writing of this simple little book have been fully investigated by Emily Emmart and published in her detailed introduction to the facsimile edition of the manuscript. The *Badianus Manuscript* contains what may be taken as the earliest illustration of a *Dahlia* that has thus far come down to us. We are doubly fortunate that this *Dahlia* illustration is in full color in the facsimile, assisting greatly in our recognition of the plant (see Fig. 2, reproduced here from Pl. 59 of the facsimile). As will be shown later, nearly 300 years intervene before a colored picture of a *Dahlia* again appears in botanical literature.

The Martinus-Badianus illustration of the dahlia is somewhat contrived and stylized in a manner typifying most of the drawings in their book. Because of this it would be presumptive to assert its correspondence with any of the wild species as we
know them today. That it is a *Dahlia* at all is a matter of judgment. In *The Badianus Manuscript* we are shown a picture of a plant with three flowering heads, each producing eight ligulate or ray florets and each borne singly at the end of a branch. The pinnately compound leaves are opposite each other across the stem (though some are shown arranged alternately). Except for the few alternate leaves, the other characteristics displayed are all those one usually associates with the genus *Dahlia*. It is unfortunate the best known and probably most characteristic feature of the genus, namely the tuberous root, is poorly drawn and rather non-descript. The generalized portrayal of the roots may be a reflection of the emphasis the authors have placed upon the stems as the most important part of the plant. Only the stems are used in the medicinal preparations they describe. One should, perhaps, not search too deeply for any significance in the authors' omission of the tuberous roots. Emmart has pointed out that the manner in which roots are portrayed in the manuscript is intended to convey in symbolic form the respective natural habitats of each plant. Thus the roots of their dahlia are shown penetrating the symbol for *rocks* or *stones*, thereby accurately asserting the plant is to be found among the rocks of nearby mountain slopes.

The color of the rays as reproduced in the facsimile is of such a tint that one cannot determine whether it represents a shade of purple or a shade of scarlet. The same color appears in the illustrations of other plants throughout the book and is also used by the writers for the lettering of all the names and subtitles. If pressed for a specific determination of this *Dahlia*, I should likely choose to call it *Dahlia coccinea*. In so doing I can scarcely avoid taking into consideration that *D. coccinea* is the most widespread of the species. One finds it particularly abundant on the mountain slopes surrounding the Valley of Mexico. Other species occur in this region as well, but these tend to have more restricted ranges and would be less well known.

Regarding medicinal properties, it is worthwhile to note briefly the early uses Aztec physicians found for dahlias as revealed in *The Badianus Manuscript*. Emmart has carefully analyzed the Latin text and offered her own English translation and commentary. Stems of the dahlia, in combination with extracts and ground up seeds of other plants, were used principally in a preparation for the treatment of a disorder called the "closed urinary meatus." According to Martinus de la Cruz, the Aztec's name for the dahlia used in this way was "Cohuanenepilli,"
which means "serpent tongue." Emmart explains that nothing about a dahlia resembles a serpent's tongue, rather the name is a reference to the use of the plant. Other species with this vernacular name were used in the treatment of the same disorder. One such, recognized as a Passiflora and identified by Martinez as P. jorullensis, bears leaves vaguely suggestive of a snake's forked tongue.

These early Aztec herbalists provide us with a record of the medicinal plants of Ancient Mexico but tell us nothing about their cultivation. At best we can only guess that in a culture where medicinal plants were grown in special gardens, as those created by Moctezuma for his court physicians, the dahlia would have been a likely subject.

*The "Dahlias" of Francisco Hernandez.* Interestingly, our second historical encounter with a dahlia is in a source similar to that of *The Badianus Manuscript* — a medical book. By the middle of the 16th Century Europeans regularly received reports from the fabulous lands the Spanish had colonized across the Atlantic. Woodcuts of the period reveal the exaggerations of some tales told about the New World. Such excessiveness aroused curiosity among Europeans and undoubtedly hastened further exploration. His interest perhaps awakened by such reports, King Phillip II of Spain commissioned his personal physician, Francisco Hernandez, to travel to Nueva España and prepare an account of "the natural history of the land." King Phillip honored Hernandez with the title "Protomedico of the Indies" and provided a generous sum of money to support his work. Hernandez sailed from Spain in 1570 with five years allotted him to complete his task.

The salient facts of Hernandez' travels have been recorded by Standley, where we read that five years were scarcely enough to complete his work. By 1575 he had sixteen folio volumes ready for publication, but he remained in Mexico two more years, continually engaged with the objects of his commission. In September 1577 he returned to Spain hoping to address himself immediately to the problem of publishing his book. Difficulties arose to thwart his efforts, and he died in 1578 without seeing his work in print.

Nearly a century elapsed before work again began on publishing the manuscript. Meanwhile, other persons had extracted from it certain portions which they thought important, and these received further attention from students and scholars who added their annotations. When at last the book did appear,
published in Rome about 1651, one wonders how much of it was the work of Hernandez and how much that of others.

The title of Hernandez' book is *Rerum Medicarum Novae Hispaniae Thesaurus seu Plantarum, Animalium, Mineralium Mexicanorum Historia* (happily, often abbreviated simply *Thesaurus*). It contains the enormous quantity of detailed observations he made as well as the sketches he produced of the landscape, plants, and animals. Considering the magnitude of the task, it was a very complete work for that period, and at times has been called the world's first natural history.

Our interest here with Hernandez' *Thesaurus* is that in it are found sketches of three dahlias, introduced by their vernacular Nahuatl names, *acocotli* and *cocoxyochitl*, which Safford translates as follows: "...[the names are] derived from *cocotli*, signifying the word 'syringa' a hollow-stemmed plant; *acocotli* literally translated becoming 'water-cane' or 'water-pipe'; *cocoxyochitl*, 'cane-flower' or 'hollow-stem-flower.'" Of particular significance are the characteristics of the dahlias revealed in these sketches. On page 372 of the *Thesaurus* (redrawn here in Fig. 3) is a dahlia essentially like many contemporary cultivars, in that the capitula or heads are shown with multiple whorls of ligulate florets. Such heads are called, in the terminology of today's horticultural trade, "double-flowered." Wild individuals of *Dahlia* species do not normally produce such heads but rather produce heads with a uniform single whorl of eight ligulate florets or rays (Fig. 1). Double-flowered forms seem to be extremely common among cultivated genera of Compositae, the plant family to which *Dahlia* belongs. Strains producing double-flowered heads are usually derived through selection from variants, of which some or all of the tubular shaped disc florets occupying the center of the heads are abnormally modified into florets developing an elongate ray or strap-shaped ligule composed of the fused petals of the corolla. Many of the common cultivated genera of Compositae are known to modern gardeners only in their double-flowered form, but this type is rare among wild populations. During the course of two 8,000-mile collecting trips by auto through Mexico and Central America, I visited and collected from hundreds of wild populations of *Dahlia* species without seeing a single individual bearing double-flowered heads. Moreover, of the more than 2,000 herbarium specimens which I examined for my studies of the genus, the only double-flowered specimens were those of cultivars collected from garden-grown plants, mostly from Europe and the United States.
In Hernandez' *Thesaurus* there appear, in all, three separate illustrations of dahlias. These figures were reproduced by woodcuts, worked from the original sketches made by Hernandez. The quality of the figures varies somewhat. For example, the illustration reproduced here in Fig. 3 has very well drawn heads which show the principal diagnostic features of the dahlia capitulum. First of all the heads show clearly their degree of doubleness, and in this regard they may be compared to many of those produced on our modern cultivars. More importantly, or of more diagnostic value, are the reflexed outer involucral bracts. The position of these bracts is a trait present in well over half the wild species and all of the modern cultivars. These bracts, usually five in number, but ranging within the genus from four to six (rarely to seven or more), surround the capitulum tightly in the young bud. As the buds near anthesis the bracts begin to be reflexed and remain so during the flowering period and later. Ultimately, as the fruits or achenes reach maturity, the inner whorl of bracts subtending the non-functional ovaries of the ligulate florets also become reflexed. When this happens the ripe achenes dislodge and are dispersed short distances by the wind.

