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HORTICULTURAL
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Notes on Old Floral Decoration

KATE DOGGETT BOGGS

"And the Lord God planted a garden." Since childhood we have all been thrilled by those mystic words, but are we aware that, according to Miss Rohde, in the first chapter of Genesis the earliest garden plan is described? Here we are told of four rivers which run in four directions. This foursquare plan with elaborations has persisted to a remarkable degree and seems by its balance and adaptability to have satisfied alike the eastern ruler for his "Paradise" and the modern woman for her village dooryard.

More than three thousand years ago, the kings and nobles of Egypt and Babylonia made pleasure grounds to charm their leisure hours and we are astonished to learn of the magnitude and splendor of these enclosures of the ancients. Rare trees and herbs were brought long distances to beautify their gardens, while streams or canals for irrigation were a necessary part of the scheme. The great queen of Egypt Hatshepsut sent an expedition to the land of Punt to bring back "incense trees," along with other tribute, while Thutmose 3rd gave herbs and trees from Palestine and Syria for the garden of the temple of Amon. On a tomb painting at Beni-Hassan upon a terrace of about 1900 B. C. plants are shown growing in very modern looking pots.

Noah is supposed to have planted a garden after the flood and we read that, during the Captivity, the Egyptians forced the children of Israel to lay out their gardens and parks. Perhaps it was from these task-masters that the Israelites learned to excel in horticulture. Most of the gardens at

Jerusalem were outside the walls, because the use of dung within the holy city was against the Law, but there was one famous rose garden inside the walls during the time of the prophets.

The Greek garden of Homer's day was more simple than the Eastern "Paradise," but, later, when close contact was established between East and West, the Greeks used more complex plans.

In Rome, during the Empire, garden craft rose to such tremendous heights of elaboration that Rome was called the garden of the world. Shears were used ruthlessly on shrubs and trees and so we find topiary work carried to absurd lengths, even before the Christian era. Many temples, seats and statues decorated the estates of the wealthy, some of these being spoils of Greece and others copies of the Hellenic masterpieces.

When at last Rome fell, the lore of plants was kept alive by the monks, who, through the dark ages, tended their herbs with loving care within the cloister garth.

During the thirteenth century, we read of the "Fair pleasaunce" protected by wall and moat. Here the knights and ladies could walk on "Flowry medes," dally by the fountain or rest on sodded seats and listen to the troubadours. It was not until the Renaissance that our ancestors could safely leave the protection of strong walls and establish those stately inclosures full of ponds, fountains, wooden beasts, statues and arbors with which we are familiar from the old prints and garden books.

Thus it is seen that trees and blossoms have been esteemed in all civilizations. Trees were commonly worshipped, and certain flowers were for centuries held sacred to heathen gods and christian saints alike. The temples and homes of the Egyptians were strewn and decorated with bouquets of the sweet scented lotus and other flowers and in the tombs funeral offerings of dried herbs and collars of flowers are found, many of the species being still recognizable. Garlands were worn on head and breast and the first historic professionals in floral decoration were the garland makers of Egypt. Blooms were used much as in our own time. Food at banquets was decorated with flowers; they were given to guests, sent to friends and placed in lovely vases to decorate the rooms, while bouquets of the lotus and other flowers were presented as marks of honor. Perfume so wonderful was extracted from flowers by the Egyptians that after three thousand years the odor still lingers in jars found in the tombs.

Thus we look to ancient Egypt and Mesopotamia as the sources of floral decoration. Excavations at Ur of the Chaldees seem to prove that at a very early date the Sumerians had achieved a high state of civilization and it is to this nation and to Egypt that the ancient Near East probably owed its art and culture. While true that gardens at Ur are not mentioned by Woolley, the golden wreath of beech leaves, willow leaves and flowers found on the head of Queen Shub-ad would indicate a previous use of natural flowers for personal adornment.

Herodotus (ca. 484-424 B. C.) tells us that the Babylonian women sat in their places of worship bound about the temples of the head with sweet and pleasant flowers.

"The Jews," says the Hebrew En-

cyclopedia, "in their own land appreciated flowers as a means of natural decoration." We know that many of the Hebrew works of art were adorned with representations of flowers and the Talmud says that the temple court contained mimic flowering trees of gold. When the first fruits were carried to Jerusalem, an ox with gilded horns and crowned with olive branches went before them, and the baskets were wreathed with flowers for the sacrifice. At the Feast of Tabernacles the willow and palm (lulab) surrounded the altar and the Jewish marriage canopy was a bower of roses and myrtle. The carnation and the chestnut are mentioned in the Talmud. The composition of the holy incense has always been to me a matter of interest, for the very names of spices, frankincense and myrrh take one's mind to far away lands. For those who are likewise curious, I shall quote from the "Holy Incense"* by Dr. David I. Macht of Baltimore.

Balm—a resin that exudes from the wood of the balsam tree (*Opobalsamum* or balm of Gilead).

Onycha—animal or mineral, *Strombus* mollusc.

Galbanum—gum of *Ferula Galbaniflua*, Asia Minor.

Frankincense or *Olibanum*—from *Boswellia*.

Myrrh—resin from several species of trees. *Cammiphora Abyssinica* or *Balsamodendron Myrrh*.

Cassia—the kidda of Exodus, bark of *Cassia Lignea*.

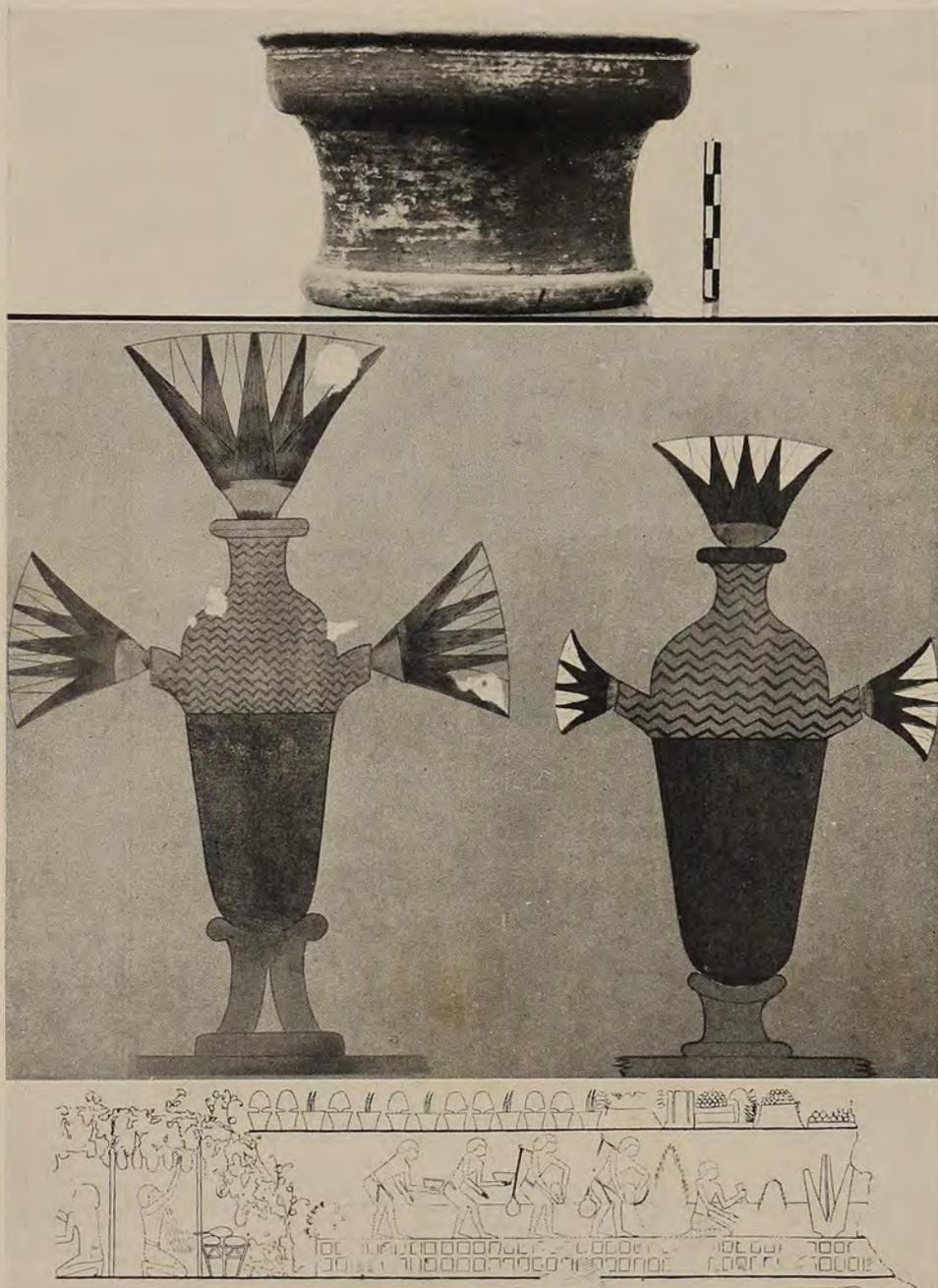
Spikenard—probably *Andropogon Nardus*, used to make citronella oil.

Saffron—*Crocus sativus*, blooms in autumn, purple flower.

Costus—probably root of *Aucklandia Costus*.

Aromatic Bark.

*Waverly Press, Baltimore, 1928.



Upper. Terra-cotta Flower Pot found at Olynthus in Macedonia
Date about 400 B. C. Courtesy of David M. Robinson

Center. Glass Vases. Egyptian
From Beni Hasan, Part IV, Plate XIX

Lower. Egyptian Flower Pots. From Archaeological Survey at Egypt
El Bersheh, Part I, Plate XXVI

Cinnamon — bark from China and Ceylon.

Lye or Alkali from Karshina.

Cyprus Wine.

Salt of Sodom—of the Red Sea.

Herb Maaleh Ashan — grass which caused the smoke of the incense to go up in a straight line.

Odoriferous Herb—kippath-ha Jarden.

It is difficult to determine how floral decoration reached Greece, but probably through commerce with the Near East. The Greeks had a market in Athens where flowers were sold for their gay color and sweet perfume. Coronary plants such as carnation, thyme, gilliflower, wall flower, bergamot, violet, calamint, saffron crocus, narcissi, roses, lavender, lilies, anemones, iris, etc., were specially cultivated. Often twigs of mulberry or wild fig were used to add strength and ease of bending. Many of the plants were symbolic and floral crowns were worn by philosophers and warriors, as well as by guests at feasts. Garlands sometimes decorated the gates at entertainments and flowers were strewn on the tables, as their proximity, while drinking, was supposed to clear the minds of the diners and counteract the effect of wine. Theophrastus says that the flowers most popular were roses, gilliflowers, narcissi, and violets, which were used on the altars of the gods and in the service of the temples. The Greeks, like the Egyptians, had professional garland-makers as the Romans had at a later period. The lavish use of blossoms reached its peak in Rome, where Suetonius says that Nero spent fabulous sums on roses for one feast. Even the floors at banquets were covered with roses and the petals of the saffron crocus. Sometimes Romans were carried in litters padded with flowers, until finally a law was made that no citizen be allowed to

appear wearing a wreath of plant material unless entitled to do so. These garlands and wreaths of many familiar flowers played an enormous part in all important ceremonies, such as marriages, feasts and in the worship of the gods.

Before leaving the ancients let me quote from a letter written by Sir Thomas Browne to John Evelyn entitled "Of Garlands and Coronary or Garland Plants." "They were convivial, festival, sacrificial, nuptial, honorary, funebrial" and again "Their honorary crowns, triumphal, ovary, civic, obsidional." (That is of grasses and weeds given to the General who raised a Siege.) Sir Thomas says "The ancients had garlands also the hyemal . . . made of horn, dyed several colors and shaped into figures of flowers . . ." Some of the emperors had roses brought from Egypt and later they were grown in Rome in winter. This was in the time of Tiberius.

No flower seems to peep out so constantly from the far away past as the little fall flowering purple *Crocus sativus*, known as saffron. It was beloved by the ancients for spice, perfume and dye and used in the Hebrew incense. In Elizabethan times, it was considered a panacea in illness, strewn with the rushes on floors and used in salad. In some districts of England, the bright colored stigmas color the food today.

Early in the thirteenth century, flowers were used extensively in the service of the church. For great procession the priests and minor clergy were crowned and garlanded with white roses, red roses and periwinkle, according to the season, and the shrines of the saints and even the candles were decorated with flowers.

There were gardens within the monastery walls in which these flowers



Upper. Five Vases, porcelain, Chinese; reign of K'ang H'si (1662-1722)
 Courtesy of The Victoria and Albert Museum, London

Lower. Two bulb pots, blue jasper ware. English (made by Josiah Wedgwood at Etruria) about 1780. Courtesy of The Victoria and Albert Museum, London

were grown by the sacristan, to deck the church, together with herbs and simples for healing the sick in the infirmary. Potions, powders and poultices were made of physic herbs by the monks and every blossom seems to have been held beneficial in some disease. Gardens were attached to many churches and chapels as well as to monasteries, but, on great occasions, flowers had sometimes to be bought, and large payments for them are listed in the church accounts. Rushes and sweet herbs were laid on the floors of the churches, and herbs such as periwinkle and saffron were used in the hope of protecting the congregation against the plague and were also placed in homes or held in the hand for this purpose.

Thus flowers, especially roses, were used to decorate the churches. It would be interesting to trace back as far as possible ecclesiastical flower containers placed on the altars and before the shrines of the saints, but this would be well nigh impossible without making a trip to the cathedral treasuries of Europe. Some illustrations of these vases may be seen in early religious paintings and in illuminations in the old missals. Frau Angelico painted a row of brass or gold vases bulging near the base with small lips and holding four roses, two pink and two white. This is on what seems to be an altar under one of his Madonnas; neither foliage nor stems of the flowers show. There are many elaborate containers holding lilies in the church paintings of the Annunciation. In missals, some of the vases have wide mouths and two handles and are of pottery or brass. As far as I can learn, there appear to be no traditional church flower arrangements or containers; sometimes the stems are long with few flowers, again, the flowers are crowded and show no stems. They

are either mixed or of one variety.

At the time of the Reformation in England the use of blossoms in the service was being given up as a Romish practice, but, about 1660, holly, rosemary and other evergreens still decorated the church on saints' days and at Christmas. This usage was brought to America by our ancestors and has come down to our own time. Mistletoe, long associated with pagan rites, was prohibited, but rosemary was considered an holy herb which would only thrive in the gardens of the pious.

In the fourteenth, fifteenth and sixteenth centuries we read of long, narrow tables covered with cloths and then strewn with odoriferous herbs such as pinks, lilies, daffodils, roses, jasmine, lily of the valley or lavender. This is the first mention of flowers on the banquet table that I can find since Roman times and I must add that, although I found the strewn flowers thus described, I have never seen illustrations of them.

It is in the sixteenth century that we begin to read of the extensive use of flowers for decoration in English homes. Levinus Lemnius, a physician of Holland, who travelled through England in 1560, writes of the English,* "their chambers and parlours strawed all over with sweete herbes refreshed mee; their nosegays finally entermingled wyth sundry sortes of fragrunte floures in their bedchambers and privyroomes with comfortable smell cheered mee up and entiereye de-lyghted all my sences." This Hollander was so much impressed by the English decorations that he wants "to trimme up our parlours with greene boughes, freshe herbes or vine leaves; which thing although in the Low Country it be usually frequented, yet no nation more decently, more trimme-

*As translated in "The Touchstone of Complexions," London, 1581.



