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CONTENTS

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Linnaeus in his Lapland dress at the time of his travel to Lapland in 1732.

The Great Swedish Botanist-Linnaeus*

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It seems very appropriate to speak on Linnaeus on the first day of May. May is the spring month in Sweden and the first of May is celebrated as the first spring day by school children, university and college students, and by people in general. In fact, the first of May is a legal holiday in Sweden, and has been for several years. The universities and colleges, especially, celebrate the arrival of spring, starting April 30, when the students, as well as the professors, put on the white summer student caps. Consequently, on May 1 any university town is filled with students wearing snow white caps and, naturally also, of girls in cheerful spring dresses. Everything looks like spring. All this will tell us one thing: May is the month of spring, of flowers, and of hope for the coming pleasant part of the year, the summer.

Then if we look back to Linnaeus, we find that he was born in May in Småland, in southern Sweden, which probably is the loveliest part of the country at this particular time of year. It can almost be said that he was born "with flowers in his hands" and we will soon find more reasons for this statement.

But to get the story complete and to be able to understand some later developments in Linnaeus's life, it will pay to look on the history of the period when he was born and lived. He was born on May 23, 1707 in Råshult, Småland, and was on May 29 christened as "Carl" for the Swedish king, Carl XII. His father was then a minister in the Lutheran church in Stenbrohult and after a few years the family moved to Stenbrohult. This was therefore the place where Linnaeus spent his first years. I mentioned that Linnaeus got his Christian name after Carl XII and this carries us to the historic times I wanted to discuss. It was in 1709 that the Swedes lost the battle at Poltava to the Russians, which is considered as significant of the loss of the Swedish power in eastern Europe and the start of the Russian power in that area. It was later, in 1718, that Carl XIIwas killed at Fredrikshald in Norway and Sweden's great influence in European affairs was lost. This all happened while Linnaeus grew up; and when he had reached the age that he was starting his university studies, and also later during his life, the Swedish government and many of the provincial governors had a viewpoint on future developments in Sweden that can be summarized in the words "regain within the Swedish boundaries what was lost through the wars." The Swedes were at that time tired of wars and this resulted in an increased interest in education, science, farming, and industry. In a way, Linnaeus started out under conditions similar to those under which many men all over the world will have to start after the present conflict is over. Maybe he could serve as an example of what men with energy, ability, and love for their profession and country can do.

In short this was the political situation during the period when Linnaeus grew up and worked in Sweden.

What was the more intimate environment in which he grew up? The opinions on this may differ widely. He grew up in a clergyman's home; his mother was the daughter of a minister, and only 18 years old when he was

*Address at the Annual Dinner Meeting of the Botanical Society of Washington, Washington, D. C., May 1, 1945.

Uppsala from the air showing: a, Linnaeus' house; b, his botanical garden; c, the Uppsala Cathedral where Linnaeus is buried. (After photo by Liljeqvist, Almquist and Cöster, Hälsingborg, Sweden).

born. It has often been pointed out that Linnaeus grew up under very poor conditions. Possibly he did, because Sweden as a whole was poor after the terrific wars in the beginning of the 18th century. It should be remembered, however, that he did not belong to the very poor group of Swedish people, if so he never would have had a chance to get through schools and universities at that time. Thus it is clearly evident that Linnaeus had a fair chance from the beginning, and I am sure he had more than that insofar as the education in his home was concerned. He grew up in an environment where clergymen, high school teachers, and men of the nobility visited. His family traced back to earlier families that had shown intelligence and energy in their professions.

About his early years, quite a little emphasis should be placed on the content of a letter written by Samuel Linnaeus immediately after Carl Linnaeus's death. Samuel Linnaeus was the only brother of Carl Linnaeus and a minister in the same community where Linnaeus's father had served. It is evident from this letter that Linnaeus's father had been very much interested in flowers, particularly ornamentals. Now it happens to be common in Sweden for every home to have its own garden. At the present time it is quite the pride of the owner of such a garden to have abundant flowers from early spring to late fall. This might not have been common in the 18th century, but apparently it was practiced by the nobility and clergymen.

There are many stories about how early Linnaeus's father started to put flowers in the hands of the baby and how he used to put the baby out on the grass giving him flowers to play with. How much of this is true is of course hard to tell, but undoubtedly it is true that flowers were among Linnaeus's earliest toys; and that they remained

Plan of the botanical garden in Uppsala during Linnaeus' time. (From Linné-Nauclér; Hortus Upsalienses, 1745).

his toys for years. The region where he was born, almost on the shores of one of the finest lakes in South Sweden, is characterized by a rich native flora. The area is just on the border line between the plains in southern Sweden and the hilly and mountainous region to the north. The hills are covered with evergreens, the cultivated fields and the pastures are broken by small hummocks, where birch, beech, oaks, linden, and hazel shrubs occur together; and where species of *Convallaria, Viola,* and numerous genera and species of the family *Ranunculaceae* are abundant. Likewise *Arnica montana* and species of *Erica* and *Vaccinium* are common. Lake Möckeln, just beside Linnaeus's home, has plenty of vegetation along its shores. Such rare species as *Lobelia dortmannia, Elatine hydropiper, Plantago monanthos* are found there. On Linnaeus's playground, *Narthecium ossifragum, Aegopodium podagraria,* and *Viola palustris* grew. And in the woods a little farther away, Linnaeus himself found and reported the plant that now is known as *Linnaeus borealis,* the genus named in his honor. These few examples illustrate what I mean when I say that Linnaeus grew up in what we might call a natural botanical garden in South Sweden.

Linnaeus's father kept up his interest in ornamentals and while Carl grew up, he apparently impressed on him his viewpoints. He took Carl with him into the garden to help and he gave him certain sections of the garden to take care of. When Linnaeus had to leave his home at 10 years of age to go to school in Växjö, his knowledge of plants and his interest in them brought him in close contact with the principal of the school he attended, a Mr. Lannaerus. It also brought him in contact with a friend of the principal, a medical doctor, Dr. Rothman. These two men encouraged Linnaeus to further deepen his knowledge in botany. Probably even then, it was clear to Linnaeus that he was not going to educate himself to be a clergyman, which was what his parents wanted him to do. To us who judge Linnaeus

200 years after he lived, it is also clear that some of the qualifications that later made him the great man in botany already now were noticeable. It has been said by someone that Linnaeus's extremely pleasant personality seems to have opened all hearts and money deposits for him. His personality was already apparent when he came to school in Växjö, otherwise the school principal and the medical doctor would not have spent so much time with him.

During his school years in Växjö, Linnaeus was facing the problem how to get over to his parents that he was not going to be a clergyman as they so badly wanted him to be. He got the opportunity once at his home in Stenbrohult when he was with his father who had just been in a discussion with some friends and then had stated: "What one has a desire to do always happens and then is a success." When the party had left Linnaeus reminded his father about this statement and added: "Then do not ask me to become a clergyman." His father, very astonished, asked: "What do you want to be?" The answer was: "I want to study botany and medicine." His father told him of the expense for such an education and about the financial difficulties of the family but got the following significant reply: "If I have the same success as I have desire, then there will always be means." Of course the young Linnaeus won and consequently he went to the univeristy to study botany and medicine in 1727. He first went to the University of Lund. There he did not find the good teachers in botany and medicine that he had hoped to find but nevertheless his stay in Lund was far from a loss. By arrangements of friends of his he got to live in the house of a medical doctor, Dr. Kilian Stobaeus, a man that Linnaeus wanted to learn from. And apparently he did. This Dr. Stobaeus had a good collection of plants and animals and a good library and Linnaeus certainly used them. Also during the time Linnaeus was in Lund he made excursions to the areas around Lund and there are many profitable places to go to. Lund is my own high school town and part of my university courses in botany were taken there. In fact I lived only 6 miles from the town for about 20 years. There are some very good localities for studying the flora of South Sweden at Kungsängen (meaning the King's pasture) and in Dalby hage (meaning the hummock at Dalby). The latter is now a national park. Linnaeus did not lose the opportunity to compare the flora around Lund with that around his home about 100 miles to the north.

But as Linnaeus did not find in Lund the botany courses he wanted to take, he decided, after conferring with his old friend from his high school days, Dr. Rothman, to start in at University of Uppsala in 1728. It showed a real determination to learn when he decided to make this shift. In Uppsala, there was a botanical garden that Olof Rudbeck, Sr., had started in 1654 to 1657. He cared for it until his death in 1702 and then it came under the supervision of his son, Olof Rudbeck, Jr., who was the professor of botany when Linnaeus came to Uppsala. It is interesting to note that also in Uppsala there were very few courses or lectures that Linnaeus could follow when he first came there. But he spent that much more time in studying in the University library and in the botanical garden. Apparently his first years at Uppsala were rather hard on him financially, but his personality, intelligence, and energy again helped him out. Example of his energy is that in 1729 he went to Stockholm to follow lectures in medicine to supplement what he could get in Uppsala. Few students during the 18th century would

have done this, with the poor transportation system that existed then. In our day, the trip to Stockholm is made in 50 minutes but Linnaeus surely did not make it in that time.

The incident that finally got Linnaeus going in Uppsala seems quite remarkable and a round about way to get the attention of the person that ought to have found Linnaeus much earlier. It was because of Linnaeus acquaintance with Dr. Celsius, then Bishop at the Uppsala Cathedral, that Linnaeus's knowledge of plants was brought to attention of Olof Rudbeck, Jr. Linnaeus is said to have met Dr. Celsius in the botanical garden in Uppsala in the spring of 1729, while Dr. Celsius, who himself was very much interested in botany, was studying the plants there. Dr. Celsius was very much impressed by Linnaeus's knowledge of plants. Later on a paper on the propagation of plants, based on ideas which to Linnaeus sounded very antiquated was being discussed in Uppsala. Linnaeus wrote in this connection a paper of his own on the subject and gave it to Dr. Celsius as a New Year's gift. It aroused quite a sensation in Uppsala ; it was duplicated and distributed among the students. One copy was brought to the meeting of the Royal Scientific Society in April 1730 and there a desire was expressed to have it published. Linnaeus himself labeled the paper in 1729 as "Praeludia Sponsaliorum Plantarum." The title is in Latin but the paper was written in Swedish. What he brought out was actually the start to our present knowledge of pollination and seedset in plants.

This paper helped to give Linnaeus a position at the University and he started to give courses in botany to relieve Professor Rudbeck from some of his duties. He was asked by his listeners to prepare a list of the plants in the botanical garden in Uppsala. He did this, but used in his first edition Tournefort's system of nomenclature. However, in his second edition he put his own system into use. This was in July 1730. He kept on editing his list and in May 1731, one of his editions "Adonis Uplandicus" was praised very highly by the Royal Scientific Society. In fact this was the outline to what became Linnaeus's famous sexual system of plant classification. It is remarkable to find that it was prepared when Linnaeus was only 24 years old and still a student.

His future success depended on a number of incidents, possibly planned by himself. At the age of 24, Linnaeus had, at a time when traveling was difficult, seen the floras of Småland, where he was born, and of Skåne and Uppland, where he had gone to school. He had followed the ideas that prevailed in the botany departments two Swedish universities. Apparently he had realized that what he now needed was to see more. He was correct. University studies are all right but they are ten times more valuable if they are combined with traveling in other parts of the world. That was true during the 18th century, and it is likewise true today.

Possibly I should point out the length of Sweden from north to south and also indicates how far north Sweden is located. Uppsala is about on the 60th parallel, which means that the extreme southern part of Sweden is on the same parallel as the southern parts of Hudson Bay in Canada. Go 1,000 miles north from there and you are in Lapland, the northern most of the provinces of Sweden. Southern Sweden has lands only a few feet above sea level, northern Sweden has mountains of about 7,000 feet. To any botanist, it is clear that Sweden has a greatly varied flora and that the northern sections have many plants new to a botanist

Linnaeus' botanical garden as it looks today. (After photo by Svenska Linné—Sällskapet, Uppsala, Sweden).

from southern or middle Sweden. This was exactly what made Linnaeus ask for money from the Royal Scientific Society in Uppsala at the end of 1731 in order to go to Lapland. Some of the arguments he used in his application are of special interest. Of course he pointed out the need for studying a section of Sweden that was practically unknown, as far as nature was concerned, but he added, for example, that he was young and could run up and down the mountains, that he was unmarried and therefore did not have to worry about children losing their support, should he be lost. Linnaeus put in his application in December 1731, went home the same month to visit his parents and went to the University of Lund for a short time. With the enthusiasm and ambition he had, he was sure to have a decision on his application when he returned to Uppsala in April 1732. But he was greatly disappointed to find that nothing had been done. Scientific societies during the 18th century were evidently very much like our own when it comes to reaching decisions. Linnaeus had to file a second application and then got the money to go.

He left Uppsala May 12, 1732. About that day, he wrote in his diary approximately as follows: "It is a beautiful spring day, the sky is clear, it is warm, and there is a gentle west wind. The winter rye is about one foot tall and the barley has developed its first leaf. Few flowers are out as yet but they are starting." Linnaeus went on horseback and passed through several provinces on his way north. Several times on his trip north he ran into winter weather. After two weeks he reached Lapland. He came in time to experience the spring floods and had some rather bad adventures but he did not give up. While he was caught by these spring floods, he learned that the Laps had to go to church regularly and if they did not go they were penalized. This Linnaeus thought was too hard on them because many times they had to make dangerous river crossings

The pond in Linnaeus' botanical garden. (After photo by Svenska Linné--Sällskapet, Uppsala, Sweden).

to reach the church. Linnaeus followed the life of the Laps closely and although one of them once sent a bullet after him he apparently loved them. Besides looking at the Laps he also looked at the girls, as he mentions in his diary an 18 year old Sara Rasch, who was the beautiful daughter of the minister in Rörstad. Apparently he left her in Rörstad, however, as he picked up another Sara on another trip elsewhere.

The way Linnaeus traveled through Lapland, gave him good chances to study flowers and animals, geological formations and life in general. He went on horseback, on foot ,and in boats on the rivers; he passed over lowlands and mountains and it is evident that he was more impressed by the enormous wealth of flowers on the mountain slopes than by anything else.

The trip took Linnaeus the whole summer and when he was ready to return to Uppsala he could follow the same road he had taken when he came up; he could go by boat or he could travel on the eastern side of the Gulf of Botnia in what now is Finland. The last was the one that a person like Linnaeus would choose as it would give him opportunities to see and learn something new. On October 10, he was back in Uppsala. His trip to Lapland had been an adventurous one, but it had given him, beside the experience, new and good recommendations. The trip was mentioned in scientific journals outside of Sweden and it was mentioned in detail in the records of the Royal Scientific Society. Linnaeus reported on flowers, minerals, and birds; on ten different kinds of bread substitutes; on 16 different kinds of milk; on the cattle death in the Torne valley, etc. Most important is of course his botanical observations. Some of these were published in 1732 but the bulk of them was published in his Flora Lapponica in 1737.

For Linnaeus himself the trip was a very good education; as to his financial situation, it brought him into difficulties. But he continued his studies at the University of Uppsala even if he

did not get very much of a chance to take part in courses during that time simply because there were practically no courses in botany or medicine to take. There were two professors in botany and medicine, one of them, Professor Rudbeck, was on leave of absence finishing up a manuscript, the other, Professor Roberg, did not have any teaching as he was carrying the responsibilities as the President of the University. So Linnaeus did his own studying, following methods similar to those he had followed in earlier years. At the same time he worked on his Flora Lapponica. He did not seem satisfied, however, during the next two years, mainly because of worries over his future.

The offer that ended his worries for some time to come was made by the Governor of Dalecarlia, who had made the acquaintance of Linnaeus during short visits that Linnaeus had made to the capital of Dalecarlia. The Governor was interested in having his province surveyed as Lapland had been surveyed by Linnaeus in 1732. In the spring of 1734 he offered Linnaeus to travel over Dalecarlia and gave him sufficient money for the trip. It was under different conditions that Linnaeus could travel this time as compared to his Lapland trip. The offer shows that the provincial governors were interested in supporting peaceful contributions of value for the development of the country as a whole. On the Dalecarlia trip Linnaeus brought with him eight students from Uppsala, of whom one was an American, even though these students had to travel at their own expense. During the trip Linnaeus observed practically everything that was happening in Dalecarlia and only a few incidents can be mentioned. One example of how poorly plants were known to the people and how mystery surrounded rare plants is the following. Close to Rättvik there was a tree supposed to have flowers only when changes in the leadership of the nation were coming. It was said to have had two flowers, one white and one black, just before the death of King Carl XII. Linnaeus found it was nothing but a linden. Linnaeus was surprised not to find more flowers on the mountain slopes. He had expected the mountain slopes in Dalecarlia to have more flowers than the ones in Lapland as he was further south but still in the mountains. Linnaeus wrote his report on his trip already in August 1734, gave it to the Governor of Dalecarlia, who was very much impressed by it. And then Linnaeus was ready to start something else.

