

ROADSIDE BEAUTIFICATION IN THE
UNITED STATES

THESIS FOR THE DEGREE OF M. S.
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THESIS

Roadside improvement

Landscape architecture

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PREFACE

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CHAPTER I
INTRODUCTION

This thesis is written to bring before the public the importance of this phase of highway development, and to point out the reasons for its becoming a more vital issue as the years go by.

Roadside beautification deals with more than the planting of trees and shrubs along the roadside. The following conditions are considered in this thesis as pertaining to roadside beautification work: The selecting of scenic locations for new roads; the protecting of existing material during construction work; the planting of trees and shrubs where there are none; and the replacing of material injured or removed during construction; the seeding or sodding of all bare spaces such as cuts, fills, and shoulders; the grading of roads so that the slopes of cuts and fills are natural, not artificial as they have been in the past; the trimming and cutting of existing material for pleasing vistas. It pertains to the enactment of laws pertaining to the placement of public utility lines, to the practice of dumping rubbish along roadsides, to the placement of advertising signs, to the prohibition of the destruction of trees or shrubs on the right of way, and to the appropriation of money for the planting of trees, shrubs, vines and flowers along the right of way.

The value of roadside trees was appreciated many hundreds of years ago. During the expansion of the Roman Empire about the year of 27 B.C., the Romans built many hundreds of miles of roads throughout Europe for the transportation of their Legions. It was found that the soldiers were not as fit for battle after marching along roads that were not shaded as they were when the line of march was through the forest or in partial shade. Due to this fact the Romans planted trees along their military roads where they were not otherwise shaded by natural growing trees.

It is for these same reasons that we find the French roads lined with their soldierly rows of trees. During the reign of Napoleon, France built military roads in all directions from Paris to facilitate the movement of troops. In order to have these armies reach the fields of battle in the best possible condition, Napoleon had the roadsides planted to rows of trees. The trees along these roads kept the hot sun from shining directly upon the soldiers, and made the line of march more pleasing and inspiring due to the esthetic beauty of the trees. These plantings of the Romans and of the French, were made primarily for this utilitarian purpose with little thought given to their esthetic value. When one drives along a road that is thus lined on either side with a strict alignment of trees, they become very displeasing after a short time due to their monotonous repetition. Such a condition

never occurs in nature. That is why one never tires of nature. Seldom is there a monotonous repetition in placement of character.

Below is an illustration of the two types of planting, the formal or row type and the informal or naturalistic type.

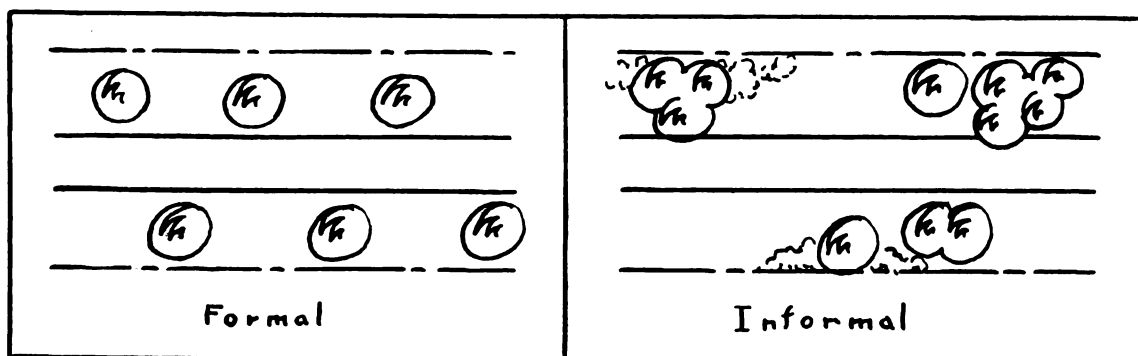


Fig. 1.

When Columbus discovered America the natural landscape beauty of the country was its most inspiring quality. Much of the native flora that constituted this effect has been since destroyed. The early roads that were made by the pioneers as illustrated on the following page, were cut through these native forests, carried over small hills, or around larger ones and sometimes necessarily splashed through the swamps. Due to the preponderance of naturalistic beauty at this time there was no thought of conserving it. Later as new roads were built over these early trails the native material was cleared away from the roadsides. Farmers owning the adjacent properties also cleared away the trees and shrubs from their lands to accommodate the cultivation of crops. As these denuded roadsides became more barren



Fig. 2.- Beginning of one of the first roads in western United States—the old Oregon Trail.



Corduroy roads were among the first "all weather" roads in the United States. The one shown here was used for redwood logging operations in northern California.

Fig. 3. & 3a.



Judging by the width of this early horse and buggy road, it must have been a "main highway."

and depressing, the public began to think of the desirability of replanting trees and shrubs along these right of ways. The first planting of this kind was initiated by private enterprize or by civic organizations because public funds were not available for this purpose.

The next era in the history of road building, coincident with the use of the automobile, was the unprecedented demand for better surfaced roads. This demand drew upon the resources of the states to such an extent as to monopolize all the available road-building funds. Later as the road-building program approached completion money began to become available for landscape improvement work. Now all states have commenced to think seriously of roadside beautification. The next chapter will present the status of roadside beautification work in each state.

CHAPTER II

WHAT THE DIFFERENT STATES ARE DOING

This chapter is devoted to quotations and a chart which is developed from the data upon the present status of roadside beautification as obtained from letters received from the state highway departments of these various states.

ALABAMA

"Due to lack of funds very little roadside beautification work has been done by the highway department. However in scattered communities a small local effort has been made."

ARIZONA

"Due to the fact that we have no department covering roadside beautification, we can not give you the information you desire."

ARKANSAS

"At this time the Arkansas State Highway Commission has not decided to spend any money other than for road and bridge construction. Civic clubs in various towns throughout the state have done work of this nature in a small way."

CALIFORNIA

"All trees are planted by private initiative or civic bodies. They pay for the plants, planting, and the first years maintenance which usually amounts to \$2.25 per tree according to the locality in which the trees are to be planted and the amount of maintenance required. The state then does the actual planting and cares for them We have

not found it satisfactory for private individuals or civic bodies to do their own planting.

We have planted approximately seven hundred miles of trees at the present time. These are spaced usually one hundred feet apart and staggered so that actually there is a tree every fifty feet.

All grade separations are planted to beautify and reduce erosion of the slopes, and also along the coast the slopes are planted with Mesembryanthemum which requires no maintenance and reduces fire hazard as well as erosion.

Native shrubbery is being set out principally along the Redwood Highway this year in an effort to obscure old and new construction scars. We have a State Nursery that furnishes the shrubbery and trees for State use, which includes shrubs for Maintenance Yards as well as for roadsides.

Drinking fountains are being installed wherever there are running springs and sufficient parking area. These require considerable thought as there are several features each fountain must embody to be useful to the public, and they must be simple in design and appropriate to the surroundings.

There is no special organization that cares for the trees and shrubs. A tree foreman or superintendent in each District has charge of the planting, and he either has a crew under him or does the work himself according



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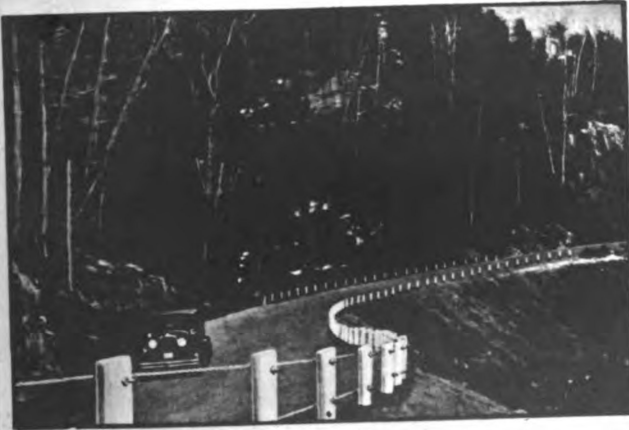
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8



9



10

11



to the extent of the beautification in his particular District.

Throughout the dry interior valleys of California we concentrate our beautification to tree planting mostly as the maintenance on slope covers and shrubs is prohibitive except on a small scale.

Along the coast where the atmospheric conditions are more favorable, native shrubs and slope covers maintain themselves if planted in the fall of the year so they have the benefit of the winter rains. Great strides are being taken this year along these lines with the use of the relief help the State is employing this winter.

There have been several small parks planted through the State by civic bodies and maintained by the State that are doing very well, but in California the maintenance on lawns and shrubs is very expensive which holds developments of this nature to a minimum."

COLORADO

"Our mileage is so large and the funds for construction and maintenance are so meager that we have been spending every available dollar for roadway improvement.

Of course our engineers give careful consideration to retaining as much of the natural beauty as possible, and leave the construction work in a presentable condition."

CONNECTICUT

"The Connecticut Highway Department has a unit in its

organization formerly known as our Landscape Division but now The Bureau of Roadside Development, which carries on a systematic program of roadside beautification and improvement.

The unit was organized in July 1, 1927 under special legislation which was passed by previous General Assembly."

*"The General Assembly of 1927 passed legislation giving the State Highway Commissioner jurisdiction over all trees, shrubs, and other vegetation within State Highway rights of way and authorized planting and maintenance.

Connecticut believes that any effort that adds to the beauty of our roadsides, makes our highways safer and gives the public a better use and enjoyment of them may well be considered roadside development.

Before building a new road, trained men remove all good young trees and shrubs, transplanting them to temporary nurseries.

Upon completion of the road, the roadside development begins. Existing trees are pruned and slash growth removed, allowing the better type of shrubs and vines to develop. Pruning trees and cutting brush by cooperation with the property owners is carried on to open up landscape and water vistas.

Parking areas are provided with tables and waste barrels.

*Four years along Connecticut highways.

Wherever there are historical trees, boulders, monuments, milestones or other landmarks within the right of way, the State protects and maintains them.

Three types of planting have been found to be most practical for average conditions met on Connecticut highways.

Informal groups of one to five trees are adapted to rolling, hilly country, or in flat regions where the road winds in and out. An effort should be made to imitate natural groves and the trees may be placed at any interval the planter decides is necessary to blend the group into the local scenery. The spacing between clumps should be irregular to avoid a mechanical aspect.

Where the right of way is narrow, but still providing room for trees, the formal row type of planting may be used to advantage. This consists of maintaining all the trees equidistant from each other. Where both sides of the highway are planted in rows, it is not practical to attempt keeping trees on both sides directly opposite each other. Entrances, guypoles, drains and the like cause a shift in spacing on one side, while across the road such conditions may be absent.

The third style is called "random" or "staggered" planting. Along wide rights of way, trees may effectively be placed at random, so that the distances of consecutive trees from the center line are unequal. This breaks up the monotony of driving along roads that are hemmed in by very

soldierly appearing rows. It further gives the appearance that the trees are native to the roadside, having survived the thinning out process of years gone by.

Opinions vary on the proper spacing of shade trees. The question has carefully been considered by this department and a few rules formulates as follows: In row planting, varieties similar in crown spread to the Sugar Maple are to be planted at intervals of sixty feet. Those similar to Norway Maples are placed on fifty foot centers, while Weeping Willows are set forty feet apart. The result of this planting is that when the trees reach maturity adjacent crowns will just touch. In group planting, any distance is suitable, for nature never used a yardstick in her work. In random planting, the intervals may vary slightly, to achieve the best effect. For safety sake, if for no other, it does not seem feasible to plant trees closer to the edge of the traveled surface than twelve feet. Twenty to twenty-five feet from the edge of the highway is an ideal distance, for the trees will shade the road, and at the same time will not be a menace to traffic.

On sharp turns, it is inadvisable to place trees on the inside of the curve, as they obstruct the sight line. On flat curves, if the vision is at least two hundred fifty feet ahead, trees on the inside of the curve are permitted. Planting on the outside of a curve is in good form at all times. Intersections, approaches to railroad crossings,

and similar hazards must not be planted in any way with trees.

One of the first decisions to be made on a tree planting program is the definite choice of trees to be used. It has been our experience that it is preferable to use only those varieties which occur natively in the section to be planted. For example, in level, sandy plains, sixty percent of the wood lots were found to be mixed oak. It is desirable to plant oaks on the highway in that vicinity rather than to choose Red Maples which might die from lack of moisture. The limiting factor in such decisions must be necessarily the availability of the varieties desired.

To illustrate--Some New England areas have dense stands of White Oak. Yet, eastern nurserymen do not have quantities of this variety in the sizes desired on hand. Consequently, we substitute something else available which is adapted to conditions favorable to White Oaks, such as Oriental Plane.

Along seashores and other barren areas, introduced varieties must be tried. With a survival of the fittest, the planter may tell by observation what grows best on that particular site.

Where funds are sufficient, it is the best policy to purchase nursery-grown trees because they will have far better fibrous root systems, better shaped boles and be less subject to mechanical injury than collected stock. If it is imperative that collected trees be used, they should be lifted from their native surroundings and set in a



Fig. 12.



Fig. 13.



Fig. 14.

Fig. 15.

Fig. 16.



nursery for two years, during which time they should be heavily mulched to encourage strong root growth."

FLORIDA

"Beacuse of lack of funds Florida has no organized branch for this side of road building."

GEORGIA

"Georgia has made a pretty good start in this work, all of which is being done in cooperation with the different civic organizations of the State. They furnish the plants and the State puts them out and maintains them."

IDAHO

"We are doing nothing of this sort in Idaho aside from prohibiting signs and advertisements from the right of way as much as possible, but we have so little money for highway use that the one vital problem is construction and we will have to leave beautification in this State for future generations."

ILLINOIS

"The Department of Public Works and Buildings, Division of Highways, Bureau of Maintainence, has for the past five years given attention to the following roadside beautification problems:

Preventing mutilation of worthy existing trees and shrubbery; creating formal drainage through the smaller towns; cleaning up automobile dumps, trash and weeds; mowing and seeding slopes and shoulders, and carrying

on an educational campaign relative to billboards, careless kept filling stations, and commercial stands.

Under the supervision of this Bureau, the organization consists of one landscape architect, one landscape engineer, and one expert in tree trimming, who furnish planting plans without cost for those who desire to plant trees and shrubbery upon the Highways.

The Department of Public Works and Buildings, Division of Highways, provides a policy and issues a permit. Briefly the policy provides that they (the Department of Public Works) will do the necessary grading, prepare the seed beds, and maintain the trees and shrubbery after planting, but do not furnish them. "

INDIANA

*"As an aid in maintaining the roadside against erosion, the Highway Commission has continued the practice of seeding the shoulders and ditch slopes on all newly graded roads.

The Highway Commission also continued the planting of willows and other trees at special places to protect the roadbed from erosion. Some miscellaneous planting was done along the roadside which will aid in the protection against erosion and also serve as ornamentation in future years. The Commission cooperated in a limited way with local clubs and organizations desiring to plant trees and ornamental

*Annual report 1930, page 74.



Fig. 17.

Fig. 18.



Fig. 19.

shrubbery. The Commission's part, however, in the purely ornamental work consists largely in supervising and furnishing instructions.

The greatest handicap to planting trees and shrubs on the roadside is the narrowness of the highway right of way. Where local organizations desire planting largely for ornamental purposes they should aid in securing sufficient width of right of way to provide for same.

Many flowers and shrubs have been planted by these local clubs and individuals at various places along the State Highway. The planting at the end of culverts, near bridges, at intersections, on curves and other places add much to the attractiveness of the highway. With sufficient right of way and proper local cooperation it would not be difficult to make many stretches of roadside into beautiful and ornamental parks. This planting should not be done promiscuously but should be done on such stretches of road and at such locations where it is appropriate.

It is very necessary to guard against planting high shrubs and trees near road intersections because of the obstructed view which may be caused in later years. Also it is important to guard against planting shrubbery where same will be the cause of snow drifting on the highway. Where the wind has a clean sweep across the level plain and drifting snow is common, shrubbery should not be planted closer than seventy five feet to the edge of the traveled

way. At this distance, or preferably one hundred feet the planting will also serve as a snow fence. If this fact is recognized, and trees and shrubbery planted at the proper locations, they may aid in keeping roads open during the snow season."

KANSAS

"Kansas has not gone into roadside beautification, but we hope to within the next year or two."

KENTUCKY

"This department has no information available regarding roadside beautification work."

LOUISIANA

"This is to advise that the Louisiana Highway Commission has just commenced to beautify the roads, and we are in no position at this time to give you the information requested."

MAINE

"We have no Department nor authorization of the expenditure of funds for roadside beautification."

MARYLAND

"The State Roads Commission of Maryland have gone into roadside beautification only insofar as to plant trees along the roads and vines along the banks."