Walters Art Gallery, Baltimore

Pair small Jardinières and Flower Vase
French (Sevres) about 1760

ly, nor more sightly than they doe in Englande.”

Queen Elizabeth loved flowers. She paid large sums for “strewing herbs” and employed a “strewing woman to the Queen,” which office still existed in England during the early eighteenth century. In Elizabeth’s time, bouquets were placed about the rooms, but these nosegays were tight and stiff and of all sorts of flowers. Herbs and flowers were valued especially for their scent and healing properties and the more crowded the containers and heavier the perfume, the better. We must not forget the still rooms of this period, where sweet waters were distilled and rose leaves, lavender and many pungent herbs were dried to scent my lady’s linen, or to be placed in rose bowls.

Flowers are being grown inside the houses and suggestions are given by some of the florists as to what to grow and where they should be placed. Not even our window boxes are new. They were used in ancient Rome and Sir Hugh Platt, the great horticultural authority of Elizabethan days, says **“In*

**Floraes Paradise*, by H. P. Knight (Sir Hugh Platt), London, 1608.

every windowe you may make square frames either of lead or of boorders, well pitched within: fill them with some rich earth, and plant such flowers or herbes therin as you like best. . . . And if you plant them with Rosemarie, you may maintaine the same running up the transomes and mouels of your windowes. . . . You may also hang in the rooffe, and about the sides of this room, small pompions or cowcumpers, pricked full of Barlie, first making holes for the Barlie (*quaere*, what other seedes or flowers will grow in them) and these will bee overgrown with greene spires, so as the pompion or cowcumber will not appeare . . . in Summer time your chimney may be trimmed with a fine banke of moss, which may be wrought in workes being placed in earth, or with Orpin, or the white flower called Everlasting. And at either end, and in the midst, place one of your flower or Rosemarie pottes . . . or els, from platformes of lead over your windowes. . . . You may also plant vines without the walls, which being let in at som quarrels (holes left in the mullioned windows) may run about the sides of your windowes,

and all over the seeling of your rooms. . . ."

A foreigner visiting England at this period says that holly filled the fireplaces like an arbour from Good Friday until All Hallows Day.

Meadowsweet and box are mentioned to "deck up" houses and strew in chambers, halls and banqueting houses. These banqueting houses were sometimes built in the garden by people of wealth and position, especially for feasts, and "a fleur potte" for flowers is mentioned about this time.

The seventeenth century brings us to the forerunner of the flower show. As early as 1665, the Florists held annual feasts "where they crowned the best flower with a premium or a present." Speaking of presents, I must say that, at this period as in ancient times, flowers were greatly prized as gifts and, although we read especially of plants being exchanged by lovers of flowers, doubtless the charming bouquets which Parkinson calls "Tussiemussies" were also esteemed for this purpose.

It is difficult to think only of English usage, for our Island ancestors, like the rest of Europe, were borrowing luxurious styles from abroad. *Nicander Nucius, a Greek, who visited England 1545-46, writes, "As regards their manners and mode of living, ornaments . . . and vestments . . . they resemble the French more than others and in feasts and drinkings . . . they differ nothing from the French."

Evelyn in his Diary, "Dined at Goings House, whither my Lord Arlington carried me from Whitehall with the Marquis of Worcester. . . . Lord Stafford rose from the table in some disorder because there were roses stuck about the fruit when the dessert was set upon the table; such an antipathy, it seems he had to them."

*From Camden Soc. ed. 1841, p. 13.

I want to call your attention especially to the fact that bowls of fruit stood on a side table until dessert, and thus cannot be considered a typical table-centerpiece. The first use of flowers in vases on a dinner table that I can find occurs about 1686 at a banquet given in Italy by Lord Castlemain to the Pope. The table was covered by a tremendous service, a silver cross in the center. Extending from the cross in both directions were vases of flowers, but whether used for their scent, to guard against disease, or merely for decoration, I am unable to say.

Customs changed slowly in early days and scholars rarely give definite dates. Thus, when some custom or decoration came into use at the end of one century, it would have lasted well into the next in the cities and continue in the country even longer. The use of flowers for decoration in the eighteenth century is proved by Fairchild who, writing about 1721, says "One may guess the general love my fellow citizens have of gardening in furnishing their rooms and chambers with basins of flowers and bough pots rather than not have something of a garden before them." The question of table decoration in this century is a very difficult one. I have read in modern books on the manners and customs of this period that flowers were never used on an English dinner table. I feel, however, that this statement is entirely too broad, for the print of 1688 shows vases of flowers on a banquet table. This indicates that flowers were certainly used for feasts, although I am inclined to believe that their use was restricted to tables for elaborate entertainments. A large joint of butcher's meat or a pyramid of poultry generally occupied the place of honor in the center of the table for the family meal or even for



Courtesy, Victoria and Albert Museum

Salt-glazed Stoneware Flower Horn, Staffordshire, about 1760



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Flower Vase, Porcelain, Ludwigsburg, about 1765

small gatherings and this was called a "dormant" because it was not to be eaten, but was solely an ornament.

In time, the huge pieces of meat were replaced by a china or silver Epergne which often held candied fruit or sweets. The early Epergnes were usually perforated and would not have held water for flowers, but there are exceptions to this rule, as some were made to hold flowers as well as bonbons. These Epergnes for the center of the dining table continued in use all through the Victorian period. In France, the "Surtout," a frame of silver or gold with branches holding glass vases for a few flowers and dishes for sweetmeats was popular. This became so elaborate, as it was interspersed with statuettes and candelabra, that it in time covered the whole table and, so, we reach the period when the dishes had to be

handed around to the guests one by one. When the richer classes tired of the Surtout, well on toward the end of the eighteenth century, they began to use more flowers, so as not always to look at the same table decoration. Another decoration of this period was a cake of potter's earth laid directly on the cloth in the center of the table. In this, the florist stuck cut flowers to represent a flower bed. Sometimes a landscape was depicted and an artificial hoar frost was invented by a Frenchman which, as it melted in the heat of the room, would cause the flowers to open. An especially elaborate decoration consisted of statues, columns, temples, bridges, triumphal arches, domes, trees, arbors, flowers, vases, etc., all made of porcelain or paste, which were frequently designed by distinguished sculptors. There were also sableurs who, by the use of col-



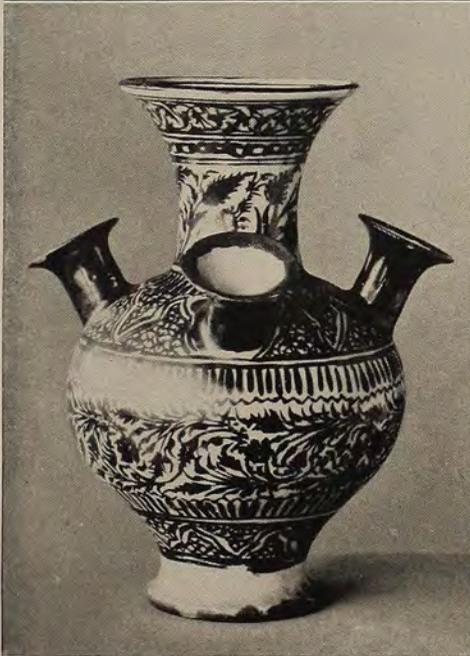
Courtesy, Victoria and Albert Museum

Flower Vase, Porcelain, painted in color. English (Chelsea); about 1765



Top. Flower Vase, black Basalt Ware with Terra-cotta applique. English (Josiah Wedgwood at Etruria) about 1780. Courtesy of The Victoria and Albert Museum

Lower. Bouquet Holder, enameled earthenware. French (Nevers) Second Half of 17th Century.



Upper left. Bulb Grower from Hampton Court Palace. Owned by Queen Mary about 1780. Courtesy Lord Chamberlain's Office
 Upper right. Wedgwood "Tulip" Vase. Walters Art Gallery, Baltimore
 Lower left. Bulb Vase, earthenware with gold lustre decoration. Persian; Second Half 16th Century. Courtesy of The Victoria and Albert Museum
 Bottom right. Flower Vase, Rhages, 13th Century. Walters Art Gallery, Baltimore

ored sand, made wonderful representations of Persian carpets upon the cloth, and this form of centerpiece, though very fragile, was thought to harmonize well with Chinese services. While these French decorations may have easily been adopted by the wealthy gentry of England, I have no positive data on this subject. All elaborate table decorations were for banquets and the illustrations in contemporary cookery books, showing how to place food on a family dinner table, have very dull dishes in the center—roasted ham, rump of steak, salad, pickle, lemon cream or roasted lobster appear on the cookery book charts. Our familiar dessert called Floating Island sometimes occupied the center of the dinner table adorned with "candy sheep pecking at a greenery of myrtle." Flowers in sets of pots, both growing and cut, decorated dining tables. Please bear in mind that cut, as well as growing flowers, were placed on the table in pots.

The plateau, a mirror in one or many sections set in silver or ormolu, was used and has continued as a table "center piece" until the present time. This is almost too familiar to need mention. You all know the plateau at Mount Vernon, sent to General Washington from France, which originally had separate figures to be placed upon it.

Having discussed table decorations, we turn to other uses of flowers in the eighteenth century. They were candied for sweets, and put in salads, borage flowers, marigolds, primroses and cowslips mixed with eggs and curd were made into tarts. Sweet herbs and dried leaves were used in sick rooms to overcome disagreeable odors and in pot pourri bowls to scent drawing rooms. Roses and other flowers decorated the fruit, were stuck in Epergnes, worn and placed in the

hair. Flowers with long stems, ornamental grasses and evergreens were used during the summer in large containers and set in fireplaces as during the Victorian period. Sets of three, five or seven jars and beakers adorned the mantel shelves, the beakers holding cut flowers. We all know that the English were especially partial to all things Chinese, whether for the garden or house. Old-fashioned mantels were "cluttered," for, even in the time of Queen Anne, the narrow mantel shelf frequently was crowded with Chinese porcelain jars, large and small. It is for this reason natural that in Holland, England and European countries, the makers of porcelain and pottery copied the jars and beakers of China with decided variations, in order to undersell the foreign importations. Vases of flowers or potted plants were put on one end of the mantelpiece, on both ends or used in sets of three. They were also placed on console tables, on dressing tables, or on very small tables, but usually near the wall. Bulbs, in handsome bulb or tulip vases, were used, while large growing plants are seen on the floor, at each side of the hearth, on a table or on tall stands and in elaborate pots. Rows of potted flowers not only often filled the windows, but were placed on the window ledge. We are familiar today with the covering of flower pots with "ornamental" paper. It is very interesting then to find listed in the inventory of Augustine Washington November 3rd, 1762, the following: "8 pss. flower pot paper, 1 piece borders for do., 4 pcs. tulip crimson paper, ½ piece of bordering for do."

I must call your attention to the ancient lineage of potted plants. They were used by the Egyptians, Greeks and Romans, and we find them all through the old English garden prints

on terraces, walls, gate posts, and around blooming flower beds, as well as in the house.

Some of you may have seen an early eighteenth century book, "The Garden Displayed," — which contains illustrations of arrangements of flowers for each month in the year. You will notice that the vases are very large and elaborate, and on small bases. They may have been of terracotta, marble or alabaster, perhaps of pottery. The arrangements are high and crowded and, while these particular drawings were to show the flowers available in the various months, most old arrangements were of mixed flowers and the containers very full. It is my opinion that wet clay or moss was used to hold the flowers, for, in spite of crowding, the containers seem not tall enough to balance such large and heavy stalks. I have never seen in the old prints and paintings a punch or dreg bowl used to hold flowers. Rather shallow copper, silver or china "basins," however, do appear.

The lore of floral decoration in China and Japan is too vast for casual research, hence no mention of these countries has been made in this discussion. However, one could hardly begin a description of china flower containers without reference to that fatherland of porcelain where scholars wrote whole volumes on receptacles for flowers alone. The Chinese took many of their patterns from ancient ritual vases of bronze. When, later, I write of Chinese containers, it is to be understood that, aside from some kindly guidance by the keepers of Chinese collections in various Museums, my information has been obtained from Dr. S. W. Bushell's "Oriental Ceramic Art Collection of W. T. Walters." The ancestor of flower containers with tubular or other groups of openings for separate

flowers is undoubtedly an Egyptian vase of glass illustrated in a painting at Beni-Hassan holding three lotus flowers about 1900 B. C. I have found no especial receptacles for flowers referred to in available sources about Greece or Rome, although I have seen contemporary decorations picturing vases of flowers.

This, however, is not conclusive, as my information must be relayed through translations of the classics. I felt quite happy on one occasion over some mention of "flowers" in a translation from Leviticus by old John Parkhurst (a famous English biblical lexicographer of the 18th century). My joy was short lived, however, for a modern Hebrew scholar assures me that the Hebrew word translated as "flowers" has two roots and does not here mean "flowers" at all.

To return to vases with tubular openings which must have been widely distributed. There is a very interesting example of a 13th century Persian flower vase of this sort at the Walters gallery and Dr. Bushell quotes from an ancient Chinese writer the following description of "a flower vase of crackled porcelain with an oval mouth surrounded by four smaller tubular mouths springing from the shoulder of the vase," made sometime between the tenth and fifteenth centuries. This vase was used to mingle the perfume of various sorts of roses. For cut flowers, the Chinese made special vases of many shapes and preferred them smaller at the top, as a bulge near the bottom was thought to keep disagreeable odors out of the room. They ranged in size from two or three inches—for a single bloom—to five or six feet. One of their best known shapes so frequently copied by European nations was the previously mentioned beaker. This was an ancient form with trumpet shaped mouth,



*Arrangement with Few Flowers
From an old print.*



*A Crowded Arrangement
from
The Flower Garden Display'd
London MDCCXXXII*

called by an early Chinese writer "Golden halls for flowers." Containers were considered most important in arranging cut flowers, but one suitable for a lady's drawing room was thought too frivolous for a scholar's library. There were special flowers for each season, and the flowers were not mixed. Gourds were approved to hold lotus flowers and a round dish often held citron or fragrant melons to perfume the air. In fact, Chinese porcelain containers were of the greatest variety—there were pots for growing flowers, suspended perforated baskets for sweet-scented blooms, joined sections of bamboo, dishes for flowering bulbs and many more.

Their famous garnitures originally consisted of two jars, two beakers and a vase in the middle. After the Chinese began to make porcelain for the European trade, the middle vase was not used and the garniture consisted of three jars and two beakers.

The Hollanders were the first to use this decoration in Europe. Late in the 17th century and early in the 18th century, it was greatly esteemed; the earliest garnitures were in blue and white and later in polychrome. These sets of beakers and jars were copied by hundreds in Delft ware, and of all mantel ornaments were considered most desirable to light up dark rooms, especially when the beakers contained cut flowers from the garden. There was much traffic between Holland and England, and so we find the English collecting Delft ware, as well as porcelain.