He did not want to return to Uppsala and decided to go abroad to obtain a doctor's degree in medicine. Before he could go abroad, however, he had to get a degree in theology. Otherwise he would not be issued the necessary passports. Therefore he was forced to Uppsala for his theological examination. He took this immediately when he arrived in Uppsala and also received his degree. It was easy to get degrees in those days.

Linnaeus left Uppsala on December 19, 1734 but did not go abroad directly. He returned to Falun in Dalecarlia to finish up some work on his manuscripts but also took time out, while there, to find another 18 year old Sara, the daughter of Dr. Johan Moraeus. She later became his wife. He stayed in Falun until February 20, 1735 and then went to his home in Stenbrohult, and on April 19 he left Sweden for a stay abroad that was to last for 3½ years. He went through Denmark and Germany. In Lübeck he went to church on April 27 but expressed his dissatisfaction with all the hymns that were sung. Linnaeus was too ambitious and too much a lover

Aerial photo of Linné's Hammarby. (After photo by Gösta Gustafsson.)

of nature to sit inside and listen patiently to 14 hymns during one Sunday. He intended to go to Hardivijk in Holland and arrived there on June 6. How university studies were handled at that time is illustrated by the following: On June 7, he had a general examination in medicine and he was found to be so good that he was the same day given a Bachelor of Medicine degree. He had prepared his thesis in Sweden, and after it was examined and printed, Linnaeus defended it on June 24 and that same day obtained his Doctor of Medicine degree.

After this, he intended to return to Sweden but it did not turn out that way. He remained with a person who, among all the friends he made during his stay in Holland and during his trips to England and France before he returned to Sweden, would mean more than anyone else for his future. He was Dr. Georg Clifford in Hartecamp. Dr. Clifford had at Hartecamp a large garden with numerous foreign plants. Linnaeus was offered the opportunity to stay with Dr. Clifford at Hartecamp and he remained there most of the time that he was in Holland. The way he came there is quite amusing. He had, before he met Dr. Clifford, promised to help a Mr. Johan Burman in Amsterdam with a plant collection of his. Burman did not want to let Linnaeus go but during a visit Burman made to Clifford's house, he became very interested in a book by Hans Sloane on

a voyage to Madera, Barbados and some other islands. Dr. Clifford said I have two copies of that book, you can have one if I can have Linnaeus. The result was that Linnaeus was traded for a copy of a book.

During his time at Hartecamp, Linnaeus had the opportunity of getting to know tropical and oriental plants he had not seen before. Based on these plants, he wrote, during his stay there, the important publication "Hortus Cliffortianus," and he had several of his earlier manuscripts published also. Among these were his "Flora Lapponica" and "Genera Plantarum," both published in 1737.

When Linnaeus finally left Holland, he did that by turning down several offers for good positions. Linnaeus had gone abroad to get a medical doctor's degree, he had obtained this in a remarkably short time and had, besides, won fame on his contributions in botany. On his sexual system of plant classification, he had received hardly anything but compliments and favorable support. One of the few criticisms of his system is worth mentioning. It came from J. G. Siegesbeck in St. Petersburg in Russia, who argued that God would not have allowed that several men (the anthers) could have a common wife (the stigma) or, like the case in *Compositae,* that the men should, beside the legal wife, have other wives also. Such a system could not, without causing embarrassment, be presented to the young students. That was Russia 200 years ago.

It seems that Linnaeus should have been given a position in botany at the University of Uppsala when he returned to Sweden. But instead he had to practice medicine in Stockholm from 1738 to 1741. He did not, however, waste his time as he obtained numerous influential friends in Stockholm and he had a hand in starting the Swedish Academy of Science there in 1739, which Academy by the way, is still active. He did not forget his science for his more practical phase of life, the practice of medicine. There were people who wanted him back at Uppsala. However, the two old professors in botany and medicine did not want to make room for younger men; there was apparently the same difficulty for young scientists in the 18th century as in our day. However, Professor Rudbeck died in 1740 and Professor Roberg finally resigned in 1741. On May 5, 1741, Linnaeus was appointed professor at the University of Uppsala to take the place of Professor Roberg. As it later developed, he instead took over the botanical garden and the responsibilities that had been Professor Rudbeck's.

In 1739 Linnnaeus was married to Sara Moraea from Falun in Dalecarlia. She had patiently waited for him all the years he had been in Holland. Before Linnaeus moved to Uppsala, his son, Carl Linnaeus, Jr., later his successor as professor in botany in Uppsala, was born on January 20, 1741.

The first and hardest part of Linnaeus's life ended with his appointment as professor at Uppsala, and his later years were characterized by the experienced man's way of handling and solving problems. It can not be denied that Linnaeus had an unusual experience during the first part of his life when he actually had to fight for his existence, a fight that was, however, eased very much through his sympathetic nature and great intelligence. On the borderline to his new life in Uppsala came three more travels inside Sweden, which he made at government expense, having been asked by the Swedish Parliament to undertake. The first one he made to Öland and Gotland in 1741, the second one to Västergötland in 1746, and the third to

Linnaeus' bedroom on his farm at Hammarby. (After photo by E. Finn).

Skåne in 1749. The trips to Öland and Gotland and to Västergötland were undertaken to find dye plants and medical plants and to study the soil. The trip to Skåne was made to find calcium deposits and certain woods. Also the economic plants should be studied as should plants of purely botanical interest. It is very noticeable that Linnaeus during these trips paid very great attention to economic plants although he did not forget other plants. He was, for example, very much pleased to find such an abundance of orchids in the pastures on Öland; he was very happy when he found *Coronilla Emerus* on Gotland, as he did not expect this plant to grow wild in Sweden. Altogether, on these trips, he found 130 plants that had not been found in Sweden before.

These three trips were the last that Linnaeus made; and with all the background he now had, it could be expected that his services as professor at the University of Uppsala should be outstanding. And they proved to be. One of Linnaeus's first arrangements for the botanical garden in Uppsala was to secure the services of Mr. D. Nietzel as a gardener. Mr. Nietzel had had experience in several gardens in Germany and England and came to Uppsala from Dr. Clifford's garden in Hartecamp in Holland. Linnaeus also obtained new greenhouses and more land, and he rearranged the plan of the garden. Then came the question of getting more new plants introduced. He wrote his friends abroad and received very good help from them. He obtained material from Sweden that he did not have before and in a couple of years the number of plants had increased from about 200 species to more than 3,000. And it continued this way. From all over the world, seeds and herbarium specimens were sent to him. Linnaeus himself said once that a tremendous correspondence

had brought to his botanical garden seeds from far off countries like Siberia, Canada, and India. In 1771, a collection of seeds from Siberia was given to him on order by the Russian Empress, Catharina II. And in the same year the King of France sent him seeds that he had collected himself. The continued flow of new material to the garden gave Linnaeus satisfaction and new impulses for future planning. In 1748, Linnaeus published his work "Hortus Upsaliensis," which is one of his very much used publications even now. In this, he described all the plants in the botanical garden. In his efforts in building up the botanical garden, Linnaeus had tremendous help from Mr. Nietzel, until Nietzel's death in 1756. After that, Linnaeus was alone until 1759, when he had his son appointed as his helper in the garden.

The botanical garden that Linnaeus built up has undergone a number of changes since his time. It is now a museum kept very much as it was during Linnaeus's time. The botanical garden of the University of Uppsala is at present at another location where it was started by C. P. Thunberg in 1787. In that year King Gustaf III presented the garden of the Uppsala Castle for use as the botanical garden of the University of Uppsala and it is still used for this. The plants were moved there from the old botanical garden soon after 1787 but it was not until 1807, on the 100th anniversary of Linnaeus's birth, that it was officially opened.

In 1758 Linnaeus bought two farms outside of Uppsala, Hammerby and Sâfja. Hammarby became the one we remember, as it is now a museum that will always remind us of Linnaeus. Hammarby is located about 7 miles southeast of Uppsala. In 1762 Linnaeus built a home on Hammarby for himself and his family. Most luxurious in the house were two rooms upstairs, one of them with wallpaper that was nothing but drawn plants from the West and East Indies, and the other, his bedroom, that had painted flowers as wallpapers. In 1769 he built what is known as the "Museum," located on a rocky hill beside the farm houses. There he kept his collections, he worked there during his stay at Hammarby and he gave his lectures from there. In the garden around the house, he planted rare plants and he started a Siberian garden there in 1773 with the seeds he got from the Empress Catharina II. Among plants still growing in the garden there at Hammarby are *Mercurialis perennis, Tulipa silvestris, Corydalis nobilis, Campanula latifolia, Lilium Martagon, Crepis sibrica, Galanthus nivalis,* species of *Aquilegia,* and *Myrrhis, Sempervivum globiferum, Sorbus fennica,* and many others.

After Linnaeus's death, Hammarby came into the hands of his daughter Sophia, later on was owned by her daughter, and finally by Carl Ridderbjelke, who was Linnaeus's great grandson. The Swedish Government bought the farm from Mr. Ridderbjelke in November 1879 for 30,000 Swedish crowns or about 7,500 dollars. Since then much effort has been put into reconstructing the farm into a museum to look just as it did when Linnaeus lived and worked there. The last time I was at the farm was in May 1940, when the Swedish Linnaean Society had its spring meeting there. It is a lovely place, peaceful, filled with inspiration and relaxation. With its location on the slope of a rocky hill, it is a wonderful place for looking over the fertile lands stretching for miles to the south.

His first lecture as professor in Uppsala, Linnaeus gave on November 2, 1741 and he kept on teaching for 35 years, that is until 1776. His lectures were always popular. His record num-

The "Museum" at Linné's Hammarby. (After photo by T. Kalén.)

ber of students was during the spring semester of 1760 when he had 239 students out of a total of less than 1,000 students in the entire university. It is interesting to see how he taught his courses. They were apparently theoretical observations tied in with practical and economic problems. Sometimes they were very practical. (For example, once he gave the following discussion on *Arundo arenaria* (*Psamma arenaria*) : Is used in Holland to prevent the sand from being blown by the wind. This is the grass that has been recommended for use in Skåne. Where it grows, the sand can not move but is blown into a bank like drifting snow. The more sand that moves into the bank, the better the grass grows. Other plants he described in a similar way. There is one description of *Triglochin palustre:* Tastes salty, is pretty good for cattle because where it grows it thrives. It would therefore be advantageous if farmers got seed of it and planted it on suitable places. Distinguished from other grasses in Sweden by the flower having 6 petals of which every other one is attached lower than the others. It has also 6 anthers without filaments. That his lectures must have been interesting is evident as someone has said that science streamed with pleasantness from his lips, that he spoke with conviction and deep penetration. And that it was impossible to hear him without participating in his enthusiasm.

Linnaeus apparently loved to take his students with him on field trips. There are numerous descriptions of excursions he made around Uppsala with his students.

However, this was only one part of his teaching. Another dealt with his advanced students and collaborators. He had many of them, both Swedish and foreign. The contact with the foreigners who came to Uppsala brought Linnaeus new viewpoints and new plants, herbarium specimens, as well as seed. Such material he also got through his own Swedish students who went abroad. In this way, he kept in contact with the plant world in places where he himself had never been. Among his Swedish students abroad was Peter Kalm, who visited America in 1748 to 1751. Another student, Fredrik Hasselquist, visited Asia Minor, Egypt, and Palestine in 1749 to 1752 but died on his way back to Sweden. However, his valuable collections came to Linnaeus' institution. Still another of Linnaeus' students, C. F. Adler, went to the East Indies in 1748 to 1749 and this was the way it went. Linnaeus was the teacher, he inspired the students, he got them started on their foreign trips, he got continued support for them when they were out traveling and he helped them with their collections after they returned to Sweden.

Some of Linnaeus' publications have

CAROLI LINNÆI

REGIÆ MTIS SVECIÆ ARCHIATRI; MEDIC. & BOTAN.
PROFESS. UPSAL: EQUITIS AUR. DE STELLA POLARI,
nec non ACAD. IMPER. MONSPEL. BEROL. TOLOS.
UPSAL. STOCKH. SOC. & PARIS. CORESP.

SPECIES PLANTARUM.

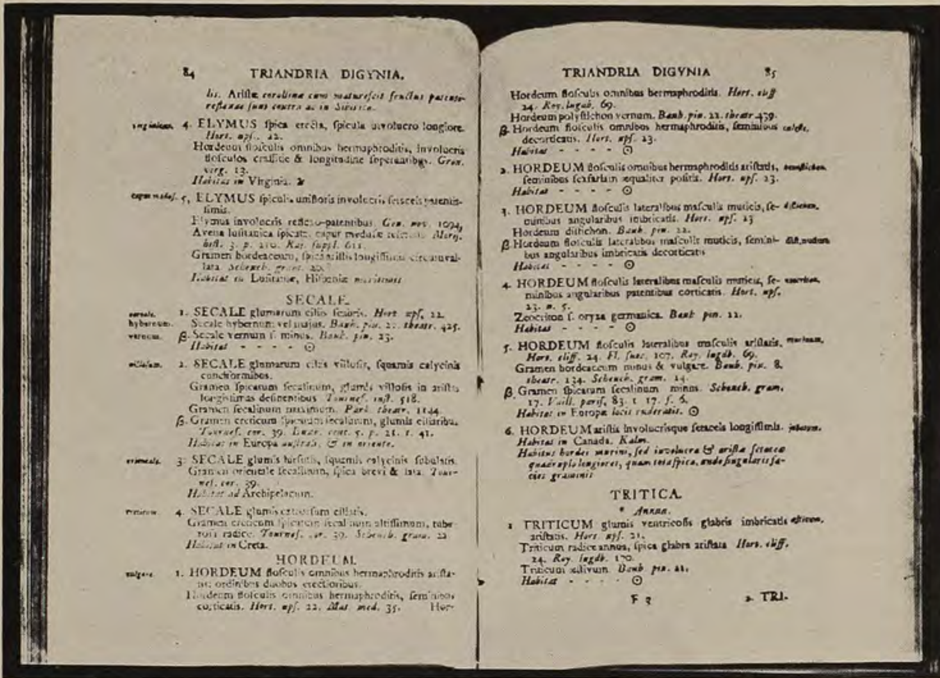
EXHIBENTES
PLANTAS RITE COGNITAS.
AD
GENERA RELATAS.
CUM
DIFFERENTIIS SPECIFICIS,
NOMINIBUS TRIVIALIBUS,
SYNONYMIS SELECTIS,
LOCIS NATALIBUS,
SECUNDUM
SYSTEMA SEXUALE
DIGESTAS.

TOMUS I.

Cum Privilegio S. R. Mtis Sveciæ & S. R. Mtis Poloniæ ac Electoris Saxon.

HOLMIÆ,
IMPENSIS LAURENTII SALVII.
1753.

Title page of Linnaeus' "Species Plantarum."



84 TRIANDRIA DIGYNIA.

lis. Aristæ corollinæ cum maturescit fructus patentireflexæ sunt contra ac in Sibirica.

virginicum. 4. ELYMUS spica erecta, spicula involucro longiore. Hort. upf. 22.
Hordeum flosculis omnibus hermaphroditis, involucris flosculos crassitie & longitudine superantibus. Gron. virg. 13.
Habitat in Virginia. ♃

caput medusæ. 5. ELYMUS spiculis unifloris involucris setaceis patentissimis.
Elymus involucris reflexo-patentibus. Gen. nov. 1094.
Avena lusitanica spicata, caput medusæ referens. Moris. hist. 3. p. 210. Raj. suppl. 611.
Gramen hordeaceum, spica aristis longissimis circumvallata. Scheuch. gram. 20.
Habitat in Lusitaniæ, Hispaniæ maritimis.

SECALE.

cereale. 1. SECALE glumarum ciliis scabris. Hort. upf. 22.
hybernum. Secale hybernum vel majus. Bauh. pin. 22. theatr. 425.
vernum. β. Secale vernum s. minus. Bauh. pin. 23.
Habitat - - - - ☉

villosum. 2. SECALE glumarum ciliis villosis, squamis calycinis cuneiformibus.
Gramen spicatum secalinum, glumis villosis in aristas longissimas desinentibus. Tournef. inst. 518.
Gramen secalinum maximum. Park. theatr. 1144.
β. Gramen creticum spicatum secalinum, glumis ciliaribus. Tournef. cor. 39. Buxb. cent. 5. p. 21. t. 41.
Habitat in Europa australi, & in oriente.

orientale. 3. SECALE glumis hirsutis, squamis calycinis subulatis.
Gramen orientale secalinum, spica brevi & lata. Tournef. cor. 39.
Habitat ad Archipelagum.

creticum. 4. SECALE glumis exterioribus ciliatis.
Gramen creticum spicatum secalinum altissimum, tuberosa radice. Tournef. cor. 39. Scheuch. gram. 22
Habitat in Creta.