The leaves on this illustration are not clearly drawn. It is difficult to relate the plant in the figure to any known species of the genus solely on the characteristics of the leaves as they are portrayed. The accompanying description may only be misleading in this respect. Hernandez, in reference to the leaves, writes, "*Folia Aquilegiae.*" On first appearances this would seem to mean the leaves resemble those of *Aquilegia*, but one ought not assume this too readily as this description was written in 1570 — long before a uniform usage of generic names was in practice. Nor do the leaves in the woodcut resemble those of *Aquilegia* in the present application of that name. It must be recalled that this woodcut is a "second-hand" interpretation of the original sketches which Hernandez made. Indeed, even the description may be the interpretation or annotation of one of the compilers.

The reverse problem of identification is true for the two figures which appear on page 31 of the *Thesaurus* (see Fig. 4). In this pair of woodcuts the leaves are quite clearly drawn, but the characteristics of the double-flowered heads are obscure. Payne, has made it clear he does not believe there are in these illustrations sufficient details to assert their specific — or even their generic — identity. I would agree that one might justifiably retain some skepticism concerning their relationships to

*Fig. 3: A "double-flowered" dahlia, called Acocoxochitl. Redrawn from Hernandez' Thesaurus, p. 372.*
known *Dahlia* species. However, there are at least three extant species of the genus which bear leaves roughly corresponding to those in the figures. These are *Dahlia coccinea*, *D. pinnata*, and *D. brevis*. Also, in the remarks about the figures the brief description states “*stellatos flores e pallido rubiscentes*,” or “flowers star-shaped, from pale [i.e. yellow] to red,” and “*Radix gustu odorata, amara, & acris est*,” or “the root is sweet-smelling, bitter, and sharp in taste.” The description of the root is apt and agrees with my own reaction to the taste and odor of the tubers of the more widely distributed species such as *Dahlia coccinea*. On the other hand, the description of the flowers (meaning head) “from pale to red,” may be interpreted in two ways, each of which can relate the description to *Dahlia coccinea*. First: Hernandez may have been considering the two-colored nature of the heads in which the centrally placed yellow disc florets are surrounded by the red ligulate florets; or he might have been referring to the color of the ligules themselves which, in different individuals, often within the same population, ranges from yellow to scarlet, frequently with parti-colored intermediates. Second: Hernandez mentions the geographic location of the plants he observed. He calls them “*De acocotli Quauhnahuacensi & Tepoztlanensi*,” or “The acocotli of Cuernavaca and Tepoztlán.” These cities, located in the present-day State of Morelos and known to have been well-established pueblos in pre-Hispanic times, are 18 kilometers apart and are situated in the midst of rich *Dahlia* country, where frequently one encounters, from mid- or late July through September, entire hillsides given over to large populations of these striking plants.

In the foregoing assessment of the *Dahlia* sketches which appear in Hernandez’ *Thesaurus*, I have referred to the comparisons one may draw between them and the wild species of the genus. The question remains, were the plants Hernandez observed wild or domesticated? Did he sketch them from spontaneous natural populations or did he use as his subjects individuals found under cultivation in an Aztec garden? In the text accompanying the figures of *acocotli* Hernandez makes no mention of the cultivation of the plants he sketched.

I have found no direct evidence that Hernandez’ dahlias were of garden origin. Most authors who have offered summaries of dahlia history state that Hernandez’ plants were from an Aztec garden. One early writer came to the conclusion that Hernandez wrote about garden plants; since then all writers have repeated this conclusion without further substantiation. On the other hand, the conclusion that Hernandez described dahlias from
Fig. 4. Two double-flowered dahlias, called Acoctoli and Cocoxochitl.
Redrawn from Hernandez' Thesaurus, p. 31.
gardens has a sound basis. Hernandez may very well have seen his acocotli in an Aztec garden, for it is known he spent the bulk of the time devoted to his writing at the Convent of Huaxtepec where, as described earlier, one of Ancient Mexico's largest and most elaborate gardens was located. When the first double-flowered acocotli was discovered by the pre-Hispanic people of Mexico or Central America, either among the spontaneous plants in the mountains or among offspring of plants the early gardeners had brought into cultivation, it must have been at once treasured and given careful protection. To a people who derived medicine from these plants, the rare occurrence of an abnormal double-flowered form surely aroused enormous interest and was considered a phenomenon of grave significance. Might one not guess that an Aztec apothecary, seeing a double-flowered dahlia for the first time, would have reasoned its healing powers to be also “doubled?”

Every society has had its panacea. Remembering that Hernandez was a physician, we note he has taken cognizance of many Aztec remedies. About the use of dahlias he writes, “[The tuber] when consumed in a weight of one ounce, alleviates stomach pain, dissipates blowing, draws forth urine, invokes perspiration, drives out coldness, strengthens the stomach weak because of the cold, turns aside cholic, opens what has been blocked, and when moved to the swellings, disperses them.”

The “Aster” of Thiery de Menonville. Nicolas Joseph Thiery de Menonville served the King of France as a thief. This French botanist and pupil of de Jussieu lived in the colony of Santo Domingo whence he was commissioned to perform a secret service in Mexico in 1777. His mission: to secure living specimens of the jealously guarded cochineal insect and the Nopal cactus on which the insect lived. He was to smuggle these to the French islands in the Caribbean, where it was hoped a dye industry would flourish. Whereas Hernandez was a physician who regarded plants from the viewpoint of their medicinal properties, Thiery de Menonville was a botanist whose orientation was scientific and esthetic. Once in Mexico he traveled from the city of Veracruz to the city of Oaxaca and, in a very interesting written account of his travels, describes the plants and the vegetation he observed, both in the wild and under domestication. He writes of a visit to a local merchant's garden in the mountains where he had gone to observe the Nopal: “I was struck at once by a double violet aster, as large as those of France, but produced on a shrub resembling, by its pinnate
leaves, that of our Elder, and which created a very good effect. . . ." 12 Here is a clear reference to the early cultivation of an "improved" plant which roughly describes *Dahlia tenuicaulis*, a species native to Cerro de San Felipe, which towers over the city of Oaxaca.

Some authors have credited Thiery de Menonville with the introduction of dahlia seeds into France,13 but I find this accreditation wholly obscure. The only plant materials he mentions carrying with him on his departure from Oaxaca were cuttings of the Nopal cactus, which he carefully concealed. Thiery de Menonville died in Santo Domingo in 1780 and may never have returned to France. There seems to be no record that dahlias, in fact, reached the Old World until about 1788 or 1789, when an event occurred to awaken Europeans to the ornamental possibilities of the genus.