It is strange that we see so few handsome containers made especially for growing or holding flowers either in old arrangements at the average Flower Show or in Museum houses. Many of these beautiful pieces of pottery and porcelain were made in England, and also on the Continent, as

the following items from sales lists will show: Quintal Flower Horns at the Leeds pottery late 18th century copied from earlier designs in Queensware. Stratford-le-Bow (1745-1776) flower pots. Chelsea (1745-1770) beakers and jars in sets or garnitures of three, five and seven. This factory made hundreds of separate flowers with ormolu stems which could be used in vases when fresh flowers were not available. Epergnes, flower pots and hanging flower vases were also manufactured there. Worcester sets of covered jars and beakers in 1769. Bristol (1770-1781) pairs of hanging flower vases, beakers and jars. Lowestoft, a set of porcelain beakers decorated with a crest.

Flower pots were made by Josiah Wedgwood, after 1760, of Red ware and Basalts as well as of Queensware. He turned out elaborate Epergnes with pierced baskets for bonbons and plain ones for flowers. Later on he lists a large selection of flower pots, holders and bulb pots for halls, boudoirs and drawing rooms, some of which were very elaborate. Flower pots and flower holders were made especially for the table, both "for roots and the dressing with flowers" and some of the Wedgwood bulb pots represented ruins. We read of a "Bow Pot" (bough pot) in 1772, and green hooped flower pots in 1778. Flower containers were made in Italy about 1762. In France at St. Cloud about 1697 and at Vincennes about 1740.

Mme. de Pompadour played a famous practical joke on Louis XV by filling the greenhouse at her Chateau with porcelain flowers made at this factory. She drenched them with perfume, so that they seemed to be blooming in the dead of winter.

About 1753 flower pots, jardinières and table garnitures were being made at the Sèvres factory.



- Upper left. *Jardiniere*, painted porcelain. English (Derby or Pinxton) about 1815. Courtesy of The Victoria and Albert Museum
- Upper right. *Caché-pot* (flower pot holder). French (Saint-Cloud) about 1730. Courtesy of The Victoria and Albert Museum
- Lower left. *Caché-pot* (flower pot holder). French (Arras) about 1785. Courtesy of The Victoria and Albert Museum
- Lower right. *Jardiniere*. French (Sevres), 1758. Courtesy Walters Art Gallery, Baltimore

Germany, although last on my list, should perhaps have come first. I am not familiar with German flower containers, but they were certainly made at the Dresden factory about 1715, at Nymphenburg about 1750 and at Strassburg during the last quarter of the eighteenth century.

Corucopias, although not made especially for flowers, were often used to hold them. They appear in a late eighteenth century print holding hyacinths, and on an early Victorian mantel shelf with three roses just at the top, but no foliage. Many shiploads of china came to this country from England, and although I have not looked particularly for flower containers in American inventories, many of our wealthy families must have ordered them just as they did plates, platters, dishes and tea sets. A pair of flower pots is in the inventory of Augustine Washington, and I can vouch for a set of three lovely Wedgwood pots (a mantel garniture) which was imported about 1775 by the ancestor of a friend who lived in South Carolina. Some fine containers were made during the Empire period, and even the early Victorian jardinières and flower pots are now eagerly collected.

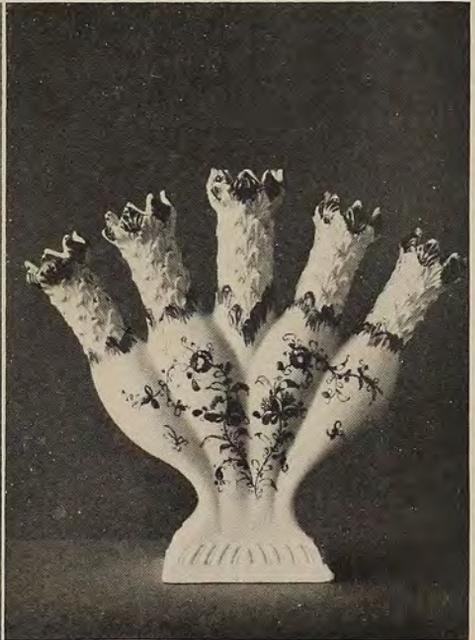
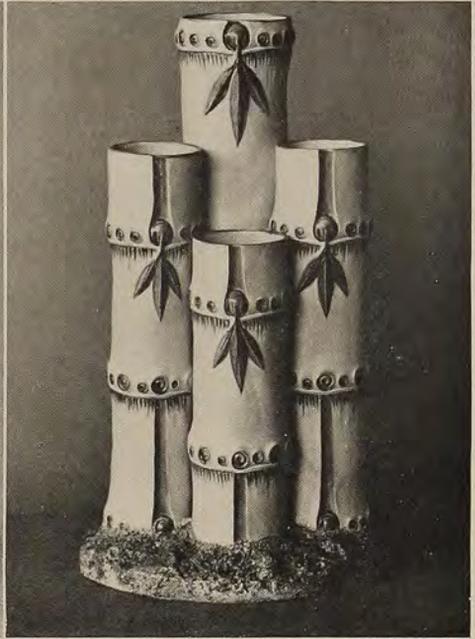
We know that, in the nineteenth century, artificial flowers were used extensively for all sorts of decoration, but they were made at china factories, and by ladies in the eighteenth century as well. An eighteenth century gentleman speaks of seeing in the house of a friend, "vessels of Chelsea china in which were placed sprigs of various coloured artificial blooms." These blooms may have been either of china (since separate flowers were made of porcelain about 1755 to use in vases) or of silk or paper. The Ladies' Monthly Museum describes a very recherché party. "Mrs. Crespigny's Dé-

jeuné . . . in every respect was the most delightful assemblage of beauty and pleasure we have been presented with this season, and artificial flowers embellished the gardens and grounds where nature with-held her decorations." We would be greatly astonished, I feel sure, if, on a pilgrimage, we beheld an old garden adorned with roses and tulips of cloth or paper, but contemporary data proves such decoration was used in the eighteenth century.

Eighteenth and early nineteenth century centerpieces for the table or mantel arrangements make interesting classes for Flower Shows. The flower beds and landscapes should give endless scope for originality and are rather amusing to make, although I suppose Persian carpets of sand would have to be left out.

Since we have evidence of vases on the table at the end of the seventeenth century, they may have been used in the eighteenth and, in any event, the Epergne, Floating Island with greenery, flower-beds and sets of flower pots would be allowed. Our horticulturists of today could hardly be more enthusiastic over some pampered blossom than the members of that 18th century "Florists Club" which is described as an "Odoriferous society consisting of pink and tulip worshippers, who would walk ten miles to see a new stripe in a gilliflower and gaze away whole hours upon an odd coloured daisy."

The question "What rules does one use for old arrangements?" is frequently asked. None that I know of! It would be hard to picture our ancestors struggling with Japanese regulations and puzzling their heads to avoid the pitfalls of our modern restrictions. We can be guided only by period flower paintings and again by arrangements seen in conversation



Upper left. Enameled Earthenware Bulb Holder. Dutch (Delft), about 1780. Courtesy of The Victoria and Albert Museum

Upper right. Flower Vase, painted. English (Josiah Wedgwood at Etruria), late 18th Century. Courtesy of The Victoria and Albert Museum

Lower left. Enameled Earthenware Bulb Vase. German (probably Frankfurt-on-Main), second half 17th Century. Courtesy of The Victoria and Albert Museum

Lower right. Quintal Flowerhorn, painted earthenware. English (Leeds), late 18th Century. Courtesy of The Victoria and Albert Museum

prints showing rooms in which flowers were used. I have waded through hundreds of prints in book shops and English and European Museums. Some of these illustrated arrangements might pass the judges at Flower Shows, but more would fall by the wayside. They are often stiff and regular, sometimes very tall in low containers and others squatty in high ones. Frequently the vases are crowded with all sorts and colors of flowers, less often they hold a few. Strive for crooked stems rather than straight ones, for in some of the loveliest old compositions tulips and poppies, as well as other flowers, show a wavy growth. A famous judge, on one occasion, complained bitterly that one class was made up of "Flowers merely stuck in bowls." Naturally, lack of composition rates as a fault in this year of grace, but how could old-fashioned ladies be expected to consider dominants and sophisticated grouping?

In the crocus and bulb pots, there are from two to five or more holes in the lid. These must be filled as if the bulbs were growing in the pot, one bloom for each hole. The containers with pierced grids have as many as fourteen openings in the lid, sometimes with one large hole in the middle; and about the number of flowers

these should hold, your guess is as good as mine.

Pots and jardinières lend themselves to the display of transplanted growing flowers of various kinds. Other containers can be used for bulbs which have slender stalks that can be trained through the holes. Still others will not admit either bulb or shoots and can only be used to hold cut flowers. The lids of bough pots have usually three holes towards the back; these are made for one stem each, the branches going hither and yon—let them cross as they like without cutting. Modern rules of judging do not apply to old arrangements. We should try to use plant material which could have been in our country at the period represented. Cottage tulips, rather than Darwin, native Wistaria, instead of Chinese, larkspur and not improved delphiniums; and, when possible, the old sorts of roses. Our ancestors doubtless decorated their homes with many flowers of the field, but could not have used those varieties introduced from abroad by their great-grandchildren.

I will conclude with the words of Brother Francis Gentle, Lay Carthusian (London, 1706): "Perhaps I have more Rote than Knowledge, more Presumption than Ingenuity, although I do not Bear Malice to those who tell me my Faults."

On the History of the Introduction of Woody Plants into North America

ALFRED REHDER

*Translated from the German*¹

by

ETHELYN M. TUCKER

(Revised by the author)

The introduction of North American woody plants into Europe has been treated frequently, and especially more recently by K. Wein,² while of the introduction of woody plants from other countries into North America almost nothing has as yet been written. It will, therefore, be appropriate to give here a brief sketch as to when and how foreign and also western American woody plants reached the gardens of eastern North America, as well as to mention the earliest and the more important gardens and arboreta.

The history of the introduction of ligneous plants into North America may be divided into three periods, the first of which embraces the time from the arrival of the first European settlers up to the middle of the 18th century. This period is characterized by the fact that the introduction of European woody plants is restricted chiefly to fruit trees and other useful plants with the addition of but a few ornamental shrubs. This is not to be wondered at since pioneers in a strange land have a hard struggle for existence and are forced to seek first to assure for themselves the necessities of life, and only with increasing wealth and security of possession do they find leisure to think of beautifying their surroundings.

The first fruit tree introduced into the New World was the peach, which as early as the 16th century was brought into Florida by the Spaniards; from there it spread west and north and was planted by the white settlers as well as by the Indians. The introduction of woody plants in the North began in the first half of the 17th century. The first account of this we find in Josselyn (*New England Rarities*, 1672, and *Account of Two Voyages to New England* in 1638 and 1663, 1674) where he mentions the apple, pear, quince, cherry, plum and barberry as thriving in New England; he mentions also *Salvia officinalis* and remarks that *Artemisia abrotanum*, rosemary and lavender were not suited to the climate of New England, which shows that their introduction was attempted, but was successful only in the southern states. Of ornamental shrubs he mentions only the rose. We can, however, be almost certain that some other ornamental shrubs, such as the lilac, snowball (*Viburnum Opulus* f. *roseum*) and box had already in the second half of the 17th century been found here and there, as in the garden of Van Cortlandt in Croton on Hudson established shortly after 1861, and in that of Peter Stuyvesant in New Amsterdam (New York) which was established somewhat earlier; but as to what other plants these gardens may

¹*Mitteilungen der Deutschen dendrologischen Gesellschaft*, 1932, pp. 114-129.

²*Mitteilungen der Deutschen dendrologischen Gesellschaft*, 1930, pp. 137-163; 1931, pp. 95-154; 1932, pp. 123-129.

have contained we have no knowledge. The sources of information concerning the garden plants of this period are very few and unreliable; it is, however, to be assumed that some native ligneous plants also were cultivated, especially shade trees such as sugar maple, elm (*Ulmus americana*), red oak, and farther south *Catalpa*. Here, too, it may be mentioned that in the year 1645 Endecott, Governor of Massachusetts, introduced *Genista tinctoria* as a dye plant, which soon escaped from cultivation and is now thoroughly naturalized in eastern Massachusetts.

The second period is characterized by the introduction of an ever-increasing number of ornamental trees and shrubs, exclusively however from European gardens, and may be considered as extending from the middle of the 18th to the middle of the 19th century. In this period two men are outstanding figures, pioneers in garden-craft. One is John Bartram, who in 1728 established a botanic garden at Kinsessing near Philadelphia, where he planted and cultivated American trees and shrubs, which he had collected in his travels extending from Lake Ontario to Florida. He was in active communication with England and introduced many American plants there; in exchange he received plants from European gardens and propagated them in America. Among these may be mentioned the horse chestnut, which probably came to America in the year 1746. His work was continued by his sons, John and William. Bartram's house and garden stand today, preserved in their original form. The second man is Robert Prince, who in the year 1730 founded a nursery in Flushing, Long Island, which has been managed continuously through five generations of the same

family. Although in the beginning intended only for the raising of fruit trees, the management gradually broadened to include ornamental trees and shrubs, and since 1793 the nursery has been continued under the name Linnean Botanic Garden. From the catalogues which were issued it is evident what foreign trees and shrubs were in commerce at that time; from the catalogue of 1790 the following plants may be mentioned, though only the English names are given: *Cotinus coggygria*, *Koelreuteria paniculata*, *Colutea arborescens*, *Laburnum anagyroides*, *Populus nigra* var. *italica*, *Viburnum opulus* f. *sterile*, *Hibiscus syriacus*. In the earlier Prince estate still stand the oldest specimens in America of the cedar of Lebanon and Atlas cedar, *Paulownia*, the copper beech, Asiatic magnolias and others.

Toward the middle of the 18th century wealthy landowners, especially in Pennsylvania and Virginia, began to lay out large gardens in which among other things one finds box, lilac, *Taxus baccata*, and *Salix babylonica*. Washington's garden at Mount Vernon, begun about 1760, was one of the most important and contained many American and foreign trees and shrubs. One other very rich garden was laid out some years later by William Hamilton on his estate, "The Woodlands," near Philadelphia. This estate was later converted into a cemetery, "Woodlands Cemetery," in which today many of the trees planted by Hamilton still stand, among them the first *Ginkgo* in America which was planted in 1784. Humphry Marshall, inspired by his cousin, John Bartram, began in 1773 the foundation of an arboretum in Bradford, now Marshallton, in Pennsylvania. In 1785 he published his "Arbustrum americanum," the first work written by an American on American trees and



Arnold Arboretum

Ginkgo biloba in Woodlawn Cemetery

shrubs. Many of the trees which Marshall planted stand today. The first actual botanic garden in America was founded in 1801 by David Hosack in New York under the name "Elgin Botanic Garden." In the year 1810 it was taken over by the state of New York and later transferred to Columbia University, but was finally discontinued for want of funds. The second edition of the catalogue of this garden in 1811 contained many European and a number of Asiatic trees and shrubs, among which are *Gleditsia sinensis*, *Malus spectabilis*, *Rosa multiflora*, *Magnolia liliflora*, *Hydrangea macrophylla* (*H. opuloides*), *Sophora japonica* and *Aucuba japonica*, the last two grown as greenhouse plants. A second botanic garden was established at the beginning of the 19th century in Cambridge, Massachusetts, and still exists as the Botanic Garden of Harvard University. In the year 1818 a catalogue of the garden by W. D. Peck was issued listing the following Asiatic trees and shrubs not mentioned in the catalogue of the Elgin Botanic Garden: *Vitex Negundo* var. *incisa*, *Eriobotrya japonica* and *Thuja orientalis*. Other eastern Asiatic trees and shrubs listed in Prince's catalogue for 1828 are *Ulmus parvifolia* and *Wisteria sinensis*. In the year 1806 an expedition under command of Lewis and Clark, sent to the west coast by the United States government, brought back to the East the first west American plants, which were distributed by Macmahon and Philip Landreth, two gardeners in Philadelphia; by far the most important woody plants so brought were *Mahonia Aquifolium*, *Ribes aureum*, and *Ribes sanguineum*. At the beginning of the 19th century a greatly increased interest in gardening and plant culture and especially in the cultivation of trees and shrubs was evi-



Sequoia gigantea in Painter's Arboretum, Media, Pa.

denced through the collections of ligneous plants begun in 1800 by the brothers Samuel and Joshua Pierce in Longwood, Pennsylvania, and through more than 50 years carried on by the family. The garden which still contains many of the trees planted by the Pierce brothers is now the property of Pierre S. Du Pont. Another well-known collection is the Painter Arboretum, near Lima, in Pennsylvania, founded in 1825 by the brothers Minshall and Jacob Painter, who extended and maintained the arboretum up to the time of their death in the 70's. The garden exists today and contains among other plants the oldest specimen of *Sequoia gigantea* in eastern North America unless the *Sequoia* at Aurora, N. Y., which is a taller tree, is older.



