

SUBCOMMITTEE No. 2 - PLANT MATERIALS

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PLANTING*

By

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The subject of planting, particularly naturalistic planting has been more or less misunderstood in the past by most of those both in and outside this work. No blame or criticism can be attached to the old viewpoint, however, because roadside development has shown considerable improvement in technique and practice during the past five years. In support of this changed aspect a statement made a short time ago by Mr. R. W. Crum, Director of the Highway Research Board, is significant:-

"Roadside improvement meant largely to its proponents the planting of trees and shrubs, but roadside development as now in wide usage signifies the improvement of the road as a whole and involves important engineering as well as esthetic features. Planting is important, yes, but not as an end in itself; it is one factor only in the larger problem.

"From the esthetic point of view it is now realized that ornamentation is not the aim, but that the job is to conserve the landscape by adjusting and adapting the highway so as to make maximum practical use of the landscape without unnecessarily disturbing the balance of nature. From the standpoint of utility the objectives are to promote safety, facilitate upkeep and enlarge the usefulness of the road. Wide shoulders, easy slopes and shallow ditches not only look better but they are safer and easier to maintain, and the development of roadside areas where a traveler may stop to rest and perhaps to picnic is filling a real need".

* No formal report was submitted by the Subcommittee on Planting, but this paper was presented before the roadside development session of the Sixteenth Annual Meeting of the Highway Research Board, Washington, D. C. November, 1936.

The Pennsylvania Manual for Forestry and Landscape Practices along that highway system says, "The ultimate aim of any roadside development is to cover up construction scars and other man-created situations along the highway in such a manner that the whole highway development blends naturally into the native landscape".

Dr. Frederic E. Clements of the Carnegie Institution of Washington has this to say:- "It --- affords a method for returning the roadway, which in spite of its necessity is a violation of the landscape, to its proper place in the natural setting, and thus makes it the focus of a design for enhancing the charm of nature instead of diminishing it. ---- By natural landscaping is meant the use of native materials in accordance with nature's own artistry ---- Every great climate expresses itself in terms of a particular vegetation or climax ----- the climax and its constituents are native in the highest possible degree, even though within its wide area there are regional variations that necessarily limit the range of many species".

Planting therefore in its broadest aspect is important, but it is only one factor in the larger problem of roadside development. Furthermore, planting design must be naturalistic - it must follow nature. Colonies and natural groupings must be developed, except in special cases where a semi-formal design is indicated or desirable.

Purposes of Planting

The principal reasons for roadside planting operations in general may be briefly summarized as follows, in the order of their importance:

1. To control washing and erosion, and thus reduce maintenance costs.
2. To control snow and wind, thus reducing snow removal costs.
3. To regulate and direct traffic, such as on center strips, berms, intersections, inside of curves and similar areas, thus improving traffic safety conditions.
4. To furnish some shade and protection to the roadway.
5. To create more favorable public opinion. (Toward highway reconstruction).
6. To give esthetic effect.

While it is true that the planting of any suitable material on or along the roadway does add to the esthetic effect, yet it is certain that the most important purposes of planting are to reduce

ultimate maintenance costs and improve traffic safety conditions. Therefore planting slopes and fills, and snow and wind barriers are most important.

Perhaps equally important are the plantings made to regulate and direct traffic, such as on center strips, berms, inter-sections, inside of curves and similar areas. Proper division of traffic by a center strip, planted to grass, vines or low growing shrubs, is one phase of highway work which is now in its infancy, but which will demand more attention in the future. Some of the States have already started this work, but most of them have not realized the magnitude nor the pressing need for prompt consideration of this problem. In this connection, it is noted that Pennsylvania is planning its first divided highway for completion in 1937.

While the planting of shade and ornamental trees is not so important, yet it is conceded that such plantings do furnish some protection to the road metal in that these plantings tend to diffuse the summer heat to a certain degree; while in winter they tend to prevent rapid freezing and thawing, thus giving some protection to the road surface.

In many cases, interested organizations, clubs and individuals desire to cooperate in the making of plantings along the roadside, and the establishment of such plantings tends to create a more favorable public reaction.

Finally there are plantings made for esthetic effect primarily, but which can be construed as falling somewhat within the previous classifications. In fact, it is almost certain that some other purpose can be given for such plantings although they may be primarily for esthetic effect, and it is recommended that these other purposes of planting be emphasized rather than the esthetic effect. It is believed that this procedure will have a better effect among highway officials and the public until such a time as roadside development is recognized as an integral and necessary part of highway construction, operation and maintenance, and as such will be entitled to proper recognition.

Planting Materials and Procedure

It has been found impossible to standardize planting materials because of varying conditions of climate, soil and other features peculiar to various sections of the country. However, some general principles are outlined as a general guide in such work:-

1. Native material should be listed and used so far as possible. The landscape engineer should have a complete survey of the location of available material and should use it on his projects. It is recommended

that each State prepare a list of material suitable for the State, following the classification recommended by the Bureau of Public Roads. Such a pamphlet has been prepared for Pennsylvania, entitled Standard Key and Plant List.