*Dahlias Reach Europe.* Late in the eighteenth century, Vincente Cervantes, a man associated with a Mexican botanic garden, consigned to Antonio José Cavanilles, in Madrid, a shipment of seeds of Mexican plants. Cavanilles, who was then Professor and later Director of the Royal Botanic Gardens of Spain, raised from among these seeds the plants he used to describe the first three species of the genus *Dahlia.* He published his finding in six books called *Icones et Descriptiones Plantarum*. The first volume (1791) contains his drawing and description of *Dahlia pinnata*.14 The importance of this first scientifically recognized species of the genus *Dahlia* warrants further comment.

The precise origin of *Dahlia pinnata* is not known. Cavanilles, in his remarks on the nativity of the species, states merely that it grows in Mexico. Knowledge of its origin would be very revealing to us because this early record is also of a double-flowered form. Could it be this plant was discovered in the wild by Cervantes or someone in his employ? Perhaps Cervantes gathered the seeds from plants cultivated in an Aztec garden. More likely, the seeds were gathered from plants in a botanic garden of Mexico City where the Spanish had undoubtedly assembled many of the wild and domesticated plants of the land during the 200 years of colonial occupation.

In a later volume (1796) of his *Icones*, Cavanilles described and illustrated two additional species of *Dahlia*, *D. rosea* and *D. coccinea*. The flowering heads of both these species as seen in the plates drawn of them bore ligulate florets in a single

*It is unlikely tubers could have survived the voyage.*
The origin of the seeds from which these plants grew is equally as obscure as the origin of the seeds of *Dahlia pinnata*. They could as well have come from wild populations as from a garden, since their single-flowered heads indicate they had not undergone selection for “improvement.”

During the latter half of the eighteenth century Europeans developed a great enthusiasm for plants of the New World. Because of Spain’s role as a colonial power, botanists and plantmen of other European countries were eager to maintain correspondence with the Royal Botanic Garden in Madrid, where each returning vessel delivered an increasing and bewildering number of new and unusual plants from the floras of Nueva Hispania. Regular exchanges of plant materials between individuals and institutions were established so that, in a short time, new introductions of plants with particular merit received a wide distribution.

As reported in an article by Thouin, Cavanilles sent seeds of his three dahlias to M. Thibaud of France in the year 1802.16 Thibaud conveyed these seeds to the botanists of the Paris Museum of Natural History where they were grown and tested. For his article, believed to be the first ever dealing with the modern procedures for the cultivation of dahlias, Thouin provided the world’s first published colored portrait of these plants. This portrait created a great interest in itself, for it was soon reproduced in several other European journals and horticultural magazines, and undoubtedly helped to create further enthusiasm for these new garden plants.

Exactly how widely seeds of dahlias were disseminated from Madrid is not fully known. What is known is that dahlia seeds were received at Montpellier, in Berlin, in St. Petersburg, and at Kensington, England. No doubt other places — such as the horticultural capitals of Brussels, Leiden, Copenhagen, Edinburgh, and Kew — were not neglected in this distribution. In Montpellier, the French botanist, Alphonse de Candolle, received seeds in 1802 from Cavanilles.17 Seeds were also received in Berlin about 1802, and there, in the following year, Willdenow prepared a revision of the genus for the fourth edition of Linnaeus’ *Species Plantarum*. With this revision Willdenow introduced the genus under a new name, that of *Georgina*, believing that the name *Dahlia* (Cavanilles, 1791) had already been used for a genus of the Hamamelidaceae described by Thunberg in 1792. This error in dates, and the substitution of the name *Georgina* for *Dahlia*, took many years to correct. The name *Georgina* became firmly established in the literature and horti-
culture of the countries east of the Rhine, where even today it persists as a common name for the garden dahlia.

For many years it was thought that dahlias were first introduced into Great Britain in 1789 through the auspices of one Lady Bute. Few stopped to consider that the genus had not even been described until 1791. An enthusiastic “detective” by the name of C. Harman Payne, of England — about the time of what was thought to be the 100th anniversary of the arrival of dahlias in England — grappled with this problem. He studied the events and records of the 18th century and discovered that the error could be traced to an edition of Hortus Kewensis by Aiton (1813), in which the date of introduction was given as 1789. This turned out to be an error of the printer who had transposed the last two digits of 1798. The error had been noted and corrected in a supplement to this work published a few years later, but the correction went unnoticed. Payne also deduced that living plants had not been introduced in 1798; rather, what had been received in England, at Kew, were three herbarium specimens of dahlias. These had been sent to the (by then) Marchioness of Bute by Dr. Ortega, Director of the Royal Botanic Gardens, Madrid. The Marchioness in turn gave them to the herbarium at Kew.

The first authenticated introduction of living dahlia materials into England occurred in 1803 — and on this date many authors agree. The source of the information is volume 6, plate 408, dated November 1804, of Andrew’s Botanist’s Repository, where the world's second published colored portrait of a dahlia appears. The accompanying text states that the illustration was made from a plant grown from seeds sent from Madrid the year before to Lady Holland of Holland House, Kensington. The picture is that of Dahlia pinnata.

Having placed living dahlias in the hands of plant breeders in the horticultural centers of Europe, the portents of a new floral industry were assured. The results of the flourishing period which followed are some we all still share and enjoy.

PAUL D. SORENSEN
Assistant Professor
Northern Illinois University

NOTES

2 Colmeiro, Miguel, Bosquejo Histórico y Estadístico del Jardín Botánico de Madrid, Madrid, 1875, p. 79.
Mr. Heman A. Howard, Assistant Horticulturist, will resign from the staff on August 31st of this year. Mr. Howard, who came to the Arboretum in 1929, has been responsible for a multitude of duties—labeling, mapping, checking, and photographing the plants on the grounds for the past several years. Needless to say, the staff will miss his hard work and good humor. We wish him well in his new position as Horticulturist at the Heritage Plantation, Sandwich, Mass.
Yews in Fiction and Fact

Of vast circumference and gloom profound
This solitary Tree! a living thing
Produced too slowly ever to decay;
Of form and aspect too magnificent
To be destroyed.

*Wordsworth*

Yew trees first caught the photographer's attention during a summer auto tour of England and Wales.* He was particularly drawn to them when he arrived in the small town of Painswick in Gloucestershire. As one drives into the center of the village, one sees that it is dominated by its churchyard. The church — a beautiful, old stone edifice dedicated to St. Mary the Virgin — is surrounded by some ninety yew trees, each meticulously trimmed and manicured into free-standing forms, shaping paths and walks throughout the yard.

The characteristic deep green, dense foliage of the trees contrasts with the grays of the church and gravestones to create a mood that borders between enchanting and haunting. According to tradition, the Painswick yews are clipped faithfully, on September 8, during the feast of the nativity of Our Lady. On the following Sunday — known locally as "clipping Sunday" — the parishioners march in procession around the churchyard and join hands, forming a ring around the church. Following that, they gather at the foot of a flight of steps leading to a tower door from which a sermon is preached.

*Yews in History and Literature.* It is difficult to think of the English countryside without conjuring up some images of old churchyards, resplendent with *Taxus baccata.* The trees are so abundant in certain areas that they are called the "Hampshire weed." According to some references, the yews are even older than the churchyards themselves and may be the only surviving vestiges of medieval times.

*Mark Silber, a professional photographer, is co-author of this article and was formerly a student in Professor Richard Schultes' Economic Botany class at Harvard. Mr. Silber is especially interested in ancient literary references to plants and animals.
The association of the churchyard yew with the emblem of immortality most probably came into Christian tradition from pagan Britain. The yew is believed to have been but one of many pre-Christian symbols of nature that influenced later religious beliefs. It is easy to understand why the yew was selected for such meaning when one considers that it was, in early times, one of the only evergreen trees in England and Wales. Therefore, its foliage was not only decorative but "ever-lasting." The yew was probably planted on religious sites and was a survival of pre-Christian tree worshippers. It is perhaps remarkable that it survived the transition from pre-Christian to Christian times, since Christian councils of the sixth and seventh centuries restricted the veneration of trees.