Arnold Arboretum

Ginkgo biloba, in Bartram's Garden

In the year 1828 John Evans founded a garden on the Ithan Creek near Philadelphia and brought together a remarkable collection of trees, shrubs and herbaceous plants. He corresponded with both Hookers, father and son, and exchanged seeds, and also received seeds of Himalayan plants which Joseph Hooker had collected. In the year 1841 Henry Winthrop Sargent bought the estate Wodenethe above Fishkill Landing in the state of New York and planted and attempted to raise all the conifers which he was able to obtain; from here was distributed *Pinus ponderosa* f. *pendula*. Another Pinetum was established by Horatio Hollis Hunnewell, of Wellesley, in the year 1852, and is still maintained by the family. No garden in the eastern United States can boast a better collection of fine large specimens of various conifers.

Here also mention should be made of some famous nurseries such as that of Ellwanger and Barry in Rochester, New York, established in 1840, the nursery of Samuel B. Parsons and his brother Robert established at the same time in Flushing, Long Island, and later that of Thomas Meehan, in Germantown, near Philadelphia, in 1853. All these firms carried a large number of trees and shrubs and thereby made many of the plant treasures of European gardens available to American garden lovers.

A third period may be marked from the year 1861 in which the first Japanese plants were sent to America and thereby direct communication with Japan and later also with China was initiated, countries which were destined to enrich American and European gardens through a large number of beautiful and valuable trees and shrubs. Up to this time America had received eastern Asiatic woody plants

entirely by way of Europe, with the possible exception of a few important trees and shrubs such as *Rosa laevigata* Michx., which had previously come direct to America and by the end of the 18th century was already growing wild in the southern states. How it may have come there remains unknown.

In the year 1861 Dr. George R. Hall, who spent nearly fifteen years in China and had also visited Japan sent a number of plants from Japan to America; in the following year he brought still more Japanese plants, some of which he sent to Parson's Nursery, in Flushing, some to Francis Parkman, in Boston, and some he planted on his own estate in Bristol, Rhode Island, where many of them are growing today. Among the plants which he introduced may be mentioned some then not even known in Europe, as his *Malus Halliana*, *Magnolia stellata* and *M. kobus*, *Hydrangea paniculata* f. *grandiflora*, *Hypericum patulum*, *Taxus cuspidata* f. *nana*, *Sciadopitys verticillata*, *Phellodendron Lavalleyi*, *Evonymus patens* and *Lilium auratum*. Other Japanese plants were introduced by Thomas Hogg, the American consul in Japan in the years 1865 and 1875, and propagated in Parson's nursery; among these *Cercidiphyllum japonicum*, *Hydrangea petiolaris*, *Symplocos paniculata*, *Magnolia parviflora* and *M. obovata* (*M. hypoleuca*) deserve special mention.

In the year 1872 the Arnold Arboretum was founded as a department of Harvard University with Professor C. S. Sargent as Director, an institution whose purpose was to grow all the woody plants which would be hardy in the climate of Boston. All plants already cultivated in European and American gardens were collected and planted. As to those not yet found in cultivation the director made

it his aim to introduce from eastern Asia the rich ligneous flora up to that time only slightly known in western gardens. The first shipment of seeds from eastern Asia was sent to the Arnold Arboretum in the 80's by Dr. E. Bretschneider, who was physician to the Russian embassy in Peking. It consisted chiefly of trees and shrubs from the mountains west of Peking, among which may be mentioned *Syringa pubescens* and *S. villosa*, *Sorbus pohuashanensis* and *S. discolor* (*S. pekinensis*), *Deutzia parviflora*, *Rhododendron dauricum* var. *mucronulatum*, *Pyrus Bretschneideri*, *P. betulifolia* and *P. phaeocarpa*.

From Japan the Arboretum received in 1890, through Dr. William S. Bigelow, seeds of *Prunus Sargentii*. Two years later the director, Professor Sargent, visited Japan and brought back seeds of many trees and shrubs chief among which were *Rhododendron obtusum* var. *Kaempferi*, one of the most valuable introductions of the Arboretum, *Malus Sargentii*, *Acer cappilipes* and *Sorbus alnifolia*. In the year 1905 J. G. Jack made a trip to eastern Asia and brought back, among other plants from Korea, *Rhododendron yedoense* var. *poukhanense*, *Tripterygium Regelii* and *Evodia Daniellii*, and from northern China *Quercus aliena* and *Salix Matsudana*. A year earlier the Japanese botanist Uchiyama had sent seeds of Korean woody plants to the Arnold Arboretum, among them *Abies holophylla* and *Neillia Uekii*. In the years 1907 and 1908 E. H. Wilson, who had formerly collected very successfully in China for the English nursery firm of Veitch, traveled for the Arnold Arboretum. Two years later he undertook a second journey to China, chiefly to western China, to collect seeds of conifers which in 1908 had borne no cones. During these three

years Wilson sent more than 1,200 numbers of seeds to the Arnold Arboretum as well as a number of cuttings and young plants of *Populus* and *Salix* and some other woody plants. Many of the plants collected by him proved to be new not only to cultivation, but also to science. Wilson's new introductions and even those of horticultural merit are too numerous to mention here and only the following selection may be noted, among which are found some previously collected by him for Veitch; *Abies Fargesii*, *Actinidia chinensis*, *Aesculus Wilsonii*, *Berberis Sargentiana* and *B. triacanthophora*, *Cercis racemosa*, *Corylopsis Veitchiana*, *Cotoneaster divaricata* and *C. hupehensis*, *Dipteronia sinensis*, *Fagus lucida*, *Hydrangea Sargentiana*, *Ilex Pernyi*, *Jasminum Mesnyi* (*J. primulinum*), *Kolkwitzia amabilis*, *Malus hupehensis*, *Populus lasiocarpa*, *Picea asperata*, *Rosa Moyesii*, *Salix magnifica*, *Sargentodoxa cuneata*, *Sinowilsonia Henryi*, *Sorbaria arborea*, *Spiraea Veitchii*, *Styrax Wilsonii*, *Syringa reflexa*, *Viburnum rhytidiphyllum*. Also a part of the seeds of woody plants collected in western China by C. Schneider for the Austrian Dendrological Society in 1914 came to America owing to the interruption of communication with Europe by the World War. In the year 1914 Wilson went again to eastern Asia and this time to Korea and Japan. Of the Korean ligneous plants which he introduced those deserving of special mention are *Forsythia ovata*, *Pentactina rupicola*, *Stewartia koreana*, *Buxus microphylla* var. *koreana*, *Thuja koraiensis* and *Syringa velutina*; of the Japanese ligneous plants may be named the numerous garden forms of Japanese cherries and the Kurume azaleas. From Formosa, which he visited in 1918, he introduced the only recently

discovered *Taiwania cryptomerioides*, the tallest conifer of eastern Asia, a counterpart of the *Sequoia gigantea* of California. In the year 1910 and 1911 William Purdom visited the northern provinces of China and sent back a large number of valuable seeds of ligneous plants, such as *Malus transitoria*, *Prinsepia uniflora*, *Berberis circumserrata* and *B. Purdomii*, *Sorbus Koehneana*, *Deutzia grandiflora* and *D. hypoglauca*, and *Picea Meyerii*. The last collector for the Arnold Arboretum in eastern Asia was J. F. Rock, who in the years 1925 and 1926 collected in northwestern China, after he had previously traveled for the United States Department of Agriculture in southwest China, Burma and Siam. Among the woody plants collected by him that were new to cultivation may be mentioned the following: *Juniperus tibetica*, *J. distans*, *J. glaucescens*, *Betula japonica* var. *Rockii*, *Quercus laotungensis*, *Spiraea uratensis*, *Caragana brevifolia* and *C. densa*, *Evonymus nanooides* and *E. Przewalskii*, *Rhododendron rufum* and *R. capitatum*. During the sixty years of its existence the Arnold Arboretum has introduced into American gardens some 2,500 species and varieties besides the garden forms of *Syringa*, *Rhododendron*, *Rosa*, *Diervilla* and others; of these some 1,400, including 600 species of *Crataegus*, were for the first time introduced into cultivation and over 1,000 were introductions from European gardens into America. Also to the Department of Agriculture with its experiment gardens in different parts of the country, America is indebted for many new introductions of trees and shrubs through collectors sent to all parts of the world. One of the most successful of these collectors was Frank N. Meyer, who

in the years 1907-1914 traveled in central and eastern Asia, where by accident he lost his life in the Yangtze River. Among his new introductions may be mentioned *Juniperus squamata* var. *Meyeri*, *Syringa Meyeri*, *Albizzia kalkora*, *Betula chinensis*, *Buxus microphylla* var. *sinica*, *Daphne Giraldii*, *Wisteria villosa*. The botanic gardens with arboreta connected such as the Missouri Botanical Garden in St. Louis, founded by Henry Shaw as a private garden and opened to the public about 1860, the New York Botanical Garden founded in 1894 and the Brooklyn Botanic Garden established in 1910, have contributed but little to the introduction of foreign trees and shrubs. The same is true of other arboreta founded in more recent times, as the Knox Arboretum in Warren, Maine, the Sanford Arboretum in Knoxville, Tennessee, and the Morton Arboretum, in Lisle, near Chicago. The last named is, next to the Arnold Arboretum, the most important arboretum in the United States; in it are special plantations, largely of trees of value for forestry purposes, but it is also very rich in its collection of ornamental trees and shrubs.

From the preceding statements it is evident that the introduction to American gardens of most of the trees and shrubs was not direct from their native country but through the medium of European gardens. Not until the second half of the present century did introduction begin to be made direct. Even many American plants, especially those from the Rocky Mountains and from the western states, came by way of Europe into eastern American gardens.

Since most of the plants reached America by way of Europe, it may not be amiss to give here a short sketch of the history of the introduc-



Arnold Arboretum

Forsythia ovata

tion of woody plants into Europe. If we disregard the gardens of Babylon, Egypt, India, Persia, Greece and Rome, since we are chiefly concerned with the woody plants of the cooler temperate zone, we find the first written proof of cultivated trees and shrubs in middle Europe in connection with cloister gardens, as in the plan of the cloister garden of St. Gallen published in the year 830, and in the "Capitulare de villis" promulgated by Charlemagne in the year 812, in which many fruit-bearing trees such as the apple, pear, plum, cherry, quince, walnut, mulberry, peach, almond, chestnut, hazel-nut, medlar and grape, also salvia, rosemary, and *Artemesia abrotanum* are mentioned. Of ornamental shrubs only the rose appears, probably *Rosa centifolia*. A

fairly complete list of woody plants cultivated in middle Europe in the middle of the 16th century we find in Conrad Gesner's "Horti Germaniae" under the date of 1560. He names nearly all the known woody plants growing wild in Germany and also some in south Europe such as *Cercis*, *Colutea*, *Laburnum*, *Staphylea*, *Vitex* and *Cotinus*, while some eastern trees and shrubs, as the horse-chestnut, lilac and mock-orange are still lacking, but in John Gerard's Catalogue of the plants in his garden, published in 1596, which is the first catalogue of plants cultivated in English gardens, the last named plants are found together with others from eastern and southern Europe. About the same time Jean Robin published a catalogue of cultivated plants in the

Royal Garden at Paris, and Richier de Belleval a catalogue of the botanic garden in Montpellier. These are the first catalogues of garden plants for France. The first North American woody plant reached Europe through France. It was the arbor-vitae (*Thuja occidentalis*) which probably was brought to France in the year 1536 through Cartier's expedition. In the first quarter of the 17th century a large number of American trees and shrubs were introduced into France as shown by J. Robin's "Enchiridion Isagogicum" of 1623, and Cornut's "Canadensium Plantarum Historia" of 1635, in which among others were listed *Robinia Pseudoacacia*, *Parthenocissus quinquefolia*, *Rhus Toxicodendron* and *R. typhina*, *Campsis radicans* and *Prunus serotina*. From the middle of the 17th century, however, most of the new introductions came first to England and by the end of the 18th century nearly all the more important trees and shrubs of eastern North America, partly through the agency of John and William Bartram, had reached Europe. The first plants of western North America, through the expedition of Lewis and Clark, came in 1806 to the East and from there to Europe; however, most of the woody plants of the west coast of North America and of the Rocky Mountains were introduced into England through W. Lobb, R. Douglas, and Th. Hartweg between 1825 and 1850. For later introductions we are indebted chiefly to American gardens and various American and European collectors. Among the latter we may here mention the two German collectors, C. A. Purpus and A. Purpus.

Siberian plants reached Europe scarcely before 1750, when such species as *Lonicera tatarica*, *Caragana arborescens*, *C. frutex* and *C. pygmaea*, *Cornus alba*, *Sorbaria sorbifolia*, *Malus*

baccata and *Malus prunifolia* were received. From the middle to the end of our present century we owe our introductions of north and central Asiatic woody plants in large part to the St. Petersburg Botanic Garden and its collectors.