HORDEUM.

vulgare. 1. HORDEUM flosculis omnibus hermaphroditis aristatis; ordinibus duobus erectioribus.
Hordeum flosculis omnibus hermaphroditis, seminibus corticatis. Hort. upf. 22. Mat. med. 35. Hor-

TRIANDRIA DIGYNIA 85

Hordeum flosculis omnibus hermaphroditis. Hort. cliff. 24. Roy. lugdb. 69.
Hordeum polystichon vernum. Bauh. pin. 22. theatr. 439.
β. Hordeum flosculis omnibus hermaphroditis, seminibus decorticatis. Hort. upf. 23. cœleste.
Habitat - - - - ☉

2. HORDEUM flosculis omnibus hermaphroditis aristatis, seminibus sexfariam æqualiter positis. Hort. upf. 23. hexastichon.
Habitat - - - - ☉

3. HORDEUM flosculis lateralibus masculis muticis, seminibus angularibus imbricatis. Hort. upf. 23 distichon.
Hordeum distichon. Bauh. pin. 22.
β. Hordeum flosculis lateralibus masculis muticis, seminibus angularibus imbricatis decorticatis dist. nudum.
Habitat - - - - ☉

4. HORDEUM flosculis lateralibus masculis muticis, seminibus angularibus patentibus corticatis. Hort. upf. 23. n. 5. zeocriton.
Zeocriton s. oryza germanica. Bauh. pin. 22.
Habitat - - - - ☉

5. HORDEUM flosculis lateralibus masculis aristatis. Hort. cliff. 24. Fl. suec. 107. Roy. lugdb. 69. murinum.
Gramen hordeaceum minus & vulgare. Bauh. pin. 8. theatr. 134. Scheuch. gram. 14.
β. Gramen spicatum secalinum minus. Scheuch. gram. 17. Vaill. paris. 83. t. 17. f. 5.
Habitat in Europæ locis ruderatis. ☉

6. HORDEUM aristis involucrisque setaceis longissimis. jubatum.
Habitat in Canada. Kalm.
Habitus hordei murini, sed involucra & aristæ setaceæ quadruplo longiores, quam tota spica, unde singularis facies graminis.

TRITICA.

* Annua.

1. TRITICUM glumis ventricosis glabris imbricatis aristatis. Hort. upf. 21. æstivum.
Triticum radice annua, spica glabra aristata. Hort. cliff. 24. Roy. lugdb. 170.
Triticum æstivum. Bauh. pin. 21.
Habitat - - - - ☉

F 3 2. TRI-

Two pages from Linnaeus' "Species Plantarum," 1753.

Carl Linnaeus in 1739. (After a painting by J. H. Scheffel).
Carl Linnaeus in 1773. (After a painting by P. Krafft, Sr.).

been mentioned already and I will not try to discuss all of them. I believe I should mention at least two others, namely his "Species Plantarum" published in 1753 and the fifth edition of the "Genera Plantarum" published in 1754. These two are the ones that are cited most often in our scientific literature of today. As many of you know, it is the former of these, that is, the "Species Plantarum," 1753, that is designated by the International Rules of Botanical Nomenclature as the starting point for the nomenclature of flowering plants, because it was in this that the binomial system of botanical nomenclature was established.

Linnaeus' private library of 2,500 volumes and his herbarium did not stay in Sweden after his death. They are now among the possessions of the Linnean Society in London. In 1784, they were bought for 19,000 Swedish crowns or about 5,000 dollars by Sir James Edward Smith of Norwich. There are a few herbarium specimens in Uppsala that carry Linnaeus's handwriting. Altogether there are supposed to be 83 specimens, among them several species of *Erica*, specimens of *Rhododendron dauricum*, of *Asclepias pubescens*, and of a few other species.

Linneaus received many honors for his outstanding contributions. Among them was his being knighted by the King of Sweden in 1762, from which time he carried the name von Linné instead of Linné or Linneaus. Among other honors may be mentioned that he served as president of the University of Uppsala for several years. The appointment to president of a Swedish University, for which position one of the outstanding professors at the University is selected, is even today a great honor.

Linnaeus was very ill the last few years of his life. He died January 10, 1778. About his family not much will

Linnaeus' tomb in the Uppsala Cathedral and the monument in his honor in the background.

be said. His wife and son, Carl Linnaeus, Jr., have already been mentioned. His son died very young in 1783 and Linnaeus, his wife, and son are all buried in the Uppsala Cathedral. Linnaeus had four daughters. The families descending from Linnaeus all trace back to these daughters. Among such families still living in Sweden are the families Tullberg, Ödman, Martin, Beskow, and Öhrn.

The importance and meaning of all that Linnaeus did for the botany of the world will not be discussed in any detail. But it may be appropriate to summarize in a few words what made him so outstanding for such a long time. His terminology and nomenclature, his system of plant classification are known not only to any botanist but to any educated person in the world today. At the same time we should re-

One section of the present Institute of Taxonomic Botany at University of Uppsala. (After photo by Gramberg's Nya Aktiebolag, Stockholm.)

member that Linnaeus knew that his system of plant classification was only a transitional system. We know, however, that it stayed with us for a long time. In fact Linnaeus himself laid the foundation for the natural systems we are still aiming at.

Linnaeus published also on purely biological problems such as happened in his "Politia naturae," 1760, when he discussed the survival of the fittest not in the sense that Darwin did later, but rather in the way that the competition aimed at a balance in nature so that the products of nature could all live and no one could dominate at the expense of the others. That is not exactly what we think and see today, but it shows another field that Linnaeus was interested in.

Linnaeus is supposed to have first found the nectaries in flowers. These he discussed in his "Nectaria Florum," 1762. And there were so many other fields that interested him as can easily be understood from all the activities he took part in during his life time.

The Swedes can rightly be proud to have had a botanist of the capacity of Linnaeus. For the Swedish botanical institutions, he meant much; in the botanical science of the whole world, he was a pioneer, a brilliant, ambitious and unafraid scientist; yet at the same time a sympathetic human being. He did not conquer the world by force and by the use of big words, but by his sincere, honest love of flowers and the beauty of the world.

References

Arthur, J. Ch., A botanical shrine. Scientific Monthly, Vol. 22, 1926, pp. 459-462.

Floderus, M., and Carl Forsstrand, Linné's Ättlingar. Svenska Linné-Sällskapets Årsskrift, Årg. II, 1919, pp. 115-125.

Fries, Rob. M., Linné och hembygden. Svenska Linné-Sällskapets Årsskrift, Årg. X, 1927, pp. 9-20.

Fries, Rob. M., Carl von Linné, Bot. Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie, Band 41, 1907, pp. 1-54.

Fries, Th. M., Linné —— Stockholm 1903.

Gertz, O., Archiater Carl Linnaei föreläsningar uti botaniquen. Botaniska Notisser 1915, pp. 65-70.

Juel, H. O., Förteckning över i Uppsala förvarade herbarie-exemplar med påskrifter av Linnés hand. Svenska Linné-Sällskapets Årsskrift. Årg. XIV, 1931, pp. 12-16.

Lindman, C. A. M., Ett besök vid Råshult, Svenska Linné-Sällskapets Årsskrift Årg. III, 1920, pp. 103-116.

Thermaenius, E., Statsinköpet av Linnés Hammarby. Svenska Linné-Sällskapets Årsskrift Årg. XIV, 1931, pp. 31-40.

Virdestam, G., Kring några brev fran Samuel Linnaeus. Svenska Linné-Sällskapets Årsskrift, Årg. XIV, 1931, pp. 115-125.

Disease-Resistant and Hardy Varieties of Vegetables

*(Continued from October, 1944)**

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The vegetable "fruit" crops belonging to the family *Solanaceae* are not numerous but they include the most universally popular and important vegetable grown in American gardens—the tomato. Eggplant and peppers are the only others of importance, but they are, indeed, minor in comparison with the tomato. The tomato not only is grown more extensively than any other vegetable except potatoes and sweetpotatoes but it has been the object of more research and improvement effort. As a result of these widespread and continued efforts to improve it, bewildering numbers of varieties and strains have been developed, some of them representing very marked advances over older kinds. Far less attention has been devoted to breeding peppers and eggplant in America than to breeding tomatoes. In some regions of the Orient, however, the relative importance of eggplant and the tomato is just the reverse of their relationship here.

The term "hardiness" of these three crops refers to their ability to withstand generally adverse conditions and heat rather than hardiness to cold. None of them will survive any degree of freezing, and all are damaged by prolonged exposure to temperature near freezing. Furthermore, most varieties of all three are very susceptible to a great many diseases which limit their productivity although the plants may not succumb entirely to those troubles.

Tomatoes

As in the instance of sweet corn, discussed in the July, 1944 installment of this series, efforts have been made for a long time to push the culture of tomatoes farther and farther northward. The plant not only is killed by the least amount of freezing but fails to thrive at low temperatures above freezing. The first commercial varieties also required such a long season for bearing a profitable yield that they could not be grown in the short frost-free season of many northern districts of the United States. Much progress has been made in the past twenty years in developing varieties that bear relatively soon after transplanting and that are able to grow vigorously at temperatures that are too cool for most varieties. Generally speaking, these extremely early varieties that are adapted to the districts of short, cool, summers produce small plants with sparse foliage and are definitely less well adapted to the middle and southern parts of the country than are later, larger-growing kinds. Surprising as it may seem in view of experience with some of these varieties in the United States, they have succeeded better than others when planted in certain tropical Pacific islands.

Despite the frost-tenderness of the tomato and its apparent origin near the equator, most varieties grown in the

*This fourth article in the series of the above title originally was scheduled for preparation for the January 1945 issue of this magazine. Unfortunately, the series became a "war casualty"; innumerable emergency tasks became too heavy to permit the writer to continue its preparation as planned. A final installment in the January 1946 issue will be the last one.

United States do not bear well during the summer months in the warmer parts of the country. They lack hardiness to heat as well as to cold. This appears to be associated with the fact that although the tomato is native to latitudes near the equator, it came from moderately high altitudes where the weather becomes neither very hot nor very cold. Extremely dry heat such as occurs in summer in the Great Plains and in the Southwest is particularly damaging, almost entirely preventing fruit-setting for considerable periods in most varieties. A full realization of the "heat tenderness" of the tomato is so recent that far less has been to improve its fruitfulness under southern summer conditions than to extend its productivity northward.

The North Dakota Agricultural Experiment Station is pre-eminent in the development of earlier tomatoes adapted to cool, short, seasons. Beginning back in 1925 with the introduction of Red River, that station has introduced about a dozen varieties possessing those qualities, and representing a wide range of types. These include Bison (1929), the most popular and successful of their introductions for many years. Fargo Yellow Pear and Golden Bison were introduced in 1932, Farthest North in 1934, Allred in 1937 and Firesteel in 1938. All these are determinate ("self-topping") in vine habit, and produce fruits of small to medium size. They are not suited to pruning for training on stakes.

In 1941 the North Dakota Station introduced Bounty, and in 1940 the Michigan Agricultural Experiment Station introduced Mingold. Bounty and Victor are quite similar and probably the best of the extremely early red varieties yet developed for our northernmost states. Mingold is yellow, as the name suggests. Fruit and vines of these varieties are larger and they are more productive than the previous introductions in this category; the fruits also are better protected from the sun by more plentiful foliage. The Harkness variety, developed in Canada, is also very early and adapted to the short, cool, seasons of areas along the United States-Canadian boundary. The Michigan Agricultural Experiment Station has recently introduced a small-growing, medium-small fruited, very early variety, Early Chatham, for cool, moist, short seasons such as prevail in the Upper Peninsula of Michigan.

Bounty has been grown in the Tropics with more success than the larger, later sorts, presumably because it develops very rapidly, sets its crop and matures it so early that there is less time for diseases and other adversities to interfere. Although the plants are neither long-lived nor more resistant to certain diseases than those of other varieties they bear more fruit before they succumb to pests and diseases. It also sets better than the "standard" varieties in our Southern Great Plains.

Another interesting feature of varieties like Bounty and Victor is their ability to set fruit and to bear fairly well under certain conditions of *partial* shade that seriously impair fruitfulness of the larger, later varieties. In the middle part of the country, for example, where varieties like Marglobe and Rutgers do well in full sun but poorly in partial shade—for example, near a house—Bounty and Victor have made fair yields. They do not, however, yield as heavily in the shade as the other varieties do in the sun.

A number of plant breeders are working to develop varieties that will bear well in regions like the Southwest where the season is long and hot—in fact, so hot that the flowers of most varieties are damaged and set little or no fruit for long periods. The Texas Agricultural Experiment Station has

introduced Summerset, a variety with medium-small, round, red fruits, that will set reasonably good crops under Southwestern conditions that cause most other varieties to be barren during the summer heat. Another variety of interest in such districts as the Southern Great Plains is a small, oblong or plum-shaped red one known as the Porter. It was introduced by Porter and Son, Stephenville, Texas. Although the fruits are small the variety has consistently outyielded the well-known, large-fruited varieties in many tests in the Plains area.

Later in this article reference is made to varieties developed by the Illinois Agricultural Experiment Station for specific adaptability to moderately hot weather and rich prairie soils of the Corn Belt. Among these are Prairiana, Illinois Baltimore, and Early Baltimore (introduced in 1936). On light or poor soils these are not superior to such varieties as Marglobe and Rutgers; but on rich, heavy, soils in northern Illinois, for example, Prairiana and Early Baltimore far outyield the more popular varieties of the Middle Atlantic States.

Rutgers, now the most extensively grown variety in America, was developed by the New Jersey Agricultural Experiment Station for adaptability to the light soils of the Middle Atlantic coastal plain. It makes an unusually vigorous top and leaf growth on the lighter soils, so that the fruits are better protected from the sun than is true for most other varieties when grown on such soils. Rutgers, however, is not adapted to the heavy, rich, prairie soils of the Corn Belt because it grows too rank and does not set heavy crops. Conversely, Prairiana and Early Baltimore are not adapted to light, sandy, soils because they grow too sparsely. Anomalous as it may seem, these last two may be said to have been bred for "resistance" to too rich soil—soil that is too high in nitrogen for most commercial varieties to make optimum yields.

Breeding and selection of tomatoes for resistance to disease, particularly fusarium wilt, was begun in 1910 by the Agricultural Experiment Stations in Tennessee and Louisiana; and two years later in Maryland. The oldest wilt-resistant variety commonly available today is Norton, introduced in 1917 by the United States Department of Agriculture and named for J. B. S. Norton of the Maryland Agricultural Experiment Station who made the original selection that led to its development. Louisiana Pink, introduced in 1918, is also still grown to a limited extent. Both of these have been largely superseded by several varieties having superior earliness or other horticultural characters. Between 1917 and 1933 the United States Department of Agriculture introduced nine more varieties of which Marglobe (1925) and Pritchard (1932) have been the most important. These are resistant to nailhead spot as well as to fusarium wilt. Marglobe was the most extensively grown variety in the country until about 1940 when it was surpassed by Rutgers (introduced in 1934). Rutgers produces a somewhat larger plant, giving better protection to the fruits and bearing somewhat larger fruits, especially on the lighter soils of the eastern United States, where they are best adapted.

In addition to Prairiana, Early Baltimore, and Illinois Baltimore other wilt-resistant varieties introduced by the Illinois Agricultural Experiment Station (between 1930 and 1936) include several greenhouse forcing strains: Blair Forcing, Lloyd Forcing, Urbana Forcing, Sureset Forcing, and others.

Marglobe, Pritchard, and Rutgers

Fig. 1. Four tomato plants inoculated with the fungus causing fusarium wilt and planted when of the same size and at the same time. Reading left to right the varieties are Bonny Best (dead), Marglobe (nearly dead), Pan America (no disease), Currant (no disease).

are all "red" tomatoes. Those preferring "pink" varieties may be interested in Marhio, introduced in 1930 by the Ohio Agricultural Experiment Station. It is virtually a "pink" Marglobe.

