In northern Manitoba some 60 years ago when Manitoba was a very different type of province and region from what it is today, The Skinner family settled on a wheat farm. During subsequent years, Dr. F. L. Skinner, who will talk to us this morning, became very much interested in ornamental horticulture.

Dr. Skinner's growing conditions are much more rigorous than those experienced by the most of us and, from small beginnings, he has launched into a comprehensive type of privately supported plant breeding program which includes lilies, lilacs, many herbaceous species and even such shade trees as lindens and poplars.

Dr. Skinner has been the recipient of an honorary doctor's degree from the University of Manitoba. He is a member of the Order of the British Empire, which is awarded to outstanding persons living within the British Commonwealth by order of the ruling king or queen.

Dr. Skinner's life and work in Northern Manitoba is a monument to the extent to which persons working with plants can encounter difficulties and overcome them. He is, in my personal estimation, one of the greatest horticulturists of our time.

It is with both pride and pleasure that I now present Dr. F. L. Skinner of Dropmore, Manitoba, Canada.

Dr. Skinner presented his paper entitled "Developing New Plants for the Modern Garden." (Applause)

DEVELOPING NEW PLANTS FOR THE MODERN GARDEN

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I spent the first thirteen years of my life in Aberdeenshire, Scotland, and it was there that I learned to know and love the old roses, the mock-orange, the lilacs, the rhododendrons and a host of other shrubs, trees and flowers.

In 1895 when our family arrived in Manitoba there was very little ornamental gardening being done on the Canadian prairies and even in the City of Winnipeg it was several years after our arrival that the first lilac bush opened its flowers there.

There were many lovely flowers growing wild on the prairie in those days but I still missed the favourites of my childhood and it was the desire to grow them that started me on my career as a horticultural plant breeder. As soon as I was in a position to do so I imported a collection of about one hundred and forty roses including all the old varieties that were available at that time. Unfortunately none of them proved quite hardy though I was able, by giving them some protection, to keep the hardiest varieties alive for a few years. I thought that grafting these on native root stocks might give them a little extra hardiness, but in this I was dissappointed. Then I decided to try and combine the hardiness of the wild roses with the beauty of the garden varieties by raising hybrids between them using the wild roses as seed parent. I was successful in raising quite a few hybrids but owing to the fact that

one of the parents was a pure species many of that parents' poor qualities were usually dominant and only in rare cases did I secure the results I had hoped for. Thinking that the crossing of two hardy species and using the hybrid as hardy parent might bring better results I raised a number of hybrids between *Rosa rugosa* and our three native species and some of my better roses have now got both *R. rugosa* and one of the native roses in their pedigree.

Some of my earlier rose hybrids, though they could not bear comparison with the garden roses, had some value as hardy flowering shrubs and when I secured such fine leaved species as *Rosa koreana, R. primula,* and *R. laxa,* I set to work to try and raise hybrids that would have nice flowers and at the same time have clean, neat and attractive foliage that would work in well with landscape work. I already had some success in mating *Rosa blanda* with double flowered forms of *Rosa spinossima* and by using these same forms on the three species mentioned, I have now secured a number of varieties ranging from three to six feet in height that have the desired attractive foliage as well as semi-double or double flowers of good form.

