

MODERATOR BORK: The next paper will be by Dr. Harold Pellet of the University of Nebraska.

**COLLECTION, PROPAGATION AND EVALUATION OF WOODY
PLANT MATERIALS FOR HIGHWAY IMPROVEMENT IN NEBRASKA**

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The Roadside Improvement section of the Nebraska Department of Roads was reactivated in 1961 and since then has been quite active in landscape plantings along our developing Interstate 80. At present, 70 miles of interstate right of way have been landscaped and 150 miles have been seeded to grass mixtures. The average costs of the landscape plantings are approximately \$14,000 per mile and \$11,000 per major interchange in urban areas, and \$1,000 per mile and \$7,500 per interchange in rural areas.

The rest area facilities being developed by our roads department are very modern. These facilities contain sheltered picnic tables and a heated information rest room building with flush toilets. In the Platte river valley, the water table is just a few feet below the surface and in this area the road base is constructed by pumping sand to the area. This process leaves a string of sand pit lakes along the interstate route. Many of the rest areas in the Platte Valley are being established to include one of these lakes in the area. This gives a beautiful setting to these rest areas and makes it very attractive to tourists to stop and relax for a few minutes. At present, the rest area facilities being developed by our Department of Roads are not equalled by any other state. We in Nebraska are quite proud of the progress being made by our Department of Roads in landscaping, and feel that we'll have one of the most scenic interstate routes in the country.

This spring, two research projects were set up between our Department of Roads and the University. Dr. Al Dudeck is working on one of these projects dealing with the establishment of turf grasses and erosion control.

The research project that I am working on is titled and can be described as "Collection, propagation, culture and evaluation of plant materials for roadside improvement." The program was initiated in March of this year. This year's activities have dealt primarily with the 1st two categories of the project (collection and propagation) of plant materials. About 175 species of woody plants were obtained from various nurseries this spring and planted at our University Agricultural Field Laboratory. Since that time, we have collected and propagated materials from the University of Minnesota's arboretum and from the wild in arid and mountainous regions of Colorado, Utah, and Arizona. We hope some of these latter materials might prove satisfactory for plantings in the western part of Nebraska

where the annual rainfall is low (about 15-19"). These summer collections have given us about 100 additional species to evaluate.

The latter two categories of the project, culture and evaluation of plant materials, will be initiated into the program in the coming year. The chief obstacles of establishing woody plants encountered by the roadside improvement section of our highway department are caused by two prime factors. These are drought and "mower blight." A study of various mulch materials is being established this fall and next spring. The various mulch materials will be evaluated for ability to conserve moisture and for weed control. Weed control is important in that weeds compete with the desired trees and shrubs for moisture and also make it difficult for maintenance personnel to see the trees while mowing. Mulch materials that eliminate weeds for a small area around each tree will therefore also cut down on mower damage.

The 4th category of the study, evaluation of plant materials, will be a long range objective in that several seasons are necessary to adequately test the plants for various climatic conditions. The climatic conditions within Nebraska vary considerably. The route along the Interstate can be divided roughly into 3 areas. The eastern section gets a fairly good annual rainfall averaging about 26 - 30". The central portion extends through the Platte River Valley and has a much lower rainfall. However, the watertable in this area is only a few feet below the surface so the problem involves maintaining woody plants the first couple of years until the roots can reach the watertable. The western area is quite arid and will be much more difficult to establish and grow plant materials. Because of this wide variation in climate, the plant materials will need to be evaluated in several areas to give us a true picture of their performances.

A few colored slides were shown of plants collected in the Rockies of Colorado and in Utah. This collection trip was in cooperation with the USDA North Central Region Native Plant Exploration Project. The 1st picture was of a species of *Potentilla* collected in the rockies of Northern Colorado and also west of Cheyenne, Wyoming as a possible ground cover plant. It grows in dry, rocky sites and spreads by rhizomes. *Lonicera involucrata* may be a desirable small growing plant for landscaping. It reaches a height of 3 - 4' and grows native in higher altitudes in the Rockies. It is also native in much of Minnesota. The Elderberries are possible highway ornamentals as they are quite rugged. *Shepherdia rotundifolia* will make an excellent landscape plant if it can be grown under our climates. It makes a very compact growth habit to a height of four feet and is supposed to be evergreen. It grows in very poor soil in arid climates of southern Utah. The native *Amelanchier* of Utah is also of interest to us for our dryer areas. Another possibility

of a small tree for extremely dry areas is the one leaf ash *Fraxineus anomala*.

Fallugia paradoxa or Apache Plum has been reported doing quite well at Manitoba and is quite ornamental. Many of the Mountain Mahogany species, *Cercocarpus*, are of excellent ornamental qualities. *Pursha tridentata* is of extreme interest to us as an ornamental and as a possible ground cover plant for highway slopes. Clones were observed with a diameter of 20 feet. The plant is found native from Wyoming down through Utah and Arizona. Clones of *Cornus stotonifera* were collected north of Zion National Park with a very low habit of growth and a diameter of 20 feet across the clump. The height was about 3 feet. *Peraphyllum* or squaw apple is another plant with excellent aesthetic qualities. It has a spreading growth habit and reaches a height of five to six feet.

MODERATOR BORK: Thank you very much, Dr. Pellett. Continuing right along with the program, the next paper will be given by Mr. Wolfgang Matzke, from the Burwell Nurseries, Columbus, Ohio.

THE RUTHNER TOWER GREENHOUSE

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Within the short 15 minutes allowed for my paper, I can only present a brief outline of a very interesting new concept of plant growing. This concept was not originated by a nurseryman, but by an industrial engineer who derived the idea of continuous plant production from his experience with the operation of machines and control instruments in the steel and metal industry.

All industrial production of any importance uses automatically controlled conveyor systems. The raw materials are continuously fed in on one side and the finished product emerges by the time all the programmed stages have been completed. Furthermore in industrial production every phase must be clearly comprehensive and the progress within a given time must be planned and controlled.

Mr. Ruthner, the Austrian engineer and inventor of the Tower Greenhouse (TGH), developed the idea of setting the plants on a space-filling conveyor system and pass through a number of chambers each providing for a different — but constant — set of environmental factors, according to the growth stage of the plants. In such a way, he envisions the possibility of a *continuous crop production* which will eventually lead to a completely controlled environment and make the grower independent of his geographical location and the change of seasons.

Such an industrial plant for crop production could then turn out, let us say 10,000 heads of lettuce every day once the whole