MICHIGAN

A chapter on the work accomplished in Michigan will be found on page 69.

MINNESOTA

"This State has no systematic plan of roadside beautification, other than carrying out the construction grading

in such a manner that the roadsides can be readily seeded to grass and thereafter kept in a presentable condition by mowing, etc. Nothing has been done in the way of planting shrubs and trees or doing any other type of special work."

MISSISSIPPI

"Roadside beautification has never been undertaken in this State due to lack of funds."

MISSOURI

"This work is in charge of our Maintenance Bureau and is handled as a part of our regular maintenance program. We are, however, limited in our expenditures to the landscaping of properties belonging to the State and under supervision of the State Highway Commission. We have no appropriation from the State Legislature enabling us to undertake an extensive beautification program. We are dependent, to a large degree, upon various organizations throughout the state in building up a sentiment in favor of highway beautification, and thereby securing the cooperation of the property owners along the State roads. Much credit is due these organizations for the results so far accomplished. It may be possible after our road system is completed that funds will be available for beautifying the roadside."

NEBRASKA

"We do not at the present time have an organization to handle this work. We do however believe that it is a matter which should and no doubt will be given more careful consideration in the future."

NEW JERSEY

"We have a special organization to take care of this work, which was started only last year, but it is not very fully developed at this time."

NEW MEXICO

"We do have a law in this State regulating the placing of signs. No sign is permitted within one hundred feet of the right of way except by special permit."

The State Highway Department endeavors to keep the right of ways cleaned and in attractive condition and preserves native trees wherever possible during construction. Trash is not allowed upon the right of way of any State highway."

NEW YORK

"This Department conducts no operations which could be very well classed as roadside beautification."

NEVADA

"Due to the extreme dry weather conditions existing in this state, it is doubtful if any attempt to develop roadside beautification will be made for some time to come."

NORTH CAROLINA

"We do not have a special organization or plan covering this work in North Carolina."

NORTH DAKOTA

"Very little progress has been made in the line of roadside beautification in this state."

This fact is due to the lack of funds for this purpose and also to difficulties encountered for the reason of the severe winters and the semi-arid climate."

OHIO

"The Ohio Highway Department is doing very little work along this line.

Local organizations in various places are carrying on this work."

OKLAHOMA

"The Oklahoma Highway Department has never undertaken roadside beautification as a part of the State Highway work."

OREGON

"The plans of the Commission at this time is one of acquisition. The Highways of the State traverse many miles of virgin timber. The securing of strips thru these areas are being stressed. There has been some planting of trees bordering the Highways by Civic Clubs. This is not fostered to any extent due to line changes, future paving, and widening of the Highways."

PENNSYLVANIA

"Due to a growing demand it was necessary to create some branch of Highway activity specially fitted and trained to do this work and so to-day we have the Forestry and Landscape units in many of the Highway Departments. When one examines the situation carefully, there can be no doubt that the same principles apply to the essential treatment of

Highway slopes and roadsides. The well known principles of forestry that a forest cover is essential and necessary to regulate and control the runoff water and so regulate the stream flow and to reduce erosion apply with equal force to the treatment of Highway slopes and roadsides. Assuming that proper construction methods have been used in the roadway itself, there is nothing more essential to the permanency of the Highway itself than proper water control and drainage. The planting of trees, shrubs, vines and grasses on the Highway slopes and roadsides not only serves to control the runoff water and erosion, but it also covers the unsightly gashes and cuts which are the result of modern Highway construction, and so adds a touch of beauty and attractiveness to the roadsides.

Primarily as in any other business undertaking, this work must stand on its own merits. It must show a final reduction in maintenance cost of the Highways; beautification and attractiveness naturally follow. Through the removal of dangerous trees along the Highways; through the removal of trees and other growth on curves and at other dangerous points to promote traffic safety; through the establishment of ever-green snow fences and through the planting, seeding and sodding of slopes, culvert entrances and roadsides generally, such units can and will more than justify their existence from a purely business standpoint. If beauty and attractiveness, the natural result of these measures, could be judged from a material standpoint, the scales would be overbalanced,

and if the weight of favorable comment from organizations, individuals, etc., could be put on the scales, they would be broken down entirely.

The forestry unit of the Pennsylvania Department of Highways was organized in the fall of 1928. To-day eleven of the States have a special unit to care for roadsides or have set aside a definite sum for this work, and perhaps more than half of the States are expecting some of their road maintenance funds for this work. The Pennsylvania unit now consists of a Highway Forester, with headquarters at Harrisburg, who plans and directs the work, and a forester in each of the eight original highway divisions.

Under the proposed plan of reorganization of the department, made necessary to care for the additional twenty thousand miles of rural highways planned by Governor Pinchot, the State has been divided into twelve highway districts and each of these will eventually have a district forester to care for the work of the forestry unit.

The essential work of this unit may be divided into a number of activities which can be briefly classed as follows:

1. Planting of slopes and roadsides.
2. Seeding and sodding of slopes, culvert entrances and roadsides.
3. Cooperative plantings with various clubs, organizations and individuals.

4. Removal and pruning of trees to insure traffic safety.
5. Establishment of evergreen snow fences at points where drifts are constant during the winter.

During the two and one-half years of its existence, the forestry unit has planted more than three-quarters of a million trees, shrubs, vines and willows on the highway slopes to prevent erosion and to control the water runoff; more than twenty-five thousand shade trees, evergreens and shrubs around the various storage sheds; more than three million square feet of shoulders and gentle slopes seeded, and more than three thousand five hundred trees removed to protect the highways and to safeguard traffic.

In order to secure coverage of the slopes as rapidly as possible, it is necessary to use such species as develop a vigorous root system or which produce roots from the nodes when in contact with the soil. Honeysuckle, virginia creeper, barberry, iris, and various vigorous grasses are used extensively for slope work and these are supplemented by the flowering shrubs such as the spireas, dogwoods, snowberry, coralberry, laurel, rhododendron and others which are commonly found throughout the eastern United States.

At the same time, every effort is made to preserve existing natural growth wherever possible. Desirable species of all kinds are taken care of during road



Fig. 20.



A good stand of grass which will prevent costly and dangerous erosion of shoulders and slopes is a good highway investment.

Fig. 21.



Fig. 22.



Fig. 23.

construction and operations; the theory of preserving the growth already on the ground being very wise and economical. In some cases, whole avenues of stately old trees have been preserved, and many a venerable oak or other unusual specimen has been saved by a slight relocation of the road or a little change in the road line. Likewise, naturalistic effects in planting are being aimed at so that the roadsides do not have a standardized look but unfold a changing panorama of what appears to be the natural roadside growth of Pennsylvania.

An unusual problem is presented in the treatment of steep slopes where, because of the very nature of the soil itself, washing and erosion tend to wash out the planting stock before it has had a chance to establish itself. Since most phases of this highway work represents pioneer efforts and because there are at present few past experiences in any of the states to furnish any reliable guide, considerable experimental work yet remains to be done. It is well known how profusely and rapidly most varieties of willow sprout and produce vigorous root systems. This is particularly true of the common white and the crack willow. By setting heavy live willow posts, from six to eight feet in length along the slopes in the ground so that not over a foot of post is exposed, it is hoped to produce a profuse root system and growing willow sprouts to prevent washing and erosion of the steeper slopes. The results so far seem to indicate that this work will be successful.

To make the roads more safe for the motorist, the forestry unit sees that dangerous trees and tree limbs are removed so that these do not fall upon the highways and perhaps cause serious accidents and even death. Trees and other growth are also removed on the inside of curves so as to afford the motorist a clear view of approaching traffic and so promote safety. Besides, many undiscovered and hidden views along rivers and streams have been opened up by the removal of trees and underbrush so that the public has a vista of unusual beauty unfolded before its eyes. This has been done especially along the Susquehanna and Delaware Rivers.

Another unusual feature of safety work is trimming along the highway to secure circulation of air so that the roadway dries out quickly, thus aiding in the elimination of ice and slippery roads. To secure this, the lower branches of the trees at such locations are removed to a height of from ten to twelve feet and covering a width of about fifty feet from the edge of the roadway. This permits a free circulation of air over the highway and aids materially in the evaporation of the rain and snow as it falls.

In order to assist in memorial and similar plantings of shade trees and other suitable planting stock the department cooperates with clubs, organizations and individuals in this work. Usually the cooperating agency furnishes the planting stock, while the Department makes the planting plan, plants the material, maintains it and otherwise assists in

the work. Entrance plantings to towns, boroughs and cities have been made in this way, as well as avenues of shade trees, plantings around springs, and other suitable and desirable locations throughout the State.

Who has not seen the white roses of York County or the red roses of Lancaster County, or the memorial roses approaching the National Cemetery at Gettysburg in Adams County? Who has not traveled along a highway bordered with young thrifty oriental planes, oaks, or maples? These and similar beauty spots are brought about through the cooperation of the civic-minded people throughout the state.

On July 1, 1929, the forest tree nursery of the Department of Forests and Waters, located along the Susquehanna Trail between Northumberland and Milton, was transferred to the Highway Department. This nursery consists of one hundred two acres and has been placed in excellent condition. Here is raised much of the planting stock used along the highways. The nursery furnishes this stock at about half the cost of the average commercial nursery and it also insures that freshly dug plants can be taken by truck to the planting sites over the state and planted in the shortest possible time. It is possible that the majority of the planting stock used can be raised eventually at the department nursery. To take proper care of the eastern half of the state, while a similar outfit is kept at Franklin for the use of the western half of the state.

In order to present to the public exact pictures of its forestry and roadside activities, three sets of colored lantern slides have been prepared and are available for the use of the forestry unit. Each of these sets consists of about fifty slides made from actual photographs of the work in Pennsylvania. These slides are in use almost continuously and tell better than words what is being done throughout the state.

The work of the forestry unit has received most favorable comment all over the state as well as from many of the other states in the Union. It has been heartily approved and endorsed by many clubs, organizations and associations of all kinds over the state, particularly the women's organizations, the park and forestry associations and others of similar nature whose activities have to do with the outdoors. The Pennsylvania Motor Federation at its recent annual meeting endorsed the program of the unit and ask that a definite sum be set aside each year for this work. Excellent cooperation has been given by the Pennsylvania Outdoor Advertising Association in the removal and elimination of signs at points which the department considers dangerous to traffic or interferes with a scenic view.

While many states are spending considerable more money than Pennsylvania on roadside work, some as much as ten times more per mile of state road, yet the work here has been established on a firm basis of economy, ultimate reduction in maintenance costs of highway operation, and

utility. The resulting beautification of the highways is the cumulative effect of these operations and is the result so much desired and now demanded by the people. Roadside work in Pennsylvania is well under way but much remains to be done before all the highways will have been covered. Pennsylvania will have within the next four years almost forty thousand miles of improved State Highways, and many years of work will be in store for the forestry unit before all that vast mileage of roadsides will have been properly cared for and treated."

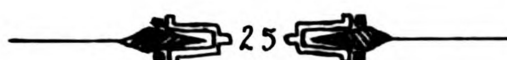
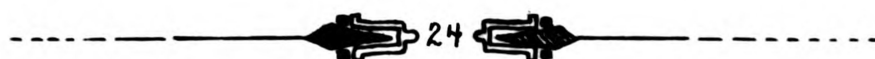
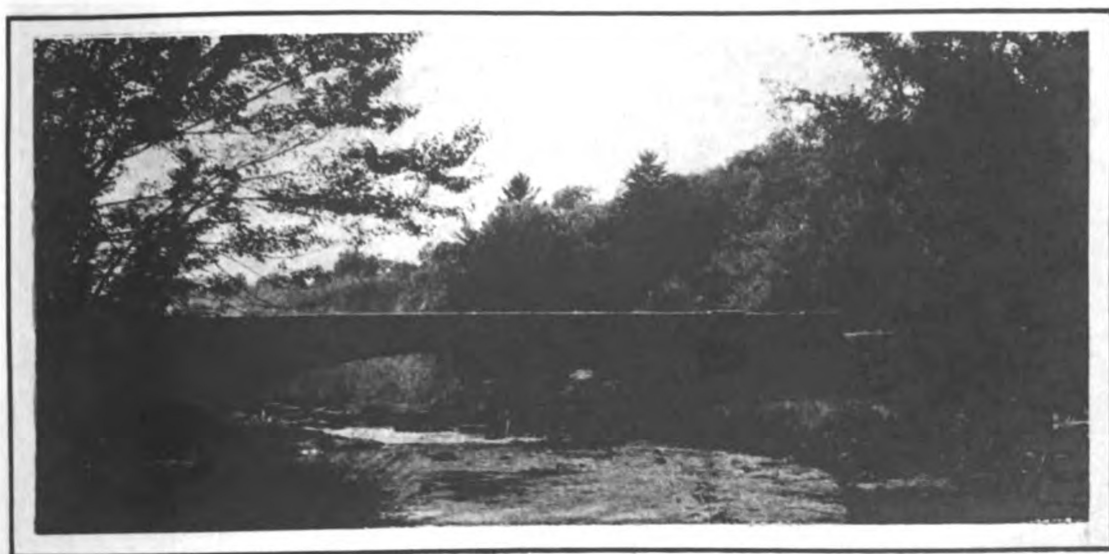
RHODE ISLAND

"Roadside beautification in this state is in its infancy. During the past year and a half we have employed tree experts to trim out and doctor up trees along our state highways, have cut back, reshaped and trimmed side slopes, removed a large amount of rock and debris, and on areas wholly controlled by the state at intersections, we have prepared planting spaces in which we intend to plant shrubs in the near future.

The work thus far carried out has been in the direct charge of the maintenance engineer and his assistants."

SOUTH DAKOTA

"The South Dakota State Highway Department has not done very much toward roadside beautification up to the present time, the only thing being the sowing of slopes and ditches with grass."



TENNESSEE

"The State Highway Department does not maintain a landscape division for this phase of work, but works through the Maintenance Division in cooperation with Civic Clubs, etc."

TEXAS

"No work of this type has been undertaken by this Department. Several Civic Organizations have been encouraged in this work, but to date, tree planting is the only form of beautification adopted. This has been done under supervision but with no definite central policy, except to insist that such trees be planted back of the ditch line."

UTAH

"Practically nothing has been done in the way of roadside beautification in this state to date. We realize the importance of this movement and no doubt ere long will be in a position to give the matter the attention it deserves."

VERMONT

"The State of Vermont at present has no Highway Department funds which may be used for roadside beautification. We feel that we are not justified in spending Department money for any other purpose outside of road building and maintenance. We have, however, spent a limited amount in grassing slopes which is primarily a question of maintenance. In as much as such grassing prevents erosion and eliminates the cost of repairing the damage caused by this erosion.

Aside from this our activities have been confined to the promotion of beautification work at the approaches of our communities. Our part in this work consists of furnishing technical advice and assistance to public minded and civic organizations in these communities. We lay out a program of development for them to follow and they furnish the funds and labor in doing this work."

VIRGINIA

"At the present time we are making an intensive study of the roadside problem in Virginia in preparation of a report to the General Assembly. Only such work as can be handled under regular maintenance operations is being undertaken."

WASHINGTON

"All expenditures of this Department are made in accordance with legislative appropriations. As yet there has been no fund available for roadside beautification work. Consequently as yet we have not made any progress along this line. Our maintenance crews, however, seek whenever possible to improve the appearance of the roadside by removal of unsightly brush and debris and keep the State right of way free from all advertising."

WEST VIRGINIA

"This state does not have a special organization for roadside beautification.

The work that we have done in this state consists of

erecting a few roadside drinking fountains. These have been erected by our regular maintenance force."

WISCONSIN

"We have not done much along the line of roadside beautification as yet and do not have any special organization to take care of this work."

WYOMING

"This state has not taken up the matter of roadside beautification. All available funds have been needed in construction and maintenance due to our sparse population and difficulty in raising funds for highway improvement. I doubt whether it will be possible to undertake any improvements of this kind for some little time to come."

MASSACHUSETTS

"The work in this state is carried out by the maintenance department. They have a nursery at Palmer, Massachusetts where the trees and shrubs for roadside beautification are propagated.

The work done by this department in the way of beautification consists of the following: removal of all dead material; first aid to injured trees; care of trees; safety work such as maintenance of proper clearance; landscape cutting for vistas; and the planting of trees and shrubs.

[illegible]

CONCLUSION

From the data given previously in this thesis, many conclusions may be drawn, the most important of which is the rapidity with which this movement is spreading over the United States. Previous to 1921 there was very little if any concentrated effort to beautify the roadside. In some instances a few states passed laws for the protection of roadside trees from destruction and one or two states had passed laws appropriating money for the planting of trees along the highway.