Now let us go back to the early days of the century. The only horticultural literature available to me at that time was the Evperimental Farm Reports; a study of these showed that many of the woody plants that had proved hardy on the Canadian prairies were natives of northern and northeastern Asia so I collected all the literature I could buy relating to the climate and flora of that region. Atkinson's "Upper and Lower Amoor" and Younghusband's "Long White Mountain" were most helpful and both gave a great deal of information about the climate and flora of northern Korea, Manchuria and eastern Siberia. Throughout this region the prevailing winter winds are from the north-west giving it extremely cold winters, however the flora is more closely related to that of western Europe and eastern North America than is that of north central Asia. When I visited the Arnold Arboretum in October, 1918, I was delighted to receive from Professor Sargent a few very small plants of *Syringa dilotata* and *S. velutina* grown from seed collected by Wilson on the Diamond mountains in 1917. I had previously received quite a collection of named lilacs from England but many of them suffered at times from the severity of our winters. The winter of 1920-21 was very hard on lilacs at Dropmore and many of the varieties killed back quite badly while both *S. dilotata* and *S. velutina* came through without injury and flowered freely. Pollen of *S. dilotata* was used on the few varieties of *S. vulgaris* that flowered and some interesting hybrids were raised. I did not expect that these would have more than local interest but a few were named. Some of these were sent to the Morton Arboretum and were so well received that I decided to do some more breeding work with this type of lilac. Though the European varieties of lilac are very beautiful, they have several faults when grown in the Great Plains area of America. Many suckered so badly that they do not flower well unless given a great deal of attention and in some districts they suffer a lot from winter injury and late spring frosts. In Iowa, Mr. Leslie Sjulin, of Inter-State Nurseries, tells me that the lilacs grow so tall that one needs a ladder to enjoy the beauty and fragrance of some varieties. *Syringa dilotata* does not seem to sucker and my first hybrids of it, now

over thirty years old, still show no sign of suckering. It also seems to have a tendency to produce a high percentage of dwarfs among its progeny. One of these is only three feet high at twenty years of age and has flowered freely for the past sixteen years. Even the taller growing forms have a tendency to flower quite close to the ground. The dwarf forms should be especially suitable for planting near the modern ranch type of dwelling.

The slides to be shown later will show the flowering habit and the pastel shades of mauve pink and blue that are to be found in the newer hybrids of *Syringa dilotata.* Incidentaly, we propagate our lilacs by grafting on *S. villosa* stocks which seem to be congenial to most varieties. We have tried grafting and budding on both *S. japonica* and *Fraxinus viridis* with little success. *Syringa vulgaris* varieties are difficult to root from green wood cuttings under our conditions; *S. dilitata* hybrids are a little more promising, however we have found a great deal of variation in the response of different varieties to this type of propagation.

I became acquainted with the late Dr. W. T. Macoun many years ago in one of our talks about prairie horticulture he said that there was a great need on the prairies for colourful vines that would take the place of the rambler roses and large flowered *Clematis* that were grown in the east. Later I will show you slides of some of the results of my endeavours to supply this need. In *Lonicera* we have a climbing native species (*L. dioica*) but its flowering period is short and it is not as colourful as *L. hirsuta* which I collected in northern Minnesota. I made several attempts to cross both these species with pollen of *Lonicera sempervirens* and at last was successful in raising four seedlings of *L. hirsuta;* three of these were apparently identical with *L. hirsuta* but the fourth resembled *L. sempervirens* in both leaf and flower and being sterile it continues to flower from June until killed by severe frost. We have found soft wood cuttings or layering the best methods of propagation.

To bring the large flowered clematis into the ranks of climbing plants that are hardy in the Great Plains area presents quite a few problems. I have secured hybrids between *Clematis integrifolia* and some of the large flowered forms that are intermediate in size and form between the parents and very floriferous, but their propagation in quantity is quite a problem. Some of them can be multiplied, in a limited way, from soft wood cuttings, but others are best propagated by division of the roots which is, at best, a slow process. An attempt to secure larger flowered forms by crossing the Dropmore hybrids with *C. Durandi* failed to produce anything better than we already had.

Clematis macropetala and its near relative, *C. sibirica,* are quite promising as parents of a race of hardy woody climbers with large flowers; a slide will be shown of a small plant of a hybrid between these two species, some of the flowers measured over five inches across. The colour of these hybrids range from pale blue to pale rose pink with a tendency to throw an occasional reddish or white flower. These hybrids are quite fertile and about five hundred seedlings were raised last year. Both parents and the hybrids can be raised from soft wood cuttings.

You may find it hard to believe but *Spiraea Van Houttei* requires protection if it is to flower freely on our western prairies, but only once in over twenty years has it flowered freely at Dropmore without pro-

tection. The introduction of the *S. tricocarpa* and *S. trilobata* gave me an opportunity to raise hybrids that have about the same ornamental value as *S. Van Houttei* and these hybrids are truly hardy. *S. media* and *S. betulifolia* have also been used at Dropmore in the production of new hardy shrubs.