In a short and interesting book titled *The Churchyard Yews and Immortality*, V. Cornish tells of his efforts to arrange the records of distribution and ages of yews found in Great Britain and, to a limited extent, on the Continent. In so doing, Cornish discovered that the distribution of these trees has been partly determined by the soil and rainfall available. In Wales, a country of heavy rainfall, the yews were abundant. Cornish estimates the age of some of these trees as about 900 years. He also recorded local legends which assigned to yews ages of somewhere between one and two thousand years. The traditions are repudiated by certain botanical experts who report that there
is no proof that any trees now in existence date back to Druidical times.

Although historians do not always agree on the origins of the use of yews in association with religion, it is generally accepted that the early Roman invaders of Britain used the yew in their funeral rites in place of the usual cypress and pine. Like the cypress, the yew was considered as a symbol of the resurrection and of immortality. Yew branches were used to line graves and to blanket caskets. Yew branches were also worn in hats and in buttonholes by mourners.

It is also fairly certain that the yew was used by some in place of palms for Palm Sunday celebrations. In the English churchyards of Kent, and in parts of Ireland, yew trees are referred to as palms because of their use in the palm services.\footnote{Ernest H. Wilson, "The Romance of Our Trees, IV. The Yew," The Garden Magazine 30: 213–217 (January 1920).}

The yew was also used in church decoration along with the male catkins of \textit{Salix caprea}, the goat willow.\footnote{W. Dallimore, \textit{Holly, Yew & Box}, London: John Lane, The Bodley Head, 1908.}

The very fact that yews are so often found in churchyards and graveyards has given rise to numerous superstitions about them. In Dallimore's book, \textit{Holly, Yew & Box}, he quotes, from R. Turner, one of the more interesting of these stories:

\begin{quote}
\end{quote}

\begin{quote}
\end{quote}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{Fig_5.png}
\caption{T. baccata in the Painswick, Gloucestershire churchyard, where there are some ninety specimens. Photo: © Mark Silber.}
\end{figure}
...if the Yew be set in a place subject to poisons and vapours, the very branches will draw and imbibe them, hence it is conceived that the judicious in former times planted it in churchyards on the west side, because those places, being fuller of putrefaction and gross oleaginous vapours exhaled out of the graves by the setting sun, and sometimes drawn by those meteors called ignes fatui, divers have been frightened, supposing some dead bodies to walk, etc.

It was undoubtedly this very superstition that moved Lord Tennyson to write in his poem "In Memoriam" the following lines:

Old Yew, which graspest at the stones
That name the underlying dead,
Thy fibres net the dreamless head,
Thy roots are wrapt about the bones.

In his book Dallimore cited numerous writers and passages from literature that show the association of yews with death and immortality. These writers include Dryden, Virgil, Pliny, John Fletcher, Shakespeare, Wordsworth, Dyer, and Sir Walter Scott. Dallimore also suggests that the poisonous nature of the foliage has probably caused some of the undesirable associations to be made with yews. The toxic qualities were exaggerated in writings to the extent that there are authors who claimed that anyone who lay down to sleep beneath a yew would die. Such would also be the fate of those who were so cursed as to dream of the yew tree.

While yews have had their longstanding association with things religious and superstitious, they have also long been associated with matters more specifically utilitarian. For centuries the wood of these trees has been coveted for the purpose of making archers' bows. It was used for the crossbows and long bows that warriors bore in the battles of Cressy and Poitiers. And it is still used in the sportman's bow.

An interesting few lines from "The Song of the Bow," by Sir Arthur Conan Doyle, read:

The bow was made in England,
Of true wood, of yew wood,
The wood of English bows.

Taxus baccata and Other Species. The genus Taxus, to which the commonly cultivated yews belong, consists of some eight
species of evergreen, needle-leaved shrubs or trees. The species are native to forest areas scattered over the North Temperate Zone. Of the eight species, only two and the hybrid between them are commonly cultivated in North America. Three more may be found in the collections of specialists or in botanical gardens. The differences listed in the books between the species do not seem to be very great. It must be admitted that some botanists, in the past, have considered them all to be merely varieties of a single species. However, the technical differences, combined with the differences of habit and habitat, do seem to be sufficient justification for keeping the entities separate. The five species that may be met with in cultivation may be distinguished as follows:

Leaves gradually pointed; scales of the winter buds obtuse, without a keel, persistent at the base of the branchlets; mature branchlets greenish (Zone VI, except one var. to Zone V)  
*T. baccata*

Leaves abruptly pointed; scales of the winter buds obtuse or pointed, keeled or not, not persistent at the base of the branchlets  
Scales of the winter buds not abruptly pointed, not keeled; leaves 2–4 cm. long, mature branchlets yellowish green (Zone V)  
*T. chinensis*

Scales of the winter buds abruptly pointed, keeled  
Leaves with a broad, prominent midrib, 2–3 mm. broad, 1.5–2.5 cm. long; mature branchlets reddish brown (Zone IV)  
*T. cuspidata*

Leaves with only a slightly raised midrib, 1.5–2 mm. broad  
Plant generally a low, frequently straggling, shrub; leaves 1.3–2 cm. long; seed broader than long; mature branchlets green (Zone II)  
*T. canadensis*

Plant a tree; leaves 1–2 cm. long; seed longer than broad; mature branchlets yellowish green (Zone VI)  
*T. brevifolia*

*Taxus × media* Rehder (*T. cuspidata × T. baccata*) is a hybrid that is commonly met with in the nursery trade. It originated about 1900 in the Hunnewell Arboretum in Wellesley, Massachusetts. Various forms are in the trade, but perhaps the most common are two erect forms, *T. × media* var. *hatfieldii* Rehder and *T. × media* var. *hicksii* Rehder. The technical characters are, in general, intermediate between the parents, except that the mature branchlets are olive green, frequently reddish above.

A second hybrid, *Taxus × hunnewelliana* Rehder (*T. cuspi-
data × T. canadensis) is much less commonly seen. This resembles T. cuspidata but generally has narrower, lighter green leaves. In winter the leaves usually take on a reddish cast, as do those of one of its parents, T. canadensis.

Though usually of dioecious nature (individual plants being either male or female), yews are found which bear both male and female reproductive organs. The female structures are small and greenish and, until ripe, inconspicuous. The male "catkins" are also small, but when pollen is shed they become yellow. The pollen is wind borne and abundantly produced — so copious, indeed, that the ground under the plants may be completely discolored by it. The fruit is a nut-like seed partly enclosed in a pinkish or reddish succulent cup. With the exception of the cup, which is apparently only slightly poisonous, all parts of the plant are intensely poisonous to all classes of livestock and to humans. The poisonous principles seem to be two alkaloids and a volatile oil, which is a slowly acting irritant. Children are attracted by the brightly colored, fleshy cup in the fall. In cases where children have ingested the fruit, it is probably wise to induce vomiting or to have the stomach pumped. In any event, a physician should be contacted.