All of the wilt-resistant varieties mentioned above possess only an intermediate or partial resistance to the disease. Although that partial resistance is generally fairly effective in avoiding loss from wilt, it is not always enough. Sometimes especially severe attacks will destroy Marglobe, Rutgers, and similar sorts. Virtual immunity was found in a certain strain of current tomato from Peru in 1936. This was crossed with Marglobe and the resulting progeny back-crossed three times to Marglobe, giving rise to the variety Pan America, introduced in 1940 by the United States Department of Agriculture. This variety, like its wild parent, is practically immune to all strains of wilt against which it has been tested. Unfortunately, however, it is no more resistant to other diseases than other good commercial varieties. It is similar to Marglobe and is being used extensively as a parent for developing higher resistance to wilt in numerous other types of tomato.

Figures 1 and 2 show differences between wilt-resistant and susceptible tomato plants.

Resistance to numerous other diseases and adverse conditions in tomatoes is being sought vigorously by many research agencies. These tasks appear much more difficult than developing wilt resistance, and many years will be required to obtain results comparable with those involving wilt resistance. However, marked progress has been made in Hawaii in developing spotted wilt resistance and combining it with

Fig. 2. A row of dead plants of Bonny Best tomato in a field of wilt-resistant varieties growing on heavily infested soil. The resistant plants are damaged little or none by the fungus.

fusarium wilt resistance. Pearl Harbor is a new variety developed by the Hawaii Agricultural Experiment Station that is a definite improvement over others for culture in those tropical islands. Greenhouse varieties resistant to leaf mold are Veto-Mold, developed by the University of Toronto and the Ontario Agricultural Experiment Station; Globelle and Bay State, developed by the Agricultural Experiment Stations of Ohio and Massachusetts, respectively.

Several wilt-resistant varieties have been developed in addition to those mentioned above. They will not be discussed here, however, because they either failed to attain much importance or have been superseded by better ones.

Following very promising yields obtained by several public research agencies from first-generation hybrids between selected inbred lines, efforts are now being made by one or more large seed companies to produce "hybrid" tomato seed on a commercial scale. It is still too early to determine definitely how successful these efforts will be financially and otherwise, but they are being watched with great interest. When commercial seed producers can develop economical methods for obtaining first-generation hybrid seed for general planting, substantial benefits to gardeners should follow as they have in the growing of hybrid field corn and sweet corn. The possibilities of obtaining increased earliness, vigor, and yields have been well demonstrated; it now remains to develop methods of producing the hybrid seed at prices that planters will pay.

Peppers

Garden peppers are somewhat more sensitive to cold than are tomatoes but are distinctly more tolerant to heat, especially the pungent varieties from

Mexico and our own Southwest. In comparison with the work done with tomatoes to improve earliness and adaptability to cool climates, little has been done with peppers. The earliest of the sweet peppers require no longer time to come into bearing after transplanting than do the earliest tomatoes *if* the weather is warm enough. However, they apparently cannot grow normally at temperatures quite as cool as those at which some varieties of tomatoes can grow well. Thus peppers are not generally grown as far north as tomatoes are.

The Connecticut Agricultural Experiment Station has developed the variety Windsor-A, which bears usable fruits in 57 to 60 days from transplanting; and the Massachusetts Agricultural Experiment Station developed Waltham Beauty, another very early variety for New England conditions. Prior to the introduction of these two, Neapolitan and Harris Early long had been the outstanding early varieties, producing fruit in 60 to 63 days.

Most varieties of peppers, both sweet and pungent, are relatively tolerant of heat, but in the extreme heat and dry atmosphere of summer in the Southwest even this tropical species suffers. Such conditions reduce fruit setting and cause stunting and malformation of the fruits, particularly of the large "bell" types of sweet pepper. The moderately pungent Chili strains, like Anaheim Chili, and the very hot varieties appear to be better adapted to high heat. Mexican Chili, Cayenne, and Tabasco are all quite pungent and heat tolerant.

Although peppers are susceptible to many diseases they generally suffer less damage than do tomatoes. In the Southwest, however, fusarium wilt has caused serious losses to strains of the Mexican Chili. The New Mexico Agricultural Experiment Station many years ago developed a wilt-resistant variety called Mexican Chili No. 9. With the exception of the work in New Mexico almost nothing has been done until the last few years in breeding for disease resistance. Work is in progress at a few experiment stations at present but no other varieties resistant to wilt or other diseases are now commercially available.

Eggplant

Eggplant is one of the less popular vegetables, probably because it is more difficult to grow than most. It has an even higher heat requirement than peppers, requires a long time to make a crop, it very susceptible to many diseases, and thrives only on soils having high fertility and a uniformly good supply of moisture. It is grown very little in the cooler parts of the country.

The earliest variety commonly available is New Hampshire Hybrid, developed by the New Hampshire Agricultural Experiment Station for adaptability to the short, cool summers of New England. It not only comes into bearing 10 to 15 days sooner than most other varieties but appears able to make satisfactory growth at slightly cooler temperatures. The Central Experimental Farms at Ottawa in Canada introduced a small, early variety, Blackie, adapted to conditions in southern Canada.

For growing in the lower South, Florida High Bush and Fort Myers Market have been developed. Although not highly resistant to diseases these are somewhat less susceptible than the older varieties, Black Beauty and New York Improved. They bear their fruits well up above the soil so that they are less likely to be attacked by rot organisms or otherwise damaged from contact with the soil.

Bamboos for American Horticulture (II)

ROBERT A. YOUNG*

THE HARDY RUNNING BAMBOOS

(*Continued from page 196*)

In the first paper of this series consideration was given to certain hardy bamboos of several genera other than Phyllostachys that have been introduced into the United States. The present paper will be concerned with some of the introduced species and varieties of Phyllostachys. The representatives of the genus that we now have in this country range in their mature heights, in a favorable environment, from 20 or 25 feet to about 75 feet.

The species of Phyllostachys have a free and open branching habit, with rather small leaves, giving them a strikingly different appearance from any of the members of Arundinaria, Sasa, and the other genera of hardy bamboos previously mentioned. Like them, however, the plants spread by the extension of horizontal underground stems, or rhizomes (see page 173, July issue), which at intervals send up vertical stems, or culms. Also, as in those genera, the culms develop regularly in the spring, though an occasional one may start during the summer or, in warmer latitudes, even in early autumn. Full growth in height—whether to 10 feet or 75 feet—is attained in 5 to 8 weeks, depending in part on the diameter of the culm but largely upon temperature and moisture conditions. High temperature with adequate soil moisture speeds development. This rapid growth is supported mainly by food materials stored in the underground parts of the plants.

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In one or two species of Phyllostachys the culms may start early in March in the northern Gulf region, when warm weather with sufficient moisture comes very early; in other species they begin to appear at various later dates during the next month or two. In a cold spring, especially if moisture is deficient, sprouting of new culm shoots for all species is delayed for a month to 6 weeks, and in rare instances may be almost completely suppressed for the entire season. Farther north, sprouting of course takes place a week to a month later in the season, depending upon the latitude and other factors that may affect heat and soil moisture.

The culm in all species of Phyllostachys is characterized by its conspicuous "sulcus," a flattened or shallowly-grooved strip on the internodes. Each internode that bears branches from the node at its base is flattened or broadly grooved on that side, and as the branches are borne alternately on opposite sides on the succeeding nodes the internodes are flattened in the same order. All nodes bearing branches are more prominent than are those without. The formation of the sulcus is due to the pressure of the buds, that are later to become branches, on the tender tissues of the developing internode. The branches and branchlets, or twigs, are similarly flattened. The character of the surface of the internodes of the culm is much the same in most species but in a few, especially in the juvenile stage, it is distinctive. The prominence of the nodes also varies noticeably between certain species. The culm sheaths are very characteristic in most, and they always furnish important

characters for identification. The oblong to lance-oblong leaves, which come out anew each spring, are borne 2 to 6 on a twig, varying in number, size, and shape, both with the species and within it, also with the age of the plant, and on the same culm, branch, and twig. The lower 1 or 2 leaves on the twig drop during the late summer or early autumn, and the remainder fall the next spring after the new leaves appear. The upper surface of the leaf is green, varying somewhat in shade with the species, and the lower surface is glaucous, sometimes conspicuously so.

There are commonly only 2, unequal, wide-spreading branches at each branch-bearing node of the culm, though there is often only one branch at the lowest and may be 3 or rarely 4 at some nodes near the top. The larger branches are often twice rebranched. Some nodes near the base of most culms are without branches, and giant culms are commonly unbranched to heights of 20 to 30 feet. In this region of such a culm the sulcus is lacking and the internodes are cylindrical or are sometimes slightly oval in cross section. The culm walls in Phyllostachys are usually of only moderate thickness but the wood is tougher in general than that of the other hardy bamboos with a few exceptions. In a number of the species some of the lower internodes occasionally may be nearly or quite solid, and in at least one (*P. purpurata*), the lower nodes are rather regularly solid and the upper have only a small central canal.

The quality of the wood, even when fully mature (3 seasons old before cutting) varies among the different species of Phyllostachys. For this reason and because of differences in size, the various species often have had special uses in the Orient, and as more precise information is obtained concerning the physical properties of the woods of species being grown in this country, reasons will be found for choosing particular species for particular industrial purposes. While it is neither likely nor desirable that bamboo shall be used so universally in this country as it is in oriental countries, where it has existed much longer than man himself, there should be a multitude of uses to which it could be adapted with profit and satisfaction when we have learned enough about it, have the inclination to use it, and when there is an adequate domestic supply.

The maximum heights of a number of species of Phyllostachys are not known with certainty. Several that have been reported as of low or medium stature have recently developed heights of from half again to 2 or 3 times as great. No bamboo grown in infertile soils, with deficient moisture, will ever attain the size that it will under better conditions. In attempting in the following pages, therefore, to treat of some of the members of the Phyllostachys group in something near the order of size, I shall ask the reader to remember that in some instances the maximum heights indicated are tentative.

Phyllostachys aureosulcata McClure, shown on page 276, is in an early stage of development, as it grew some years ago on the West Front of the U. S. Capitol in Washington. (The plants have since been removed.) It is a medium-sized Chinese bamboo, known to reach heights of at least 30 feet in favorable environments in the South. The plant was originally collected, with many others—all unidentified—in various localities in Chekiang Province, China, in 1907, by the late Frank N. Meyer, agricultural explorer for the U. S. Department of Agriculture. Because related species in this collection were planted too near one another in

Phyllostachys aureosulcata, a Chinese hardy bamboo, in early stage of growth on West Front of U. S. Capitol, Washington, D. C., as it appeared in 1933.

the nursery, however, before the danger of their invading each other's ground was realized or adequate descriptions of the various kinds could be made, crossing over of the rhizomes took place to such extent that the record of origin of some species was confused.

The name and technical description of *P. aureosulcata* have just been published (Journ. Wash. Acad. Sci. 35: 282. Sept. 1945). The specific name alludes to the pale-golden or yellowish color of the sulcus (the flattened or grooved area of the internodes of the culm and branches) that is present during the first year. In the second year, as the green of the rounded part of the culm or branch becomes paler, the yellowish color of the sulcus becomes gradually less apparent and by the third year is practically indistinguishable from the faded green of the rounded part. During the first season at least, the pale-golden sulcus constitutes an infallible means of identification of this bamboo. Another useful character is a faint roughness of the culm and branches that can be felt when the fingers are moved gently upward over the surface. This roughness also becomes less perceptible with time, but the newer culms will always exhibit unmistakably both of the char-

Phyllostachys flexuosa, 25 feet high, growing at the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga. The drooping habit of the foliage is clearly evident. (12-foot measuring pole at right.) Photograph by D. A. Bisset.

acters described. The light-green culm sheaths, with their slender whitish stripes and prominent, bristled auricles at the apex, are likewise very characteristic during the period of development of the new culms; the auricles are usually absent, however, on the lowest 4 or 5 sheaths. The leaves, 2-5 inches long by 3/8-5/8 inch wide, are borne 3-5 on a twig. The new shoots, when of sufficiently large diameter to be useful for food, are reported to be of very good quality.

P. aureosulcata was for a time erroneously placed under *P. nevinii* Hance and was sent out widely under that name. Since discovery of the error, up to the present, plants have been sent out by the Department of Agriculture simply as "*Phyllostachys* sp., P. I. No. 55713." The mature culms, when of suitable sizes, are useful for fishing poles, various types of plant stakes, and numerous other purposes.

P. flexuosa A. & C. Rivière appears to be a markedly variable species when grown from seed. It is native to China, though first described from Algiers. I have seen it from 3 or 4 different sources, probably from different seedlings, and only one—that shown on page 277—obtained by the U. S. Department of Agriculture from France many years ago, exhibits the flexuous character of the branches that would suggest the specific name *flexuosa*. It has grown to a height of 25 feet at Savannah, Ga. Another introduction of the species has failed to reach that height, while a third recently has greatly exceeded it. Although the qualities of the wood have not been reported upon, it may be presumed that the culms will be found serviceable for most of the purposes for which those of similar sizes of *P. aureosulcata* are used. The young shoots have not been tested for edibility, as they have been thus far too small for practical use. The leaves are 2-4 inches long and are borne usually in 2's or 3's on the twigs. The culm sheaths are somewhat variable in the different forms but in general are dull green when fresh and dull straw color after drying, and they are more or less dotted with small brown spots.

P. viridi-glaucescens A. & C. Rivière, shown on page 181 (background) of the July issue of the Magazine and on page 279, is a native of China and is one of the smaller to medium-sized species of the genus so far introduced into the United States. It was first introduced into France in 1846. From its specific name one might expect it to be strikingly distinctive in its greenness or in the glaucous character of the under surface of the leaves as compared with other species of Phyllostachys. The foliage does not, however, differ greatly in either of these respects from that of most others. The leaves, 2 or 3 to 5 on a twig, are 2½-6½ inches long and resemble so closely those of the giant timber bamboo, *P. bambusoides*, that they can scarcely be distinguished except by their perfect flatness from those of the latter species, which often are slightly wavy. The bristles, or oral setae, which radiate from the pair of auricles at the apex of the sheath of the new leaves, however, are more prominent than are those of almost any other species of the genus, but like those in other species they tend to disappear after a few months. The dry culm sheaths are dull straw color, lightly spotted and blotched with brown, and have a characteristic roughness on the upper part of the outer surface, due to scattered minute projections from some of the veins, noticeable when the fingers are moved carefully downward on the sheath. I have not found this character in any other species. The maximum height recorded at Savannah for

Phyllostachys viridi-glaucescens, 18 feet high, in a mature planting at Biltmore, N. C.

Phyllostachys nigra, a black-culmed oriental bamboo, in an early stage, at the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

Phyllostachys nigra f. muchisasa, one of the taller varieties of the black bamboo, 24 feet high, with a slightly drooping tendency of the foliage. Growing at the Barbour Lathrop Plant Introduction Garden, near Savannah.

P. viridi-glaucescens is about 24 feet—a third taller than that attained at Biltmore, where minimum winter temperatures sometimes are injurious. As to economic uses, the same may be said of it as for the preceding species.

P. nigra (Loddiges) Munro, the black bamboo, exists in several different forms, some of which at one time or another have received varietal or form names; a few have culms with little or no black. They originated in China and Japan. A view of a small planting of one of those from Japan, in an early stage of development, appears on page 280. It is very similar in appearance to a form obtained from England which may possibly be the same one for which the specific name *nigra* was first used. It differs, however, in sending up its new shoots later in the spring. The truly black bamboos that have been introduced range in their ultimate heights from about 20 to 25 feet or perhaps more. The culms and branches are at first green, with only a blackish shading of the nodes, and the ultimate black coloration develops gradually through the first or sometimes the second year. The different forms vary in this respect as well as in certain other characters. Biologically, the black and blackish-culmed bamboos constitute a group of varieties or forms of a medium-giant, green-culmed bamboo, but unfortunately the specific name *nigra* for one of the black forms —introduced early into England from China and grown by the London Horticultural Society—was published many years before the large green-culmed plant became known to science. The latter, when discovered, was first given the name *P. henonis*. The obvious fact of the relationship was recognized later but, under the rules of botanical nomenclature, the specific name first published had to stand, so that the giant green bamboo, presumably representing the original wild form of the species, became a nomenclatural variety of *P. nigra*, the much smaller black type, which is considered to be a garden variety. This giant bamboo (*P. nigra* var. *henonis* (Mitf.) Nakai) will be treated among the other hardy giants. The leaves of mature plants of the entire *P. nigra* group are rather small, ordinarily from 1½ to 3½ inches in length, a little narrow, and usually in 2's, sometimes 3's, on a twig. The fresh culm sheath is mauve, usually shaded or finely speckled with black on the upper part, with a small, crinkly, green blade at the apex, and a pair of very prominent dark-purplish auricles bearing conspicuous purplish bristles; the sheath dries to a straw color. The culms are rather thin walled but can be used for many purposes for which great strength is not required. Aside from its original name of *Bambusa nigra*, the black bamboo was later for a time called *Phyllostachys puberula* var. *nigra*. A common Japanese name is Kurochiku.