As the auto industry improved their cars, making for more speed on the highway, there was a demand for more and better surfaced roads. As these roads were being built, the native plant material was obliterated from the right of way in order to make room for the new construction of the road. The widening of the roads, easing of curves and better grading of cuts and fills were all needed developments that improved their serviceability but did not entirely meet the satisfactions of the people. They wanted to enjoy the native plant material that expressed the beauty of nature along the rural highways, and that required the replacement of these native trees and shrubs.

As a measure to appease this demand, states began to pass laws for the removal of bill boards from the right of ways, for the governing of the placement of public utility lines, for the cleaning up of the roadside, for

for the protection of trees and shrubs along the right of way, and for the appropriation of funds for the planting there of trees and shrubs. Of the leading states in this program, eight have laws for the governing of bill boards, eight have laws for the control of the placement of public utility lines, and six have laws for the prevention of dumping rubbish along the roadside.

In the year of 1921 Massachusetts passed a law for the beautification of its roads, as well as for the protection of the already existing plant materials. In the year of 1927, Connecticut passed a law for the creation of a landscape division in connection with its Highway Department.

During this short period from 1921 to the present time, 1933, at least eight states have a definite department for the fulfillment of a definite planting and maintenance program. In addition to these states there are many more that hope to take this step of conserving and making landscape plantings along their highways as soon as financial conditions permit. Of the forty-eight states about sixty percent have accomplished some roadside planting, either through the state or by the aid of civic clubs. In the other forty percent of the states small plantings have been made by civic clubs or civic minded citizens.

There seems to be three distinct methods of doing this work.

The first and best method is that whereby the state

is to set aside a certain amount of money each year for the planting of trees and shrubs along the roadside. These plantings can be made by a separate department or by the regular maintenance crews under the direction of an experienced landscape architect. Money may also be received through the maintenance department for the care of already existing material, and through the construction department for the planting, transplanting, and trimming of trees along the right of way of new construction jobs. This plan is very good because the state may formulate a unified plan which will result in eventually beautifying all of the roads in the state.

The second method is that whereby the money used in the planting and in the first years maintenance is supplied by civic clubs and public spirited individuals. The planting is done by the state and a unified plan is carried out in the same manner as the first method, the only difference being in the source of the money.

The third method in use is that whereby the civic associations or clubs do the planting after their own plan, without any control from the state. This results in a very haphazard development of disconnected roadways with extended undeveloped roadways between them. Often the material used is not indigenous and no unified plan is carried out.

The first two methods are very good, but the author does not recommend the third method, because of its lack

of plan and unity.

It would seem feasible for all states, whether they had a department for the care of this work or not, to publish a list of such native plant material which is to be conserved during construction and along the already existing roads. This would instil in the minds of the people as well as of the employees of the Highway Department the kinds of shrubs and trees worth protecting, and would further tend to save many shrubs from destruction by people who would not otherwise have thought of the beauty and value of such things.

All natural features along the roadsides such as springs, creeks, and wooded areas should be developed so that they will serve the public to their fullest extent. Wherever there is a good spring along the roadside that flows continuously throughout the year, the water should be tested as to purity, and if fit for drinking purposes, it should be developed as a roadside fountain. The best way to accomplish this is to purchase sufficient land where the spring is located to provide for the parking of at least five cars. The spring should be developed as naturalistically as possible to harmonize with the surroundings. Provisions should be made to maintain the purity of the water. Often such places as well as others where there is a stream in close proximity to the road, can be developed into delightful picnic areas. Such

areas should consist of a parking space of at least two cars for each picnic table that is provided, and a refuse can for each table. Tourists often carry their lunch with them so that they may eat along the roadside. Where there are convenient picnic tables and parking facilities, it tends to reduce the danger of cars parked on the shoulder of the road, as well as to reduce the cost of picking up waste papers along the roadside. This reduction in cost will often pay for more than the building of the tables, and of supplying them with refuse cans which are generally made of old oil drums properly painted and covered.

Some states that do not spend money for the planting of trees and shrubs along their roads, seed the shoulders to grass. This tends to beautify the roadside and to conserve the shoulders and ditches from erosion. The savings often are greater than the initial cost of the seeding or sodding.

The very fact that about sixty percent of the states have found that roadside beautification in some form, pays good dividends in reduced maintenance costs, in increased tourist trade, as well as in the satisfactions it gives to the people who live in the state, demonstrates the universal need and value of roadside beautification. Roadside beautification is the desire of the people. This desire for better conditions has brought about many improvements in the past and doubtless will result in

marked developments and improvements in roadside beautification of the immediate future.

CHAPTER III

LAWS THAT COVER SPECIAL FEATURES OF ROADSIDE BEAUTIFICATION

In this chapter the author has placed laws that should be given special attention by any state that plans to have a roadside beautification program. These laws cover such special features in roadside beautification as: billboards, wilfull destruction of roadside trees and shrubs, dumping of rubbish along the right of way, planting of trees along the roadside, amount of money spent on planting of trees, placement of telegraph lines, placement of telephone lines, planting of fruit or nut bearing trees on private land, right of property owner to plant trees, growing and distribution of trees, protection of roadside trees from defacement or destruction, protection and cutting of roadside trees, and the planting and care of roadside trees.

From the above list of laws, the reader can see that the planting of trees and shrubs along the roadside does not constitute all of the features of roadside beautification, but there are many other points to be considered in a program of this kind.

On the following pages are laws covering the points enumerated in the first paragraph.

NEW JERSEY GOVERNING THE PLACEMENT OF BILLBOARDS

CHAPTER 41, LAWS OF 1930.

An Act to require and provide for the issuing of licenses and permits to persons, firms and corporations for the construction, maintenance and use of billboards and/or other structures for outdoor advertising, and to regulate same.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

1. No person, firm or corporation after the first day of January next shall engage or continue in the business of outdoor advertising for profit through rentals or other compensation received for the erection, use of maintenance of billboards or other structures upon real property for the display of advertising matter without a license for that purpose from the Commissioner of Motor Vehicles and payment of the sum of one hundred dollars (\$100) hereby imposed for revenue for the use of the State. Every such license shall remain in force for the term of one year from and after said day of January, and may be renewed annually on the same terms. All licenses issued after said day of January shall expire on the first day of January following the date of issue.

2. Every application for license required by the first section of this act shall be made on a form to be furnished by the Commissioner of Motor Vehicles, and shall state the

full name and post office address of the applicant, and the name or names of the municipality or municipalities in which it is proposed to erect, maintain or use any billboard or other structure for outdoor advertising. Other relevant information required by said commissioner during the consideration of any application for a license or in any proceeding to revoke the same shall be furnished by the applicant.

Every person, firm or corporation obtaining a license in pursuance of the first section of this act must also obtain a permit for the erection, maintenance or use of each billboard or other structure used or to be used for advertising purposes as provided in the fourth section of this act.

3. No person, firm or corporation not engaged in the business of outdoor advertising for profit shall after the first day of January next erect or maintain any billboard or other structure for the outdoor display of advertising matter, except on the premises where the business advertised is carried on, without a permit for that purpose from the Commissioner of Motor Vehicles, as provided in the fourth section of this act.

4. Every person, firm or corporation desiring to erect or maintain billboards or other structures, or any billboard or other structure, for the display of advertising matter shall on or before the fifteenth day of December next, and between the first and fifteenth days of December of every

every year thereafter, file with the Commissioner of Motor Vehicles a statement showing the location of each billboard or other structure used, or to be used by such person, firm or corporation for advertising purposes, except those on the premises where the business advertised is carried on, and the area in square feet of each billboard and/or part of any other structure on which any advertisement is or shall be placed, and shall pay to said commissioner the sum of three cents (3¢) for each square foot of the surface thereof used, or to be used, for such purpose. Upon receipt of such statement and payment required by this section, the Commissioner of Motor Vehicles shall, before the first day of January following, issue a permit to maintain and use each billboard or other structure mentioned in such statement for the next calendar year; provided, the same complies with the provisions of this act. Permits may be renewed from time to time for a term or terms of one year each upon similar statement and payment, and may be granted at any time during a calendar year to expire on the first day of January following, upon filing with said commissioner a statement of the proposed location and area in square feet of each billboard and/or part of any other structure used or to be used for advertising purposes, and payment of such proportion of three cents (3¢) a square foot of each billboard or other structure to be used as aforesaid as the unexpired portion of the year bears to a full year.

5. The name and post office address of the person, firm or corporation owning any billboard or other structure, or controlling the same for advertising purposes, shall be plainly inscribed thereon. Permits shall be numbered consecutively and each billboard or other structure used for advertising purposes shall show the number and expiration date of the permit. No permit shall be required to erect, maintain or use any billboard or other structure on real estate exclusively to advertise the same for sale or to let; nor to erect, maintain or use the same on the premises where the business advertised is carried on.

6. No license or permit required by this act shall be granted to any person not residing in this State, or to any firm or corporation having its principal place of business outside of this State, to construct, maintain or use any billboard or other structure for advertising until such person, firm, or corporation shall have furnished and filed with the Commissioner of Motor Vehicles a bond satisfactory to said Commissioner, running to the State, in the sum of one thousand dollars (\$1,000), conditioned to observe, obey and fulfill all requirements of the law of this State relating thereto, and the rules and orders of said commissioner regulating the location, construction and maintenance of billboards or other structures, and the display of advertisements thereon.

7. No billboard or other structure for advertising purposes shall be erected or maintained within a distance of five hundred feet of an intersection of a highway with another highway, or with a railroad or street railway, at a point where it would obstruct or interfere with the view of a train, street car or other vehicles on the intersecting highway, railroad or street railway; nor shall any such billboard or other structure be erected or maintained on any public highway, park or other public property, unless permission in writing shall have first been obtained from the board or body having control thereover and approved by the Commissioner of Motor Vehicles.

8. No permit to erect or maintain a billboard or other structure for advertising purposes shall be issued which in the judgment of the Commissioner of Motor Vehicles is or would be injurious to property in the vicinity thereof, or injuriously affect any public interest; nor shall any such permit be issued to erect or maintain any such billboard or other structure in a place where the same is or shall be prohibited by any municipal ordinance.

9. Fees for permits issued in pursuance of section four of this act are hereby imposed for revenue and shall be deposited with the Treasurer of the State as collected. The expenses of administering this act shall be paid by him on orders of the Commissioner of Motor Vehicles, out



This clever cartoon, in a western magazine, "A Picturesque Bend in the Road," by the famous cartoonist, J. N. Darling, expresses the sentiments of many motorists with respect to roadside advertising.

Fig. 26.



Fig. 30.



An advantageous position for a large poster for the advertiser, but a bad one for the motorist. Note the highly decorative effect of the numerous smaller signs festooned on fences and utility poles.

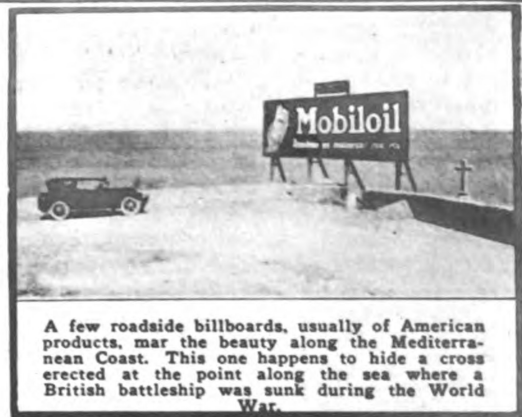


Fig. 27.

A few roadside billboards, usually of American products, mar the beauty along the Mediterranean Coast. This one happens to hide a cross erected at the point along the sea where a British battleship was sunk during the World War.



Fig. 28.



An attempt to make the most of a small hillside tract was made here in erecting signboards in pyramid form.

Fig. 29.



of the fund so created, and the balance thereof shall be divided in the month of January in each year, beginning in January, one thousand nine hundred and thirty-two , among the municipalities in which billboards or other structures used for advertising purposes are located, each municipality to receive the amount collected by the Commissioner of Motor Vehicles for permits to erect or maintain billboards or other structures used for advertising purposes therein, less its proportion of the same percentage of such cost as the amount received for permits in each municipality bears to the entire amount received.

10. The fees for licenses and permits prescribed by this act shall be in lieu of all other taxes, license fees or excises for advertising or carrying on the business of advertising by means of billboards and/or other structures.

11. Nothing in this act shall be construed to require a permit in any case where a contract was made prior to the first day of January, one thousand nine hundred and thirty, with any person, firm or corporation for the construction, maintenance or use of any billboard or other structure for outdoor advertising until the term of such contract shall have expired.

12. The Commissioner of Motor Vehicles is hereby authorized to employ and discharge clerical and other assistants, and to fix their compensation, and to make orders

and regulations for the enforcement of this act; to prescribe and enforce penalties for failure to comply herewith; to revoke any license or permit for such failure and to remove any billboard or other structure erected or maintained contrary to any provision of this act.

13. Any person, firm or corporation erecting, maintaining or using a billboard or other structure for advertising without complying with the provisions of this act shall forfeit and pay the sum of one hundred dollars (\$100) to be recovered by action at law by the Commissioner of Motor Vehicles for the use of the State, and every day that such violation continues shall be treated as a separate violation of this act.

14. If any section, clause, or provision of this act shall be held to be unconstitutional or invalid, such determination shall not be held to affect any other section, clause or provision hereof.

15. All acts and parts of acts inconsistent with the provisions of this act are hereby repealed.

Approved March 25, 1930.

EXTRACTS FROM MICHIGAN LAWS REGARDING
ROADSIDE DEVELOPMENT

Prevention of Wilfull Destruction of Roadside
Trees and Shrubs

(131) 4463. Sec. 6. Any person who shall wilfully injure, deface, tear, or destroy any tree or shrub planted along the margin of the highway or purposely left there for shade or ornament, or who shall hitch any horse to any such tree, by means of which the same shall suffer injury, or who shall negligently or carelessly, by any other means, suffer any horse or other beast driven by or for him, or any beast belonging to him and lawfully in the highway, to break down, destroy, or injure any tree or shrub not his own, standing for use or ornament in any highway, shall be liable to an action for damages in a sum not less than one nor more than twenty-five dollars for each offense, to be recovered at the suit and for the benefit of the owner or tenant of the land in front of which such tree or shrub stands, or at the suit of the commissioner in whose township such tree or shrub may be situated, for the benefit of the highway improvement fund of such township.

Prevention of Dumping Rubbish Along the Roadside

(134) 4466. Sec. 9. If any person or persons unless duly authorized by the highway commissioner of the township

shall put any garbage, rubbish or waste material of any kind into any highway of any township of this state, with the intent to permit the same to remain therein, to the injury in any way of said highway, or to the annoyance of the citizens of this state, or any of them, every person so offending shall be deemed guilty of a misdemeanor, and upon conviction thereof shall forfeit and pay a sum not less than five dollars nor more than ten dollars, together with the costs of prosecution, and in default in the payment thereof shall be imprisoned in the county jail of the county in which such conviction may be had not exceeding ten days, or both such fine and imprisonment in the discretion of the court.

Planting of Trees Along the Roadside

(135) 4467. Sec. 1. Shade trees shall be planted along both sides of the public highways, at the uniform distance, as near as may be, of sixty feet apart, and not less than twenty-three nor more than twenty-five feet from the center line of the highway, but the township board of any township may direct as to the distance which trees may be set from each other or from the outer line of the highway. All trees now growing upon the sides of any highway, and all trees that may be hereafter planted thereon, standing more than sixty feet apart, shall be preserved, and shall not be injured or removed, unless by direction of the commissioner of highways, and with the consent of the owner of the adjoining land, unless such trees shall interfere with or

obstruct the travel on the highway: Provided, That the provisions of this chapter in whole or in part shall not be deemed mandatory in townships in which the electors may by vote at a township meeting, thus determine.

Amount Spent on the Planting of Trees

(136) 4468. Sec. 2. In townships where trees are not planted and growing along the highways as required by section one of this chapter the highway commissioner may cause to be set out each year as many trees as he may deem advisable in his township where the adjoining lands are cleared but shall not expend to exceed ten per centum of the road repair tax in any one year for such purpose. The commissioner shall particularly attend to the planting of such trees, and shall allow no unsuitable tree nor any tree lacking sufficient roots or vitality to be planted, and he shall have the charge and care of the same: Provided, however, That the cost shall not exceed twenty-five cents for each tree to set out.