The following passage, quoted from Thomas Martyn's edition of Phillip Miller's Gardener's Dictionary (1807), is too touching to pass without sharing with the modern gardening public:

A clergyman, who was a curate in Sussex, informed me, that a young lady and her servant, his parishioners, being seized with an ague, were advised to take a decoction of Rue, which they unhappily mistaking for Yew, sent to the church-yard, where a large old tree grew, and gathered a quantity of the leaves, of which they made a decoction, and drank it upon going to bed. The next morning they were both found dead. This was sunday: on the thursday following, the clergyman was called upon to bury them: he performed the office on the servant, but the young lady had so fine a bloom on her countenance, that they entertained hopes of her being in a state of suspended animation, and accordingly tried the experiments usual in such cases, but without success: they determined however not to bury her at that time, but kept her till the ensuing saturday, and even then the corpse remained totally unchanged. What made it more remarkable was, that the accident happened in november, and the weather was of that damp murky kind in which the flesh keeps worst.
The name *Taxus canadensis* was first used by Humphrey Marshall in his sales catalog "Arbustum Americanum, the American Grove, or an Alphabetical Catalogue of Forest Trees and Shrubs Native of the American United States," published at Philadelphia in 1875. The plant had, of course, been known much earlier, but had been treated as a form of *Taxus baccata*. It is alleged to have been introduced into cultivation in England in 1800, though where, and by whom, seem not to have been recorded. Although by far the hardiest of the yews, it seems to be cultivated relatively seldom. Unlike *T. baccata* and *T. cuspidata*, it appears to require some shade to do well. Various gardening authorities suggest that its great value may be as a ground cover under evergreens. Rehder, writing in Bailey's *Cyclopedia of Horticuture*, says it is a "Prostrate shrub, with wide-spreading slender branches, rarely more than 3 feet high. Leaves . . . assuming in winter usually a reddish tint . . . In cultivation it becomes usually a more upright and less straggling shrub." In nature it occurs from Newfoundland to Manitoba, southward through New England to western Virginia, through west central Indiana, northern Illinois to northeast Iowa.

*Taxus brevifolia*, named by Thomas Nuttall, is a tree of the forests of the west coast of the American continent, ranging southward from British Columbia to California and eastward to Montana. It was introduced into English gardens in 1854 by William Lobb. It seems to be little cultivated and has the reputation, among gardeners, of being a difficult plant to grow. The name is said to be erroneously applied in the trade to *T. cuspidata nana*.

*Taxus cuspidata* was named by P. F. von Siebold and J. G. Zuccarini in their great *Flora Japonica* of 1826-70, though it was first described as *T. baccata* by Thunberg in 1784. It was introduced into cultivation in England by Robert Fortune in 1855. Fortune received it from a Mr. Beale, in Shanghai, who, in turn, had received it from Japan. It was introduced into the United States in 1862 by Dr. George R. Hall. In Japan it occurs naturally in the mountains of the islands of Hokkaido, Honshu, Shikoku, and Kyushu. In Japan the timber has been used in water tanks, pails, and baths, and it is used for carved trays, chopsticks, clogs, and the bows of the Ainós.

In nature this is an erect, broadly conical tree, to fifty feet tall. This form is known in the trade as *T. cuspidata var. capitata*. Most authorities record that cuttings taken from lateral branches of the *capitata* variety do not develop a leader and grow instead into spreading shrubs. E. H. Wilson, however,
asserted that these "shrubs" generally produce a leader after some years and assume the typical tree form. Whatever the case may be, there are now more than a dozen horticultural forms in the trade which do seem to maintain the shrub habit. Indeed, it is possibly the most common yew in cultivation in the United States, where the various forms are often used in foundation plantings. In common with the European *T. baccata*, it responds well to shearing, making a dense hedge or, if the gardener has the patience, making an excellent plant for topiary work. In addition to all these virtues, it is easy of cultivation and in most situations grows relatively rapidly.

*T. baccata* Linnaeus occurs in nature from latitude $63^\circ 10'$ north in Sweden, Norway, Scotland, Estonia, multitudinously throughout Great Britain and France, down to the Mediterranean and the Atlas mountains in Algiers. Toward the east, yew inhabits the plain and the hilly countries to Asia Minor, and up to the Ural mountains in Russia.

In the old books several names for the tree occur: Yeugh, Eugh, Iw, Ewe, Yewgh, Ugh, and Yw are designations for the same plant. Yw is said to be the Welsh, and Iw the Anglo-Saxon. Many years of cultivation of *T. baccata* give a definite advantage to this evergreen in its use as a garden decoration. Indeed, there are about 100 named forms of the species in cultivation. The leaves are approximately 1–1 1/2 inches in length and from 1/16–3/16 of an inch in width, varying in color from holly-green to an almost black green. One of the most interesting characteristics of the tree is its adaptability to pruning. When pruned to a desired shape, the tree's remaining branches let out new shoots in great numbers to fill out the general composition and empty volume of the tree crown.

The yew has been used for ornamental gardening as far back in English history as Tudor times. Not only were the trees used to form hedges, they were also clipped into the forms of animals, birds, and geometric shapes. The art of training and trimming trees—known as topiary art—gained popularity during the seventeenth century, to die down in the eighteenth. Such gardening tastes have not been regenerated with any comparable enthusiasm since.

Some experts estimate that the growth of the trunk, being very slow, does not exceed the rate of one foot in diameter in sixty to seventy years. Yews reach diameters of twelve to fifteen feet and a height of up to eighty feet. It has been said that

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some specimens in England are well over 1,000 years old. This longevity is in part due to the peculiar characteristic of yews to grow healthy tissue around decayed, rotten, or hollow core.

The wood used in antiquity, especially for bows and arrows, is said to be the finest for this purpose. However, in use for furniture, not only is it difficult to handle and carve, but due to the above mentioned characteristics, one never knows whether a particular stem is solid or hollow, strong or decayed. And one does not know until the wood is felled. The yew's remarkable ability to survive in spite of the frost-induced decay has been attributed to the old beliefs in the tree's divine protection and association with everlasting life. It is one of the reasons that the yew is so frequently found cultivated in the churchyards and near graves. Having seen them in such locations so often, the photographer can testify to their majestic and haunting appearance.

MARK SILBER
GORDON P. DEWOLF, JR.

Malus ‘Donald Wyman’. Many comments have been received since publication of the description of Malus ‘Donald Wyman’ in the last issue of this journal. Perhaps the most interesting one came from Mr. Ralph H. Smith, Associate Wildlife Biologist at the Wildlife Research Laboratory in Delmar, New York. Mr. Smith was given propagating material from our specimen a number of years ago.

His observations are as follows:

“Perhaps you will be interested in some comments on its performance. We top-grafted it onto volunteer common apple and also budded it onto Malus sieboldi and common apple. It grows vigorously, flowers well every year and fruits even in the years when common, volunteer apple has no fruit.

Its bright red, glossy fruit, if undisturbed, persists in good color until late March, and in a shriveled state until the flowers appear in May. The returning robins, catbirds and starlings remove the fruit in April and May.

On the hilltops in southwestern Albany County, at 1900 feet, the pine and evening grosbeaks found our tree behind our office building and cleaned it in about a week. ‘Profusion’ is almost as long lasting in fruit but is not as colorful for so long. Only ‘Sissipuk’ holds fruit longer, because nothing touches the fruit, so far.”

R.S.H.
Frances Williams and Her Garden Adventures

Some plant lovers find adventure in far-away places, on distant mountains and in wild valleys, or in ancient exotic gardens. Others, although they may dream of these alluring spots, are able to find adventure at their doorsteps. Frances Ropes Williams was one of the stay-at-homes, in Winchester, a suburb of Boston. But on her small property of only a third of an acre, shaded by several large trees, she gardened for many years, first in the time she could spare from her growing family, then, when her children were grown, much more intensively.