P. nigra forma *punctata* (Bean) Nakai may be called the Blackspot bamboo, to differentiate it from the other black types. It is credited to China in origin, though it probably reached the Western World from Japan. In the Blackspot variety the culm is not solid black but becomes dull-black-spotted during the second year, later turning nearly but not quite solid black and, finally, becoming overcast with gray. It has grown to about 23 feet high at Savannah, Ga. According to I. Tsuboi, the noted Japanese horticulturist and bamboo specialist, the culms of this variety are considered to be much more durable than are those of the ordinary black type grown in Japan. The Japanese names for it are Nitagurochiku, meaning "near-black bamboo," and Gomadake. Botanical synonyms are *Bambusa nigro-punctata*,

Phyllostachys sulphurea, a Chinese bamboo with culms of a clear sulfur-yellow color, at the Barbour Lathrop Plant Introduction Garden near Savannah, Ga. The tallest culms here are scarcely 18 feet but greater heights are attained. Photograph by D. A. Bisset.

Phyllostachys nigro-punctata, and *P. puberula* var. *nigro-punctata.*

P. nigra var. *muchisasa* (Houzeau de Lehaie) Nakai, a view of which is shown on page 281, is a black-stemmed variant grown in Japan and in Formosa (Taiwan), but the country of origin is said by the Japanese botanist Dr. T.

Phyllostachys aurea, 30 feet high, oriental bamboo long established in cultivation in the South, growing at the Barbour Lathrop Plant Introduction Garden near Savannah, Ga. The culms, often with irregular internodes near the base, are much in demand for fishing poles and other uses.

Phyllostachys aurea, kept in artificial clump form by cutting all culms that come up on the outside. This clump, growing in 1933 at the U. S. Plant Introduction Garden, Glenn Dale, Md., had a diameter of 6 feet at the base.

Nakai to be in doubt. It was introduced into Europe many years ago, from a source not now known. It is not clear to me why this bamboo is retained in varietal rank when the preceding one (*P. nigra* f. *punctata*) is accorded only the rank of "forma." I have not observed anything in either that would suggest the difference in treatment, and I therefore propose here the reduction of the variety to the rank of forma, as follows: *P. nigra* f. *muchisasa* (Houzeau de Lehaie) R. A. Young (*Phyllostachys puberula* var. *muchisasa* Houzeau de Lehaie in Actes III^e^ Congr. Int. Bot. Bruxelles II p. 223. 1910). At the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga., culms of this bamboo up to 24 feet high have been produced. The culm is a nearly uniform black, and the foliage is fairly abundant and tends to a slight graceful drooping. The Japanese name is Muchisasa, and this already has been adopted in Standardized Plant Names. Another botanical synonym is *P. nigripes*.

Another black bamboo, introduced from China by the Department of Agriculture in 1926, is very distinctive in having culms that become a brilliant purplish black by the end of the first year. The Chinese name for it is Oochuk. It was collected on Peng Mountain, Lungtau Mountains, by F. A. McClure. The foliage is similar to that of Muchisasa. In the early stages of development it gave promise of being definitely drooping, or willowy, in habit, and the horticultural name Willowy for it was given in Standardized Plant Names. As the stand became older, however, this character largely disappeared, and the name now seems doubtfully appropriate.

P. sulphurea A. & C. Rivière, the sulfur bamboo, is native to China though, like several others, described from Algiers (in 1879) from plants grown there from an earlier introduction into Europe. It received its name in allusion to the color of the culms and branches. They are clear sulfur yellow except for 1 or 2 slender green stripes on the rounded part of the internodes, and an irregular green ring just below the node. A view of a planting of the sulfur bamboo in process of development appears on page 283. Although the height thus far attained at Savannah is only about 18 feet, it is reported to have considerably exceeded this in Europe, and it may be expected in time to produce culms 25 to 30 feet high. The leaves are in 2's and 3's on the twigs and are up to 5 inches long. The lower culm sheaths when fresh are brownish yellow to yellowish green and more or less spotted with shades of brown; they are entirely glabrous and are perfectly smooth on the margins. The culms tend to taper a little more strongly than do those of its relatives, the base being slightly thicker in relation to height. The naming of *P. sulphurea* represents a situation somewhat similar to that of *P. nigra*, though different in detail. The plant is biologically a variety of a much larger, green-culmed bamboo (*P. sulphurea* var. *viridis* R. A. Young) but, having been validly named earlier, it retains its nomenclatural specific rank. The combination "*P. mitis* var. *sulphurea*" was used informally by J. Houzeau de Lehaie. *P. sulphurea* has had no other name except that it has been mistakenly treated by one or more Japanese botanists as a variety of *P. bambusoides*, which it assuredly is not.

P. aurea A. & C. Rivière is thought to be the earliest species of this genus to be successfully introduced into the United States. Notwithstanding the extensive later placing of experimental plants of other species with nurseries and individuals by the Department of Agriculture and the subsequent sale of

Basal sections of selected culms of Phyllostachys aurea, showing the characteristic distortion of nodes and internodes of some of the culms that makes them attractive for walking sticks, etc.; no two culms are exactly alike but some are very similar. The base of nearly one-half of the culms may exhibit these irregularities of structure. Photograph by Robert L. Taylor.

propagations from these by nurserymen, *P. aurea* probably is still, on a small scale, the most widely grown member of the group. A recent view of a plot at the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, grown for comparative study purposes from plants obtained from the Royal Botanic Gardens, Kew, England is shown on page 284. The height of 30 feet indicated is probably not the maximum for the species, as there are unverified reports from other sources of 5 to 10 feet greater. The largest single area of *P. aurea* of which I have heard is one of about 10 acres, owned by Mr. George H. Todd of Montgomery, Alabama. This was started a great many years ago by Mr. Todd's father, George H. Todd, Sr., from plants that he obtained direct from Japan. Although the species has the creeping rhizomes of all its relatives, it spreads much less rapidly than many. It is not difficult to confine it to a satisfactory clump form, for a number of years at least, by cutting any culms that may come up beyond the limits desired. A clump so formed is shown on page 285. The leaves of *P. aurea* are mostly rather small but they range up to 5 inches long; there are usually only 2 or 3 on a twig. The species has flowered oftener than any other of the introduced bamboos but little seed has been produced. An outstanding characteristic of this bamboo is a type of distortion of many of the culms by which a varying number of the lower internodes are shortened, in a very irregular manner; the nodes occasionally are inclined at an oblique angle, and there appears to be a form in which this pattern is commonly carried out in such a way as to give a tortoise-shell effect. This crowding of the nodes makes such culms very attractive for distinctive fishing poles and walking sticks, especially in view of the fact that the wood of this species is generally rated high in strength. A photograph showing the larger ends of a collection of walking sticks produced by Mr. E. A. McIlhenny, Avery Island, La., appears on page 287. The mature culms of this species may be considered as of high quality generally for all purposes to which bamboo of its size range may be adapted. The specific name *aurea*, which would seem to imply a distinctly golden or yellow coloration, is to that extent a misnomer. The culm is green at first and becomes no more golden with age than do the culms of numerous related species when grown under similar light conditions; and of course it does not at any time compare with the brilliant culm of *P. sulphurea* or that of *P. bambusoides* var. *castilloni* — to be discussed on a later page. The form of *P. aurea* with the tortoise-shell pattern in some of the culms has been called *P. heterocycla* but aside from this I do not know of any other name in scientific form, nor have I known of any appropriate common name for the species.

P. purpurata McClure, of which a view is shown on page 289, is a Chinese bamboo introduced in 1927 by the Department of Agriculture. It among others was collected in Anhwei Province, by F. A. McClure, then agricultural explorer for the Department. The species is of more than usual interest because of the solid or nearly solid lower internodes of the culm and the thick-walled higher ones. It is possible that some variation in this character of the culms among clones of different seedling origins will be found, as differences among them of 10 to 15 feet in apparent maximum height have been observed; variability in soil, however, may be a factor here. The clone with the 24-foot culms shown in the photograph appears to be intermediate in height. The culms of *P. purpurata* are comparatively slender and com-

Phyllostachys purpurata, a Chinese bamboo with solid or nearly solid culms. The height of the culms here is about 24 feet.

Phyllostachys bambusoides var. castilloni, an oriental bamboo about 28 feet high, with golden-yellow culms with a bright-green stripe on each internode. Photograph by D. A. Bisset.

monly are bent or arched. The foliage is a somewhat darker green than that of many other species of the genus. Characteristic is an unusually thick, matted growth of rhizomes and roots near the surface of the soil. This suggests possible value of the species as a soil binder on earthen dams and levees.

P. bambusoides var. *castilloni* (Marl.) Houzeau de Lehaie, as the name indicates, is a variety of the hardy giant timber bamboo, *P. bambusoides*. It is a comparatively small variety, probably not much exceeding the 28 feet in height that it has attained in the planting at the U. S. Barbour Lathrop Plant Introduction Garden, shown in the photograph on page 290. The type commonly reaches 60 feet and more under favorable conditions. The variety is instantly recognized by its golden-yellow culms and branches with the bright green sulcus (flattened side) of each internode; occasionally traces of the green on the sulcus extend upward into the rounded part of the next internode above. The leaves, usually 3 to 5 on a twig, range from 2 to 6 inches in length; they are commonly a little wavy and sometimes have 1 or 2 narrow creamy-white stripes. Most of the varietal characters appear to be subject to variation at times. Mr. Julian Nally, the present owner of the place at Gotha, Florida, formerly owned by the late Henry Nehrling, found a sport a few years ago in which the green coloring of the sulcus was entirely absent, the culm being practically a pure yellow. This might rather easily be confused with *P. sulphurea*, described and illustrated in earlier pages, but is distinctly different in detailed characters. The common name Castillo bamboo for *P. bambusoides* var. *castilloni* was given in the second edition of Standardized Plant Names and I think is quite as suitable as any that might be chosen or conjured up. The plant was originally named *Bambusa castilloni*, in honor of the Comte de Castillon, by the French horticulturist Marliac, and later was called *Phyllostachys castillonis* (the final "s" was added in error). The combination *P. reticulata* var. *castillonis* was also published and is still used by the Japanese botanists and perhaps some others. The question as between the species names *bambusoides* and *reticulata* hinges on whether the giant timber bamboo, the plant we know as *P. bambusoides*, has been correctly identified with the one that earlier had been named *Bambusa reticulata*. In the light of the best-informed opinion that I have been able to obtain, it seems most likely that the two were different, in which case the correct specific name is *bambusoides*, as here used, and not *reticulata*. While the Castillo bamboo is of interest chiefly for the beautiful and striking color contrast of the fresh culms, the mature culms can be used for many utilitarian purposes with the limitations suggested for *P. flexuosa*.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

Two Colorado Ferns

The traveller through Colorado (when people travelled) might well wonder how on earth ferns could grow in such a dry sunny country. They are rarely to be seen by roadsides except where Bracken covers the mountain slopes of the Rockies as it does on Rabbit Ear Pass.

Several of the commoner species, found generally in cool moist places in the temperate zone, grow along streams and in shaded rock clefts in the foothills and mountains.

There are found in Colorado two ferns which are not so widely distributed, both of them beauties:

Nothalena fendleri, Cloak Fern, resembles the Maidenhair Fern of parlor windows—in the days of parlors—except that it looks less lush, more wiry, much more dainty and at the same time independent. Its wiry stems of dark brown zig-zag obligingly to where each leaf wishes to begin. The leaves are deltoid, pinnately divided and the general affect is that of many tiny flecks of bright green supported on invisible stems. "Cloak" refers to the fine whitish powder which cloaks the spores and coats the underside of fronds. This is all nothing but words! The thrill of seeing this growing in clefts of huge granite boulders usually out of reach in perpendicular rock faces is unforgettable.

It is inclined to be homesick when transplanted. One requirement — as well as the comfort of large rocks— seems to be air drainage, and it prefers shade or a north exposure.

The second of our pair is *Cystopteris montana,* an arctic fern which has wandered south to grow by Scottish streams and, in the Western Hemisphere, to Glacier National Park. Colorado is a long way south from its home; even so it has been found in two different areas in the state. One on Mt. Princeton from which it seems to have disappeared, the other where it still grows is a cold north slope on Hoosier Pass about 11,000 feet above sea level. Here in a clearing of Engelmann Spruce is a stream from melting snow which fans out and chuckles to itself under large angular rocks. The surface is a floor of softest, greenest moss from which springs this very lovely fern. The general effect is that of horizontal, triangular fronds delicately pinnate, about a foot high. In spite of its arctic origin it grows well in the garden in a cool shady bed of peat moss, sub-irrigated, but it has not in several years attained the height or size that it does on its cool mountain home. One high spot in years of plant collecting was when we followed a Lycopodium hint and climbed to where this beautiful room in the mountain forest suddenly appeared in the slants of sunshine through the trees. The only thing possible was to sit down on a fallen log to look—and look—and look.

KATHLEEN MARRIAGE,
Colorado Springs, Colo.
January 1945

A Dissertation on rock garden annuals
In words of one syllable, strictly for amateurs.

In the use of annuals for the rock garden, one must tread carefully—just why is a subject to itself, not easily nor quickly disposed of, and open to much controversy. But the line of demarcation between suitability and incongru-

Kathleen Marriage

[*See page* 292]

Nothalena fendleri

ity is a delicate one, and over-stepping it becomes too often a *reductio ad absurdum*.

It may be well to remind our readers that rock gardening in America is in its infancy, and due to the wide diversity of our geographical conditions, set rules for the use of plants are impossible; one man's meat is too truly another man's poison.

Curiously enough, this fact is apt to be ignored, with the result that frequently many summer rock gardens present what a witty and discriminating gardener once called "desperation planting"—a condition understandably caused by lack of definite reliable information on tried-out material. Especially must one step lightly where the rock garden is under constant observation from frost to frost and the summer season is a long one. As in our Upper Middle South, it would seem that few annuals are well known that are really suitable and which, without nursing, will provide successional fresh bloom until frost. Such as are easily available are an answer to prayer.

True, the name is legion of iron-clad annuals contributing to the ordinary summer display, but comparatively few that we know here in America are in harmony with rock garden pictures, even though so robust in constitution as to flourish under most adverse conditions. Take the petunia, for instance. No one can deny its value, and its willingness and determination to people the earth, even under neglect. But who wants a petunia among rocks? The very character of the rock garden rejects such sophistication as is present in the beautiful modern forms, so obviously "city bred."

If one could lay down a general rule, it might be "Avoid specially hybridized and perfected subjects; search for plants that come unchanged from the wild and that haven't lost their individuality."

For my own part, after long years of studying catalogues (both foreign and home) in search of material that will flourish under adverse conditions in my tiny experimental "rock patch," I have found many that respond in various degrees to the exactions of heat, drouth, and thirsty tree roots. Some are able to take care of themselves from the beginning; some require a start in the seed box or cold frame. But in these days of labor shortages where one must get the most effect with the least work, my list of indispensables that will cover the season has shortened to a handful. only one of which requires early indoor sowing and transplanting. The others take care of a seasonal succession of bloom with volunteer seedlings which come up everywhere, and are easily set in place, and bloom at their appointed time.

Collinsia verna (a native of the Ohio Valley) is the first to bloom, starting in early April with plants from seeds dropped the previous year. There can be no appeal from the statement that it ranks among the choicest and most suitable of all rock garden material. Any one who has seen a woodland hillside bordered with sheets of blue that literally, and without poetic rhapsody, seems to be a fallen patch from the sky, will agree with this statement. Unfortunately, its own beauty has been its undoing, for indiscriminate picking by an enthusiastic and ignorant public has almost exterminated it in the wild, since it must be left to seed itself or it disappears. Fortunately the Wild Flower Preservation Society occasionally offers seeds, and any gardener lucky enough to have it will gladly cooperate in its preservation by giving seeds or a clump of young plants. "Blue Eyed Mary," as it is often called,

Kathleen Marriage

[*See page* 292]

Cystopteris montana

is the eastern member of the west coast *Collinsia* family, familiarly known as "Chinese Houses." It is the only one of these charming and worth-while annuals to dependably self-sow for me. The westerners must be spring-sown each year, and, moreover, not only bloom later, but haven't the length of blooming period of *C. verna*.