PLACEMENT OF TELEGRAPH LINES

(137) 4469. Sec. 3. Telegraph companies are authorized to enter upon, and construct and maintain lines of telegraph through, along, and upon any of the public roads and highways, or across or under any of the waters within the limits of this state, by the erection of the necessary fixtures, including posts, piers or abutments for sustaining the cords or wires of such lines: Provided, That said telegraph companies before

the construction and erection of said lines and poles, shall first obtain the consent of the duly constituted authorities of the city, village or township through or along which said telegraph lines and poles are to be constructed and erected: Provided further, That the same shall not be so constructed as to incommode the public use of said roads or highways, or injuriously interrupt the navigation of waters; nor shall this act be so construed as to authorize the construction of any bridge across any of the waters of this state; Provided further, That this act shall not be construed to authorize any such association to injure, deface, tear, cut down, or destroy any tree or shrub planted along the margin of any highway in this state, or purposely left there for shade or ornament. Said association, instead of running or placing their wires on posts, may, if they choose, run or place the same under ground, with a suitable or proper covering for the protection of the same.

PLACEMENT OF TELEPHONE LINES

(138) 4470 Sec. 4. Telephone companies shall have power to construct and maintain lines of wire or other material, for use in the transmission of telephonic messages along, over, across, or under any public places, streets and highways, and across or under any of the waters in this state, with all necessary erections and fixtures therefor: Provided, That said telephone companies, before the construction and erection of said telephone lines and poles,

shall first obtain the consent of the duly constituted authorities of the city, village or township through or along which said telephone lines and poles are to be constructed and erected: Provided further, That the same shall not injuriously interfere with other public uses of the said places, streets and highways, or injure, deface, tear, cut down, or destroy any tree or shrub planted along the margin of any highway in this state, or purposely left there for shade or ornament nor shall the same interfere with the navigation of said waters, or the running of railway trains.

Planting of Fruit or Nut Bearing

Trees on Private Property

(644) Section 1. The State highway commissioner and the state board of agriculture, acting jointly hereunder, shall have authority and it shall be their duty to select and plant by seed, scions or otherwise, ornamental, nut bearing, or other food producing trees, (to be supplied by the public domain commission, or the Michigan agricultural college, as may be recommended or approved by the division of agriculture of said college,) suitable for shade trees, along the state trunk line highways and all other highways of the state of Michigan, upon which state reward has been paid or earned: Provided, That in no case shall such trees be planted except by and with the consent of the owner of the property adjoining such highway. The State Highway

Commissioner shall establish rules and regulations for uniform planting or proper placing of all trees under the provisions of this act, and all such trees shall belong to the state, but the products thereof shall belong to the owners of the adjacent land. Nothing herein contained shall authorize the state highway commissioner, or the state board of agriculture to cut down or interfere with shade trees now growing along any such highway, without permission in writing from the owner of the adjoining property. All expenses incurred in carrying out the provisions of this section shall be paid out of any moneys in the state highway fund that may be available therefor.

Rights of Property Owner to Plant Trees

(646) Sec. 3. The owner of any real estate in the state of Michigan that borders upon a legal highway upon which state reward has not been paid, shall have the right to plant said approved ornamental, nut bearing, or other food producing trees along the line of said highway adjoining said land and shall receive annually a credit of five cents upon his highway tax for each tree so planted by him and growing in good order, not less than six feet in height when planted and not less than twenty and not more than forty feet apart. All of said trees and their products shall belong to the owner of said land: Provided, That no bounty shall be paid or deduction allowed under the provisions of this section upon any one tree or row of trees

for a longer period than five years. The owner of such trees shall have the care thereof and shall have the duty and responsibility for the trimming, spraying and cultivation thereof.

Growing and Distribution of Trees

(647) Sec. 4. The Michigan agricultural college and public domain commission are hereby authorized to grow and acquire suitable seeds, scions or trees for planting under the provisions of this act, and to establish proper rules and regulations for distributing the same at nominal cost, or otherwise, to counties, townships, cities, villages, and citizens of the state for the aforesaid purposes, and also for state parks or other public places.

Protection of Roadside Trees from Defacement or Destruction

(648) Sec. 5. It shall be unlawful to cut, destroy, injure, deface or break any ornamental, nut bearing, food producing or shade tree upon any public highway or place, except where such trees shall interfere with the proper construction or maintenance of such highways. It shall be unlawful to affix to any such tree any picture, announcement, play-bill, notice or advertisement, or to paint or mark such tree, except for the purpose of protecting it, or to negligently permit any animal to break down, injure or destroy any such tree within the limits of any public highway. Any person violating any of the provisions of

this act shall be guilty of a misdemeanor and on conviction thereof shall be punished by a fine of not less than one dollar or more than twenty-five dollars, and in default of payment of any such fine may be imprisoned in the county jail for a period not exceeding thirty days. Such persons shall be liable to the owner of the trees for treble the amount of damages sustained.

Protection and Cutting of Roadside Trees

(649) Sec. 1. It shall be unlawful to cut, destroy or otherwise injure any shade or ornamental tree or shrub growing within the limits of any public highway within the state of Michigan without the consent of the authorities having jurisdiction over such road. In the case of a trunk line or federal aided road the state highway commissioner shall be deemed to have such jurisdiction in all cases. It shall also be unlawful to affix to any such tree or shrub any picture, announcement, notice or advertisement or to negligently permit any animal to break down or injure the same. Any person violating any of the provisions of this act shall be deemed to be guilty of a misdemeanor and on conviction thereof shall be punished by a fine of not more than one hundred dollars or be imprisoned in the county jail for a period not exceeding thirty days, or by both such fine and imprisonment within the discretion of the court.

Planting and Care of Roadside Trees

(650) Sec. 2. The state highway commissioner is hereby authorized and empowered as a part of the maintenance of trunk line and federal aided roads to protect trees and shrubs set out along and within the limits of such roads and to set out such trees and shrubs as may be furnished to him by the Michigan agricultural college, the department of conservation, or by any other state department or institution, or obtained from neighboring lands without cost, for the use and benefit of the public. The care of such trees shall be deemed to be a part of the road maintenance work. Boards of county road commissioners and township highway authorities shall likewise have power to set out and maintain such trees along, and within the limits of, roads under their respective jurisdictions.

CHAPTER IV

PLANTING DISTANCES TO BE USED AT CURVES
AND INTERSECTIONS

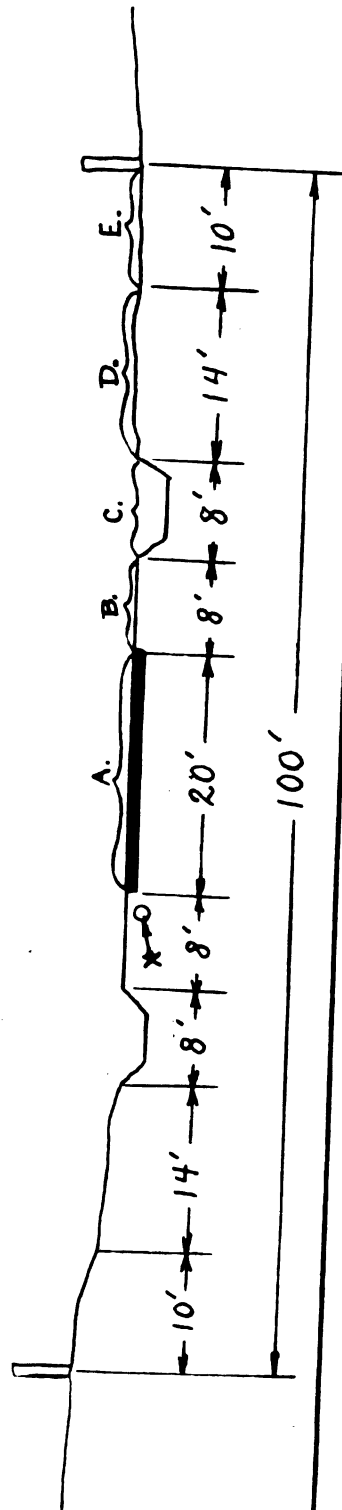
The planning of a roadside planting for future development, as well as for safety, is a very important feature of this work. Figure 31 on page 61 illustrates a very good method of dividing the cross section of the road into its component parts. This method takes the future development of the road, as well as the placement of utility lines, into consideration. The ten feet on either side for utility lines is the same for all widths of right of way. The shoulders remain the same, and the other parts may vary under different conditions. Providing the road was in fairly level land, the ditch would not have to be so wide, and the difference would be added to the tree and shrub area. If the pavement was thirty feet wide instead of twenty, the tree and shrub area on either side would be nine feet instead of fourteen.

From this illustration, the reader can see that the wider the right of way, the more area there is for roadside beautification work. It is for this reason that most of the states doing this type of work have wide rights of way.

In the planting of intersections and curves for safety, the designer must make his plan so that there are no trees

Fig. 31.

- A. = Pavement.
- B. = Shoulder.
- C. = Ditch.
- D. = Tree & Shrub area.
- E. = Utilities & low growing shrubs.
- X. = Under-ground utility line.



or high growing shrubs in such a location that they will interfere with the visability of cars approaching from other directions.

In the planting of a "T" intersection, there should be no trees directly at the end of the road, as this would be considered a hazard, due to the fact that some motorist might not make the turn and run into the tree at the end of the road. Figure 36 on page 68 shows how plantings might be arranged at an intersection of this kind. It will be noticed that there are no trees or high growing shrubs within two hundred fifty feet of the intersection on either side. This gives the approaching motorist on either road an interrupted view of the other road for at least five hundred feet. Providing there is another car approaching the intersection from the other road, this distance allows plenty of time for the motorist to bring his car to a stop.

Figure 32 page 63 is much like that of figure 36 and is planted in the same manner.

Figure 33 page 64 gives the distances for a safe railroad crossing. By not having any trees or tall growing shrubs within five hundred feet of the centerline of the railroad right of way gives the motorist adequate time to stop provided there is a train approaching the intersection.

In the planting of trees and shrubs on a curve the sight distance must also be remembered if the road is

Fig. 32.

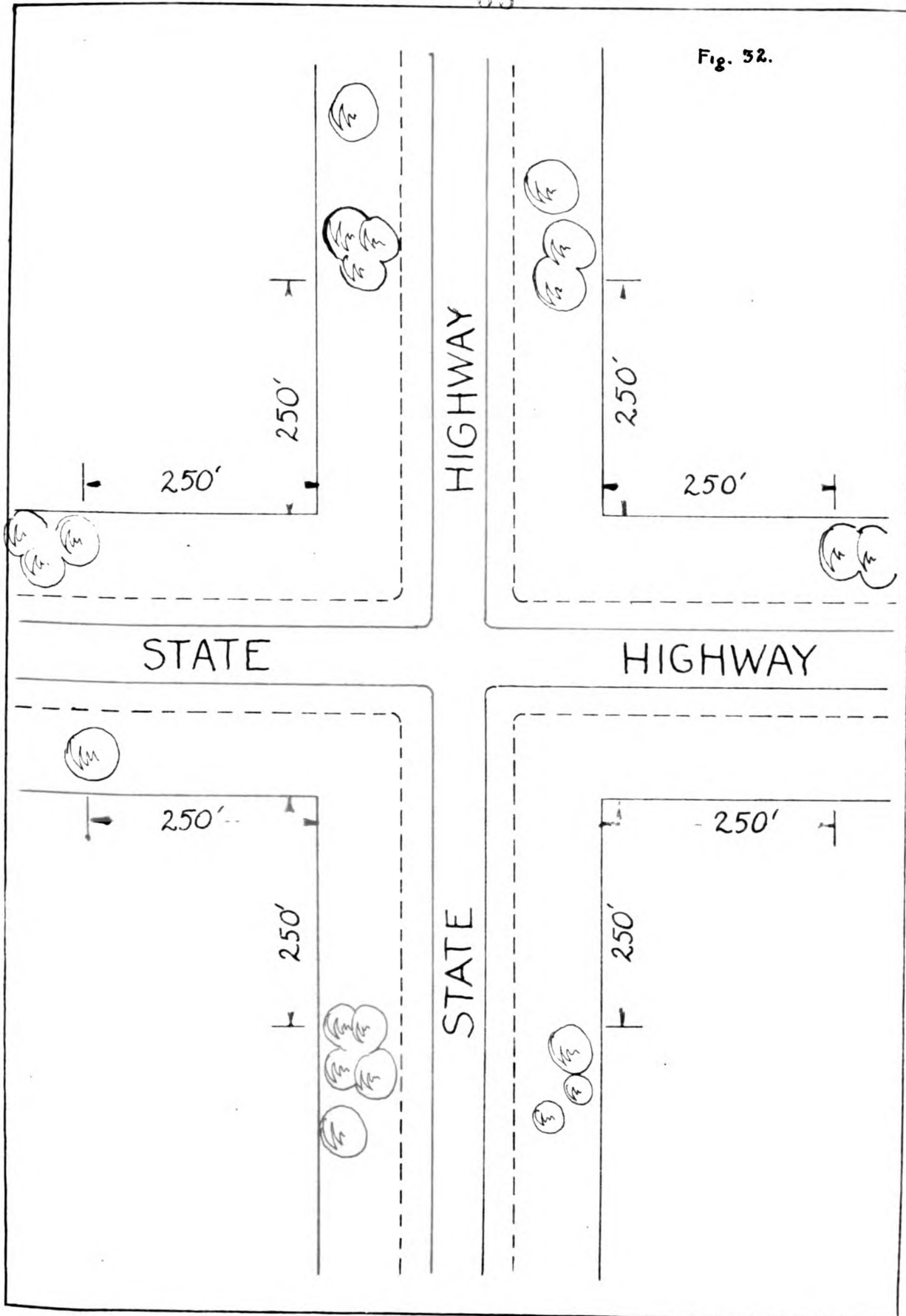


Fig. 33.