Crataegus, Malus and *Prunus* are other families of woody plants that have been used at Dropmore in the production of new hardy ornamental plants. Slides will be shown of *Malus* and *Prunus* hybrids later.

In perennial plants I have done a great deal of breeding with lilies and chrysanthemums and lesser amounts with anemone, aster, dianthus, iris, peonies, primulas and tulips and pictures of the results of some of this work will be shown.

My first work with lilies was done about thirty-five years ago with *Lilium concolor,* some bulbs of which had been imported from England a few years earlier. This form was self sterile and not fully hardy and the increase one year was very often killed the following winter. Then I secured a few seeds from Mr. Henry Correvon of *L. concolor pulchellum* that had been collected for him in Manchuria. When the first seedling of *L. concolor pulchellum* flowered the typical form was crossed with it giving rise to the *Dropmore concolor* which won an *A.M.* from the Royal Horticultural Society when shown in 1926 by Mr. Amos Perry.

The introduction of *Lilium Willmottae* led to a great deal of breeding work both by Miss Preston of Ottawa and myself. The selection of slides to be shown will give some idea of the wide range of colour and form that has been secured by mating this fine lily with some members of the *L. umbellatum* group.

The introduction of the regal lily gave a great impetus to the cultivation of the lily, but it was not wholly suited to our conditions. The severe winter of 1941-42 removed the last regal lily from my garden. *Lilium Henryi,* and a form of *L. centifolium,* grown from seed sent me by the late Mr. Wm. Saunders of London, Ontario (son of Dr. Saunders who founded the Dominion Experimental Farm System) both proved hardy and by using pollen I had secured at The American Lily Society's Shows I have been able to build up a race of hardy trumpet lilies that vary from pure white to pale pink and deep rich yellow. The martagon lily and its hybrids has also proved useful to work with and I now have martagon hybrids that range from white to almost black and with a constitution that has enabled some of them to become naturalized in the Aspen woods near my home.

The work of the United States Department of Agriculture at Beltsville, with the use of hormones and disinfectants in the propagation of lilies from scales, has removed many of the hazards of lily propagation and enabled the breeder to multiply indefinitely the best results of his work.

Twenty years ago chrysanthemums that would flower out-of-doors in western Canada were unknown. About that time some of the Azaleamums and Clara Curtis had been tried but only with a very moderate degree of success. I had grown several species including the rather weedy looking *C. Zawadskyi*—an Austrian species that had the virtue of being hardy and flowering with us in late August. While on a visit to Hartford, Connecticut, I had the good fortune to meet the late Alex Cumming and I

learned from him how to get chrysanthemums to set seed. *C. Zawadskyi* now proved invaluable for it was able to transmit to its hybrids the necessary qualities of early flowering and hardiness and until recently all my chysanthemum breeding was based on *C. Zawadskyi* and its hybrids. *Chrysanthemum arcticum,* as cultivated in this country, has been too late in flowering to be of any use to us and none of its hybrids that I have been able to secure have ever flowered out of doors at Dropmore. In 1947 I visited the Aberdeen, Scotland, University Botanic Garden and there I saw a variety of *Chrysanthemum arcticum* in bloom in July. I was eventually able to establish this form and it is now being used in breeding work by both Dr. Viehmeyer of North Platte and myself. At both places rather interesting results are being secured.

The foregoing has been a review of some of the work being done at Dropmore that is of fairly general interest. Quite a lot of breeding and introduction work has also been done, which although of more local interest has provided me with some interesting problems. While in Sweden in 1947 I saw some of the work being done in tree breeding at the Ekebo Station and also some specimens of *Populus tremula erecta.* Dr. Keillander, who was in charge at the time of my visit, informed me that in Denmark, hybrids of *Populus tremula* had been rooted from soft wood cuttings and once on their own roots were easily grown from root cuttings. I have managed to introduce the erect form of *P. tremula* and, while it buds easily on *P. tremuloides,* budded trees on this stock would not be satisfactory for general distribution and I have not yet succeeded in getting it on its own roots.