2. The use of exotics or material not native is not recommended unless it is certain that such material will give satisfactory results and will blend in with the native landscape. Only actual experimental work will determine this question.
3. Native sod, while expensive to place, has given satisfactory results at important locations where the initial expense is warranted.
4. Grass seed cannot be standardized except for certain areas or sections. It is advisable to develop perhaps three or more formulas for such seed and use them as indicated for the local situation. In some cases where a quick cover is desired for protection, rye, oats, wheat, cowpeas, and similar nurse crops have been used successfully, but a permanent cover must be provided later, for such species are only annuals. A nurse and soil improvement planting of black locust (*Robinia pseudocacia*) or moss locust (*robinia hispida*) has been used successfully in Pennsylvania, with the result that the planted areas have been reclaimed with desirable native growth within three to five years. All grass seeds should be rigidly tested by State or other authorities to see that they meet specifications, especially germination and purity tests.
5. Care should be exercised to use species of plants which will require a minimum of maintenance, because in the final analysis, reduced maintenance costs are the desired result. Native vines and low ground cover plants are generally recommended.
6. In many cases it will be advisable to supplement the plant material with other structures such as native stone walls, rip-rap work and sometimes steel and concrete. Where there is great danger of washing and erosion the use of these extra materials in the first place will be found most economical and satisfactory, and will more than warrant the increased initial expense.

7. Where noxious weeds, as determined by the various State and federal regulations, tend to occupy slope or fill areas, it is not recommended that these be pulled out by the roots, but rather that they be cut off close to the ground before they seed. Such cutting will not disturb the stability of these areas and will give the native plants a chance to develop and successfully establish themselves. When noxious weeds must be controlled to protect agricultural land or because of local regulations, chemical or mechanical processes may be employed, but the landscape engineer must determine the most satisfactory process for his State or area and how far such eradication work should proceed.
8. It is most desirable that more consideration be given to general mowing practices. In a few of the States, such operations are under the direction of the landscape engineer, but in most States this work is a part of maintenance work and results are generally unsatisfactory. Even though careful collaboration may be had between the maintenance organization and the landscape engineer, serious mistakes are bound to happen. In other words, the landscape engineer can perform such work more satisfactorily and also at less expense so that a more natural and attractive roadside development will result.
9. Whether to use nursery-grown plant material or collected stock; whether to establish highway nurseries for the purpose of conserving surplus collected or nursery-grown material are questions which must be decided by each State. Where ordinary highway labor must be used it is believed that best results will be had from nursery-grown material. Where labor can be selected, and properly directed, collected stock can be handled successfully. Connecticut has established some half dozen small nurseries where native roadside material is conserved for future use. Pennsylvania has one large nursery of 102 acres, centrally located, where native material is conserved and propagated. However, great care should be observed in the establishment of such nurseries so that they do not compete with commercial growers and thereby antagonize these interests. Highway nurseries should be considered only as conservation or storage reservoirs for native material saved along the roadside, or for surplus nursery-grown material purchased commercially. In the case of Pennsylvania, the highway

nursery material is propagated at a cost of one-quarter of the lowest competitive bid from commercial nurseries, but it produces only about half of the planting material required.

10. The size and quality of planting material to be used cannot be standardized, but must be guided by the accepted and proper landscape practices for each State or locality, or by the special condition of the particular site. However, the standard specifications, procedure and nomenclature adopted and approved by the American Association of Nurserymen, which are usually followed by the corresponding State or local association, should be used in making up roadside planting plans.

11. Planting procedure with reference to technique in spacing, fertilization, top-soil, and other details cannot be standardized but must be determined by the landscape engineer for his locality or section. It might be well to emphasize the fact that initial plantings ought to be studied carefully so that they are as successful as possible. The general public is quick to notice planting failures along the highway and to criticize perhaps unjustly and without reason. Therefore, the proverbial "stitch in time" is most desirable and highly recommended as applied to general planting technique.

12. How much to expend for plants and planting is a variable factor and only broad generalizations can be given. According to general information given by the U. S. Bureau of Public Roads, from 60 to 75 per cent of the funds allocated may properly be expended for landscape treatment other than planting. Such work includes proper grading and laying back of slopes and fills and other necessary preliminary work. Proper grading back of slopes and fills ought to be a part of the construction work, as it now is in many of the States. However, in other States such work must be done as a part of the roadside development program and completed preparatory to planting operations. The extent of this work depends, of course, on many local and State factors. Wide rights of way usually assure better and more uniform procedure, while narrow rights of way necessarily limit the scope of such work. It is conceded that

wider rights of way must eventually be secured to make possible adequate control of all roadside structures, especially at dangerous points such as road intersections, railroad and trolley crossings, the inside of curves and other points which present traffic hazards.