Mrs. Williams was a graduate of the Massachusetts Institute of Technology in landscape architecture, and her studies there, she said, gave her a background in horticulture. (How many landscape architects can say that of their training?) She was in her middle years when she entered into the concentrated phase of her gardening adventure, and she tackled it with a keen and observant mind, and, apparently, with boundless energy, both physical and mental. Her activities extended on both sides of the doorstep. Not only was she active outdoors. She kept voluminous records, and had a wide correspondence.

Since her yard was shady, Mrs. Williams started accumulating plants that would thrive under her conditions. She found that there were many that she could grow well. She enjoyed those with gray leaves and those with white or yellow variegations that added summer interest, as well as many other ground covers — lamiums, artemisias, wild-gingers. Plantainlilies (hostas) flourished under the big trees, and she found pleasure in making groupings of ground covers around them that accentuated their characteristics. A variety of Hosta sieboldiana with yellow-edged leaves, for example, was surrounded by a form of Vinca minor with yellow-edged leaves. Under and around all these were small spring bulbs. Texture, form, and scale and the changes of the seasons all were subjects of her attention, as well as growth behaviors.

She found that there were herbs that she could grow in the
shade and, through her interest in herbs, she became active in the Herb Society of America. She became corresponding secretary and continued serving in this office for many years, finally, in recognition of her devotion, being made Honorary Corresponding Secretary. She also served the Society as curator of its herbarium. In 1952 she received the first Award of Merit given by the Society, and in 1956 the New England Unit of the Society made her an honorary member.

It was the genus *Hosta*, however, that began to occupy more and more of her time and attention. It was in the early 1930's that she began collecting hostas, which proved to be well adapted to the somewhat damp shade of her partial acre. She bought some from local nurseries, and friends in Salem, where she grew up, gave her plants from old gardens.

Her interest in the plants grew, so that she looked up nurseries farther away to acquire more kinds. She began photographing plants at different stages of growth, and her record-keeping grew in importance. Each plant, when she acquired it, received a number. Each photograph bore the record of the number of the plant, its source, and the date the picture was taken. In her notebooks, plants were entered with names, numbers, sources, and other information connected with them. Through forty years she kept up all this information and added to it. She noted growth and bloom habits. She investigated the differences of root structure. The peculiarities of sporting did not escape her attention. In the fall of 1967 she wrote (at the age of 84): “I have been much interested this fall in the shoots with leaf buds at the ends of some hemerocallis roots. And in the fact that some of my hosta roots have leaf shoots on them, either at the end of the root or as fat little 1/16-inch buds that grew as perky little plants . . .”

At another time she wrote: “In several cases *Hosta undulata* (different plants) have sent out shoots that have become what is called *Hosta erromena*, big leaves, long stems two to three feet, and leaf blades five by ten inches, plants five feet across.” The validity of this observation was confirmed when *H. erromena* was reduced to a variety of *H. undulata* by Maekawa.

As the years went by, seedlings began to appear in the garden that were attractive enough to be singled out for increase. At first Mrs. Williams shared these with others designated only by the numbers she had assigned to them. Later she named a number of plants that were introduced by Mrs. Thomas Nesmith of Fairmount Gardens. Unfortunately, plants given away under number were often given Latin names or descriptive designa-
tions by the recipients. Mrs. Williams also shared other hostas, including the offspring of seed she received from the Nikko Botanic Garden in Japan in 1950.


She also did some hand crossing, and several of the plants that were grown from the seed of the pollinated plants were named and introduced.

**Hosta Cultivars of Mrs. Williams.** In the following list, I use the names used by Mrs. Williams.* They will be understood by those who have a serious interest in hostas, and I do not wish to wander into the maze of *Hosta* taxonomy, described by Prof. Hylander as a nightmare. Where quotes are used, I am repeating Mrs. Williams' written words. I have included Mrs. Williams' numbers with the cultivar names.

- **'Beatrice', #1399A.** Seedling of *H. lancifolia albomarginata*, planted 1958. “May 1962 — one leaf variegated with yellow stripes. 1965 — plant had five variegated leaves.” 'Beatrice' tends to give variegated seedlings, which make it of great interest to those who like to play with hostas.

- **'Betsy King', #502.** (Introduced 1960) Mrs. Williams thought this to be a *decorata-lancifolia* hybrid. It starts growth early in the spring like *lancifolia*, and the flower shape is very like that of *decorata*. It is light to moderate purple, the color solid outside and solid inside except for six white stripes at the joinings of the perianth segments. The leaf mound is to 14 inches, the scapes reach 20 inches. It is an effective garden plant, neat and well proportioned, the color darker than that of most hostas, blooming in early August. It is one of Mrs. Williams' best.

- **'Carol', # 1429.** A clone with white-edged leaves, a sport cut out of *H. fortunici #152 in 1967.*


'Dorothy', #511. (Introduced 1961) Mrs. Williams guessed the parents to be *fortunei* and *decorata*. The leaves are gray underneath, and the shape of *decorata*, though more cordate. The flowers are like those of *H. fortunei*. They are light purple outside, striped a little deeper inside. The plant is well proportioned, with 30-inch scapes. The leaves are about 5½ inches wide by 7 inches long.

'Frances Williams', #383. Named by G. W. Robinson, superintendent of the Oxford Botanical Garden (*Journal of the Royal Horticultural Society*, February 1963). Mrs. Williams picked this out of a batch of *H. sieboldiana* seedlings at Bristol Nurseries in 1936. It is included with her plants because it was through her efforts that it was singled out, propagated, and introduced into commerce as a special clone. It has been known as *H. sieboldiana* ‘Yellow Edge’ and *H. sieboldiana aureo-marginata*. A large clump is a handsome and effective accent in a shady place. It still commands a good price, as much as nine or ten dollars, after almost thirty-five years.

'Golden Circles', #1141. Seedling found in 1954 under 'Frances Williams'. Mrs. Williams said the yellow edge was broader; otherwise it, too, is typical *H. sieboldiana*.

'Green Pie Crust', #1290. Seedling found in 1951. The large leaves have neatly ruffled margins. The flowers are pale purple, almost white. The beautifully crimped leaves of this large, handsome plant make it especially choice, and it is sure to be ardently sought after when it becomes better known.

'Green Ripples', #851. (Named 1967-68) Seedling of *H. fortunei gigantea* #128. Mrs. Williams' photograph of #128 shows rather wavy foliage. A large plant, the light green leaves with crinkled edges, the flowers very pale.

'Kathleen', #1528. (Named 1968) Seedling. "Lovely soft pinky flowers — similar to *H. fortunei*, gray leaves."

'Louisa', #537. (Introduced some years ago, but not named by Mrs. Williams until 1969.) This charming little hosta found its way into gardens under several designations. Gray and Cole introduced it, calling it *Hosta lancifolia albomarginata alba*. The white-edged lanceolate leaves are about 4½ inches long by 1½ inches wide, making a mound about a foot high. The white flaring flowers on two-foot scapes begin to bloom in mid-August. It has also been called *Hosta* “minor alba” white edge, and F. R. W. #537. It, too, gives interesting seedlings, some variegated, some white-flowered. Combinations of both traits are likely. ‘Louisa’ is a choice, dainty plant.