In my breeding work with willows and poplars, I find it necessary to bring in flowering wood of such things as weeping willows and lombardy poplars from some considerable distance. I find that they do not flower very well after having been enroute for several days. A method of handling such material so that it could be brought into bloom when wanted would help me very much in securing the desired hybrids.

Tilia americana is very susceptible to leaf mite with us but *T. cordata* and *T. mongolica* are immue to this insect. We have raised a number of hybrids between *T. americana* and *T. cordata* that are immue to this insect and much faster growing than either parent. In our conditions these hybrids do not bench graft very well but I find that they do take very well when budded on seedlings of *T. platyphyllos.* In this connection it is interesting to note that while *Syringa villosa* does well as a stock when bench grafted it is almost useless if one buds the *S. vulgaris* hybrids on it.

Prinsepia sinensis is a shrub that very few nurseries seem to be able to propagate with any degree of success. Here we have no trouble with it. The seeds are cleaned and sown in beds as soon as possible after they are ripe. The following August or early September most of them germinate and occasionally they will develop one or two true leaves. At this stage they do not look as if they would stand our winters, but by covering them lightly with dead leaves just before severe weather sets in, a very high percentage will survive and start into growth as soon as the leaves can be removed in spring.

(Editor's Note: Dr. Skinner concluded his talk with a number of kodachrome slides showing hybrids which he has developed at his nursery in Dropmore. This discussion is summarized below.)

One of the hybrids obtained by crossing *Rosa acicularis* and *R. rugosa* has been named 'Will Alderman' after Professor Alderman of Minnesota. It grows into a bush about three feet tall, is absolutely hardy, and blooms all summer.

It would take the full time of a secretary to keep all of my records. Since I have to do all of the work myself, as well as all of the recording, some of the records become lost.

Some of the hybrids of *Rosa spimosissima altaica* have flowers of hybrid tea quality. They only bloom for a month or six weeks. The tallest ones will reach five feet.

We have secured a wide range of color in the *Syringa oblata dilatata* hybrids. I believe the color range almost equals those of the Lemoine hybrids. Many of the forms are singles and many are doubles. One of the better doubles has been named "Swarthmore" after Swarthmore College. It has a very nice bloom and is very fragrant, too. Three of the hybrids survived the winter of 1953 in Peace River when none of the *S. vulgaris* flowered. These *S. oblafa dilatata* hybrids did not suffer.

A wide range of color has also been secured in the hybrids of *S. villosa*. There is considerable more work on this plant at Swarthmore College, Dominion Experimental Farm at Ottawa, and the Morton Arboretum than at Dropmore. It has been necessary for me to secure pollen from the Arnold Arboretum by mail. My hybrid *S. villosa* are compact and very hardy. Hybrids of *S. reflexa* are not hardy.

Clematis sibirica is absolutely hardy in our area and reaches a height of six to eight feet. Hybrids which have been developed at Dropmore have flowers that are much more spread out than the species. One I measured was over five inches across.

You may find it rather hard to believe that Cunningham's White rhododendron is hardy with us. I cover it with planer shavings during the winter. One species of rhododendron which I know is hardy with us is *R. chrysanthemum*. It is hard to secure, however. It grows to only one foot in height and will grow on the tops of the highest mountains of Eastern Asia. It belongs to the same group as *R. caucasicum*. Cunningham's White is a hybrid of this species. One of the difficulties of Cunningham's White obtained from Europe is that it is grafted on tender understock and it usually kills from the roots upwards during a severe winter.

Potentillas are attracting considerably more attention now. *Potentilla dahurica* grows to about three feet with us. I think that considerable breeding can be down with this plant.

Dr. Skinner showed a picture of two groups of Scotch pines. He stated that the tall plants were grown from seed collected in Southern Sweden, while the dwarf forms were from seed collected in Northern Sweden. Both groups were germinated and grown at the nursery in Dropmore and have retained their distinctive growth characteristics.