The color and character of the flowers are outstanding. They are quarter-inch, four-petalled blooms, resembling a miniature snapdragon or penstemon (for C. belongs to the Scrophulariaceae) ; they grow in whorls of three to six on 4-5 inch spikes at the top of 8-10 inch stems. The flowers on 1-inch pedicels and facing directly outward have the upper petals pure white, the lower a clear, forget-me-not blue, one of the few true blues in the flower kingdom. The leaves are ovate or oblong. Seedlings begin showing in October, little, reddish, quite weedy looking, and continue to germinate till late March. The first blooms appear normally in early April, the last strong patch of color lasting till late May.

Silene pendula comes next, overlapping the *Collinsia* for about half the

blooming period. It is a true winter annual, seedlings appearing in autumn and growing into huge spreading masses of bloom in late April till into June. Unlike the *Collinsia*, which insists on winter germination, seeds of the *Silene* can be sown in spring for later bloom, though I have not found that in hot weather they make as large nor as long-lived plants. Bailey said of it that it comes from the Mediterranean region and blooms July-August. The ¾-inch true catchfly flowers, with a longish inflated calyz are an exquisite tone of salmon pink. The foliage, oblong spatulate to lanceolate, is soft grayish. This plant will drape itself over the edge of the rocks and often makes a sturdy, upright, bushy plant against a wall background. Seedlings can be moved at any time. My first seeds came from Thompson and Morgan in 1922 and I have never had to buy more.

Sedum pulchellum, a native American, is what its name implies—a beautiful plant. It is described as a perennial by every botanist that I have been able to consult, from Gray to Lloyd Prager, and naturally, I hesitate to go against High Authority. But it was given to me as an annual, and for me it *is* an annual, and an invaluable one at that. The plant dies entirely when seedling is finished, no trace is left of it, and that plant never returns. But in late autumn and well into the spring, tiny intriguing seedlings begin to pop up for yards around it (especially for me between stones or brick walks) which only need to be picked up and put in any desired place. It can even be moved without flagging, in full bloom. One plant will establish future hundreds.

In color it is contradictory. Close examination of the tiny florets that are borne in characteristic claw-like clusters prove them a pure, deep rose pink. But the leaves and stems are so determinedly a light greenish-yellow, that the two tones blend curiously and the mass effect is a good salmon pink. The individual plant, about 4 inches tall, looks like a tiny, aged pine tree, with bare trunks and spreading windswept top branches. To see this sedum in its glory, one should make a pilgrimage in late May to the Blandy Farm, the experiment station of the University of Virginia, at Boyce, Virginia, where acres of the out-cropping rocks that slope to the water are gorgeous sheets of bloom for several weeks.

In late June, following the sedum, there is a short lull in the volunteer ranks, but the Chinese *Incarvillea variabilis* (which from an early hot bed will be starting into bloom) makes a valuable and suitable contribution. This member of the Bignonaceae is a tender perennial, but blooms early the first year from seed, and its beauty and hardiness of constitution repay any trouble taken. It has lacy, finely cut leaves, makes a sub-shrub about 12-15 inches high and across, and its 1-inch trumpet-shaped flowers in white or pastel pink or creamy yellow are borne generously and steadily until frost. It likes to hang over a wall.

Cuphea miniata is the choicest member of the cuphea group, and yet is amazingly little known. It differs greatly from its relative, the tender greenhouse plant we call the "Cigar Flower," both in habit of growth and in appearance. It self-seeds vigorously, the seedlings appearing in late May, and by the first week of July, it is in full flower for the rest of the season. A botanical description gives no idea of its charm nor value. The ¾-inch flowers have two crinkly petals of a fine cherry-red (occasionally a purplish tone crops out), with a clear fuchsia purple at the throat. Curiously enough, though definitely red (that

color so frequently anathema to the "high-brow" gardener), *Cuphea miniata* blends perfectly with either bluish or yellowish reds, even pink, and is valuable as a cut flower. The small leaves are a strong yellow-green, slightly hairy; the bushy plants, which like to sprawl, grow to 18 inches in full sun, and are smothered in bloom from June till October. It flourishes like our anathemized petunia in any and all situations.

Torenia fournieri with its variations *T. Bailloni* (yellow and brown) and *T. alba,* bring up the rear of this procession and is probably the most pliable to handle, for in addition to its normal habits of self-perpetuation, it responds to a succession of crops with very little effort on the part of the gardener. Its blooming period is shorter than any of the above-mentioned plants, but as the small, natural volunteers appear in mid-to-late summer, it contributes its bit with the early autumn bulb parade. The little "Monkey Faces" with their lavender and purple pansy-like blooms are particularly striking grown with the deep red of *Habranthus pratensis.* The plants with their crisp, bright yellow-green foliage never exceed 10 inches in the meagre rock garden soil, and form a harmonious ground cover for the 12-15-inch amaryllids during their September bloom.

A tender perennial vine that can be depended upon to self-sow and bloom the first year from seed is *Thunbergia alata* from Africa. It can be a pest or a 100 per cent asset, for it covers much space and may have to be relentlessly weeded out to prevent suffocation of its neighbors. But in the right spot, the lovely corn-color yellow or white "Black-eyed Susans" with their black spots at their throats, bloom vigorously and uninterruptedly from their first growth in June and only cease when the frost bites the garden. Once sown, like the poor, they are always with us.

With these few "fool-proof" annuals to build on, even war-time exigencies need not deprive us of good mid- and late summer color in the rock garden.

VIOLET NILES WALKER,
Woodberry Forest, Va.

Lily Notes

GEORGE L. SLATE, *Editor*

Success with L. japonicum

About 1933 the writer began the cultivation of lilies as a hobby. The aim was first to get a collection of hardy species together and then from these to breed better varieties. Of course such difficulties as mosaic, bulb rot, and botrytis were unheard of. Likewise still to be learned were the difficulties in hybridization such as sterility, incompatibility, apomixis, etc. No sensational hybrids have been obtained to date—they are still in the future!

But no matter how many failures a gardener may have, there are a few bright spots. *L. japonicum* has furnished one of these for us. The descriptions and pictures of this lily, coupled with warnings of the difficulties of its culture, are enough to challenge any lover of lilies. Bulbs were ordered from three different sources between 1933 and 1935, and planted in strictest accordance with directions. Some never produced growth and none ever flowered.

In the meantime, seeds of *L. japoni-*

cum had been imported from Japan during the winter of 1934 (address of Japanese firm useless now). Our success with this lily started with these seeds. They were planted in a flat containing a compost rich in leaf mold. Two winters and one summer were required for germination, except that two or three pushed up near the end of the summer. The germination is similar to that of *L. auratum,* but the first leaf is smaller. In the spring, one year after germination, the small bulbs were transplanted to a frame. Here the soil was again almost pure humus.

The frames which we use consist of parallel boards about a foot high and three feet ten inches apart (inside distance). This width permits shading by lath sections four feet square. The laths are spaced the width of one lath apart and are placed in the usual way with the lath length running north and south. The soil in the frame is slightly raised to facilitate drainage.

Here the seedling bulbs remained until the spring of 1941, gaining strength each year. They were watered in dry seasons and mulched with hay during the winter. The lath shade was maintained throughout the growing season.

On July 6, 1940 the first flower of palest pink appeared and lasted five days. That was a "Red Letter Day" when we saw our first *L. japonicum* in flower and experienced a new perfume! Much praise has been given to the grace and beauty of this lily, but far too little mention has been made of the fragrance it exhales. I contend that if this lily were the plainest member of the genus, its perfume would still make it well worth-while. It is not nearly as strong as that of *auratum* or *regale,* and has a quality that must be experienced to be understood. Another pleasing difference peculiar to this lily is the manner in which the three lower petals protrude. Perhaps they are landing strips provided for friendly insects.

In succeeding years there were more flowers, and deeper colors, but none so far have approached a rose pink. In 1941 the flowering season was from June 30th through July 15th, and in 1942, from June 23d to July 22nd. A still further delightful characteristic of this lily is this long flowering season, which, of course, is partly due to the larger number of bulbs that flowered.

In the spring of 1941 we moved to our present location, where we have twenty-two acres of rocky woodland, with exposures to all points of the compass, and a wide range of soils. During the hubbub of getting a house built and moving a considerable collection of perennials, shrubs, bulbs, conifers, etc., besides clearing a garden space, the lilies were somewhat neglected. Everything had to be done with a slapdash, a pat, and a promise!

L. japonicum, however, merited attention. There is a pond in our woods which has a hard clay bottom covered with an accumulation of well-rotted leaf mold. This pond dries up in the summer. During the preceeding summer several wheelbarrow-loads of this were piled up to dry and air out. Three beds were prepared, each about a foot deep, and filled in with this leaf mold, using no sand or other admixture. Two beds were made level with the ground and one was slightly raised. The amount of shade (from tall trees) varied from forty to seventy percent.

The bulbs of *L. japonicum* are white; and these, when planted early in the spring of 1941, were small, few being over one-half inch in diameter. They were planted closely, about three inches deep, in rows four inches apart, and the beds were surrounded by chicken wire to discourage the woodchucks and rabbits. About ten plants flowered that year, and more in 1943.

Last spring (1944) a new bed was similarly prepared at a lower level and the second and fourth rows were moved *after the shoots had pierced the ground!* By using a spade, the bulbs were not disturbed, and they flowered well. This spring they look better than those not moved and have a larger proportion of buds. Incidentally, this newest bed is about one foot above the water level of a winter pond less than twenty feet away.

The writer was led to believe that *L. japonicum* demands considerable moisture in the soil, by that monumental article by Dr. F. Stoker, "The Environment of Lilies in Nature" (R. H. S. Lily Year Book, 1933, Pages 11-54). From page 44 I quote in part:

> "Lilium Japonicum Thunberg (Syn. Krameri) — trees, shrubs, dwarf bamboos; half shade. Moist humoid soil by river banks, rocks, roadsides, woodlands, with good drainage (Wilson). Rainfall large—humidity 65-85%, Temperature 30-70°."

The expression "good drainage" probably has mis-led many persons to use excessive sand when growing *L. japonicum.* Personally, I have not found any lily that is benefitted by the use of sand. A soil can be well-drained and still be retentive of moisture. The English climate perhaps requires more attention to drainage.

With seedlings, numerous combinations of soils, shade, exposures, etc., can be tried, until the best combinations are found. Of the three beds planted here the driest was unsatisfactory from the first. Today there are left only two short non-flowering spikes and a few single leaves. The other two of the three original beds have done well. The one which was slightly raised now has the most light (about 60%) and is making the best showing this year. It has the most robust spike—but not the tallest—and the largest percentage in bud at the present date (June 6, 1945).

For plant food nothing has been used except low-analysis commercial fertilizer broadcast between the rows early in the season. No winter mulch is used except the falling leaves which collect naturally. No winter or spring frost damage has ever been experienced. This lily is *not* tender.

Seed sets freely — practically every flower will produce a full capsule—if permitted. The seed ripens slowly and is seldom mature before Thanksgiving. We used to worry about frost damage, but the cold seems to have no bad effects whatever. We have been saving seed only from one or two of the best flowers and now have three lots started; all planted and left completely outside.

Following are the maximum dimensions of the two best flowering stalks: one, the tallest, growing in about 70% shade, the second, the most robust, in about 40% shade. The tallest has narrower leaves and is lighter green. Each shows one bud. Maximum height, 2 ft. 3 in.; longest leaf, 6½", located 11" from ground; number of leaves, 12; maximum width of leaf, 1"; nerves, including mid-rib, 3; stem diameter at ground, 3/16".

Never—including this season—has there been more than a single flower per spike. Also there has always been a large percentage of non-flowering spikes. Today, there are only twelve stalks which show buds out of about fifty that are of flowering size. I have noted this same condition in the picture of a group of *L. japonicum* growing in California. Yet other pictures of a single plant usually show more than on bloom. Probably we have been giving too much moisture? Is the soil wrong, or have we a poor strain of this lily? Now that the rabbits and

woodchucks have been pretty well routed, and there is more time, we plan to spread our plantings around to check these conclusions. We would greatly appreciate the opinions of anyone who is interested.

Thinking that our seed might be of an inferior variety, we secured seeds from another source, but today the two-year seedlings are much smaller than plants of the same age from our own seed. There is a variety, platyphyllum or platyfolium, which should be stronger.

No difficulties from insects have been experienced except from a small snout beetle of undetermined name which insists on eating scallops all along the margins of the leaves. This pest seems most partial to *L. japonicum!* So far it has proved more annoying than destructive. We keep it in check by handpicking the beetles late in the day.

We hope no one will be discouraged from attempting to rear this lily from seed by anything said in this article Everyone can supply humus and everyone can provide shade artificially or otherwise.

By growing seedlings, re-selecting, trial and re-trial—here in North America—we shall gradually acclimatize and improve on this beautiful and fragrant lily. We can never get anywhere by importing the soft and perishable bulbs.

RALPH M. WARNER,
Woodmont Road, RFD No. 1,
Milford, Connecticut.

Sulphureum Lily not Reliably Hardy

The Sulphureum lily (*Lilium myriophyllum*) is the largest of the trumpet lilies that can be grown successfully in this region but it is not reliably winter-hardy. Farther north (Vermont) where the snows come early and remain until late spring it winters over as well as other lilies. I obtained three bulbs of it 15 years ago and they produced several immense flowers on stalks 5 to 6 feet tall, but sub-zero temperatures one winter proved more than they could stand. A few years later I planted six bulbs in a border along the south side of a building but none came up the following spring. Then I bought two more and planted them in 9-inch flowerpots which were sunk in the ground in the spring and brought into a cool cellar in the fall. One was planted eight inches deep the second fall and mulched with six inches of peat moss but it never showed up. The other has borne two fine flowers each year and produced many bulbils. These are placed in a flowerpot of sand and soil and carried over winter in the cellar. They sprout in early spring and, when the weather is favorable, they are lined out in a frame to grow during the summer, and are returned to the cellar in the fall. This lily is so gorgeous that it is worth while going to the extra labor to get it to bloom.

EDWIN C. POWELL,
Maryland.

A Book or Two

Weeds of Lawn and Garden. A Handbook for Eastern Temperate North America. By John M. Fogg, Jr., University of Pennsylvania Press, Philadelphia, Pa. 1945. 215 pages, illustrated. $2.50.

Gardeners whether they will or no, come sooner or later to an understanding of weeds, but their knowledge may be born only out of that hard and elementary teacher, Experience.

This book is written "with the hope of enabling the gardener to identify the most common weeds of lawn and garden. . . ." It is written by a botanist who has preserved the underlying organization of his science by presenting his material in the Engler and Prantl family sequence, but has obliged the amateur or non-botanist by presenting the plants with their common names within these families. The scientific names are given but not the authorities, though one may find them by reference to Gray's New Manual of Botany 7th edition. This reviewer regrets this, since this book, both in its preliminary text and in the herbal-like body is an infectious as well as persuasive document for the evolving amateur.

Many readers may treat this like a Chinese book, reading backward (to us) from the picture section to the foreword. This will be a mistake, but whether you start on page 201 or page 2, do not skip a word.

A word must be said for the drawings which are not only faithful but beauitful in themselves, at times with the same fortuitous charm that marks the earliest woodcuts, and resulting from a too complete presentation of venation. They are in black and white, drawn with a firm but sensitive pen. They are the work of Léonie Hagerty.

This is a very nice book, one to which you will return with pleasure. The reviewer himself, having just slaughtered some hundreds of young poke weeds (an annual rite), a beautiful crop of daisy fleabane, a galinsoga or two (these are almost beaten) various crabgrasses and so on, not forgetting the really beautiful patterns of Mollugo, particularly enjoys the line ". . . there is no panacea, few short cuts, and no real substitute for just plain weeding." He would have liked a line or two on composting since most of us are not so good that weeds are all slaughtered at birth, and a word or two about which, when pulled must never be left to die in place, since they have fabulous powers of rerooting!

Vegetable Dyes From North American Plants. Douglas Leechman. The Webb Publishing Co., Book Division, St. Paul 2, Minn. 55 pages. Paper cover $.60, cloth $1.25.

This is a small manual, simply and clearly written, intended for the use of "handicrafters" but presented in such a form that it can be read with interest even by those who have not the faintest intention of dyeing anything.

The gardener may well look with a more discerning eye on the plants, not so much of his garden perhaps as of his familiar country side.

It is a book to hold in one's hand while he works with the other.

Dr. Leechman, the author, "outdoor hobbyist, naturalist and archaeologist, is a staff member of one of Canada's most important museums and was for many years the editor of The Canadian Field Naturalist."