The very first Chinese plants reached Europe before or about the beginning of the Christian era by way of the old trade route from North China through Tibet and Turkestan to Persia. The most important among these are the peach, apricot, *Morus alba*, *Hibiscus syriacus*, *Salix babylonica*, and *Syringa persica*, which for a long time was thought to be a native of Persia. Some few east Asian plants came to Europe through India, such as *Rosa chinensis*, which therefore was called Bengal rose. The first direct introduction we owe to the Jesuit father d'Incarville, who in 1750 among other plants brought to Paris *Ailanthus altissima* (*A. glandulosa*) and *Sophora japonica*. Toward the end of the 18th century and at the beginning of the 19th century Chinese plants began to be introduced into England through the English East India Company, among them *Paeonia suffruticosa* (*P. moutan*) and magnolias. Between 1810 and 1830 John Reeves sent many valuable trees and shrubs to England, such as *Wisteria sinensis*, *Spiraea cantoniensis* and various azaleas. Very important introductions we owe to Robert Fortune, who in the years 1840 to 1860 collected in China from whence he sent to England among other plants *Prunus triloba*, *Exochorda grandiflora*, *Spiraea prunifolia*, *Viburnum tomentosum*, *Jasminum nudiflorum*, *Forsythia viridissima* and *F. suspensa* var. *Fortunei*, *Chionanthus retusa*, *Syringa oblata*, and *Pseudolarix amabilis* (*P. Kaempferi*). Another English collector who in the year 1880 was sent out

to China by the nursery firm of Veitch was Charles Maries, to whom we owe the introduction of *Hamamelis mollis*. In the years 1870 to 1880, through the French missionary, A. David, many important northern Chinese plants were brought into France and at about the same time a Russian, Dr. Bretschneider, in Peking, sent woody plants from northern China to Europe and also to America. Between the years 1890 and 1900 various French missionaries as J. M. Delavey, P. Farges and J. A. Soulié sent seeds of central and western Chinese woody plants to France and the Italian missionaries G. Giraldi and C. Silvestri sent seeds of northern and central Chinese trees and shrubs to Italy. From 1900 to 1904 E. H. Wilson collected very successfully for the English firm of Veitch and from 1907 to 1910 for the Arnold Arboretum in central and western China, as already related above more in detail, where also the explorers F. N. Meyer, W. Purdom and J. F. Rock are mentioned. In more recent times F. Kingdon Ward, Reginald Farrer and G. Forrest sent many woody plants from western China to England, especially rhododendrons. During the last decade with the creation of Chinese universities and scientific institutions Europe as well as America is beginning to receive seeds and plants directly from Chinese botanists and collectors.

As in case of the Chinese plants so also the first Japanese plants came to Europe by way of other countries, as *Rhododendron indicum*, which was brought from Java to Europe in the year 1680. Others as the *Hydrangea macrophylla* (*H. opuloides*) and *Deutzia scabra*, which were cultivated in China, were introduced into Europe from the last named country. Not until the second quarter of the 19th

century were the treasures of the Japanese gardens made available for Europe, first through Philipp von Siebold, who traveled in Japan in 1823 to 1829 and returned again in the year 1856. Of the numerous valuable trees and shrubs which he introduced we may here mention *Malus floribunda* and *M. Sieboldii*, *Cornus kousa*, *Cercis sinensis*, *Hydrangea paniculata*, *Callicarpa japonica*, *Spiraea Thunbergii*, many forms of *Acer palmatum* and of *Diervilla*. Other Japanese plants were brought to St. Petersburg by the Russian botanist Maximowicz about the year 1850, and cultivated there. In the year 1860 John Gould Veitch journeyed to Japan and brought many plants, especially conifers, to England. Of the introduction of trees and shrubs to America through Hall, Hogg, Sargent and Wilson we have already spoken. In more recent times new woody plants have been sent to Europe and America by Japanese botanists and nurseries. The introduction of woody plants from the Himalayan Mountains began chiefly about the year 1820; particularly were the English gardens enriched through the collections of Joseph Hooker, who in the years 1848 to 1851, traveled in India and especially in the Himalayan Mountains. The influence, however, of the Himalayan introductions of woody plants on the gardens of the cooler temperate zone has remained comparatively slight, since most of the plants have proved more or less tender, especially the rhododendrons, among which are many of great ornamental value.

That portion of eastern Asia which was the latest to disclose to us its ligneous treasures is Korea. Some woody plants such as *Pinus koraiensis*, *Cornus officinalis*, *Poncirus* (*Citrus*) *trifoliata* and *Rhododendron*

Schlippenbachii had already reached us by way of Japan before the end of the 19th century and *Viburnum Carlesii* in the year 1902, but the first direct introductions to America came about through J. G. Jack, T. Uchiyama and E. H. Wilson, as has already been reported above.

The southern hemisphere has contributed little to the ligneous flora of our northern gardens. Of the Australian and New Zealand flora the New Zealand *Cassinia fulvida* is the only hardy shrub, and from Antarctic South America there are but a few species of *Berberis*, especially *B. buxifolia*, some species of *Pernettya*, as *P. mucronata*, and *Escallonia virgata* (*E. Philippiana*), which have proved to some extent hardy.

Of the woody plants introduced into North America from Europe and Asia may be found so favorable conditions for their growth that they, especially in the eastern states, have to a large degree escaped from cultivation, and many are so well established that they actually form a part of the native flora. Among such woody plants that have become naturalized in many places may be mentioned the following: *Picea Abies* (*P. excelsa*), *Salix fragilis*, *Populus alba*, *P. nigra*, *Alnus glutinosa*, *Berberis vulgaris*, *B. Thunbergii*, *Ribes sativum*, *Philadelphus coronarius*, *Sorbaria sorbifolia*, *Malus pumila*, *Sorbus Aucuparia*, *Crataegus Oxyacantha*, *Pyracantha coccinea*, *Rubus laciniatus*, *Rosa canina*, *R. Eglanteria* (*R. rubiginosa*), *Prunus Persica*, *P. avium*, *P. Cerasus*, *P. spinosa*, *Genista tinctoria*, *Cytisus scoparius*, *Ailanthus altissima* (*A. glandulosa*), *Evonymus europaea*, *Rhamnus cathartica* and *R. Frangula*, *Daphne Mezereum*, *Solanum Dulcamara*, *Ligustrum vulgare*, *Paulownia tomentosa*, *Lonicera Caprifolium*, *L. japonica*, *L. tatarica*, *L. Xylosteum*,

L. Morrowii and many others. Their number increases from year to year so that in time the flora of the wooded areas, at least in the more densely populated regions, takes on a mixed character. For the most part, however, the foreign trees and shrubs will probably never become so predominant as is the case with herbaceous plants on cultivated and uncultivated ground in proximity to settled communities. Here the native plants are often almost crowded out by the European aliens, and when a European who has a knowledge of plants comes to north-eastern America he will scarcely be reminded by the surrounding vegetation, so long as he stays in and near the cities and does not go out into the country, that he is in another part of the world.

In Europe this is far less the case; American plants have not become naturalized to such a degree as to change the character of the vegetation; in contrast to the European plants the American plants appear to possess less vitality, which possibly may be explained by the fact that the European plants represent a geologically younger flora. The American plants belong in the main to the tertiary flora, while the European flora has developed and spread since the ice age. But the European and Asiatic flora will also change with time. As a consequence of the intercourse between the different countries ever becoming closer one may expect that an increasing mixture of floras of each of the climatic zones will take place and that finally each climatic zone around the world will have more or less the same or similar vegetation, as this is already the case today to a higher degree in the Tropics than in the Temperate zone.

TRANSLATOR'S NOTE

In the foregoing article Professor

Rehder has made an important contribution to our knowledge of the dates of introduction into America of many of our well known trees and shrubs. There is a constantly increasing interest in the history of our favorite or familiar plants, where they came from, how and when, who named

them, and why they bear the names they do. It is hoped that someone will carry forward the fascinating study which Professor Rehder has so ably begun and thus give to garden lovers a better acquaintance with their plant friends.

E. M. T.

A Book or Two

Our Friends, the Trees. By Dr. P. G. Cross. E. P. Dutton & Co., Inc., New York, 1936. 334 pages. Illustrated. \$5.00.

When one has read innumerable books that have to do with horticulture and its allied subjects, one falls into rather easy ways of classifying them according to several more or less sharply defined groups. This can be done for the present volume, but one is not happy about it. Your reviewer would rather say first of this book that it was written with a passionate love of the subject that fires all the writing. This differentiates it at once from all those books that seem to have been written as assignments, no matter how competent that may be.

There are thirty-four chapters and four appendices. They are not all of equal length or equal value. Much is touched upon that has been written about before this. Some of the details seem to be slight, but once one starts the book, there is no escape until it is read through.

Since today we are more aware than ever before of the folly of our past life in our lack of understanding of the relation of trees to the conservation of water and soil, everyone should read it, even to the city dweller. Try it yourself and have a new view on our national life.

The Tropical Garden. By Lorraine Kuck and Richard Tongg. The Macmillan Company, New York, 1936. 378 pages. Illustrated.

The introduction of this book is dated from Honolulu and the acknowledgments suggest that all of it may have been prepared there. It states that the aim of the book is

“to cover the subject of garden making in the tropics from two angles—design, which is its art and philosophy; and the choice of plants and their culture, which is its science.” The authors recognize clearly the inextricable relation of these parts and throughout the book touch first upon the essential note of design and then discuss plants useful to obtain those ends.

The chapter headings give an idea of the contents of the book: Design of Tropical Gardens (much too brief); Outdoor Rooms for the Tropics; Dry Gardens and Patios in the Hot Climate; Tropical Water and Rock Gardens; Beach and Mountain Gardening; Lawns in the Tropics; Trees for the Tropics; Large Trees; Small Trees; Palms; Tropical Fruits as Ornamentals; Evergreens in the Tropics; Tropical Shrubs and Hibiscus; Filler Shrubs; Vines for Tropical Gardens; Exotics; Tropical Ferns; The Tropical Greenhouse and Orchids; Annuals and Perennials in the Tropics; Tropical Horticulture, with special reference to Hawaii; Color and Blooming Charts; Index.

All garden books need a certain amount of interpretation for use by any reader. The present book will be more useful in Florida than elsewhere in our country, but the enthusiastic reader will have to remember constantly that there are frosts in Florida and that there is not, therefore, the wide flora available to the gardener in Hawaii. He should discover, however, a vast number of plants more worthy of his attention than some he now grows, many pictures of excellent group combinations and ideas for designs that are well worth study.

Rafinesque's Kentucky Friends. By Harry A. Weiss. Privately printed, Highland Park, N. J. 1936.

This is not a horticultural book but since Rafinesque figures widely in early American botanical work on account of his travels and collections as much as his varied activities, it seems well to record here a note on this pleasant book with its brief but informing introduction and the series of twenty-five pencil portraits with their quaint legends and remarks.

Gentians. By David Wilkie. London, Country Life, Ltd.; New York, Charles Scribner's Sons, 1936. 187 pages. Illustrated.

There might have been a time, not long ago, when anyone would have been surprised to find a whole book on gentians. Now that rock gardening has come to such enthusiasm it is less surprising, although the genus is not confined to rock gardens for its living.

The major portion of the book is given over to alphabetically arranged descriptions of species in cultivation or likely to be reintroduced. The name is supported in each case by a reference to the original description; a reference to a good illustration, not necessarily the original one; and a page or so of text that gives in simple terms a description of the plant, its cultural preferences and any details peculiar to itself. This larger chapter is followed by an annotated list of species not in cultivation.

Chapter IV has to do with cultivation which is undoubtedly the meat of the book for unless it is mastered, there is not much point in pursuing the species so happily described. Immediately thereafter, one must master the facts in Chapter V—"Their Place in the Garden."

Before these, come pleasant chapters in which are discussed the genus as a whole and of the hybrid gentians (of which there are more and more).

The photographs are numerous and excellent, rather more infectious than the chill blue green color drawing by John Nash that introduces *Gentiana sino-ornata* as a frontispiece.

Carnations and All Dianthus. By Montague G. Allwood. Published by Allwood Bros., Hahward's Heath, England.

The title of this very interesting book is a poor one because the book does not cover all dianthus. It would have been better to have had some less inclusive title since the volume deals with carnations for greenhouse and border, sweet williams, Chinese pinks and a few hybrid strains. Nearly everything is tinged with the work and thought of the Allwoods and the book has a cultural and historical value for that reason.

No American who cares about these things should fail to read it, but no American need feel it is a new rule of thumb by which he can proceed.

Garden Variety. By Sir Arthur Hort. Edward Arnold & Co., London, 1936. 255 pages, with frontispiece.

This is the sort of book that is difficult to review since it is made up of personal comments, opinions and remarks upon the many plants the author has grown in his own garden or has seen afield. Most of the work was completed before Sir Arthur's death and the remaining portion, completed by his widow, is hardly to be distinguished from the first part.

Those who are familiar with "The Unconventional Garden" will welcome this new book with its scholarly writ-

ing, delightful prose, pungent opinions and breadth of outlook. Each reader will take from it what is most to his taste and each gardener will borrow from it something for his own store of knowledge.

Adventures with Hardy Bulbs. By Louise Beebe Wilder. The Macmillan Company, New York, N. Y. 1936. 363 pages. Illustrated. \$5.00.

The book is divided into two parts, the first and smaller section, deals with the use of bulbs in the rock garden, in naturalizing and with tender bulbs in the rock garden; the balance gives group treatments of various families from allium to zygadenus. The book rests upon Mrs. Wilder's long and varied experience in two gardens of her own, visiting in other gardens and prodigious reading. She reminds us that both her gardens have been in New York, so that we may do our own interpreting as we have to do with any book.

As always the writing is clear and felicitous, and in this book is fortified by Mrs. Wilder's charming photographs and drawings. The book is pleasantly printed and is remarkably free of typographical errors. It has the unpleasant requirement of making one turn the book sideways to see many of the pictures; even so, one finds our Eastern dog-tooth violet on its head.

There is no explanation as to why the illustrations cited in the text were chosen. Relatively few readers have access either to Curtis Botanical Magazine or the Botanical Register. There is no denying the beauty of the colored plates, but the citation is a sort of aggravation for any but the metro-

politan gardener. Perhaps the author has too many roots in England—a happy lot, but not for most of us.

Since we have few American bulb books that cover the wider field of this book, it is most welcome but one hopes that Mrs. Wilder will do another one that is more intimate in its flavor.

The Formal Garden in England. By Sir Reginald Blomfield, R. A. The Macmillan Co., New York, N. Y. 1936. 250 pages. Illustrated. \$2.40.

This is a reprinting of the third edition, with no foreword to indicate any changes from the edition of 1901. Although it is a book of greater value to students of landscape design, it may be read with both interest and profit by all who are interested in gardening.

Herbertia. Vol. 3. The publication of The American Amaryllis Society; edited by Hamilton P. Traub, Orlando, Fla. 160 pages. Illustrated.

Each year brings a larger and more interesting publication from The American Amaryllis Society.

The Yearbook follows more or less closely the established plan of other yearbooks with an initial section devoted to biographical notes on a distinguished horticulturist in this field; for the present year, Mr. Arthington Worsley. Then follow the notes of the Society's business and affairs.

For the non-member, the most interesting sections are those final divisions that discuss various species, little known or new, reports on distribution of species in various countries, various cultural articles, papers on breeding and allied subjects propagation, and shorter papers on many plants within the large field.

The Gardener's Pocketbook

A Note on Lilium superbum

In the fall of 1932 a friend of mine gave me a single bulb of *Lilium Superbum*, which is a native of West Virginia. I planted it in my garden in full sunlight and mulched it with chicken manure which had lain in the open about a year. I watered it generously during the following summer.

This bulb threw a single stem which grew to a height of 8 ft. 2 ins. and bore 77 individual flowers.

The following summer eight stalks were produced bearing eight umbels of flowers, as follows:

- Stock No. 1, 97 flowers
- Stock No. 2, 39 flowers
- Stock No. 3, 48 flowers
- Stock No. 4, 34 flowers
- Stock No. 5, 12 flowers
- Stock No. 6, 8 flowers
- Stock No. 7, 8 flowers
- Stock No. 8, 6 flowers

Total, 252 individual florets.