I have introduced *Rhamnus pallasi* from the Caucasus. It grows to a height of about three feet and has very attractive foliage. The leaves are an inch wide and two inches long, quite glossy, and during the sum-

mer appear almost evergreen-like. It has a possibility of being used in place of privet. It is very slow growing, however. From seed, it takes three years to obtain plants six to eight inches in height. It is possible that by crossing this plant with another species we might obtain a faster growing form.

A number of years ago, I obtained a hardy form of Japanese plum, *Prunus salicina koreana,* from a Mr. Wycoff in Manchuria. By crossing this plant with sandcherry, we have obtained a very good plum which is quite hardy with us.

The hybrid honeysuckle, which I have named 'Dropemore Scarlet,' obtained by crossing *Lonicera hirsuta* and *L. sempervirens* is covered with flowers in June. I have picked flowers from this plant in late autumn.

Tulipa kolpakowskyana, which was obtained from Russia, has flowers which are about two inches across. I have crossed this with tulips at Dropmore and have obtained hybrids that range from yellow, through orange, to deep scarlet. These plants are absolutely hardy with us. One or two of these hybrids can be grown from small bulbs produced at the base but, as a rule, this type of tulip is grown only from seed.

The Japanese iris is not hardy at Dropmore. Plants grown from seeds of *Iris Kaempferi* are hardy. Hybrids produced from crosses of these two are hardy, but the flowers do not resemble those of the Japanese Iris. In other crosses I have used *Iris pseudacoris.*

Most of the commercial varieties of chrysanthemums obtained from Europe and Eastern North America are too late at Dropmore. One of our crosses of the native Michaelmas daisy with a commercial variety flowers rather freely and is early enough for us. The flowers are about two inches across.

Part of our breeding program has been with lilies. Forms range from the typical Willmottiae types to upright umbrella forms. One of our lily hybrids, named 'Helen Carrol,' won an award at Boston. It is a *Lilium elegans* hybrd which has no spots on it and is a pure yellow. Another hybrid is partially orange. The flowers measure six to seven inches across.

The *Anemone tomentosa,* which I saw growing at the Stockholm Botanical Garden has a more northerly range than the Japanese anemone. It is quite possible that it could be used to obtain a wider choice of anemones for our northern areas.

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PRESIDENT FILLMORE: It is evident to all of us that you have done a remarkable job, Dr. Skinner, in selecting and breeding plants which can be grown in your northern country. We are, indeed, fortunate to have had the opportunity to have you discuss your work and show pictures of some of your hybrids. It is regretable that some of these excellent colored pictures cannot be reproduced in our Proceedings.

There is sufficient time for a few questions.

LESLIE HANCOCK (Woodland Nurseries, Cooksville, Ontario): Have you brought *Rhododendron laponicum* down from the northern part of Manitoba?

DR. SKINNER: No, I have not.

C. S. INGELS (Home Nursery, Lafayette, Ill.): What are the extremes in temperature in your area?

DR. SKINNER: Sometimes in the summer the temperature goes over 100°F. and in the winter as low as fifty below zero.

DONALD NORDINE (J. V. Bailey Nursery, St. Paul, Minn.): What is the rainfall and how much is snow?

DR. SKINNER: Our average rainfall is only eighteen inches. Some winters we have about a foot of snow, other winters as much as three or four feet. The snow lasts all winter. In my sixty years in the area, I recall only two winters when a February thaw removed the snow cover.

MARTIN VAN HOF (Rhode Island Nurseries, Newport, R.I.): Why did you advise us not to use *Syringa villosa* as an understock?

DR. SKINNER: *S. villosa* is not hardy with us. We have found that it is not satisfactory as a budding understock, but that it can be used as an understock for bench grafting in winter providing the plants are set deep enough to become established on their own roots.

PRESIDENT FILLMORE: There are a number of instances reported in the literature in which a given understock is satisfactory for budding but not for grafting, or *vice versa*. Apparently the methods are not always interchangebale.

I regret the necessity of concluding this discussion, however if we are to maintain our program schedule, we must adjourn. Before we adjourn, however, I want to again express the appreciation of our membership to Dr. Skinner for being with us and telling of his breeding experiences.

The session adjourned at 12:15 o'clock.