Modern Farmers Cyclopedia of Agriculture. E. V. Wilcox. Orange Judd Publishing Co., Inc. New York, 1944. 497 pages, illustrated. $4.50.

As can be guessed from the number of pages, this is a well compressed treatment of many things. Its sections are: Field Crops (44 entries), Garden Crops (44 entries), Fruits and Nuts (53 entries), Beef Cattle and Dairying, Other Live Stock, Poultry, Drainage, Fertilizers, Irrigation, Soils, etc., and Miscellaneous.

The style is clear and succint and should provide the exact type of reference book for the farmer in nearly every emergency.

The Field Seed Industry in the United States. Frank Victor Beck. University of Wisconsin Press, Madison, Wisconsin, 1944. 230 pages, illustrated. $3.00.

"The author, Dr. Frank Beck, is economist of the Field Seed Institute of North America, an organization for the promotion of research on field seed production and distribution."

This suggests as good an expression of what one may expect as anything else. For the seller's and grower's eye rather than the consumers.

Southern Field Crops Management. E. N. Fergus, Carsie Hammond and Hayden Rogers: Edited by R. W. Gregory. J. B. Lippincott Co., Philadelphia, Pa. 1944. 725 pages, illustrated. $0.00.

"This book is designed to be of use to those engaged in, or who expect to engage in, producing field crops, in the South. Crops not limited to the South are discussed from a national standpoint. * * * * Not only is material in specific crops presented, but the book has a chapter on 'What Crops to Grow' etc. . . ." Apparently there were endless advisers.

Pictures have been borrowed from all directions. Corn, cotton, tobacco, small grains, hay crops, and so on—not forgetting the inevitable song for soil conservation and a passionate page or two for Kudzu.

New Crops for the New World. Edited by Charles Morrow Wilson. The Macmillan Company, New York, 1944. 295 pages, illustrated. $3.50.

This is a most interesting if sometimes an unsatisfactory book. It is made up of sixteen shorter or longer pieces by fourteen different people all with different backgrounds of experience, both here and in Latin America, for the "New World" of the title is made up of our Americas and does not mean a new "global" world, or at least not yet.

Some of the copy is born of business, some of government work, some of pure compilation. Some of it is much more complete and factual than some other parts. Some is tinctured by opinion, some is touched by caprice and some is on a purely "take it or leave it" basis.

Whether you are interested in Latin America or not, whether you hope to enjoy material imported from our sister republics or prefer to go there to eat "out of hand," read the book.

If it had no other virtue, and it has many, it has the particular virtue of the radio. If you don't care for the author or the subject matter, you may turn him not off but down, and pass on to the next and all this without spoiling the story.

The Gardener's Pocketbook

From the Midwest Horticultural Society

Cercis canadensis alba.

While the redbud has been well known for some time and has taken its place as a standard item in the nursery trade the white form is not known and is offered by scarcely more than a half dozen nurseries. Apparently the white form is restricted in its occurrence to the Ozarks of Missouri as the reports of it have come from there mostly by way of the Missouri Botanical Garden. Several specimens have been found. One of the first finds was studied by the staff of the Garden and successfully propagated. Material was then disseminated to some nurseries and today there are some half dozen widely scattered nurseries supplying the plant.

In normal appearance there is little to mark the white flowered form. Possibly a trifle lighter color of the foliage, and no red tinge on the petioles. The flower buds are greenish white and lack the red color of the species. All parts of the flower are a pure white.

Cultural handling of this variety is no different from that of the parent species. The use of the plants with a ball is desirable as redbuds sometime die back to the root and this would be catastrophic in the case of a grafted plant.

This is a striking plant if flower and in combination with the rosy normal color would greatly enhance any landscape.

Certainly this is one of the plants worth hunting for.

Kerria japonica

This interesting low shrub is one that apparently has not been extensively used. It is listed in practically all catalogues but rarely shows up in gardens.

As a garden plant for facing shrubs of taller stature or for use as a low informal hedge Kerria has much to recommend it. The foliage is a vivid green with rugose veins, and is very ornamental. The small branches and most of the old ones are a bright green that remains so all winter. It is a bright green reminder of spring against the snow and ice. The flowers are bright yellow and resemble buttercups in size and shape. They appear in the middle of May in normal seasons. There is a double form in which the flowers resemble golden balls.

Culture is as for most shrubs. A fair soil, with full exposure or light shade, and pruning to remove old stems. Propagation in the garden can be effected by the removal of the stems which creep a short distance from the clump. These do not spread so rapidly as to cause the plant to get out of bounds.

This neat little shrub has much to add to many gardens where bright green and gold can be used. For winter color this is tops.

Deutzia gracilis

The choice of low shrubby material for the Middle West does not give a great deal of variety. One shrub that has the habit of low stature and sufficient hardiness is the Slender Deutzia. This plant like the larger deutzias is not particular as to soil or location. It will do fair in rather heavy shade or in poor soil but reaches its best development when given better opportunities.

This plant is listed as growing to six feet in some works but the height of two feet as listed in others is closer

and is the height of those that I have observed. The plants are rather spreading with small branches. The flowers are white in small racemes and produced in early spring.

This could be used as a foreground shrub to face taller material or as a low hedge either trimmed or untrimmed. The foliage is about 2½ inches long and a bright green. Probably the size of the foliage would not lend itself to extremely close trimming without giving a chopped effect but as a hedge trimmed before leafing out and with occasional pinching of long shoots it should give a neat appearance.

Five-leaved aralia

This neat shrub which is very useful for shady situations has had a taxonomic history that is confusing and still adds to the difficulty as the older name still occurs occasionally and the common name is merely a translation. At the present this is placed in *Acanthopanax sieboldianum,* but formerly was known as *Aralia pentaphyllum.*

While supposed to reach ten feet in height this is seldom attained in this region as the plant is generally used in shady and difficult situations that would tend to slow growth and reduce ultimate height.

In small plants the branches are erect and the plant has a rather columnar appearance. With age the branches ascend and then arch outward giving a round topped shrub from a compact base.

The leaves are five parted, about 2½" in diameter and a dark glossy green. The flowers are small and white and are not generally conspicuous enough to warrant much attention.

While the ability of this plant to succeed in shady spots has been mentioned it will grow better in open situations. Soil conditions should be moderate. Propagation of the plant is effected by removal of the side stems after they have rooted or by cuttings which are not always so readily rooted.

There seems to have been a dearth of this species in the lists this spring, but once the labor situation eases, no doubt this will find its way back in.

ELDRED E. GREEN.

Ranunculus cooleyae

This charming little flower which grows among the snows of the Alaska Mountains, was named in honor of Miss Grace E. Cooley, instructor in Botany at Wellesley College, Massachusetts, who collected the plant in August, 1891 on a trip to Alaska. She found it in fruit among loose rocks near the top of a snow-covered ridge, not far from the city of Juneau. In August, 1892, it was collected in flower near the top of a bare, 3,000 foot mountain of the Saint Elias Alps, above Disenchantment Bay, Alaska. Mr. Frederick Funston, the finder, says that the plant is rare and he was able to obtain only five specimens. It is, however, still growing in its mountain haunts as these photographs were taken recently by Mrs. Maxcine Williams of Juneau.

The yellow flowers grow on 1- or 2-flowered scapes, naked or bearing a small leaf near the middle; the scapes when in flower about the length of the leaves—1 to 1½ inches—later 8-10 inches in height. There are many root leaves, orbicular, on short stems. The leaves are deeply 3-parted, each division again 3-5-parted, the lobes oblong, obtuse, granular-tipped; sepals 5, oblong, obtuse, deciduous, smooth. There are 10 oblong yellow petals, tapering at the base into a slender claw. Stamens are numerous; carpels numerous in a close head, strongly compressed laterally. Style short, reflexed.

This is one of the flowers which is not intimidated by Alaska's snows, producing its blossoms, as our eastern ar-

Maxcine Williams

Ranunculus cooleyae

butus does, directly from its snowy refuge. It blooms in August.

SARAH V. COOMBS.
Scarsdale, N. Y.

An Annual Report

Some flowers are perennial in the South but perform like annuals in our gardens in the Middle West. Others are biennial but might well be called winter annuals and then there are those which are strictly annuals in every sense of the word.

Collinsia verna, the dear little Blue-eyed Mary, is a charming winter annual of the Figwort Family that blooms in late April or in May. Seeds are sown in August in a semi-shady spot if possible although it will bloom very satisfactorily in a sunny location. It takes several weeks for the seeds to germinate and they make little fall growth. But they winter over perfectly and awaken early in the spring and are budded almost before some of the lazier perennials have even raised their heads. A bed of them planted thickly is a checkered mist of blue and white two-lipped flowers in whorls of five to six blossoms and three or more whorls to a stem. They self-sow very satisfactorily.

Another early blooming flower which is a biennial but which might well be classed as a winter annual is the English Wallflower Fire King. There are many varieties of Wallflowers but Fire King in a glorious orange. I sow the fresh seeds in August. They germinate in less than two weeks' time and make fine clumps by the end of the growing season. In the spring they grow rapidly and just now as I am writing this on May 15th, they are in all their glory—like so much golden sunshine on even this dark day. They are in bloom for many weeks and are so delightfully fragrant. One really has to see them in full bloom to fully appreciate them and to be able to realize their great desirability. Such plants as double Larkspurs, Iris and Heartsease in blue-purple shades planted near them are lovely. Also Hemerocallis and Tulips in orange-yellow colors.

What are Pansies? Annuals, biennials or perennials: Use them as winter annuals, planting the seed in August and enjoy their luxurious blossoms from late March on while someone else wrangles over their botanical classification. Buy seeds of the large-flowered strains and plant them in a well prepared seed bed. They must not dry

out during the first ten days or you will have no Pansy plants. Burlap sacks or lath covers for shade will make it easier to keep the bed just moist for the best germination results. It is well to keep the young plants shaded during the hot hours of the day until cooler weather comes. Thin them out if the plants are too thick. In the Spring when they commence blooming pay no attention to the "pick-your-Pansies-every-day-if-you-want-to-keep-them-blooming" advocates. Pick only the blossoms wanted for button-holes and bouquets and leave the rest on the bushes to provide beauty to the border. A Pansy during favorable growing weather is much larger by the 4th day than it is the day it opens. Keep the *faded* blossoms snipped off regularly to prevent seed formation and your plants will continue blooming if they have plenty of moisture.

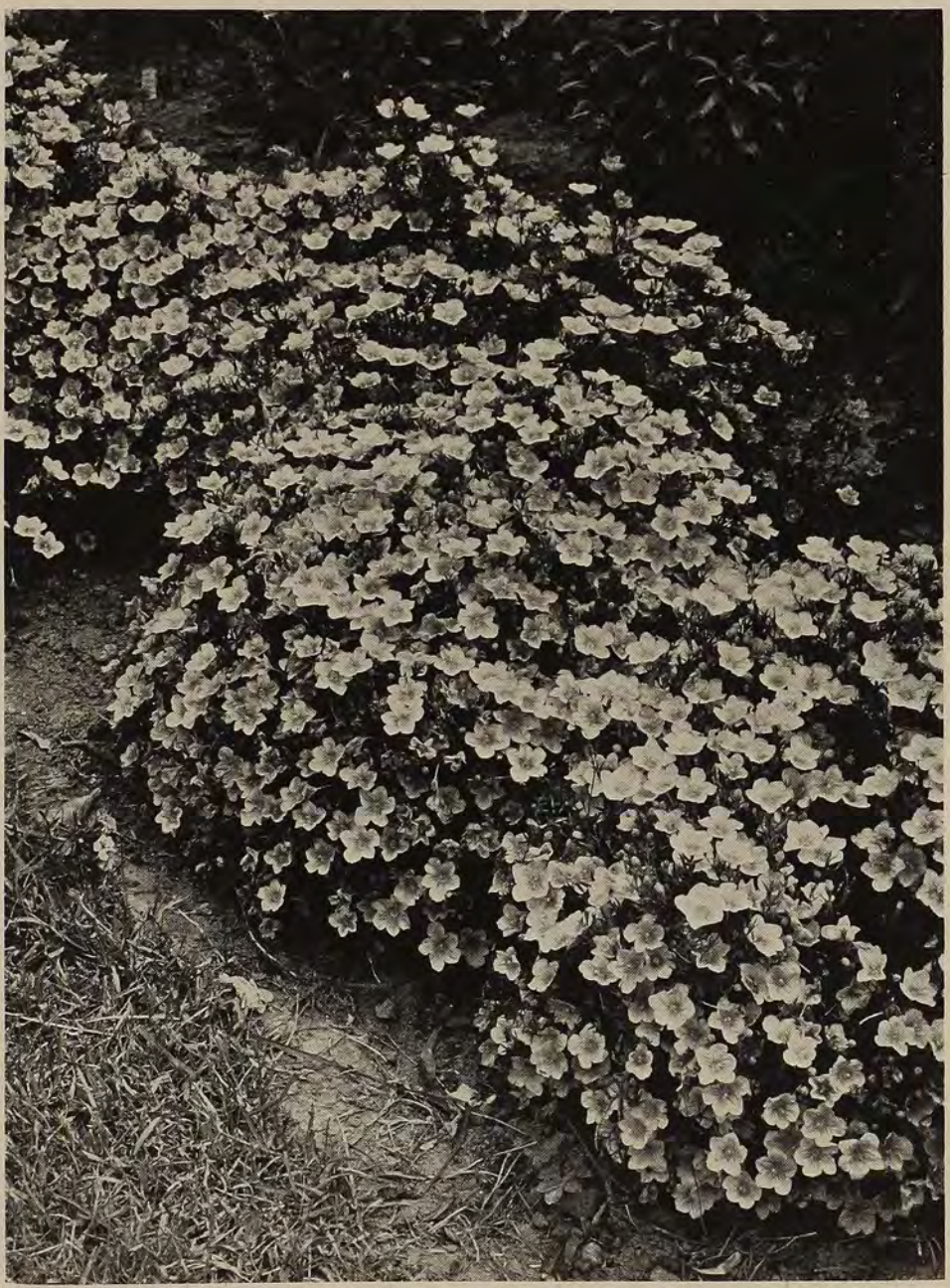
Another plant classified as a perennial but that has all the earmarks of an annual or winter annual here in the Middle West is the *Eryngium leavenworthi.* It is a most unusual plant as to coloring as the entire plant is a glorious purple in the fall. It retains this lovely purple color when dried if cut at just the right stage and is thus useful for winter bouquets. The seeds are very independent. We plant them but have no idea when they will decide to grow. Sometimes they come up quickly when planted in the Spring and again they lie in the ground until the fall rains come. These plants then act as winter annuals, most of them wintering over quite well and blooming the next fall. The flowers in themselves, however, are nondescript—it is the rare purple coloring of the burs, bracts and leaves that makes it so attractive.

The Cup Flower, *Nierembergia hippomanica,* is a very desirable flower for a somewhat hot and dry location. We use it as an annual here although farther south it is no doubt a perennial. The variety Purple Robe is a much deeper color than the type and does not fade. They are lovely planted in front of orange Lantanas which can also endure the same sort of location and bloom just as profusely as the Cup Flower. The Cup Flower may be grown from seeds or from cuttings.

Marigolds are one of the most satisfactory of the annuals. There are so many varieties that it is hard to choose when space is limited. I am particularly fond of the tall kinds and make them serve a double purpose. By planting them close together on the south side of beds, they make a fine "heat-break" for plants that require sun yet appreciate having hot south winds diverted. When used for this purpose they must certainly be staked as they are such shallow rooters that hard winds and rainstorms tumble them "every-which-way" and thus they would not serve the purpose well. The mum-flowered types come in dwarf and tall forms and are especially lovely. If one has Marigolds of various kinds one can be quite sure of flowers long into the fall—in fact until Jack Frost really takes over.

The well-known annual Sweet Alyssum in white hardly needs description, but it is one of the old standbys that we can always count on for snow drifts of bloom for weeks and weeks and a garden border hardly seems complete without it. Some gardeners report that the seeds germinate poorly or not at all. Perhaps the secret lies in planting the seed early and covering very, very lightly.

There are annual vines that should be in every garden. If you wish to welcome the humming birds, plant Cypress Vine for them. They like the Cardinal Climber, too, but flutter more around the Cypress Vine. For our own joy we should not be without the Heavenly



Nierembergia, "Purple Robe"

Blue Morning Glory. The big blue blossoms almost outnumber the leaves in September when it is at its best. Plant it near the Marigolds for a good color combination. Some may hesitate to plant it because it is a Morning Glory and might become a pest but in this section we worry for fear no seeds will ripen for next year's planting. There are some volunteers occasionally but never enough to warrant putting it in the pest class.