‘Sprite’, #795. Seedling found about 1946. “Low, six inches, flower eight inches, leaf thickened. Mosaic?” This was not introduced, perhaps because of the possible mosaic, or perhaps it lacked the proper attraction.

‘Sunlight’, #1142. A sport of ‘Frances Williams’ with yellow-green leaves. It is rather weak because of its lack of chlorophyll, with a tendency to brown at the edges. It reverted to green in Mrs. Williams’ garden, but still exists in the collection at the Case Estates of the Arnold Arboretum.

Mrs. Williams’ Crosses. In 1949 Mrs. Williams pollinated a plant of Hosta “minor alba” (I use the double quotes and lack of italics to indicate that this well known and widely used name has no botanical standing) with pollen from H. plantaginea.
She considered the offspring to be the result of this cross, but I can see no trace of *H. plantaginea* in the plants that she named and introduced. They may well be hybrids, however. Plants similar to the ones she named often appear in our garden, where many hostas have been growing together for several decades. However, 'Sweet Susan', result of another hand cross, is the unmistakable hybrid it is supposed to be.

'Lavender Lady', #1025. (Introduced 1964) “Very pale pinky lavender flowers, stalk 1 1/2 to 2 feet.” Mid-August.


'Slim Polly', #1155. (Introduced 1964) Flowers pale purple, late August. Purplish red in base of petioles.


'Tinker Bell', #1156. (Introduced 1963?) White flaring flowers in early August. The leaves are more slender than those of 'Snow Flakes', and the plant is smaller and weaker.

'Sweet Susan', #1383. (Introduced 1966) The only plant resulting from the 1958 cross of *H. lancifolia albomarginata* by *H. plantaginea*. This is an interesting hybrid, as it is such an obvious blend of the two parents in size of leaves, flowers, and seed-pods. The number of well formed capsules is surprising, but there are few seeds. I planted some last fall but had no germination. The flowers of 'Sweet Susan' are somewhat fragrant, their color pale purple, deeper than those of the well known hybrid of *H. plantaginea*, 'Honeybells'. Mrs. Williams' granddaughter, Susan Williams, did the actual pollen-dabbing of this cross.

Another cross made by Mrs. Williams in 1948 involved *H. plantaginea* and *H. decorata*. She records but one resulting seedling.

'Pancakes', #1023. She says of it, “Squat, dumpy... leaves flat, oval and round... lovely gentle purple flowers.” I have never seen it, and do not know anything more of it than this. Mrs. Williams does not mention any scent.

*The Moral of a Long Tale.* The moral of all this is that Mrs. Williams had a very good time in her little garden. Within the confines of what seems to have been an ordinary suburban housewife's horizons, she found adventure. The moral is further that we owe her some very fine plants, that she loved to share.
plants and information with others, and that she kept records! How often in horticulture do we hear the sad refrain, "He kept no records." So anxious was Mrs. Williams to pass on information that in the last years of her life, with her eyesight failing, she wrote out notes on her plants with a felt pen, only a few large words to a page.

She gave plants to several institutions as well as to many individuals. She gave seventy-five, all with her numbers, to the Arnold Arboretum, and these can be seen in the hosta collection at the Case Estates in Weston. Her daughter, Miss Constance Williams, writes that her family plans to give a collection to her Alma Mater, M.I.T.

The Herb Society will always claim her as its own. After she died in the autumn of 1969 at the age of 86, the Appalachian Mountain Club noted that it had lost a life member. The other societies and organizations to which she belonged must feel poorer without her, but richer for having known her.

The American Hosta Society, born in 1968, gave her a citation in the summer of 1969, "for inspiring others with the love of Hosta." But perhaps the loveliest tribute came from one who had long known her through the Herb Society. With deepest feeling she said, "I never knew her to say an unkind word about anyone."

As for those records, there are boxes and boxes of them. No doubt there is much that will not be preserved. They cover her other plants, not only Hosta. But as far as Hosta goes, there are enthusiasts who will willingly comb them over, gleaning out all that is of permanent value to add to our store of information about Mrs. Williams' plants, and Hosta in general.

We shall always be grateful to Frances Williams for her generosity, for the lovely plants she has given us, and for those voluminous records.

Gertrude S. Wister
Swarthmore, Pa.

Summary of weather data recorded at the Dana Greenhouses, April and May 1970.

<table>
<thead>
<tr>
<th></th>
<th>Precipitation</th>
<th>Avg. 8 a.m. Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>3.84</td>
<td>46.93</td>
</tr>
<tr>
<td>May</td>
<td>3.79</td>
<td>57.19</td>
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</tbody>
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Notes from the Arnold Arboretum

Spring Planting Program. Planting activities this spring have concentrated upon the renovation and landscaping of several key areas which, for one reason or another, were in need of special attention so that the grounds may be in the best possible condition by 1972, when the Arboretum will celebrate its 100th anniversary. In conjunction with this, certain mass plantings of the more showy spring flowering shrubs, especially azaleas, have been enlarged to provide more color during the time of year when public attendance is highest.

This has necessitated the planting of nearly two thousand shrubs of various sizes and represents a temporary departure from the normal spring sequence of moving plants to Jamaica Plain from the growing areas at the Case Estates. For a project of this size, it was necessary that the Arboretum obtain most of the plant material from commercial nursery sources, and it should be noted here, with gratitude, the good will that was shown by all the nurserymen we approached. Nearly all the plants were specially selected and offered at reduced prices for Arboretum use.

The planting season started in late April when workmen from a commercial tree company arrived on the grounds to move seven large specimens of the longstalk holly, *Ilex pedunculosa*, from the *Ilex* plantings at the Centre Street beds to new positions in front of the Administration Building. The need for evergreen material in the vicinity of the Administration Building and the Jamaica Plain Gate has been realized for some time, and the opportunity to make such plantings came as a result of the disastrous snow and ice storm which occurred in the winter of 1968–69. Among other things, this storm severely damaged several large plants of *Magnolia stellata* in the border in front of the Administration Building. Two of them were so badly broken that they had to be removed. They were replaced with three specimens of *Ilex pedunculosa*, approximately 9 feet tall. Three more, of large dimensions, were placed as free standing specimens at the southeast corner of the Administration Building where they serve to soften the rather harsh lines at that corner of the Building. The largest plant is 12 feet high, 10 feet wide, and weighed approximately 2½ tons. These plants presented a most unusual sight as they moved slowly through the Arboretum, on special equipment, from their old site to the new one.
Fig. 7: George Robert White Medal of the Massachusetts Horticultural Society, awarded to Dr. Donald Wyman, "author of many books and innumerable articles, indefatigable teacher and lecturer, energetic holder of executive office at various times in national horticultural organizations, worthy recipient of many of the highest awards in horticulture at home and abroad... the virtual embodiment of horticulture in New England."

Fig. 8: Ilex pedunculosa en route to its new home. Photo: P. Bruns.
A matching planting of three 9 foot specimens of the umbrella pine, *Sciadopitys verticillata*, was made at the opposite corner of the building. It was particularly fortunate that such large specimens of this handsome and slow-growing conifer could be located, for we are now able to display, in a prominent place, two of the best exotic evergreens which are hardy in this area.

*Sciadopitys* is valued for its dark green leaves which are arranged in whorls and, more particularly, for its very dense habit. *Ilex pedunculosa*, an Arnold Arboretum introduction from Japan in 1892, is one of the hardiest of the evergreen hollies and, despite its availability in nurseries, is all too seldom seen in gardens. It forms a large shrub or small, slow-growing tree with dense shiny leaves and glossy red berries which hang downward on stalks nearly an inch long.