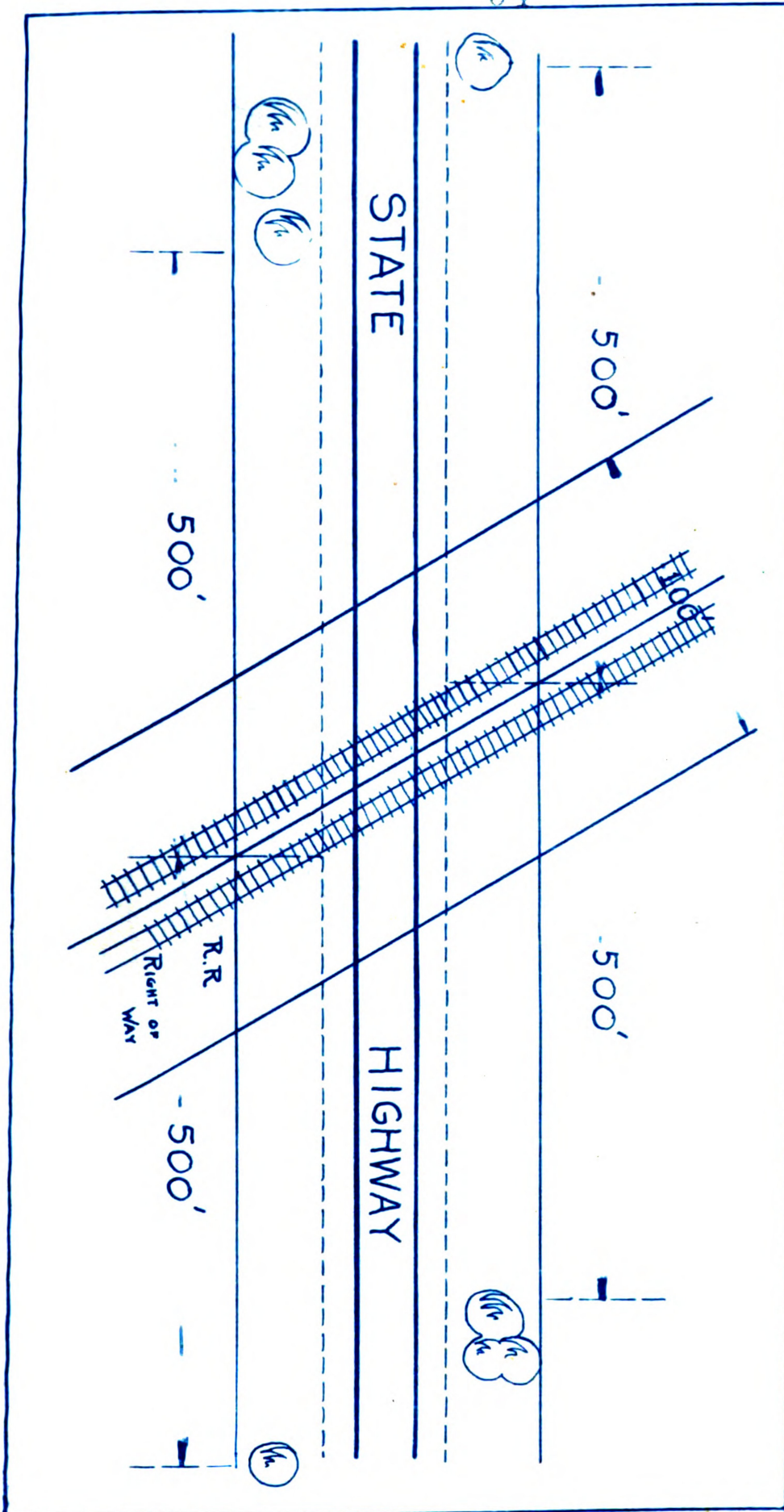
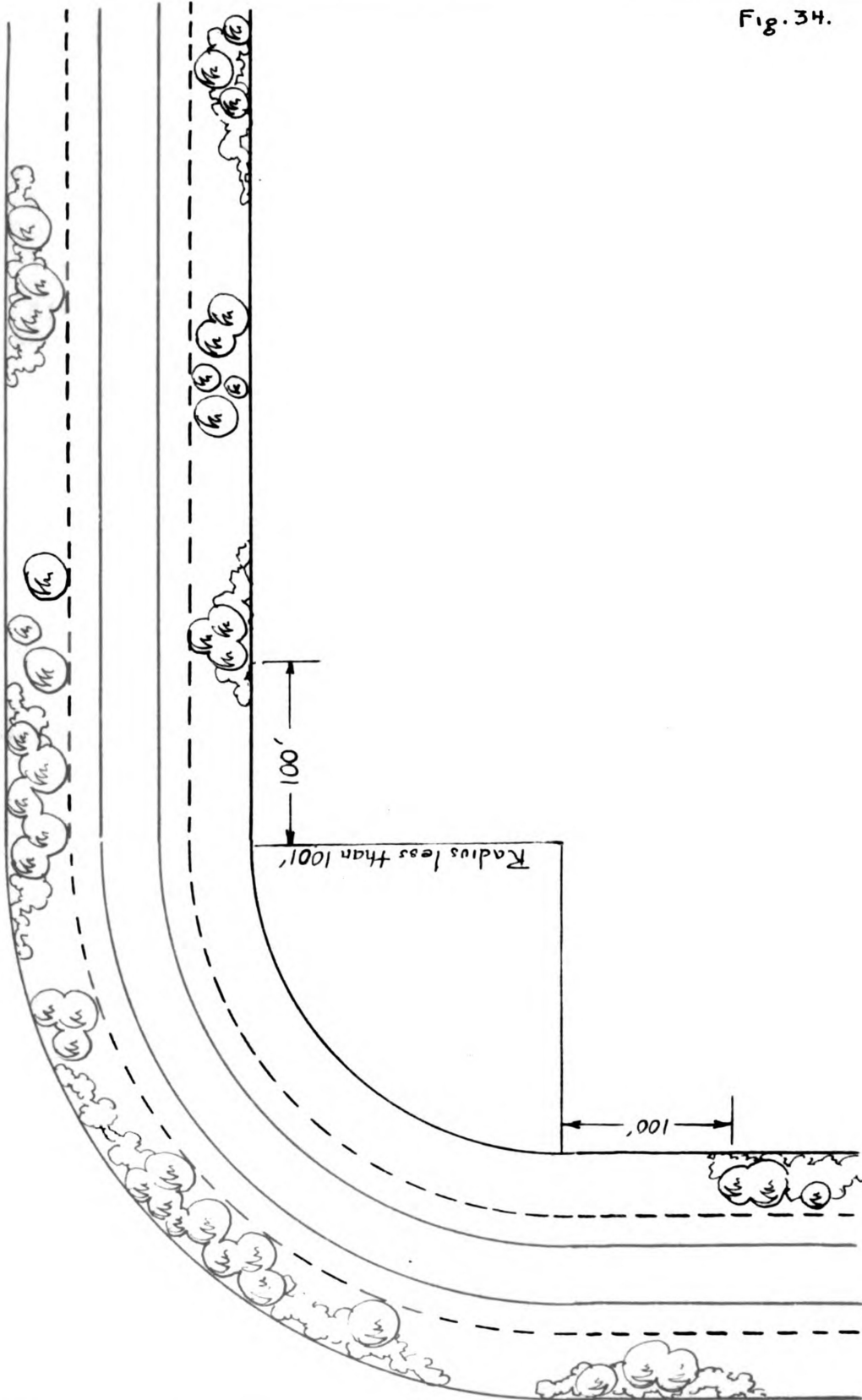


Fig. 34.



to be safe for the users of the road. On a curve with a radius of over one thousand feet, trees and shrubs may be planted on both sides of a curve, but where the radius is less than one thousand feet, figure 34 on page 65 and figure 35 on page 67 illustrate the best planting distances to use.

Fig. 35.

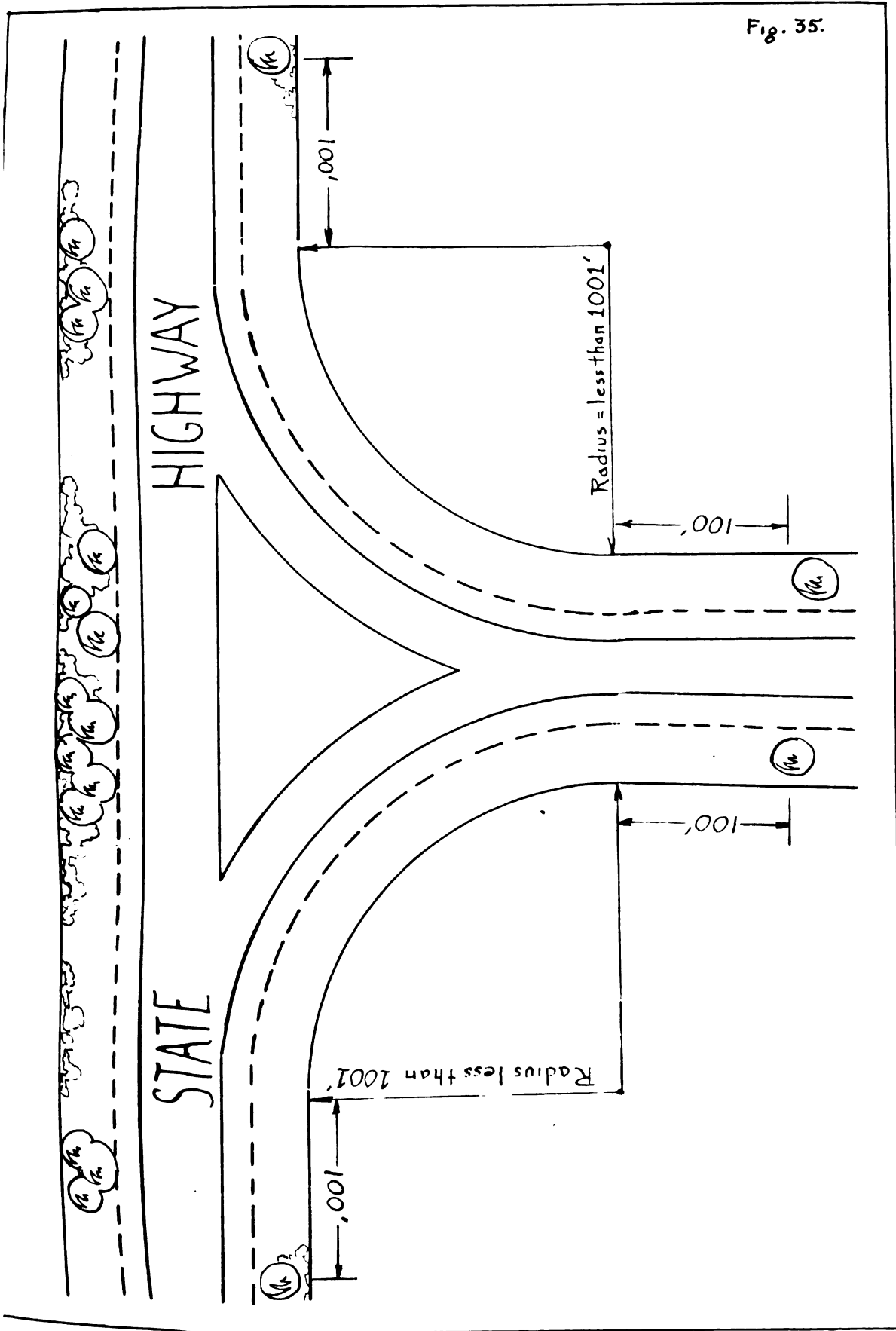
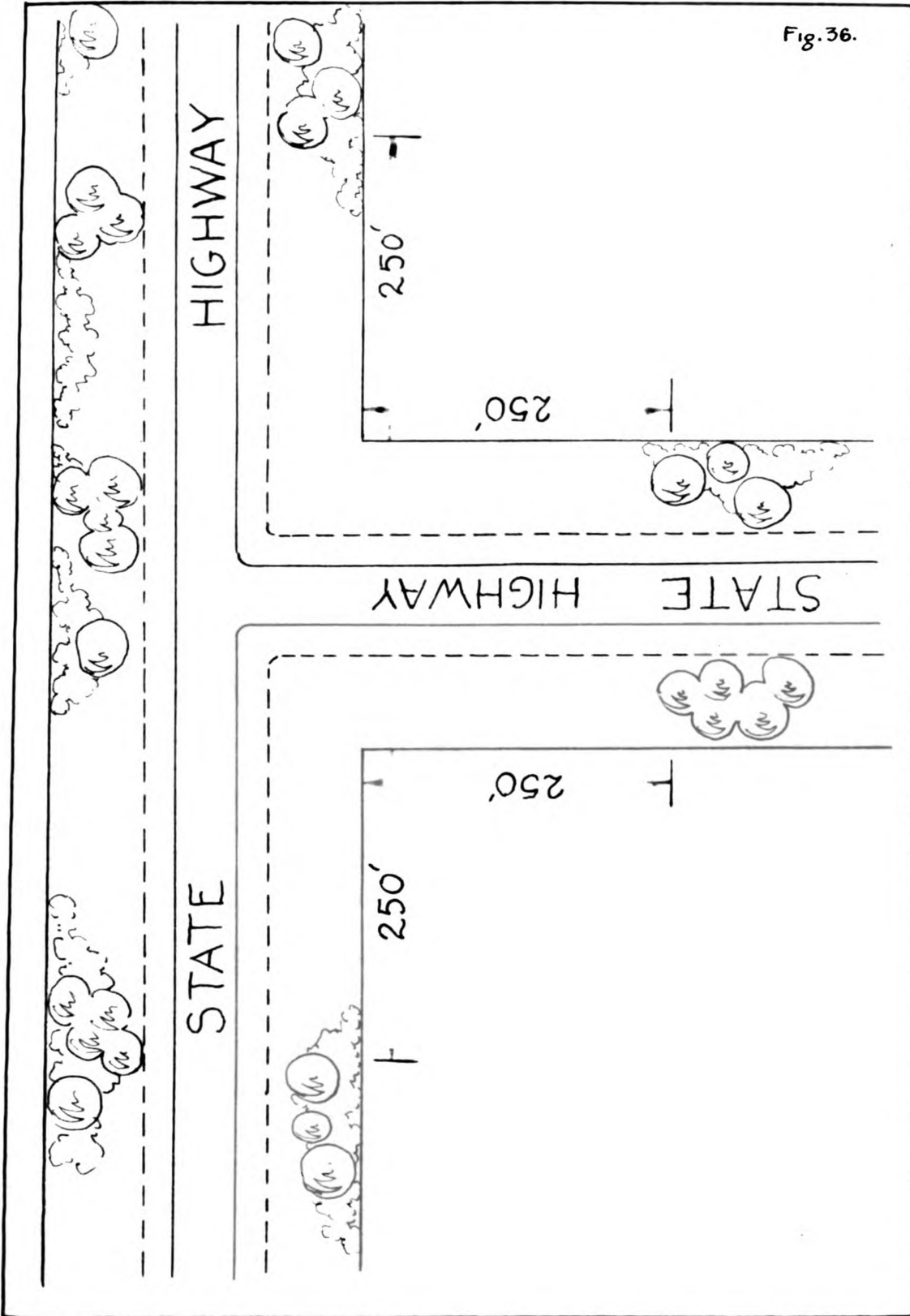


Fig. 36.



CHAPTER V

ROADSIDE BEAUTIFICATION IN MICHIGAN

Beginning about the year of nineteen-hundred and sixteen there was an intensive drive, or campaign for the building of more paved roads throughout the state. At this time the making of a good road called for the removal of all shrubs from the right of way. The surface of the road was the essential part of the program and the grading was done at the least possible expense to the state. The removal of all of the shrubs from the right of way, combined with the steep slopes where the road was cut through a hill, or a filled section over a low land, made the road very barren looking.

During this period between nineteen-hundred and sixteen and the spring of nineteen-hundred and twenty nine, the people of the state began to see the value of roadside trees and shrubs. At first there were only a few voices raised, calling for the state to take action along this line, but they were soon fortified by the multitude, and the state legislature took the issue to task. In the spring of nineteen-hundred and twenty nine the legislature passed a bill allowing the cost of planting along new construction jobs to be figured into the estimate of the cost of the road. This was a big step toward the planting of all of the roads in the state, as after the crust had been broken it would be much easier to get at the pie within, or to obtain money

for the planting of other than new construction projects.

The planting work in Michigan is carried out by the Forestry Division of the State Highway Department. This Division has control of the placement of public utility lines; the trimming for the public utility lines; the removal of signs from the right of way; the selection of material for planting; the making of the planting plan; the planting of the material; and the development of roadside springs and picnic areas.

The kinds of trees selected by the forestry department for their general desirability and freedom from disease are the Elm, Sugar Maple, Norway Maple, Ash, Pin Oak, Sycamore, Linden and Hackberry. The new trees are planted in an informal arrangement, that is in groups of three to five trees. This type of planting aims to make the trees appear to be the original trees that have survived the thinning out process, as the trees were destroyed in order to make the land more suitable for the growth of crops.

Many of the road intersections have been graded, and planted to lawn, trees and shrubs in order to give the appearance of a parklike development. This work is also charged to the construction fund. On the next page will be found an illustration of a few types of intersections that may be developed in this way.

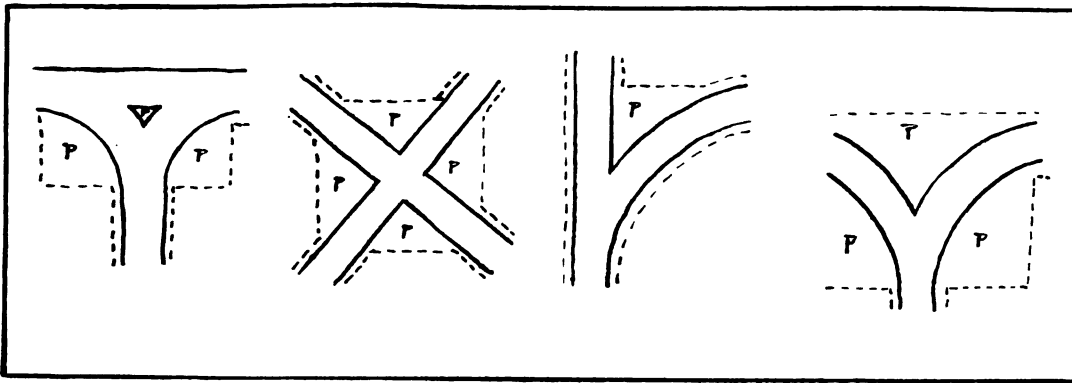


Fig. 37.

Most of the trees along the state roads have been trimmed and cleaned up by the state. Unsightly banks and shoulders have been seeded or sodded, and the general appearance of the road has been improved.

Most of the plantings to date in Michigan have been tree plantings, but in the Michigan plan there are spaces left for the planting of shrubs and vines at a later date.

The State Highway Department has found that wherever the cost of land is reasonable it pays to buy a wide right of way wherever there are snow drifts formed in the winter months. This wide right of way is used for the planting of a permanent snow fence. This does away with the cost of erecting the portable snow fence every Fall and the cost of taking it down again in the spring.

One of the most commendable features of the Michigan program is the development of roadside springs and picnic areas. Thousands of tourists, as well as other motorists have taken advantage of these features, either to eat a



Fig. 39.