There are many other annuals that we use to fill in the gaps like *Phlox drummondi, Salvia splendens* and Larkspurs. We would miss them like old friends if we did not have them in our gardens every year but these are surely all so well known that they do not need description.

Olga Rolf Tiemann,
Westboro, Missouri.

Cornus kousa

During our strenuous winter season I get several months behind in my horticultural reading which accounts for my not until now having noticed your request relative to *Cornus kousa* on page 180 of July 1944 magazine. We have grown it here nearly 20 years, having originally received seed from University of Nanking in 1926. We like it here particularly well because due to the alkalinity of our soil and water neither the eastern *C. florida* nor our own *C. nuttalli* thrives well unless the soil is artificially acidified. Our old specimen seems to be thoroughly at home here, flowering freely and developing fertile seed. The total width of the "flowers" is about 6 to 7 cm. The acuminate bracts are cream colored when fully developed but with a little age they become heavily stained red. We have also propagated quite extensively the variety *C. k. chinensis* but have never planted out a specimen so have never seen it in flower. Judging by your illustration the bracts are more broadly ovate but somewhat less acuminate in the variety than in the species.

W. B. Clarke,
San Jose, California.

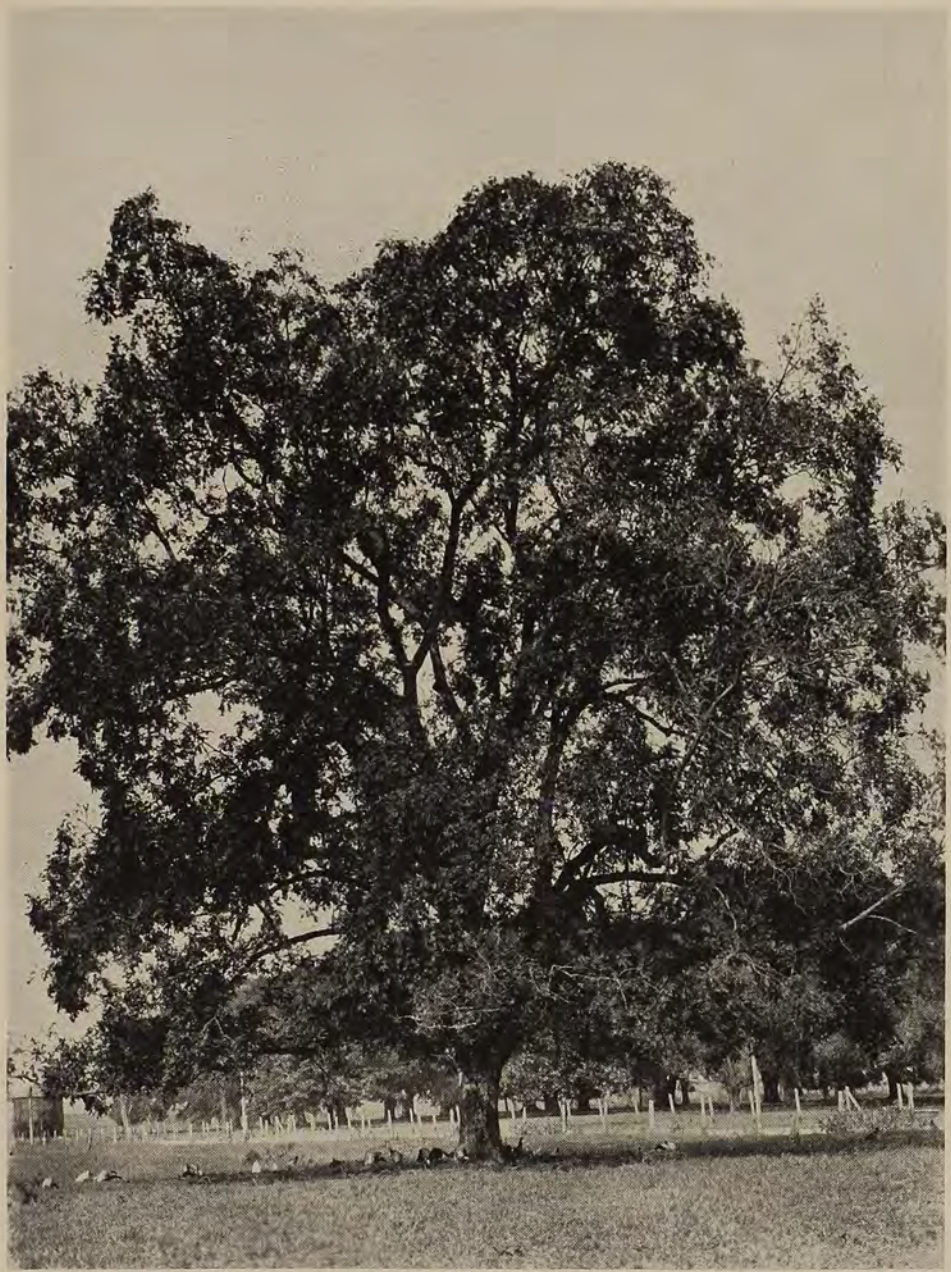
Zoysia matrella

Zoysia matrella was first sent to the United States from Japan by David Fairchild in 1902. It was called Birodoshiba by the Japanese and was used in rock gardens.

It is a well-known lawn grass in the extreme south. As it is a tropical grass it was not known whether it would be hardy in this section. But as it was known to be hardy at Auburn, Alabama, it was decided to test it as a lawn grass in northeastern Oklahoma.

Its rate of growth is very slow. This is a decided drawback when establishing a lawn, but its best feature once the lawn is established. A neat appearance may be kept by mowing once a month. As it does not set seed readily in the United States increase is by stolons. They are quite fine, very tough and nodes are about one-half inch apart. It makes a very thick firm turf that does not encroach rapidly upon flower borders. For this section this is its greatest recommendation. African Bermuda and common Bermuda, the usual lawn grasses, run into flower beds with such amazing rapidity as to necessitate weekly or semi-monthly clipping around borders. Two clippings a year are sufficient to keep Zoysia from the border.

Spring planting is to be preferred to fall planting. By close sprigging good coverage may be had in about four months. Sprigging is begun about the middle of April and continued into early August if there are surplus stolons. Later sprigging has not proved satisfactory as the grass does not become established quickly in cool weath-



W. A. Taylor

Centennial Pecan Tree, October, 1902 (*see page 213, July, 1945*)

er. Close sprigging has proved more satisfactory in getting quick coverage than planting small tufts.

Zoysia starts to become green earlier than Bermuda grasses and is much more resistant to frost. Upon close inspection it is partially evergreen even in midwinter. Plantings where a great deal of humus has been added remain about 33% green at temperatures not lower than 15°.

New plantings are kept free of weeds to encourage rapid growth. When established very little weed growth is possible. It has not choked out clover. Recently it has been recommended that Zoysia lawns containing patches of clover be given an application of high nitrogenous fertilizer in hot weather. This is reported not to injure the Zoysia, but burns the clover to such an extent that the Zoysia can choke it out.

Recently commercial plantings have been made in Connecticut where it is being sold under the name of Flawn.

ELEANOR HILL,
Tulsa, Oklahoma.

Cornus florida (See page 311)

It may seem almost banal to publish a picture giving natural size details of flowering branch of our Eastern Dogwood, and the captious may well point out that the picture must have been taken when the flowers were fairly old since all of the flowers are open, and the leaves are developing about and below the white bracts. This is only too true, but as excuse there can be said only that the season of 1945 was very curious with premature heat, then cold and rain, that turned all seasonal flowering topsy turvy so that the dogwoods which hereabouts do flower before the leaves are well developed, in most cases exhibited flowers sitting on collars of green leaves long before the bracts began dropping.

It is also repetitious to remind general readers that one may have considerable profit and pleasure in studying dogwood trees in any area where they are abundant to observe the size, shape and carriage of the floral bracts. In my own particular area this is a game one can carry as far as he likes since the flowering dogwood is a weed tree to all purposes. The illustration was chosen from the individual plant which showed the best bracts, among those in flower and in condition for photographing. There are on the hillside, individuals with even larger bracts, or perhaps longer rather than larger, some in which the length is less and the width greater which tends toward a round flower and possibly greater whiteness. One tree has produced for years, flowers in which the bracts do not lie flat but stand up like incurving curls their tips almost touching over the true flowers in the center. It is neither showy nor beautiful.

Never has it been the luck or fortune of the writer to come upon a wild tree with pink tinted bracts. Several have been found which showed a tinting on the margin, but not enough in intensity to warrant the propagation.

As far as can be told from natural processes, seeds which fall naturally to the ground, or which are planted in the open, with no protection save what might come from falling leaves, germinate in late April and May. If they can be given any sort of attention they will make fair sized plants before frost. If one will learn to recognize the cotyledons of the dogwood seedling, he can soon transplant as many as he likes, lifting them with the same care that he would use in transplanting any other garden plant into a bed in which the acid soil has plenty of food and humus. Here with watering, even more astonishing growth will follow. If continued attention is given, the trees will flower sparsely in the fourth year.

Robert L. Taylor

[*See page* 310]

Flowering dogwood, Cornus florida

Most of the gardeners of the immediate neighborhood, who are far better weeders, never find the young dogwoods as they germinate but it is not a trick and among the other trees with which they have to contend, the only one that causes any possible confusion in the cotyledon stage is the sour gum, but as soon as the first true leaves appear, even the most hesitating should have no further doubts, since the very first dogwood leaves are unmistakably just that.

Another bit of useful information in moving dogwoods, is to remember that the foliage usually does not develop normally during the first summer but after pushing out, stands still at about one third size. This is perfectly safe and proper development will come the following season; one can take matters into his own hand however, and prune the tree violently after these leaves have shown that the tree is growing, and with good watering the then naked tree should push out into good growth. The one trouble in this is to do the job of pruning so skillfully that it will not show in the future development of the plant. Dogwoods tolerate pruning well and the person who is willing to study the branching pattern of the tree can soon learn where and how to cut so that little will show of his handiwork.

Cotoneaster salicifolia (See page 313)

Cotoneasters as a group have been known in gardens for a long time but the genus came in for considerable attention when seeds of various species came back from the various explorers, mostly British, who were ransacking China for ornamentals.

If one were to make a search through catalogues in this country, even going back before the present war had laid such a restraining hand on the production of nursery stock and all the nurseryworkers had not escaped to war industries, one would find a relatively small number of species and forms offered for sale.

There are a good many reasons for this. Many of the more attractive forms, evergreen or semi-evergreen are not too hardy to cold. The nurseryman does not like them particularly well since they are not the easiest plants to transplant and unless they sell while they are still small, they can be more economically pulled up and destroyed than saved. In areas where pear blight is common, many will succumb.

For those of us who happen to like the plants and are willing to work to have some of them, guarding against pears, buying small pot plants or raising our own things from seed, they are worth the trouble.

This particular species, which is so variable within its limits that the botanists have separated and described several charming forms is one of a group of more or less similar plants which are all beautiful. *C. lactea* is a more robust but more tender member of the series, *C. Henryana* a somewhat less compact member, but *C. salicifolia* in its several forms is worth the attention of any gardener who has room in the shrubbery border. It needs room for both height and spread, certainly eight feet in each direction. In the beginning it will look rather thin, but as the framework fills out and the lesser branches complete the pattern it is a lovely sight even when there are neither flowers nor fruit to give it point. The flowering is abundant, and is well enough shown in the picture. The berries are a good deep crimson scarlet and persist well into the winter. The typical twig arrangement of the plant is shown in the illustration and it should be recalled that the larger branch shown is a secondary branch from a main stalk rising from the crown.

Robert L. Taylor [*See page* 312]

Cotoneaster salicifolia

Wanted!

In the July issue of the magazine, there was published an announcement that there would be carried hereafter, lists of "wants" from members. The person caring to reply is requested to write directly to the member making the request.

Plants wanted, all at once, or a few at a time; cuttings, cions, or seeds welcomed, if plants are not available:

Abies alba, silver fir; *A. alba compacta; A. Veitchii,* Veitch fir; *A. balsamea Hudsoni;* Apple, Cox's Orange Pippin (English); *Chionanthus retusus,* Chinese Fringe Tree; *Cotoneaster Dammeri* or *humifusa; Davidia involucrata,* English strain. *Galax aphylla; Gaultheria miquelina,* Japanese variety; *G. Shallon,* salal; *Kalmia cuneata,* mentioned NHM. 4.41 p. 143; *Larix sibirica,* Siberian larch; *Mahonia aquifolium,* Oregon Holly grape; *Picea sitchensis,* Sitka spruce; *P. abies pygmaea,* Dwarf Norway spruce; *P. omorika,* Serbian spruce; *Pinus nigra Hornibrookiana,* Dwarf Austrian pine; *P. monophylla,* one leaf pine; *P. aristata,* Bristle cone pine; *P. strobus prostrata,* Prostrate white pine; *Psuedolarix amabilia,* Golden Larch; *Pseudotsuga Douglasi globosa* or *densa,* Dwarf Douglas fir; *Rhododendron canadense,* Rhodora; *Shortia galacifolia,* Oconee bells; *Torreya nucifera,* Japanese Torreya; *Tsuga canadensis microphylla; Vaccinium crassifolium,* mentioned NHM 4.41 p. 143; *Vaccinium Vitis-idaea* var. *minus* mentioned NHM 7.44 p. 171.

R. M. Warner,
RFD No. 1, Woodmont Road,
Milford, Conn.

I should very much like to find a source of supply for the Gesneriaceae. I know of sources of seeds for *Chirita, Corytholma, Streptocarpus* and plant sources for *Saintpaulia* and *Gloxinia,* but *Achimenes, Naegelia* and *Isoloma* seem to be very scarce. I do not like to send for too many catalogues. If you could help me, it would be greatly appreciated.

(Miss) Elsie Cordts,
813 E. Mineral Street,
Plattesville, Wisc.

For years I have been searching catalogues and gardens for the double flowering form of Sweet Rocket, said to be very charming. Can you suggest where seeds or plants may be bought?

(Miss) Rosamund Danielson,
Putnam Heights,
Putnam, Conn.

Plants wanted ,or exchanges if desired:

Ixora, rose, pink and salmon; *Bryophyllum uniflora; Hoya,* amethyst, rust and "imperialis"; *Dipladenia* vine, rose and white forms; *Rhodochiton* vine, purple; *Maurandia,* vine, white, blue—rose; *Clitoria* vine, double blue; *Jacquemontia* vine, blue; *Selaginella wildenovi,* blue leaves; *Antignon,* with small wild-rose bloom, not *leptopus.*

(Mrs.) Marian A. McAdow,
Osprey, Florida.

Wanted, plants of the double flowered forms of *Hesperis matronalis* particularly the true double white and the true violet form, in single and double, if the latter exists. The grayed-magenta roadside form is *not* meant!

Mrs. Campbell Harvey,
Orchard Lake, Michigan.

List of plants wanted, for publication should be prepared as above and sent to the Editorial Office, 821 Washington Loan and Trust Bldg., Washington 4, D. C., whenever they are ready. They will be published as soon after receipt as possible.

Index to Volume 24

Figures in *italics* represent illustrations

The American Horticultural Society

INVITES to membership all persons who are interested in the development of a great national society that shall serve as an ever growing center for the dissemination of the common knowledge of the members. There is no requirement for membership other than this and no reward beyond a share in the development of the organization.

For its members the society publishes THE NATIONAL HORTICULTURAL MAGAZINE, at the present time a quarterly of increasing importance among the horticultural publications of the day and destined to fill an even larger role as the society grows. It is published during the months of January, April, July and October and is written by and for members. Under the present organization of the society with special committees appointed for the furthering of special plant projects the members will receive advance material on narcissus, tulips, lilies, rock garden plants, conifers, nuts, and rhododendrons. Membership in the society, therefore, brings one the advantages of membership in many societies. In addition to these special projects, the usual garden subjects are covered and particular attention is paid to new or little known plants that are not commonly described elsewhere.

The American Horticultural Society invites not only personal memberships but affiliations with horticultural societies and clubs. To such it offers some special inducements in memberships. Memberships are by the calendar year.

The Annual Meeting of the Society is held in Washington, D. C., and members are invited to attend the special lectures that are given at that time. These are announced to the membership at the time of balloting.

The annual dues are three dollars the year, payable in advance; life membership is one hundred dollars; inquiry as to affiliation should be addressed to the Secretary, 821 Washington Loan and Trust Building, Washington, D. C.