—C. E. LAUTERBACH,

Buckhannon, W. Va.

Clematis Boweri, Spingarn

This is, so far as I know, the first account of an unnamed *Clematis*, a natural hybrid between *C. Virginiana* and *C. Davidiana*, to which I have given the name of *Clematis Boweri*.

C. Davidiana is a low-growing plant with blue tubular flowers, and when growing near certain other *Clematis* species, has on various occasions cross fertilized them and produced one or more interesting natural hybrids. One of these, *C. Jouiniana*, is a cross between *C. Davidiana* and the European climber *C. Vitalba*, with the foliage and the flowers (somewhat

modified in color) of *C. Davidiana*, but with the rampant climbing habit of *C. Vitalba*. I published an account of it in the *National Horticultural Magazine* in January, 1933. No variety of *Clematis* is more easily grown, and it deserves to be far better known than it is in this country.

C. Boweri was first found in a garden in Waukegan, Illinois, and was called to my attention by the owner of the garden, Mrs. Susan M. Bower, a native of Dutchess County, New York. *C. Virginiana* and *C. Davidiana* were growing near each other in her garden, and about seven years ago she noticed some seedlings near by. She replanted one of these, and it proved to be different from any other plant in the garden. She sent specimens to a nearby arboretum and various nurserymen, but they were unable to identify the plant. She then sent a specimen to me, in her beloved Dutchess County, and it is from this specimen that I first became acquainted with the new hybrid.

It is as rampant a climber as *C. Virginiana*, sometimes growing as much as fifteen feet the first year it is set out. The foliage varies in size, some of the leaflets being as large and coarsely toothed as those of *C. Davidiana*, while those at the end of the branches are smaller and finer. The flowers grow in small panicles and are somewhat similar to those of *C. Davidiana*, but of pale lavender color, and bloom for two weeks or so about the middle of August. Male flowers are found on some branches and female flowers on other branches. As a rampant and floriferous climber it has much to recommend it, for draping trellises, fences, and stone walls,

and for screening purposes of all sorts.

J. E. SPINGARN.

Troutbeck, Amenia, New York.

A Good Hedge Rose

Some ten or twenty years ago we planted a short hedge of the shrub rose "Schneezwerg." It is a Rugosa Hybrid I presume, though I haven't its pedigree. The only catalog (Bob-bink and Atkins) in which I find it listed describes it: "Half-double snow white flowers, with a center of golden stamens, are produced in clusters steadily from Spring to frost. A spiny plant with splendid green foliage. Entirely hardy and resistant to rose pests." This, and more, is true. Our hedge is some ways from our other roses in a dry place, poor soil, full sun.

Last summer on August 15, 1936, a sudden announcement that company was coming inspired a skirmish through the garden in search of flowers for our entrance hall. The early blooms were gone, the late ones not out, the in-betweens all dried up—even zinnias that had been watered and marigolds were unfit to use. Everything seemed done up by the heat. We were in the midst of one of our heat waves—103 degrees in the shade. We remembered the rose hedge outside the gateway and there to our joy found abundant sprays of crisp green foliage sprinkled with clusters of white roses in full bloom, buds and charming hips. These roses had survived two record-breaking winters without protection, 33 degrees below zero one year and six weeks when it did not get above 32 degrees. Then two summers of the worst drought in memory and an onslaught of rose chafers during which for two years roses, peonies, dutzia and grapes were devastated.

Maybe the sweet brier fragrance of the leaves was unsatisfactory to the rose chafers, but anyway they scorned it.

The exclamations of our guests when they came upon the cool green and white bouquet with its touch of red and the refreshing fragrance of sweetbrier through the house well repaid us for the trip out in the hot sun to capture it.

MARY SELDEN.

Avon, New York.

A Garden Center

One of the pleasant features of an editor's mail is that it can usually be counted on for at least one unexpected subject each day.

Recently there came an attractive set of leaflets from The Hackensack Garden Center, Union and Berry Streets, Hackensack, N. J., and a letter from Mrs. Frederick T. Fisher telling particularly of their Penny Tree Planting Association, which "originated in a Hackensack School" and is being promoted by the Garden Center to help the city replace trees lost in widening boulevards and by disease. It seems a feasible scheme for others to follow and, now that we are so acutely aware of the value of trees, one that other clubs may want to follow.

Six useful blue-toned irises

Some time I should like to devote an extended article to irises which give a garden effect approaching true blue and the pleasant results which follow their extended use. Such ambition must needs lead beyond the scope of the present note, which is designed merely to pay my respects to a half-dozen irises of this type, none of them new enough to be very expensive, which have in our experi-

ence been found consistently dependable and still in the face of newer rivals have been a particular source of delight to us this now waning season.

ARIEL is of fairly recent English origin and as yet not widely known outside of collections, but it is a charming thing. In stature it is rather modest, but it comes early, is free of bloom, and the nicely formed flowers are lightly and airily poised on stems slender enough to give them grace, whence no doubt the very appropriate and pleasing name. The flowers are of fair size and their color seems well described as harebell blue. Unfortunately I do not have a note of the exact matching according to Ridgway. The garden effect is wholly delightful, and could doubtless be enhanced in many ways, for instance by association with one of the solid deep violet varieties like Harmony and perhaps a yellow of the clear tone of Miss Sturtevant's sunny Gold Imperial. I know from experience that these three irises are beautiful in a bowl together.

WEDGWOOD is a somewhat older English variety originated by the late Mr. W. R. Dykes, whose passion seems principally to have been for the clearest, purest colors he could get. Here again we have a name more than usually appropriate, since the flowers are of that entrancing hue denominated Soft Bluish Violet by Ridgway (the falls tending to deepen to Dauphin's Violet). Thus there is about as close an approach to a clear pure blue as I have been able to match in any of the irises at present in commerce. I may be reminded that a rival for color may be found in the French variety Ideal, but the latter is so much less reliable in its behavior that I long ago discarded it. Wedgwood is not only hardy but of vigor-

ous habit. It yields an amazing burst of bloom and hence makes a great show in a sunny border. Like all blue flowers, it loses much of its character when subjected to the yellowish light of the usual exhibition hall or artificial illumination. With me the flowers open so fast as materially to shorten the duration of the display, which I regard as something of a fault, but I am glad to add that not all my friends report a similar experience. Wedgwood is a trifle later than Ariel and also somewhat taller.

CLARIDAD is a good mid-season iris of an especially clean and therefore pure and pleasing tone. I do not have a memorandum of its exact color, but it swerves enough on the blue side of lavender to be of noteworthy effect in the garden. The flowers are large and of good substance. I well remember the enthusiasm of one of our well-known eastern fanciers of the iris the first time he saw a clump of this variety in bloom. It is of Californian origin but I think is generally reported of fair hardiness elsewhere.

LADY CHARLES ALLOM brings us back to England again, and even though it has often been damned with faint praise, to me it has ever appealed as one of the noblest of the many fine irises bearing the seal of Amos Perry. With a height of a yard or more, the branching stems carry in comfort the large, well-spaced flowers which come out later and last longer than those of Wedgwood, while in color they really approach very near. Ridgway would probably call the standards Deep Soft Bluish Violet, while the falls seem rather brighter perhaps than Dauphin's Violet. Less technically this signifies a flower on the blue side of violet, a trifle deeper in tone than Wedgwood, and in effect almost a self, a surprisingly close

match to some of the prettiest variants of the peach-bell, *Campanula persicifolia*. Overlapping in season, the iris and the bellflower consequently plant well together, and are then a charming illustration of the peculiar beauty which flowers similar in tone but strongly contrasting in form so often yield to one another. The trim outlines of the segments and the fact that the color of the fall is solid to the beard add much to the distinction of the flower. The beard is pale lavender, tipped Deep Chrome, a pleasing contrast against the blue. I would not wish to be without this iris. I wonder if I am correct in a suspicion that there is somewhat more than a trace of the blood of *Iris cenigioltii* to be found there, as likewise perhaps in Ariel and Wedgwood and possibly even in Perladonna.

JOYA is a striking late iris originated by Mr. B. Y. Morrison. The large massive flowers are of a deep violet color and are substantial rather than ethereal in effect. I know nothing else very closely like it in its combination of interesting form and texture with blueness and depth of hue. It is, however, a little dark for use in very large masses.

PERLADONNA (Belladonna of Perry) is also late, and having a very long season becomes toward the end one of the last of its type. It is taller than Joya and has smaller flowers. Ridgway's name for the color, Dull Bluish Violet, sounds much less enticing than it appears in life. The effect is really not dull at all, but very lovely indeed in sunshine, and withal of excellent carrying quality. It is floriferous and those who enjoy working out color schemes will find a thousand pretty ways to use it in conjunction not alone with other irises but with a wide variety of flowers.

Its effect as an isolated specimen on the show table is far from overwhelming, but from the standpoint of general utility I have found this one of the truly worth-while irises. Perladonna has the pleasing habit of some irises in now and then showing two peaks of bloom by reason of its not always responding with all its buds to whatever may be the initial stimulus to the attainment of its climax.

It should be remembered that in the bluer tones we are in one of the marches of irisdom, an outpost of variation where the banners of our allegiance are being planted in every newer territory, however slight the advance possible at one time. Consequently the technical perfection demanded in a new exhibition iris of lavender or purple or other standard hue cannot be expected to prevail to the same extent here. On the marches mere occupation of territory, in other words *color*, is the real victory to be achieved; the refinements of civilization must come later with the anticipated increase in population.

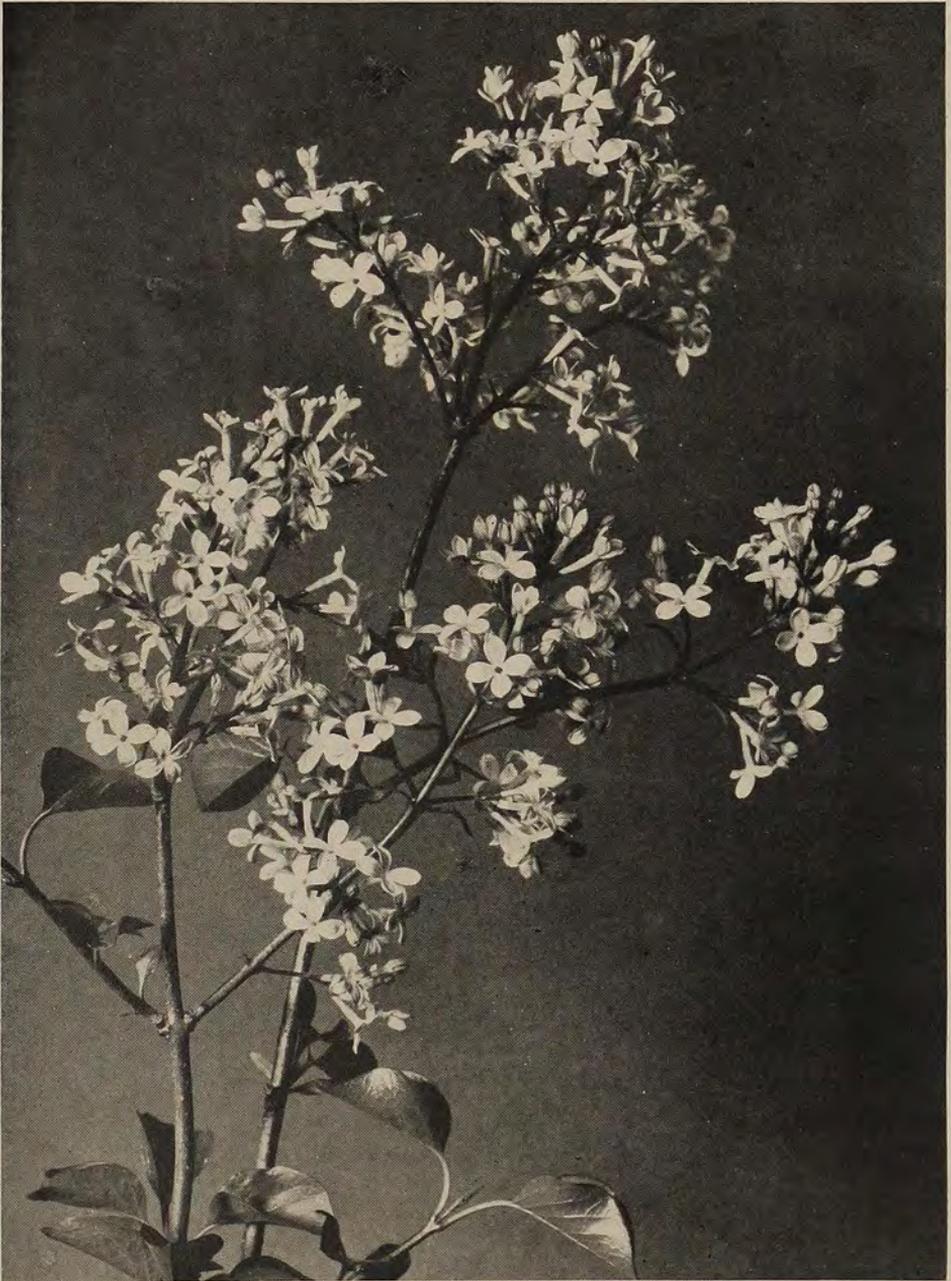
S. STILLMAN BERRY

Redlands, California.

Syringa oblata dilatata (Nakai) Rehd.
(See page 265)

To the gardener who feels that the proper remark to make about lilacs is that they are remarkably slow to arrive at flowering age, it may seem absurd to speak about the pleasure of raising a seedling or two. Until recent years, however, the person who wanted to grow species lilacs very often had to raise them that way or go without.

The species *oblata* would not be a bad one with which to begin for it is by no means slow to develop into a bush although it does take many years in some cases at least, before it makes



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Syringa oblata dilatata

a heavy mass of twigs. Its strong shoots ascend with widely-angled branches until one has a height of about ten or twelve feet. As these thicken into almost trunk-like proportions, the top develops its flowering structure.

In a general way the foliage suggests that of the common lilacs except that it is much thinner which fact makes the leaves less opaque so that they have a lighter, more yellowish green color than one usually associates with any lilac. Like that of many other lilacs, the foliage persists rather late in the autumn.

The flowering is as variable as the growth and if it is possible one should have a plant that has been propagated vegetatively from a good specimen, rather than a seedling, if one has room for only one specimen. Among seedlings, the worst forms are those bushes with meager flowering and with flowers that are almost colorless. In the best forms, the flowering is abundant and the flowers themselves are the familiar lilac color.

There is no need to do more than mention here the fact that this species and even more so, one of its forms has been used to produce a race of lilacs that have all the advantages of its vigorous growth and the very early time of flowering, together with the larger size of bloom and some of the better colorings of the more familiar common lilac.

It should be mentioned, however, that like many other Korean plants, this is a very hardy species and one that has been reported favorably from our northern Great Plains States as well as Canada.

Washington, D. C.

Narcissus, Godolphin (See page 267)

From earliest times in gardening enthusiasts have been making lists of their favorite varieties or for other reasons as personal, and as temporary.

Such lists of narcissus varieties can be found in books or magazines for many years back and if one has the time and inclination, it is diverting to see the changes that come and the lengths of time that some few survive beyond their fellows.