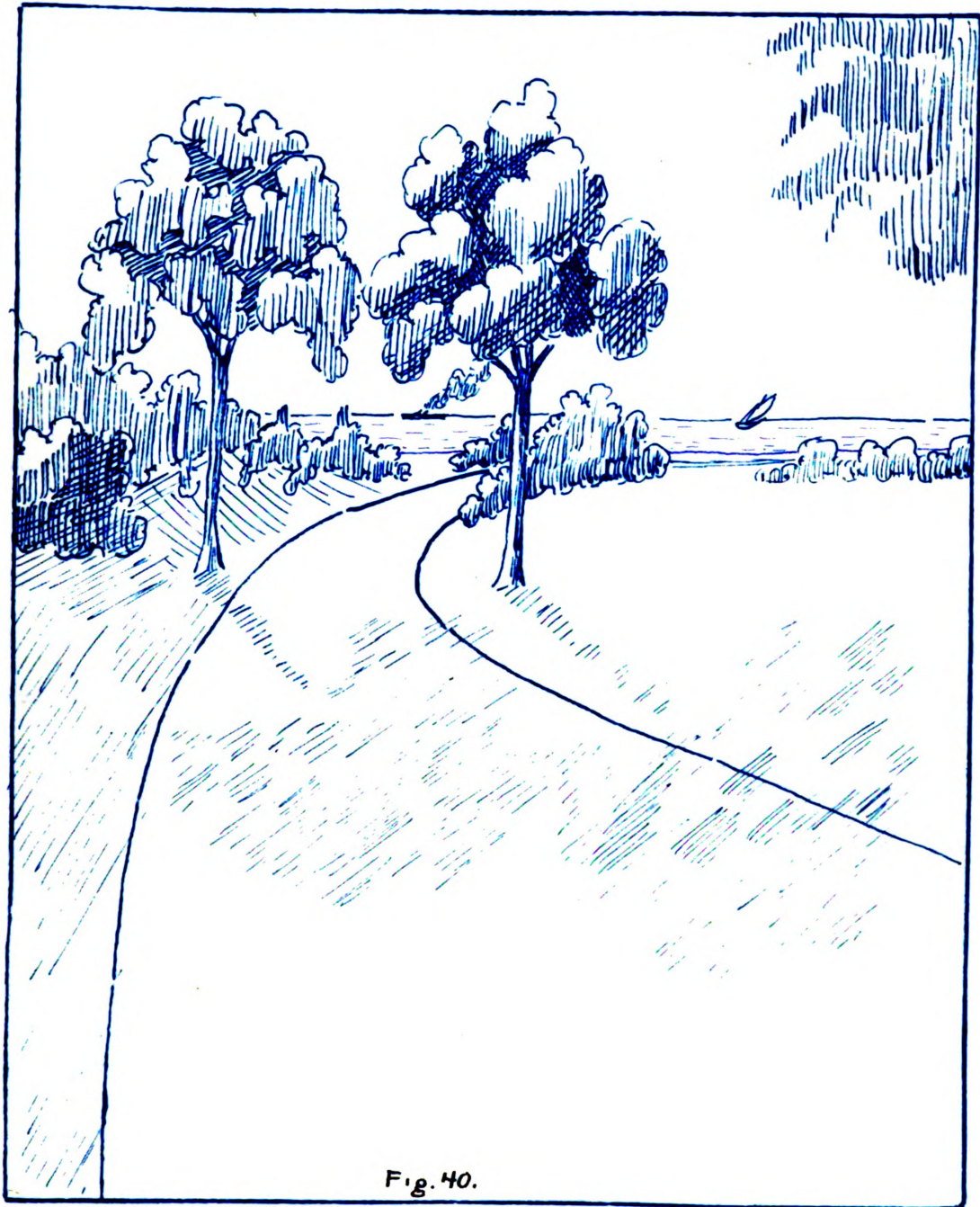


Fig. 40.

a picnic lunch or to get a cool refreshing drink of cool water. In the development of the drinking fountains along the roadside there are numerous things to take into consideration. The first of which is the parking problem. At a place of this kind there must be a place for the motorist to park off of the road, so the development will not be a danger spot. The next consideration is the purity of the water. The water must be tested for purity; the source of the water must be made impregnable to disease germs of any kind, and the spout must be of the type that will not become contaminated. The bubbler type of fountain is used exclusively in Michigan because it has been found to have this characteristic. A diagram of a fountain of this type may be seen below.

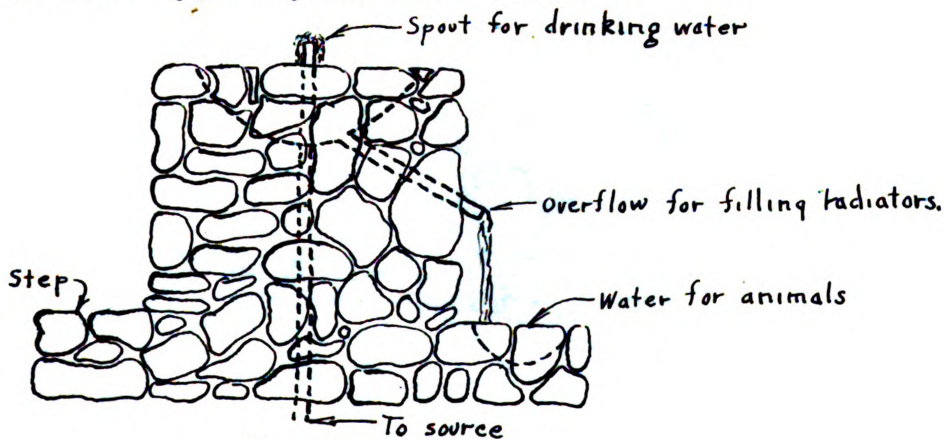


Fig. 38.

After the springs are constructed they are given a fitting background of shrubbery which is indigenous with the surroundings. Where the location is fitting, a lily pond is built in connection with the fountain. This is

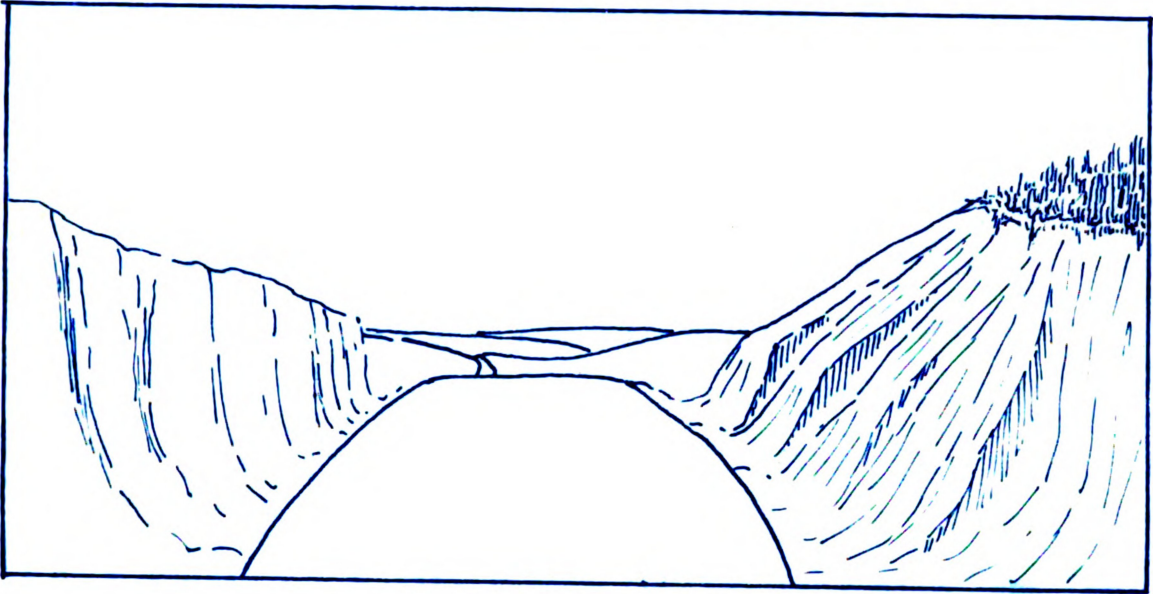


Fig. 41.

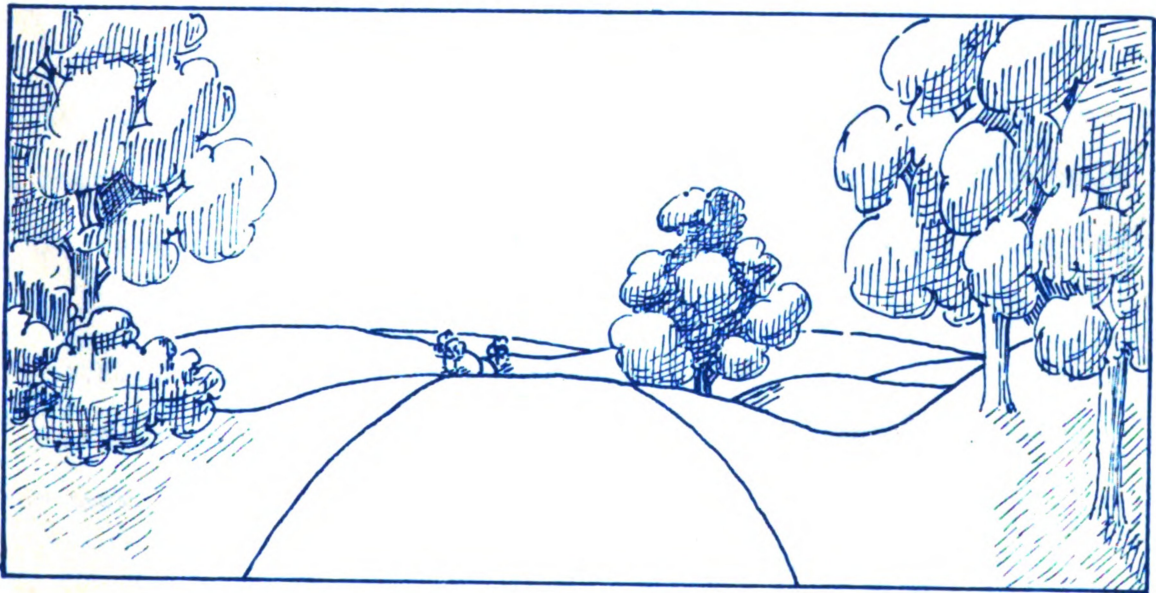


Fig. 42.

of the informal type so that it fits into the surroundings.

The number of these fountains already developed are thirty three, with many more pending funds for their construction.

During the summers previous to 1930, the need for picnic areas along the roads was noted by the Maintenance Department. This need was noticed during the summer months when the cost of maintaining the roads increased due to the cost of picking up papers, and other rubbish left along the roadside by picnic parties. Due to this need the State Highway Department developed a few areas of this kind for the benefit of the picnickers, and to see if the cost of maintenance in that area decreased enough to pay for the construction of other picnic areas throughout the state. Due to this experiment the department has decided to develop more of these areas throughout the state. The cost of developing these areas is very small as the tables and benches are constructed from salvage guard rail, and the rubbish cans are made of old oil drums. The saving in maintenance more than pays for the development of these areas.

Roadside Development in Wayne

County under Auspices of County Road Commission

"Public interest in roadside development has rapidly increased during the past year throughout the entire Country.

The demands made upon State and County Highway Commissions, by public spirited organizations, by committees, and by individuals are being fulfilled. Practically all such programs for roadside improvement in other localities are based upon the successful pioneer work done in Wayne County. Early in the activities of this Board the future requirements for properly developed roadsides were realized and at the present time the results of many years of such effort remain unparalleled.

Along the completed roads under the jurisdiction of this Board may be found thousands of planted shade trees from four to six inches in diameter, adequately protected from overhead utility wires by proper planning and arrangement. No evidence of improper trimming or "tree butchery" can be found.

All barren areas have been seeded and the slopes at approaches to bridges and grade separations have been sodded and landscaped. Native trees and shrubs have been preserved and in addition many thousands have been set out. Native roses, dogwoods, viburnums, witchhazels, and numerous others have been grouped among natural surroundings and bridge structures have been covered here and there with climbing vines. Comfort Stations have been constructed which add to the convenience of those using the highways, and which completely serve the traveling public in a sanitary manner.

Properly developed roadsides indicate to a large degree the progressive attitude of any community. The soundness of this is evidenced by the fact that public service is increased to a maximum through the economical use of otherwise waste land.

A service of this type is demanded by a forward thinking public and it therefore becomes the duty of this Board to carry out the work in a practical manner to provide such service. Each year the demand for roadside development has steadily grown and each year this demand has been met with a completed program. The past year's accomplishments in this respect have not been equaled during any previous year.

Trees totaling more than forty-seven thousand have been planted, covering more than two hundred fifty miles of road. These included Norway Maples, American Elms, Sugar Maples, Red Oaks, and Pin Oaks.

All trees purchased are carefully selected at the nurseries. Only healthy, well formed stock produced by competent growers is accepted with full consideration given to prices. Carload shipments of selected stock from experienced nurserymen arrive at the unloading yard in good condition, the process of unloading, heeling-in, and pruning continues uninterruptedly, and the material is available when needed. Small shipments arriving in bales, boxes, or trucks are not as dependable and since the planting program is entirely seasonal such deliveries are bound to hold

up the work.

Also trees shipped in this manner fail to arrive in a satisfactory condition. Only nursery grown trees are considered. Woods grown trees are more expensive to handle, their loss is much greater, and their form is far from ideal.

Each tree is carefully inspected and sprayed at the unloading yard before being taken to the job for planting. Trees which fail to survive are replaced during the following planting season.

Existing trees along improved roads must serve their purpose without interference to traffic. In order to do this they must often be trimmed. Trimming is further necessary for the proper maintenance of trees in order to increase their vigor and preserve them for a longer period."



U.S. 112 near Moscow. Conserving Roadside
trees and shrubs. 7-1-32. G.E.M.

Fig. 43.



Transplanted shrubs on US-25 Saginaw Co.
7-18-32 P.V.

Fig. 44.

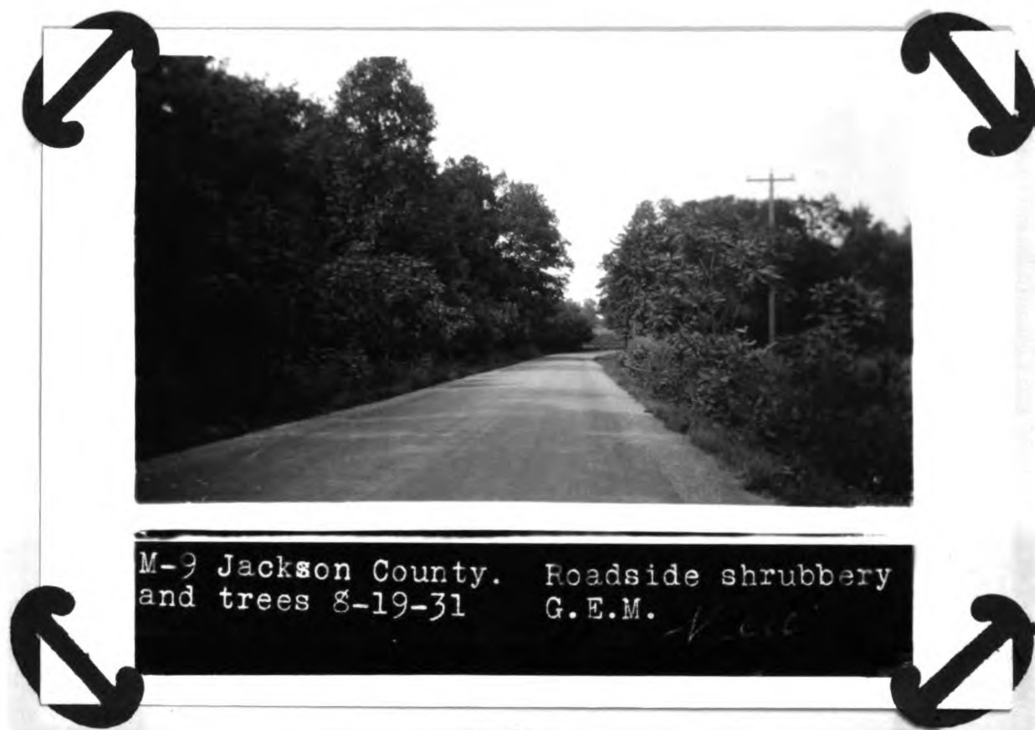


Fig. 45.