Planting and the choice of plant materials, as one of the factors in a well-rounded roadside development plan, are important enough to warrant close and careful study so that serious mistakes may be avoided. In this connection it will be advisable to consult with State or federal officials, colleges and similar interests concerned. Thus advantage may be taken of their advice and experience with reference to plant material, the suitability of the various soils for certain species, and the necessary artificial aids to be applied such as fertilizer, humus and similar materials.

It cannot be denied that Nature herself furnishes the best and most reliable guide, and if a genuine naturalistic planting is carried forward following this lead, the planting work will succeed. When those using the highways cannot determine what has been planted and what is natural; when it is impossible to differentiate between the man-created situations and the natural landscape, then roadside planting has achieved its ultimate goal -- then the whole roadside development blends naturally into the native landscape and has enhanced the charm of nature instead of diminishing it.

PLANT MATERIALS - DISCUSSION

It was pointed out that in general a 1 on 1 slope is entirely too steep for planting, and that it is futile to spend money trying to plant slopes that will not hold. There was general agreement that a 1 on 2 slope on uniform subsoil will support ground cover, but that for economical mowing operations a slope should be 1 on 3 or flatter. Some States have adopted the policy of planting ground covers on any slope steeper than 1 on 3 and grasses on flatter slopes. In a number of cases attention has been given to roadside development through the medium of planting without due emphasis on the fundamental principles of grading and stabilization of slopes.

There is an increasing need for an accurate definition of good roadside mowing operations. It was suggested that the ideal set-up would be first to eliminate the noxious weeds from the roadsides and then to maintain roadside areas in a condition similar to adjacent property.

A questionnaire might be distributed which would clear up this subject by producing ideal standards.

At the St. Louis Meeting there was considerable discussion with regard to mowing costs. Unfortunately no data are available to make any comparisons between the cost of maintaining roadsides before being graded and planted and after. This question arises continually in the attempt to answer the claims of some engineers that planting increases maintenance costs. The only answer to this charge would be for the States to keep more accurate records as a basis for cost comparison.

A discussion of mowing equipment revealed that there are several types of mowers in general use. Mr. Gubbels of Texas said that his State was developing an air pressure mower, and anyone interested was invited to correspond with the Texas State Highway Department.

It was reported that by the removal of guard rail mowing operations formerly done by hand could be carried on by machinery. The use of native sod, particularly in rural areas, naturalizes the roadsides and tends to eliminate some mowing operations.

A number of States experience difficulty in establishing locations for tree plantings due to public utility poles along the right of way. This brings out the need for more study of tree species with ultimate growth susceptible to proper clearance. It was further recommended that the Committee investigate existing tree laws for the purpose of eventually formulating an ideal standard covering this subject. This is particularly necessary now, due to the rural electrification program. One or more States have ruled that no pole lines could be constructed on new right of way or where poles did not exist at the time rural electrification was put into force.

The subject of divided highways* was discussed, and mention made of a 5,000 mile German road designed with a center strip. It was suggested that this new phase of highway development be given attention by the Committee on Plant Materials as well as the Committee on Highway Types and Roadside Areas. This Committee was in agreement that center strip planting should be dictated by simplicity and dignity, and by the type of the highway. The use of mass shrubbery was not recommended, especially in residential areas where youngsters might be induced to play on these islands, endangering their own lives and those of motorists. A certain amount of planting to prevent cross glare of headlights was cited as especially desirable.

Observation was made by Mr. Levandowsky that nature in time will cover our roadsides with native plant growth. More emphasis should be placed upon native material, therefore, rather than exotics, and it is better yet to encourage voluntary growth of proper species**.

Concerning types of plants, Mr. Ludwig recommended that studies be made of both naturalistic and formal plantings as they may serve to make traffic signs more effective and to eliminate guard rail. The use of formal tree plantings at intersections, on the outside of curves, at approaches to towns, and in front of school houses would portray to the motorist a more vivid picture of approaching traffic conditions than could be effected by signs.

Limiting formal planting to such areas and stressing the informal and naturalistic on all other sections of the road would eventually produce a psychological effect upon the motorist. Mr. Ludwig pointed out that different species may also be used to guide the driver, Pennsylvania having utilized white birch to indicate roadway limitations at night.

One phase of highway planting mentioned was the choice of trees and shrubs which will produce food for birds and wild life. The introduction of vines and thorny growths for the protection of wild life, as well as food producing plants, may sometime become a definite part of planting policy.

*Reading Reference: "The First Thirty-Five Years' Experience in Modern Highway Building" by Sydney D. Waldon of Detroit, Chairman of the Committee on Roadside Development and Control, American Automobile Association.

**Reading Reference: "Roadside Ecology" by Professor F. A. Waugh, Massachusetts State College.