In lists of later years there often appears the name Godolphin and this is true for catalogues as well as magazines.

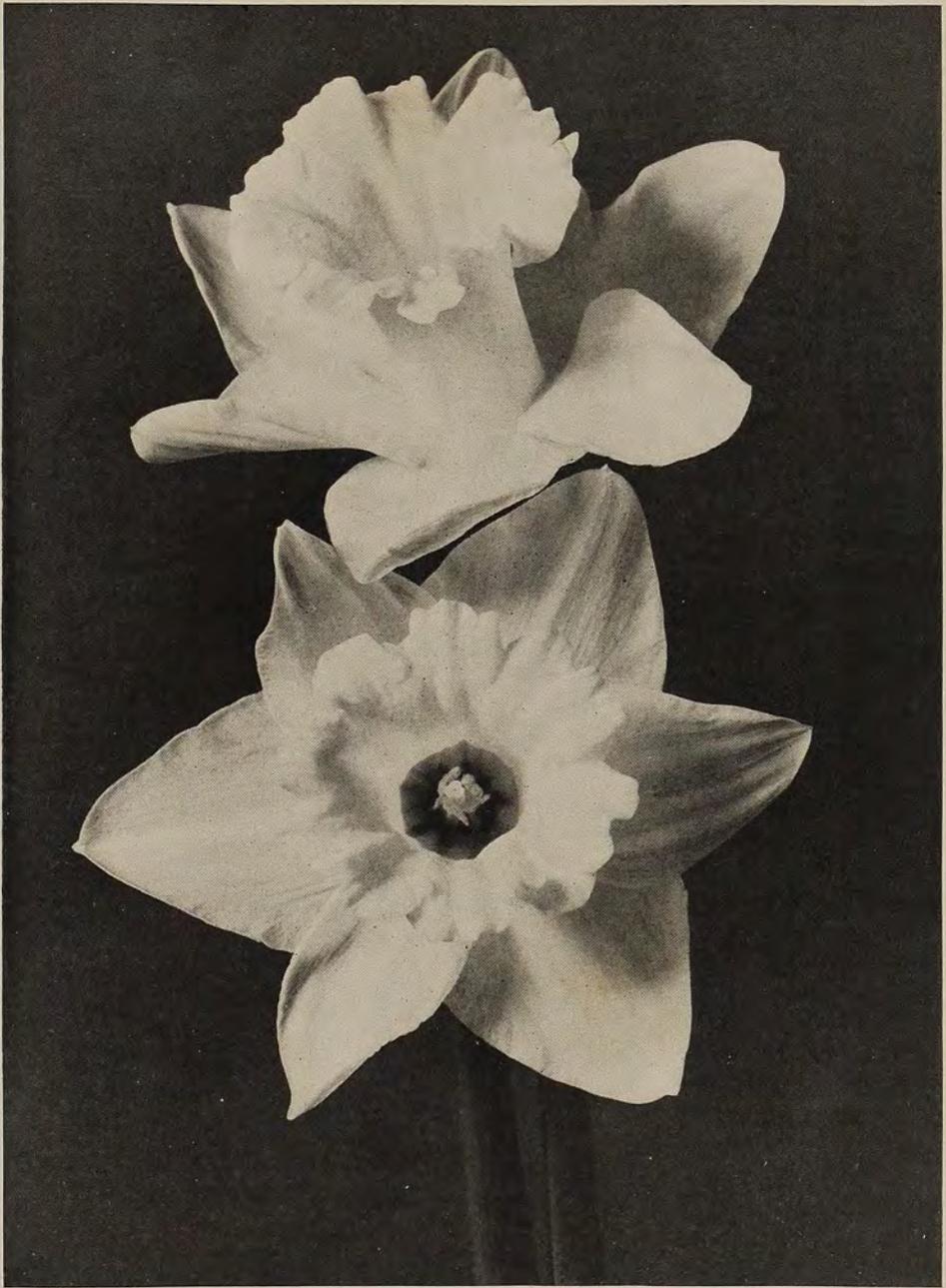
It belongs in the section of yellow trumpets and within that group among the early flowering varieties. In vigor and floriferousness it is as good as any; in style it is rather of the informal type since its perianth segments do not lie with starry flatness; in color it is a self-yellow, not as golden as King Alfred and yet more golden than the later and more familiar Emperor. As compared with the sorts that have an excess of *maximus* blood it is more dependable in growth and increase, yet in this garden it never pleases quite so much as Hebron flowering at the same season though with slightly shorter stems.

Washington, D. C.

Pentstemon cobaea (See page 269)

I enclose a photograph of a native Texas *Pentstemon cobaea* plant that has been growing in our yard for several years. It started to bloom April 14, and was through blooming May 7. When the picture was taken, April 25, the plant had 6 flower stalks ranging from 14 to 23 inches in height. The lowest blossoms on the taller stalks were 14 inches from the ground; the spread of the plant one way was 12½ inches and 15½ inches the other way; the spread facing the camera was 13½ inches.

The best developed plant in the yard was just back of the hydrant observed in the background of the picture. This plant had 9 flower stalks, the latest one



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Narcissus Godolphin

being 24 inches. Of the 24 plants in the yard, the tallest was 32 inches. It had 3 flower stalks. The average height of these plants was 24 inches. Blooming period was from April 14 to May 12.

The *P. barbatus* plants were moved last fall and they did not come up to normal. The *P. murrayanus* were also below normal this year, therefore, no pictures were taken of these two species. This year the *P. barbatus* bloomed from April 14 to May 25, and the *P. murrayanus* from May 4 to June 1.

Last year I raised *P. pubescens* and *P. unilateralis* from seed. This year *P. pubescens* bloomed May 3 to May 22, and *P. unilateralis* April 27 to May 15 in one location, and from May 1 to June 10 in another location. I understand that the blooming periods of these two species are well known in the North and these dates are given for comparative purposes.

G. M. SOXMAN.

Symplocos paniculata Wall. (See page 271)

One's first sight of this large shrub well loaded with berries is something to remember always, particularly if the birds have not seen it before you, for the berries are blue, not purple or lavender or blue-gray, but blue, in the best forms, like fine lapis-azuli. It is almost unbelievable and the idea fixes itself in one's mind, *Symplocos*, blue berries. Then, if one goes that way in spring, there is an almost equally charming sight for all the branches are wreathed in white.

This is a plant for which one needs ample room. It cannot be hidden away between a *deutzia* and a *weigelia* and show itself to any advantage and yet there is such a space of time between its flowering in May-June and its fruiting in September, that one should not

choose for it the most conspicuous place in the shrub garden. Give it, rather, a position towards the front of a shrub group on a turn where one may come upon it suddenly, but it must not be near a path unless there is room for its ultimate spread of ten to fifteen feet.

Two groups of this plant have been observed — one planted on a warm, rather dry hill, the other on a sandy open flat where there is ample moisture. The first have grown well though slowly, but did not begin to flower or fruit until they were about six feet tall. All have had fruits of exactly the same hue, dark lapis-lazuli blue. The other lot has grown equally slowly but began to fruit at half the height and have shown considerable variation in fruit color, from light greenish blues to the familiar dark blue. Their fruiting clusters are somewhat more compact and the fruits themselves are less quickly stripped by birds. This may not be significant, however, as the first group is near a wood where birds congregate and apparently expect food, for nearly every fruiting shrub is cleared in its season.

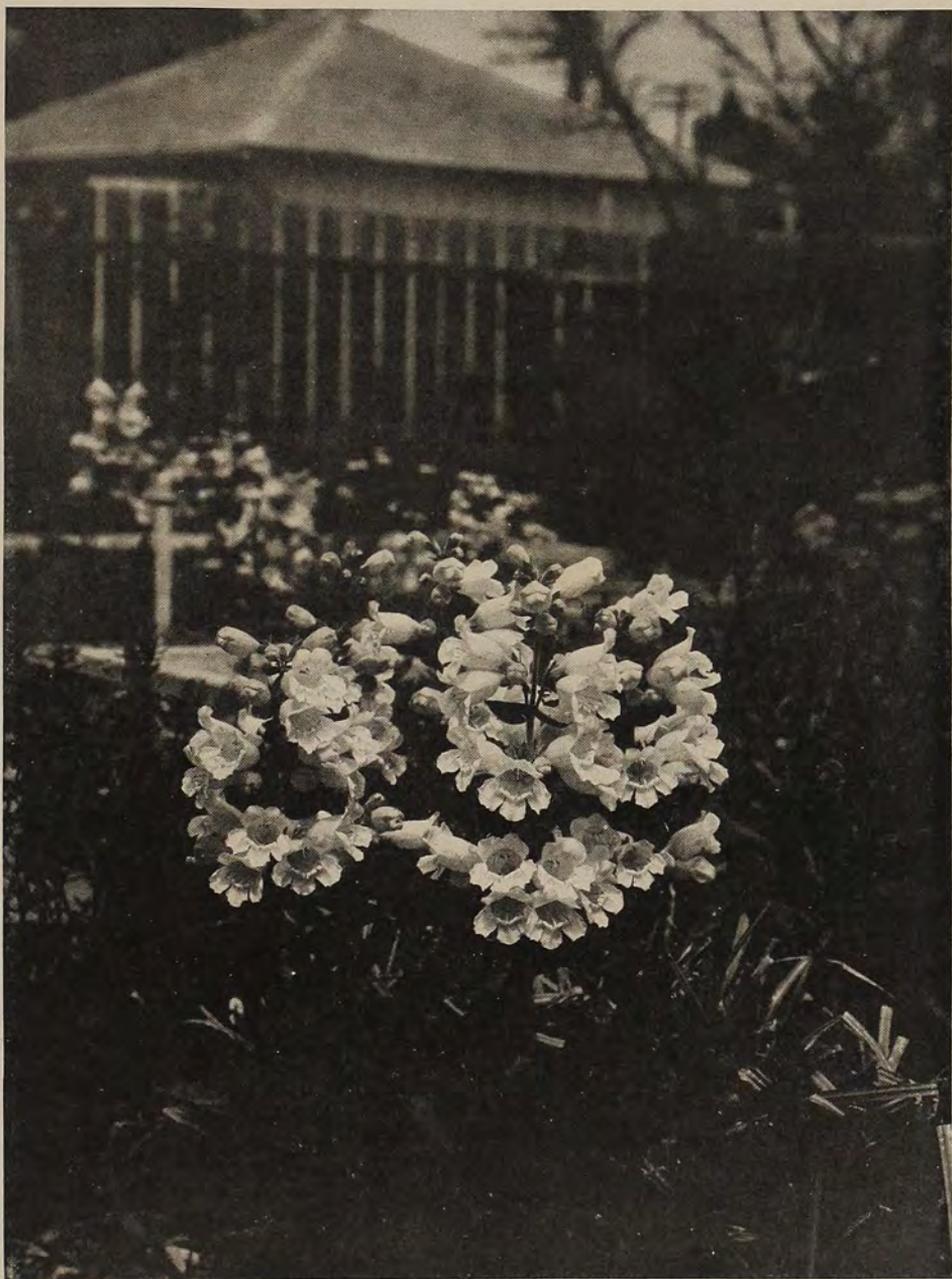
Seeds germinate easily if planted in the autumn and left where winter temperatures can act on them as is needful for so many hard seeds.

At another time it is hoped to show an illustration of a flowering branch with its white flowers and conspicuous stamens. These in themselves are worthy of a note but as was said first, one thinks of this Asiatic plant in its fruiting rather than its flowering.

An Aster or Two.

Nearly all gardeners have noted either last year or this, some word of the new dwarf asters in their named forms and if they have watched them last season and this they have observed that their performance is not uniform season after season.

From the horticultural point of view



The Fosby Studio

[See page 266]

Pentstemon cobaea

they are essentially like our familiar Michaelmas daisies except that they have been reduced in stature, forming low mounds not over twenty inches in height and when all conditions conspire for an optimum covered with small flowers that vary in color from pinkish lilac to lilac pink with a few whites, deep reddish violets and a few blue purples for good measure. One's first feeling is that there are too many of them and that they are too much alike, but if one sees them through a season or two, he discovers that they do not flower at precisely the same times and that there is not as much overlapping as was first thought. No two persons ever choose the same half-dozen named sorts so there is no point in naming any. Nevertheless, one is tempted to record the fact that Snowsprite might be snowier to its advantage; that Little Pink Lady is quite nice in spite of her name; that Little Blue Boy is not a masterpiece and that Blue Emperor which differs from all its fellows in general habit is quite splendid though lavender rather than blue as might be expected.

In poor seasons, which apparently means seasons with too much heat and drought in mid-summer, there seems to be a general tendency toward blindness and an aster that takes all summer to grow and then fools one is an aggravation.

Of quite a different nature is an aster that has been passed from garden to garden hereabouts with the story that it was brought back from Florida by a garden-minded traveler. Every September it is covered with hundreds of deep blue-violet flowers. This year it was shown to a botanist who specializes in composites and was dismissed as being merely a very good form of *Aster laevis* "which, of course, grows wild all through the East." Distinguished or undistinguished it remains

a valued perennial for the last half of September.

Aster ericoides in the wild is worth observation and selection, especially of those forms that are most floriferous, and *Aster acris* with its curious lax stems and shaggy lavender flowers is a sight to see when well fed and watered. Washington, D. C.

Crocus iridiflorus

Some years ago in an order of crocus species, there were a few forms of what was then known as *Crocus iridiflorus*, a telling name because the three inner segments are much smaller than the outer three. Although their carriage is not similar, this difference in size in some way suggests an iris flower.

With other species, these were planted in a bed lightened with sand and in as sunny a spot as the garden provided. Ordinary heather was their neighbor and now after seven years, the crocus flowers appear each October through the twisted stems of the heather, just a few days after the forms of *C. speciosus* come into full bloom beyond them. With their fringed stigmata of almost the same color as the petals, lying between the smaller inner perianth segments, they make a unique sight.

So far as has been noted there have never matured seed as do so many of the other crocus species, but it is to be hoped they will for they show little inclination to other increase.

Heleniums from European Gardens

Although heleniums or Helen's flowers or sneezeweeds, as you will, are American enough, they have had amazing attention away from home. If one looks through a few years' files of *Gartenschönheit* one almost inevitably comes upon pictures of mid- to late summer borders with magnificent masses of our heleniums and helianthus as well. Perhaps in that cooler summer climate



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Symplocos paniculata

they do take on a beauty they cannot achieve in our hot July or August, but even so there are more worth trying than the scant half-dozen one finds commonly listed.

As is the case for other composites, notably chrysanthemums, a dry period in mid-summer leads to a hardening of the growth and a loss of the lower leaves on the stems which is most unsightly if these show. One can always count on the prolific *Artemisia Silver King* to cover their nakedness and provide a gray-white foreground for the heleniums in flower.

The other fault of heleniums in general, is that too often they have ragged flowers of too greenish yellow a hue. Now one need not choose such sorts unless one wishes, or is careless.

Of various newer sorts three seem particularly promising provided they are free of increase. *Peregrina* provides good flowers of dark wall flower crimson with just a hint of gold at the tips of the ray florets. Like most of the dark colored forms, this does not promise abundant increase, but it seems more vigorous than *Crimson Beauty* which is its nearest rival. *Pumilum magnificum* makes excellent clumps with many shoots from each crown and good branching on each shoot. The flowers are a good yellow and the disk does not darken until the seeds are well developed. *Chipperfield Orange* is not distinguished by any exuberance of growth but for its flower form. In this case, there are almost two rows of ray florets so that each flower is very perfect and round. The color is yellow with an occasional touch of rusty red that reminds one that the reverse of the ray florets is rusty red all over. The disk florets are golden yellow but turn an orange-brown as they develop.