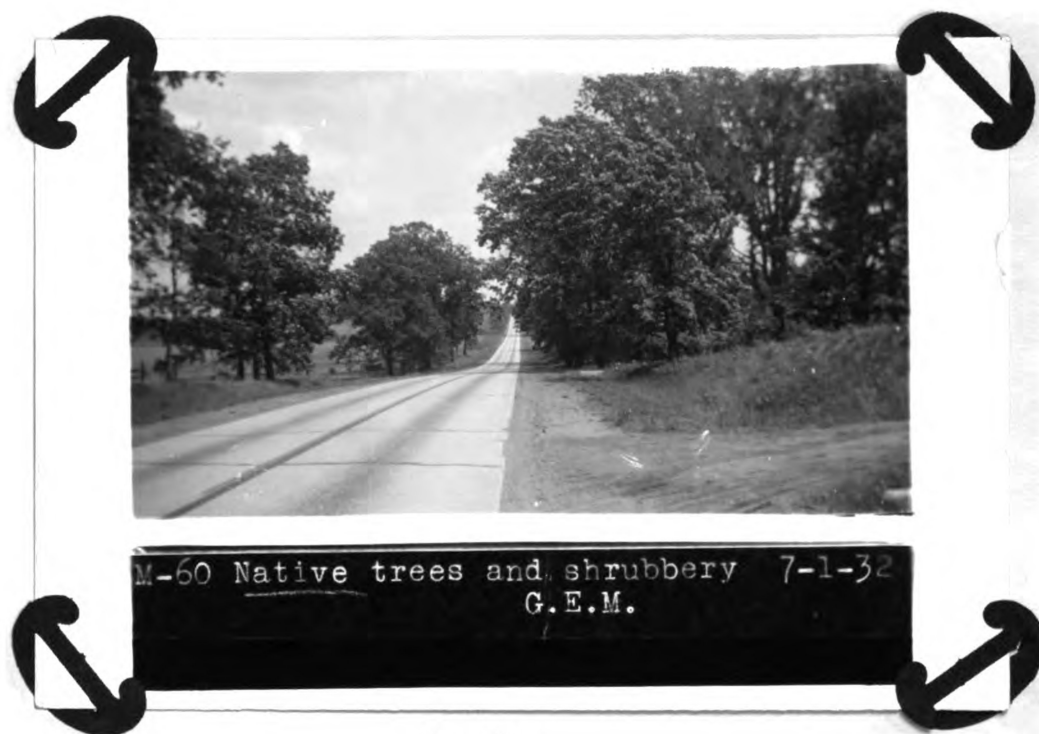


Fig. 46.



Native Elm on M-21 Ionia County
11-14-32 P.V.

Fig. 47.



M-60 Willows and bridge over Sandstone
Creek 7-1-32 G.E.M.

Fig. 48.



Before cleanup on M-76, Kalkaska Co.

J.W.A. 2-16-33.

Fig. 49.



Condition of roadside on M-55 Prudenvill
to Junction m-55 & M-66. J.W.A. 12-14-3

Fig. 50.



Roadside cleanup in dense cedar swamp
3 mi. N. of Roscommon on U.S.-27, Crawford
Co. Looking West. J.W.A. 12-18-31.

Fig. 51.



Park bench and table to to used along
State T.L. highways. J.W.A. 6-23-32.

Fig. 52.



Flowing Well. 10-1930 North of Conway,
Emmet Co. Not planted.

Fig. 53.



Roadside Spring M-60 Jackson Co. Looking
S. and E. G.E.M. 7-15-31.

Fig. 54.



Landscaping spring North of Oden, looking
South. Maint. Sec. 31-2, Emmet County.
J.W.A. 5-24-32.

Fig. 55.



M-60 Roadside Spring. 7-1-32 G.E.

Fig. 56.



Roadside Planting on F 010-6 C1, Honor
to Beulah, Benzie Co. J.W.A. 5-19-32.

Fig. 57.



Roadside planting, Project F 010-6 C1
Honor-Beulah in Benzie County. J.W.A.
5-19-32

Fig. 58.



Bonnie Elk Park. West of Vandalla on M-60
Cass Co.

Fig. 59.



Roadside Park U.S. 112 Hillsdale Co.
E. of Jonesville 7-14-32 G.E.M.

Fig. 60.



Grand Haven Park showing trees and shrubs
just planted. US 31 P.V. 11-15-32.

Fig. 61.



Park on M-21 at Genesee. Shiawassee Co.
line. Looking N.E. Planted Fall
1930 9-14-32 F.W.P.

Fig. 62.



Roadside Park Somerset Ctr. Int. U.S.-11
and U.S. 127 looking E. G.E.M. 7-30-31

Fig. 63.



Okemos Corner looking east from Grade
separation 6.9.32 P.V.

Fig. 64.

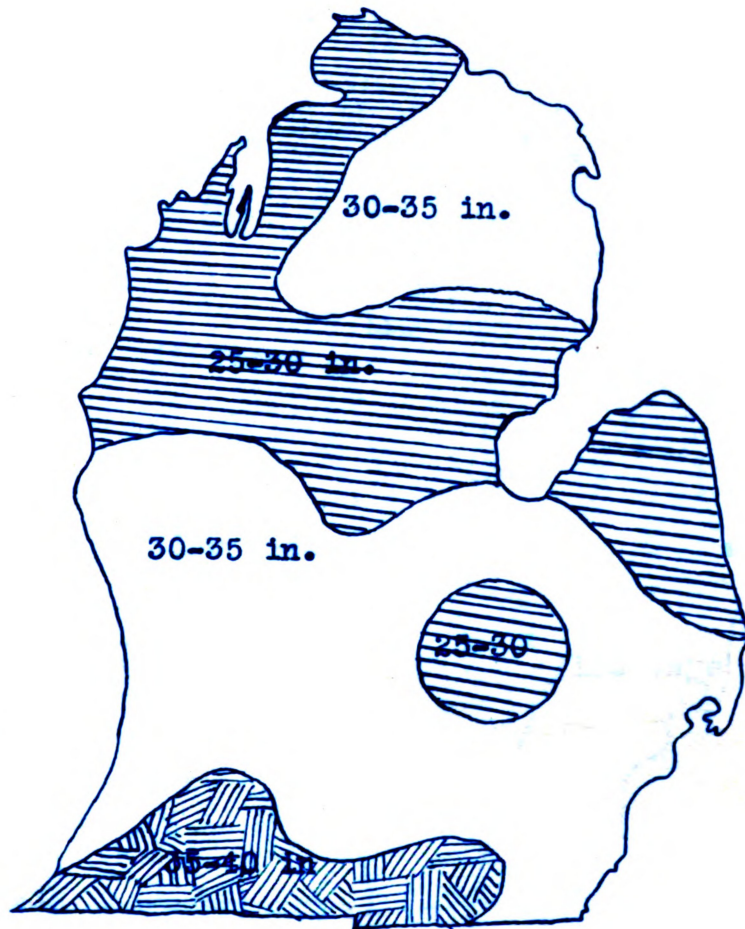
CHAPTER VI
PLANTING LIST FOR MICHIGAN WITH REFERENCE TO CLIMATE
AND SOIL CONDITIONS

In choosing trees and shrubs for roadside planting in Michigan there are four main points to take into consideration. The author has in this thesis presented these points in the order that will direct one in the selection of stock for roadside plants in Michigan.

The main points to be considered are as follows:

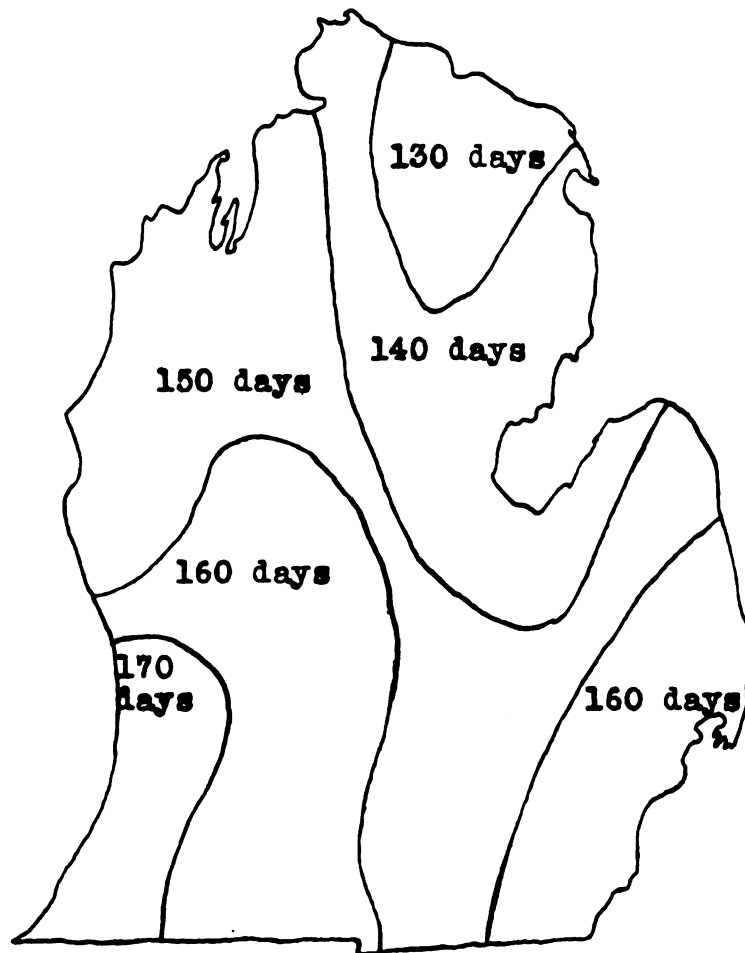
1. Climate.
2. Soil.
3. Use & Type of plant.
4. Indigenous or exotic.

The first two points are of great importance to the growth of the material, as all plants have certain moisture requirements; they have temperature limits, and specific soil types upon which they will thrive best. The use or purpose of a planting must also be taken into consideration. If the wrong type of material is selected, it may create a hazard to drivers, and not fill the intended purpose. The main idea in roadside planting is to harmonize the road with the natural surroundings. This may usually be accomplished best by selecting native kinds of plants that are native of the area to be planted, and sometimes supplement by others that look native and harmonize with them. If a roadway passes through an area of pines, the material



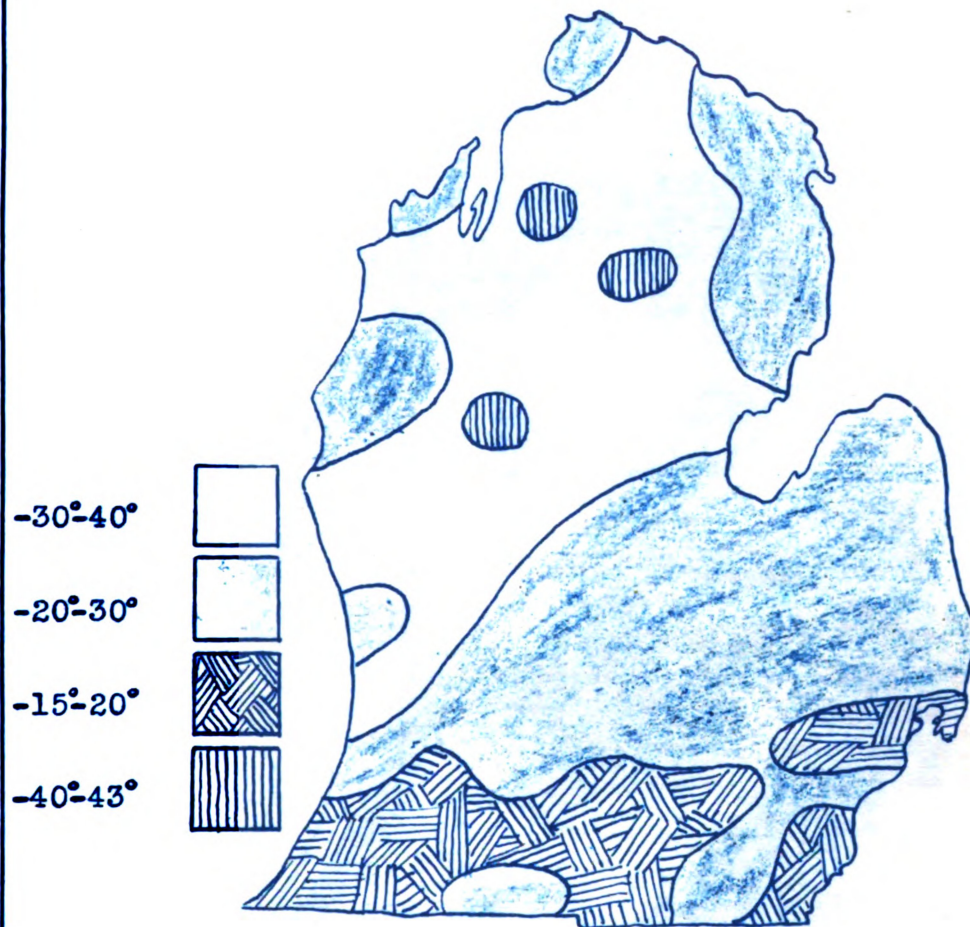
RAINFALL IN INCHES FOR
THE LOWER PENINSULA

Fig. 65.



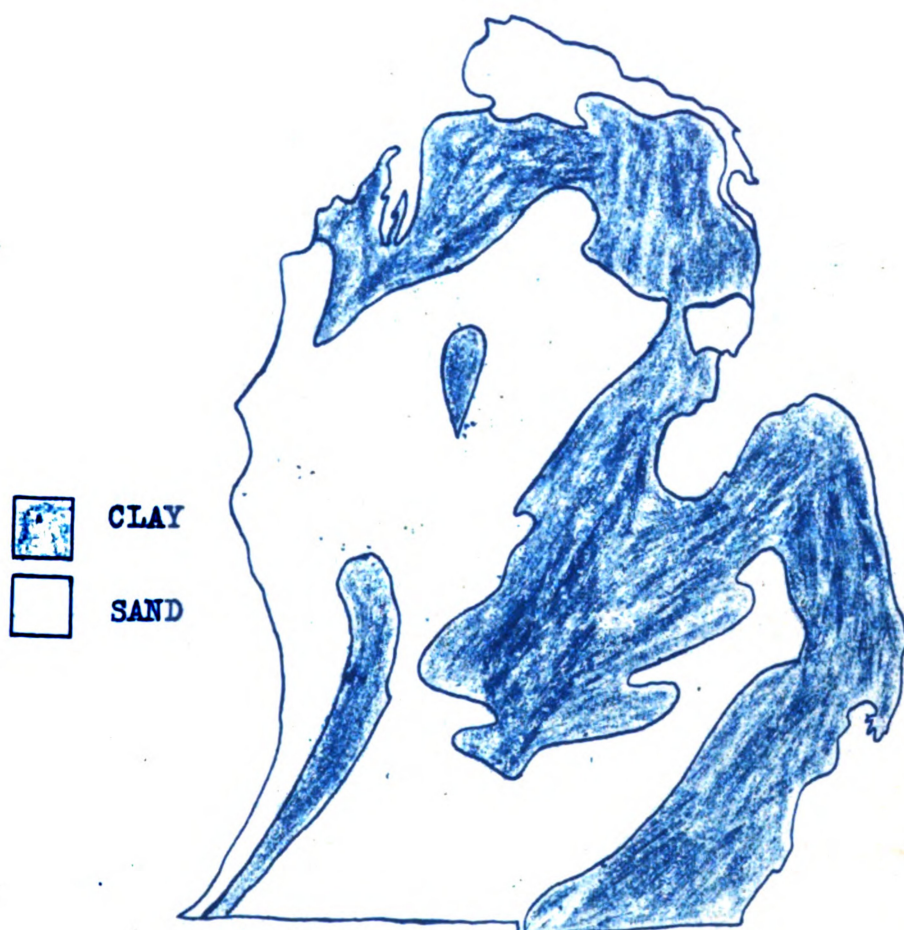
**AVERAGE LENGTH OF PLANT GROWING SEASON
IN THE LOWER PENINSULA**

Fig. 66.



LOWEST KNOWN TEMPERATURES FOR THE
LOWER PENINSULA

Fig. 67.



APPROXIMATE LOCATION OF SANDY AND
CLAY SOILS OF MICHIGAN

to use is of the same kind of pines supplement sparingly with other conifers that harmonize with these pines. If the road is through an area of oaks, and maples, the material to use is oaks, maples and shrubs that are native of that area. Other trees could be sparingly used if they harmonized with the native material and made a naturalistic setting for the road.

On the following pages will be found a table showing trees and shrubs that may be used, their climatic or geographical distribution, and soil preferences.