Much other evergreen material has been used in this area. A bed of *Pieris floribunda*, the mountain andromeda, was made at the entrance to the driveway near the main gate. Although this plant is fairly common, it deserves the prominent placement allotted to it here as it is perhaps the most attractive and dependable of all the broad-leaved evergreen shrubs for the north. The erect clusters of white flowers, perfect hardiness, evergreen leaves, and prominent flower buds all winter long provide a combination of good attributes difficult to beat in any other plant.

Across the road, on the south side of the main gate, a large mass planting of *Rhododendron carolinianum*, the Carolina rhododendron, has been made. The pale rosy-purple flowers should provide an attractive welcome to visitors who use this gate at lilac time. When these grow a bit larger an especially pleasing effect should be evident in the contrasting flower colors of the rhododendrons and a nearby specimen of *Fothergilla major*, a relative of the witch-hazels with interesting white flowers in mid-May.

Another major project which was started is the renovation of the extensive azalea border which lines one side of the Meadow Road, starting opposite the Administration Building and running nearly to the shrub collection, a length of almost a quarter of a mile. This border was planted in 1949 at the suggestion of Mrs. Beatrix Farrand, who served as a landscape consultant for the Arboretum. The original idea was to display the various species and cultivars of azaleas hardy at the Arboretum according to the sequence in which they blossom, with the earliest flowering species starting diagonally across from the Administration Building and finishing at the other end of the road with the later flowering varieties.
Many factors have necessitated the task of renovating the border at this time. It has been found over the years that very poor soil conditions in several places have contributed to the decline of some of the plants. A number of these, in poor condition, were discarded in early spring; others were removed to the nursery for rejuvenation. Soon after this many tons of soil were removed to a depth of about two feet and, after a layer of gravel was laid to provide drainage, better soil was brought from another part of the Arboretum to fill in the holes. Approximately one third of the azalea border has now been replanted and, where possible, the plants have been rearranged according to the proper sequence of blossom. Much work remains to be done at another time, especially the planting of a large number of cultivars which are new to the collection and still in the nurseries.

A new planting was made around the large pond near the shrub collection. This includes *Rhododendron vaseyi*, the pink-shell azalea, *R. prinophyllum*, the rosseshell azalea, and *R. periclymenoides*, the pinxterbloom azalea. These species were selected because they bloom at the same time as the lilacs nearby and should, as they increase in size, reflect nicely into the pond.

The last major azalea planting to be undertaken was the placing of 50 *Rhododendron schlippenbachii*, the royal azalea, next to the older planting on Bussey Hill. The grouping is now situated in such a way as to be visible for some distance along the road which leads to the top of the hill.

Finally, two slopes at the Weld Street Tract were planted with ground covers. This is planned to be a demonstration of plants which can be used to cover a dry slope, also to provide an interesting view for motorists traveling along Centre Street or Weld Street. Over a thousand small plants were placed on these two banks. They include the following:

*Akebia quinata*
*Coronilla varia* ‘Penngift’
*Euonymus fortunei* ‘Coloratus’
*Juniperus chinensis* ‘Sargentii’
*Juniperus horizontalis* ‘Douglasii’
*Lonicera henryi*
*Lycium chinense*
*Parthenocissus quinquefolia*
*Rhus aromatica*
*Rosa wichuraiana*
*Stephanandra incisa* ‘Crispa’

Robert S. Hebb
Arnoldia Reviews

Orchids, by Floyd S. Shuttleworth, Herbert S. Zim, and Gordon W. Dillon

When one of the greatest orchidologists of all time, Oakes Ames, wrote, "Few genera of plants have played greater havoc with human pride: few genera of plants have so humbled men of science," he was thinking of Charles Darwin and John Lindley and their well documented troubles with the orchid genera, Catasetum and Cycnoches. This huge, eccentric family has not only humbled and confused but delighted and entertained perhaps a greater number of people the world over than any other family of plants. There seems to be no end to surprises in the orchid family. It is pleasing to find in this sprightly little book, modestly titled Orchids, a large number of orchids excellently illustrated and carefully described. In addition to Catasetum, Cycnoches, and many other genera, one finds the "bucket orchids" like Coryanthes; cucumber orchids; "blue" orchids; orchids involved with pseudo-copulation, as in the genus Ophrys; "weed" orchids; and, perhaps one of the most incredible of all, the recently discovered Australian orchid that grows and flowers entirely under the ground.

"This book surveys the great Orchid Family as it illustrates and describes those selected wild forms that best show the family characteristics and diversities. It also attempts to show those species most commonly cultivated and often used in breeding." So states the foreword. This promise is well carried out. It is difficult to imagine that any other publication costing as little as $1.25 can possibly bring as much enlightenment and pleasure regarding orchids as this booklet. It deserves to sell by the hundreds of thousands.

Vividly depicting the orchid family from an evolutionary standpoint, the book fairly explodes with a multitude of skillfully done color illustrations by Elmer Smith. Mr. Smith confesses that he does not grow orchids. He must have spent a great amount of time in painstaking research in order to produce as remarkable a series of scientifically accurate and aesthetically pleasing studies of the several hundred species that we find here. An enormous quantity of botanical information is tied in nicely with the illustrations. Additional pleasant tidbits are liberally scattered throughout the text. It was a happy collaboration when Gordon Dillon, who edited the American Orchid Society Bulletin for more than twenty-five years, Dr. Herbert Zim, an outstanding authority on science education, and the late Dr. Floyd S. Shuttleworth, of Wisconsin State University, prepared the text for the Golden Nature Guide series.
It should come as welcome news to the owners of this small volume that the publishers are already at work on a "coffee table size" edition, in which much more information can be given and larger reproductions of the excellent plates will be possible.

G.H.P.


This is a book written in Great Britain for a British audience. It claims to deal with 420 varieties of food and/or condiment producing plants. When it treats plants cultivated in Britain (nearly half the text and plates) it seems to be quite good. When it deals with plants unfamiliar in the British Isles it leaves — at least occasionally — something to be desired. For example, the description of "sugaring-off" maple sugar (p. 16) is surely confused. The pecan (p. 29) has 11–17 (not 7) curved (not straight) leaflets — very distinct from other caryas and not at all like the illustration. Both the butternut and the American walnut have the basal leaflets much smaller than the others; in the butternut all the leaflets are sessile, while in the American walnut they are stalked. The colors of the carrots (p. 175) and the 'Summer Crookneck' squash (p. 123) seem to be inaccurate. These are only a few small complaints, perhaps, but one cannot feel completely confident about the treatment of plants with which one is unfamiliar if one knows that erroneous statements or illustrations are given for plants with which one is familiar.

It is disappointing that this book, with its limited frame of reference, does not inspire more confidence. It is regrettable that the style is so pedestrian. Exciting work is being done on the origins, wanderings, and chemistry of economic plants. Particular economic plants have molded the history of civilizations and influenced the development of whole cultures. One looks in vain for such information here.

The value of the book lies in its illustrations, and, despite what has been said above, they appear to be, for the most part, accurate. The colors could have been better, and it is regrettable that they are not. All in all, this book does fill a gap in the popular literature. One must, say, even though without enthusiasm, that it is useful.

G. P. DeW.

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Robert Gerow Williams, B.S., Superintendent
Carroll Emory Wood, Jr., Ph.D., Curator
Donald Wyman, Ph.D., Horticulturist

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