All are at their best hereabouts from August into mid-September.
Washington, D. C.

Phlox amplifolia (See page 279)

Some years ago Mrs. G. Latta Clement sent this species to my garden with the note that as I was interested in phlox species, I would want to see it but that it was not "very wonderful." The root system, the ends of last year's stems, and the new shoots suggested *Phlox paniculata*, so it was planted among azaleas within sight of some wild plants of that latter species from Dr. Wherry's garden.

Unlike these latter plants, which have increased by root and widely dispersed seed, *Phlox amplifolia* has not taken possession and the few seedlings that have appeared have been slow to reach flowering strength. They are easily identified as they develop for they soon show the broad leaves suggested by their name.

Here the plants grow about three feet high with a terminal panicle of bloom much like that of a seedling garden phlox. A closer examination shows a rather different character to the flowers which, in our specimens, are distinguished by their clear lavender color. This is a hue that is hard to name. One is almost tempted to say that it comes close to the pinker lavenders that one finds among seedlings of *Phlox divaricata* but May and July are so far apart that such a statement is unsafe. It is safe to record, however, that as compared with the so-called lavender varieties of *P. paniculata* these have the better color, with none of that look as if the pigmentation were unstable and might slip back to magenta pink while one watched.

If it were an abundant phlox or one more easily come by, perhaps in the search through hundreds of plants one might find individuals of even clearer hue and then doubtless, one should be tempted to various improvements in size and shape of flower that might or might not be improvements in the end. Meantime, just as it is, it makes a



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Chrysanthemum morifolium

pleasant sight with its fine head rising above shrubs in the broken light of thin woods.

Washington, D. C.

Chrysanthemums—

C. morifolium (See page 273)

C. indicum (See page 275)

Every autumn brings its display of chrysanthemums for the garden and for the greenhouse and a period of anxiety for the gardener who wonders if his early-blooming sorts will flower safely before a killing frost or wait until after that date for the period of fine weather that so often follows the first hard frost. Now that there are so many early-flowering sorts, particularly the new varieties derived from *C. koreanum*, the hazard is not so great as once but even so weather may play a trick or two.

If one turns to almost any text, he will find that the race of garden chrysanthemums is usually ascribed to *C. morifolium*, although *C. indicum* is also accredited with a share, but one rarely sees plants that are representative of either of these species. Some years ago, the U. S. Department of Agriculture brought into cultivation, a charming form of the former that has never met with the success it deserves at the hands of gardeners in general. Some years later, a wild form of *C. indicum* was sent back from Peiping but that has gone only to one or two specialists who are using it in breeding work, particularly Mr. Alex Cumming who has done so much in this genus.

Before they are completely overshadowed by their hybrids, if they are to share the fate of the Korean chrysanthemum, a word should be said for these species, at least as represented in these propagations.

The former, *morifolium*, makes a somewhat tufted mass of short stems with handsome leaves that are more or

less evergreen in this climate. In a general way, the plant at this stage resembles the Korean chrysanthemum. When the flowering shoots begin to develop the difference is apparent for the stems are less erect, and branch many times so that each plant becomes a rounded mass of pliant slender branches, which in turn are closely dotted over with small flowers opening pinky white, fading to white and aging to pink again as white chrysanthemums so often do.

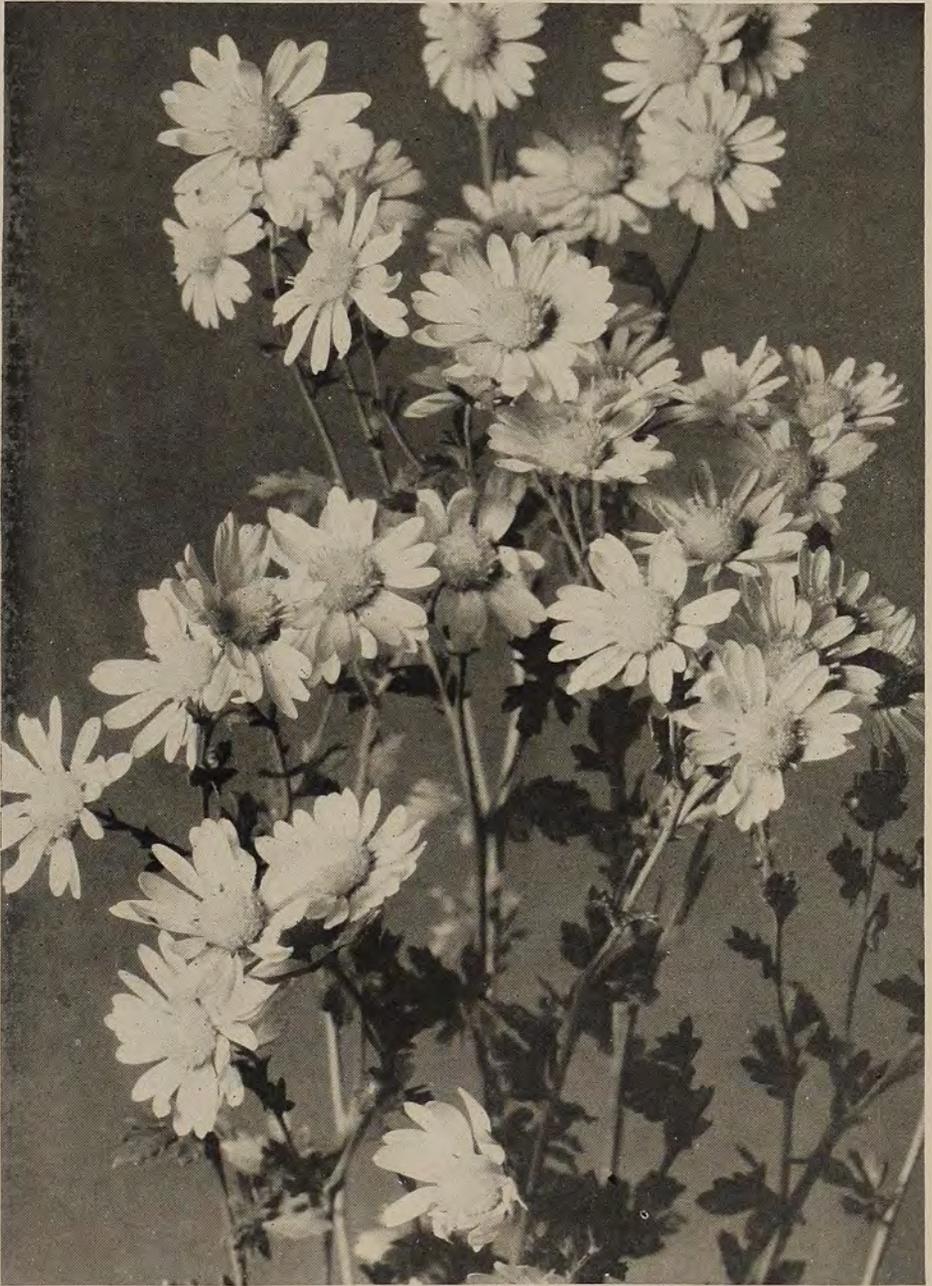
The illustration shows the size of the flowers and their somewhat irregular form. It does not suggest, however, their abundance, nor the beauty of their mass in the garden. Here, the usual season of bloom is late September.

Like any other chrysanthemum with a great autumnal flowering, this species enjoys a liberal diet and frequent lifting and resetting, which should be done in the usual fashion and season.

Our other plant, grows and increases much like any other garden chrysanthemum with stiff shoots and flowers from all the upper axils as well as the end of the shoot. Among the original seedlings there was practically no difference in the manner of growth, but there was marked variation in the size of the flowers, the lengths of their individual stalks and in their abundance on the shoot. These characters varied so much that some plants resembled merely small single yellow chrysanthemums such as one might get from any garden strain while others were so covered with close-set flowers that they looked more like some strange yellow Michaelmas daisy.

Here, this group flowers in late September, but if there is any fluctuation in season, they are likely to be more delayed than *C. morifolium*.

For them, as for garden chrysanthemums generally, an annual division and replanting is almost essential and like



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Chrysanthemum indicum

other chrysanthemums, a little care for good drainage in winter assures their complete survival.
Washington, D. C.

In planting lilies.

In many texts the necessity for cushioning a lily bulb in sand is urged upon the gardener. Sometimes it is advised that the entire bulb be buried in sand. An easy way of accomplishing this was devised by the late Edward Goucher. The cushion of sand is prepared as usual above the layer of good soil, the bulb is set in place and over it is set a cylinder of tin easily made from any can of the proper diameter. This can is filled with sand. The planting hole is filled in with good soil and then the can is gently removed leaving the bulb within a column of sand but surrounded with good soil into which its roots from the developing stalk can easily push their way.

Allium amplexans (See page 277)

Of small flowering alliums, there seems to be no end. Some are of conspicuous importance, and others are only mildly so; others may be seen once and then forgotten if one is mainly concerned with garden display.

This species belongs perhaps in the second group as far as Eastern gardens are concerned, for it makes no great mass of bloom and the size of its flower heads can be seen in the illustration which is natural size. It has the advantage that its flowers are not of that dull lavender pink that is so common in the family but are rather a clean white with enough of green to make them even whiter.

Like many other alliums and like many other small bulbs from the Pacific Coast, it makes some new growth of foliage in the autumn, which fortunately is not injured by our winter weather.

Even in spring, however, there is no mass of foliage for the leaves are slender. Perhaps if it were exactly suited, it would form small clumps, but this has yet to be proven here, where the bulbs were given too dry a location for much increase. As the foliage ripens off and disappears soon after flowering time, some care must be exercised in choosing a spot for it, and here again we have no advice as yet as to what covering plant or what associate plants would be best. One would be almost tempted to try it in the fern-like sods of *Cotula squalida* or perhaps among patches of *Veronica repens* so that its white heads of bloom might rise above a green turf that would also help conserve the moisture.

After flowering, the seed heads develop rapidly and insofar as can be determined are content to make seed and no bulbils, a habit that should be required of all alliums for the garden. So far no seedlings have appeared, but this too may be due to the too dry location chosen for the planting.

After one has tried and grown the showier alliums, such as *Ostrowskianum*, *falcatum*, *azureum* and their fellows, this species is worth a small spot in the collector's garden.
Washington, D. C.

Shrubs as Ground-Covers.

When one uses the word ground-cover, the idea that comes to mind most often is the same plant that may take the place of grass in a lawn and yet will give a surface that may be walked over. Although this field has by no means been exhausted, perhaps not even studied as much as well might be, some rather interesting plantings have been noticed of late in which the designer has abandoned the idea of finding a plant that may be walked on and has chosen instead a plant that will preserve a flat sur-



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Allium amplexans

face that will repeat the surface of the ground covered.

Such a choice admits the use of shrubs but requires their use in areas sufficiently large to keep the area within scale. Several examples may illustrate the point.

In a North Carolina town several large terraces were observed that had been entirely covered with prostrate junipers. One very steep bank was planted with Pfitzer's juniper. If one may judge from their size, they were plants at least ten years old. The dryness of the site had reduced the luxuriance of their growth so that they were not more than three feet tall. If there had been any pruning, it had been managed with sufficient skill so that it was not apparent. Weeds did not show but if weeding were needed, it could be managed easily because the growth of juniper is sufficiently soft that one could walk between the plants with ease.

Another slope much more gentle was planted with large areas of *Juniperus depressa plumosa*, that gives an even lower mass of growth and a beautiful sheet of color during the winter when bronze and purple tones enliven the green and make a brilliant contrast with the areas of lawn that abutted the plantings.

In both these places, the junipers were used in areas of informal outline.

In another place a lawn area of formal shape was outlined with a formal strip of *Juniperus tamariscifolia*. This was somewhat less successful but only because it had needed some care in spraying for red spider that apparently had not been done in season.

Of late considerable use has been made of some of the newer Chinese pyracanthas. Often they have been disappointing in that they did not

develop into erect plants such as had been expected. A recent planting was observed in which these plants had been used as a ground-cover in very large masses, so that the whole area was covered with a great sheet of evergreen foliage filled with brilliant fruits. In this planting there was no evidence of pruning, but in another of more formal outlines the whole surface had been lopped off during the growing season so that it presented a flat top that preserved the plane of the soil beneath.

In two city parks, much used by the public, large areas have been noticed that were entirely planted to privets that were kept cut down to about two feet in height so that the whole mass became an architectural whole as dense and green as might be wished for. As the areas were carefully planted to repeat the formality of the paths and lawn panels, the effect was surprisingly good in its stark architectural formality.

In another park a similar planting, but of larger dimensions as is suitable with the plant used, was covered with a mass of our common hornbeam. This, of course, will require more frequent pruning as time goes on since hornbeam is a tree rather than a shrub but the dense twiggy growth, the beautiful gray stems, the persistence of the yellowish brown foliage in winter, all are desirable features.

Still another planting has been found in which *Cotoneaster horizontalis* was used to cover a great area of informal shape. In its earliest stages, this plant is most compact, but as it develops there is a suggestion of graceful undulation where the sweeping branches of maturity rise and fall over the surface of the whole area.

Where it is hardy large areas can be covered with Moser's hypericum.



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Phlox amplifolia

This makes a nearly evergreen mass dotted with brilliant golden flowers in season. At times it is benefitted by shearing to the ground and a good feeding to stimulate active new growth.

In Japan there are many examples of the use of azaleas, particularly those of the Kurume and Satsuki groups. The former are well known here, but the latter are represented in the trade by only one or two forms of *Azalea macrantha* (more properly *Rhododendron indicum*.)

The first type is usually planted there, in mixture, with some astonishing results at flowering time. We need not copy, however, this juxtaposition of scarlet and magenta, but may combine as we see fit. The only feature to keep in mind is that all varieties do not grow with equal density. If, for example, one should choose the charming Hinomayo, it would always appear as a loose and open mass in the midst of the group. In making such a planting, the ultimate height should be about four feet, but shearing is always possible.

The Satsuki azaleas are much lower in growth and more spreading in habit. Frequently they are much more evergreen. Like other azaleas they are very patient of shearing and can

be forced to develop into plants of low height and great breadth. If one were to abandon ideas of cost, it would be remarkable to have a sheet of the exquisite *balsamiflora*, with its camellia-like light salmon-pink flowers. This form, however, grows very slowly and yields scanty wood for propagation so this idea may remain always an idea.

From azaleas to heaths and heathers is no great leap of the imagination. Of the two the easier plants would probably be the heaths as they need less frequent shearings to keep them clothed with vigorous flowering wood. Everyone who has seen a sheet of *Erica carnea* or of *Erica cinerea* will know what might be had.

Genista pilosula, which is mentioned more often in lists of rock plants, might well be mentioned here too, for it also forms wide rather flat-topped masses of good foliage over a long season, with golden flowers in summer and green twigs for winter.

The list might be continued far beyond these few plants, but they are enough to remind one that there are other plants than herbs that will cover large areas with a surface that repeats the surface of the earth beneath.

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