TABLE II
TREES THAT ARE HARDY AND MAY BE USED
FOR
ROADSIDE PLANTING IN ALL PARTS OF MICHIGAN

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
1. *Austrian pine.	<i>Pinus austrica</i> H.
2. Tamarack.	<i>Larix laticina</i> .
3. *Norway spruce.	<i>Picea abies</i> .
4. *Black willow.	<i>Salix nigra</i> M.
5. *Almond leaf willow.	<i>Salix amygdaloides</i> A.
6. *Crack willow.	<i>Salix fragilis</i> L.
7. White poplar.	<i>Populus alba</i> L.
8. Iron wood.	<i>Ostrya virginiana</i> K.
9. *Blue beech.	<i>Carpinus caroliniana</i> W.
10. *White beech.	<i>Fagus grandifolia</i> E.
11. *Red elm.	<i>Ulmus fulva</i> .
12. *American elm.	<i>Ulmus americana</i> .
13. *Hackberry.	<i>Celtis occidentalis</i> .
14. Burr oak.	<i>Quercus macrocarpo</i> .
15. Osage orange.	<i>Maclura pomifera</i> .
16. *Serviceberry.	<i>Amelanchier canadensis</i> .
17. *Choke cherry.	<i>Prunus virginiana</i> .
18. Black locust.	<i>Robinia pseudo-acacia</i> .
19. *Sugar maple.	<i>Acer saccharum</i> .

*Denotes trees that make the best naturalistic plantings,
and are the most suitable for roadside planting.

TABLE II

TREES THAT ARE HARDY AND MAY BE USED
FOR
ROADSIDE PLANTING IN ALL PARTS OF MICHIGAN

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
20. *Red maple.	Acer rubrum.
21. *Norway maple.	Acer platanoides.
22. Bass wood.	Tilia americana.
23. *White ash.	Fraxinus americana.
24. *Black ash.	Fraxinus nigra.
25. *Nannyberry.	Viburnum lentago.

*Denotes trees that make the best naturalistic plantings,
and are the most suitable for roadside planting.

TABLE III
TREES THAT ARE HARDY AND MAY BE USED
FOR
ROADSIDE PLANTING IN SOUTHERN ONE-HALF OF MICHIGAN
IN ADDITION TO TABLE II

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
1. *Maidenhair tree.	Ginkgo.
2. Red cedar.	Juniperus virginiana.
3. *Weeping willow.	Salix babylonica.
4. *White oak.	Quercus alba.
5. Swamp oak.	Quercus bicolor.
6. Chestnut oak.	Quercus acuminata.
7. *Red oak.	Quercus rubra.
8. Scarlet oak.	Quercus coccinea.
9. Black oak.	Quercus ellipsoidalis.
10. Red mulberry.	Morus rubra.
11. *Sassafras.	Sassafras variifolium.
12. Sweet crab.	Malus coronaria.
13. Black cherry.	Prunus serotina.
14. Silver maple.	Acer dasycarpum.
15. Red ash.	Fraxinus pubescens.
16. Blue ash.	Fraxinus quadrangulata.

*Denotes trees that make the best naturalistic plantings,
and are the most suitable for roadside planting.

TABLE IV
TREES THAT ARE HARDY AND MAY BE USED
FOR
ROADSIDE PLANTING IN NORTHERN ONE-HALF OF MICHIGAN
IN ADDITION TO TABLE II

	<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
1.	Jack pine.	<i>Pinus divericata.</i>
2.	Scotch pine.	<i>Pinus sylvestris.</i>
3.	*Norway pine.	<i>Pinus resinosis.</i>
4.	White spruce.	<i>Picea alba.</i>
5.	*Balsam fir.	<i>Abies balsamea.</i>
6.	*White cedar.	<i>Thuja occidentalis.</i>
7.	Aspen.	<i>Populus tremuloides.</i>
8.	Large tooth aspen.	<i>Populus grandidentata.</i>
9.	Balsam poplar.	<i>Populus balsamifera.</i>
10.	*Mountain ash.	<i>Pyrus americana.</i>
11.	*Pin cherry.	<i>Prunus pennsylvanica.</i>
12.	Striped maple.	<i>Acer pennsylvanicum.</i>
13.	Mountain maple.	<i>Acer spicatum.</i>

*Denotes trees that make the best naturalistic plantings,
and are the most suitable for roadside planting.

TABLE V

TREES THAT ARE HARDY AND MAY BE USED FOR ROADSIDE PLANTING
IN THE SOUTH EAST ONE-FOURTH OF MICHIGAN
IN ADDITION TO TABLE II

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
1. Chestnut.	Castanea dentata.
2. Black maple.	Acer nigrum.

TABLE VI

TREES THAT ARE HARDY AND MAY BE USED FOR ROADSIDE PLANTING
IN THE SOUTHERN ONE-FOURTH OF MICHIGAN
IN ADDITION TO TABLE II

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
1. *Pin oak.	Quercus palustris.
2. *Tulip tree.	Lidrodendron tulipifera.
3. Honey locust.	Gleditsia triacanthos.
4. Red bud.	Cercis canadensis.
5. Cork elm.	Ulmus racemosa.

*Denotes trees that make the best naturalistic plantings,
and are most suitable for roadside planting.

TABLE VII

TREES THAT ARE HARDY AND MAY BE USED FOR ROADSIDE PLANTING
IN THE NORTHERN THREE-FOURTHS OF MICHIGAN
IN ADDITION TO TABLE II

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
1. White pine.	<i>Pinus strobus.</i>
2. Black birch.	<i>Betula lenta.</i>
3. Yellow birch.	<i>Betula lutea.</i>
4. *White birch.	<i>Betula papyrifera.</i>
5. Canada plum.	<i>Prunus nigra.</i>

TABLE VIII

TREES THAT ARE HARDY AND MAY BE USED FOR ROADSIDE PLANTING
IN ALL BUT THE SOUTH WEST ONE-FOURTH OF MICHIGAN
IN ADDITION TO TABLE II

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
1. Hemlock.	<i>Tsuga canadensis.</i>

*Denotes trees that make the best naturalistic plantings,
and are most suitable for roadside planting.

TABLE IX

SOIL PREFERENCES OF MICHIGAN TREES

<u>NAME OF TREE</u>	<u>SOIL PREFERENCES</u>
1. White pine. (<i>Pinus strobus</i>)	Light fertile loam and granite sand.
2. Red pine. (<i>Pinus resinosa</i>)	Sandy plains and dry woods.
3. Tamarack. (<i>Larix laricina</i>)	Cold deep swamps.
4. White spruce. (<i>Picea canadensis</i>)	High rocky sandy slopes and damp woods.
5. Black spruce. (<i>Picea mariana</i>)	Cold bogs, swamps and lake shores.
6. Hemlock. (<i>Tsuga canadensis</i>)	Well drained slopes and uplands.
7. Balsam fir. (<i>Abies balsamea</i>)	Cool, moist, rich well drained soil.
8. White cedar. (<i>Thuja occidentalis</i>)	Moist low swamps.
9. Red cedar. (<i>Juniperus virginiana</i>)	Dry loam, on sunny, rocky slopes.
10. Juniper. (<i>Juniper communis</i>)	Dry sandy loams, sunny locations.
11. Black walnut. (<i>Juglans nigra</i>)	Rich bottomlands and fertile hills.
12. Peach willow. (<i>Salix amygdaloides</i>)	Banks of streams and lakes.

<u>NAME OF TREE</u>	<u>SOIL PREFERENCES</u>
13. Shining willow. (<i>Salix lucida</i>)	Banks of streams and lakes.
14. Blueleaf willow. (<i>Salix glaucophylla</i>)	Any fertile moist soil.
15. Carolina poplar. (<i>Populus robusta</i>)	Any well drained rich soil.
16. Lombardy poplar. (<i>Populus fastigiata</i>)	Any well drained rich soil.
17. Balsam poplar. (<i>Populus balsamifera</i>)	River bottomlands and swamp borders.
18. Trembling poplar. (<i>Populus tremuloides</i>)	Moist sandy soil and gravelly hills.
19. Large tooth poplar. (<i>Populus grandidentata</i>)	Moist rich sandy soil.
20. Iron wood. (<i>Ostrya virginiana</i> K.)	Dry gravelly slopes and ridges.
21. Paper birch. (<i>Betula papyrifera</i>)	Rich moist hillside river banks.
22. Black birch. (<i>Betula nigra</i>)	Any type of soil.
23. Yellow birch. (<i>Betula lutea</i>)	Rich moist uplands.
24. Beech. (<i>Fagus americana</i>)	Deep rich well drained loam.
25. Chestnut. (<i>Castanea dentata</i>)	Glacial drift.
26. Red oak. (<i>Quercus rubra</i>)	Rich moist glacial drift.
27. Pin oak. (<i>Quercus palustris</i>)	Rich borders of swamps and rivers.
28. Hill's pin oak. (<i>Quercus palustris</i> H.)	Clays and well drained uplands.

<u>NAME OF TREE</u>	<u>SOIL PREFERENCES</u>
29. Scarlet oak. (<i>Quercus coccinea</i>)	Light dry sandy soil.
30. Black Oak. (<i>Quercus ellipsoidalis</i>)	Poor glacial drift-dry gravelly upland.
31. White oak. (<i>Quercus alba</i>)	All but wet soils.
32. Burr oak. (<i>Quercus macrocarpo</i>)	Rich moist bottom lands.
33. Chestnut oak. (<i>Quercus acuminata</i>)	Limestone soil-dry hillsides.
34. Swamp white oak. (<i>Quercus bicolor</i>)	Rich soil bordering swamps and streams.
35. American elm. (<i>Ulmus americana</i>)	Deep rich moist loam.
36. Red Elm. (<i>Ulmus fulva</i>)	Rich bottomlands and rocky slopes.
37. Rock elm. (<i>Ulmus racemosa</i>)	Dry gravelly uplands and heavy clay.
38. Hackberry. (<i>Celtis occidentalis</i>)	Rich moist soil but often rocky hillside.
39. Red mulberry. (<i>Morus rubra</i>)	Rich river bottoms.
40. Osage orange. (<i>Maclura pomifera</i>)	Almost any soil.
41. Tulip tree. (<i>Lidrodendron tulipifera</i>)	Adaptable to any good soil.
42. Sassafras. (<i>Sassafras variifolium</i>)	Well drained stony or sandy soil.
43. Sycamore. (<i>Platanus occidentalis</i>)	Rich bottomlands along rivers and lakes.
44. Fragrant crab. (<i>Malus coronaria</i>)	Rich moist well drained soil along streams.

<u>NAME OF TREE</u>	<u>SOIL PREFERENCES</u>
45. Mountain ash. (<i>Sorbus</i>)	Rich moist soil-swamps hills and mountains.
46. Witch hazel. (<i>Hamamelis virginica</i>)	Sandy soils.
47. Shad-bush. (<i>Amelanchier canadensis</i>)	Rich moist soil.
48. Pin cherry. (<i>Prunus pennsylvanica</i>)	Sand and burned over lands.
49. Canada plum. (<i>Prunus nigra</i>)	Rich alluvial soil.
50. Choke cherry. (<i>Prunus species</i>)	Deep rich loam but is found on others.
51. Wild black cherry. (<i>Prunus serotina</i>)	Rich moist soil, dry gravelly or sandy.
52. Judas tree. (<i>Cercis siliquastrum</i>)	Rich bottom lands in shade.
53. Coffee tree. (<i>Gymnocladus dioica</i>)	Rich bottom lands.
54. Sugar maple. (<i>Acer saccharum</i>)	Moist rich soil in valleys and upland slopes.
55. Black maple. (<i>Acer nigrum</i>)	Low moist rich soil and does well on gravel.
56. Mountain maple. (<i>Acer spicatum</i>)	Damp rocky soil and found in shade.
57. Striped maple. (<i>Acer pennsylvanicum</i>)	Rocky sandy soil, cool and shady.
58. Silver maple. (<i>Acer dasycarpum</i>)	Very low rich bottom lands, not swamps.
59. Red maple. (<i>Acer rubrum</i>)	Swamp land and banks of streams.
60. Box elder. (<i>Acer negundo</i>)	Rich moist soil in swamps and stream banks.

<u>NAME OF TREE</u>	<u>SOIL PREFERENCES</u>
61. Bass wood. (<i>Tilia american</i>)	Rich well drained loamy soils.
62. Black ash. (<i>Fraxinus nigra</i>)	Deep cold swamps, grows in any soil.
63. Blue ash. (<i>Fraxinus quadrangulata</i>)	Rich limestone hills, also fertile bottom lands.
64. White ash. (<i>Fraxinus americana</i>)	Any well drained situation.
65. Green ash. (<i>Fraxinus lanceolata</i>)	Sandy well drained soil.
66. Red ash. (<i>Fraxinus pennsylvanica</i>)	Moist rich loams, swamps and lowlands.
67. Nanny berry. (<i>Viburnum lentago</i>)	Rich moist soil.

TABLE X

SHRUBS THAT MAY BE USED ADVANTAGEOUSLY
FOR ROADSIDE PLANTING IN MICHIGAN

<u>NAME OF SHRUB</u>	<u>SOIL PREFERENCES</u>
1. *Tatarian dogwood. (<i>Cornus alba</i>)	Usually found on low, cool soil, but does well on moderately fertile upland soil in shady locations.
2. *Coral dogwood. (<i>Cornus alba sibirica</i>)	Same as above.
3. Silky dogwood. (<i>Cornus amomum</i>)	Same as above.
4. *Flowering dogwood. (<i>Cornus florida</i>)	Rich well drained soil in a shaded location.
5. Kousa dogwood. (<i>Cornus kousa</i>)	Same as above.
6. Cornelian dogwood. (<i>Cornus mas</i>)	Any fertile soil, grows well in full sunlight.
7. Grey dogwood. (<i>Cornus paniculata</i>)	River banks, lake shores, edges of swamps, etc.
8. *Bloodtwig dogwood. (<i>Cornus sanguinea</i>)	Any fertile moist soil.
9. *Red-Osier dogwood. (<i>Cornus slaloniifera</i>)	Any fertile moist soil.
10. *Common witch-hazel. (<i>Hamamelis virginica</i>)	Moderately moist cool soils in a shady location.
11. *Common winterberry. (<i>Ribes fasciculatum</i>)	Moist swampy, or cool moist upland soils in shady situations.
12. *Common ninebark. (<i>Physocarpus opulifolius</i>)	Low moist lands along the borders of streams, lakes and swamps.

*Best for roadside planting.

<u>NAME OF SHRUBS</u>	<u>SOIL PREFERENCES</u>
13. *Goldleaf ninebark. (<i>Physocarpus opulifolius luteus</i>)	Same as common ninebark.
14. *Common buckthorn. (<i>Rhamnus cathartica</i>)	Almost any soil or condition.
15. *Glossy buckthorn. (<i>Rhamnus frangula</i>)	Same as common buckthorn.
16. Smooth sumach. (<i>Rhus glabra</i>)	Grows well on dry barren soil.
17. Cutleaf sumach. (<i>Rhus glabra laciniata</i>)	Same as smooth sumach.
18. *Staghorn sumach. (<i>Rhus typhina</i>)	Same as smooth sumach.
19. Shredded sumach. (<i>Rhus typhina laciniata</i>)	Same as smooth sumach.
20. *Meadow rose. (<i>Rosa blanda</i>)	There are many soils upon which the rose family do fairly well, but they prefer fertile moist soil, or fertile well-drained soils.
21. *Bristly rose. (<i>Rosa nitida</i>)	
22. *Pasture rose. (<i>Rosa humilis</i>)	
23. *Sweet briar rose. (<i>Rosa rubiginosa</i>)	Same as above.
24. *Hugonis rose. (<i>Rosa hugonis</i>)	Same as above.
25. *Prairie rose. (<i>Rosa setigera</i>)	Same as above.
26. *Rugosa rose. (<i>Rosa rugosa</i>)	Same as above.
27. *American elder. (<i>Sambucus canadensis</i>)	Low moist land; does well on fairly infertile land.

*Best for roadside planting.

<u>NAME OF SHRUB</u>	<u>SOIL PREFERENCE</u>
28. *Maple-leaf viburnum. (<i>Viburnum acerifolium</i>)	Same as American elder.
29. American cranberry bush. (<i>Viburnum americanum</i>)	Same as American elder.
30. Fragrant viburnum. (<i>Viburnum carlesi</i>)	Same as American elder.
31. Arrowwood. (<i>Viburnum dentatum</i>)	Cool moist fertile soils.
32. Kentucky viburnum. (<i>Viburnum molle</i>)	Same as above.
33. European cranberry bush. (<i>Viburnum opulus</i>)	Same as above.
34. Dwarf cranberry bush. (<i>Viburnum opulus nanum</i>)	Same as above.

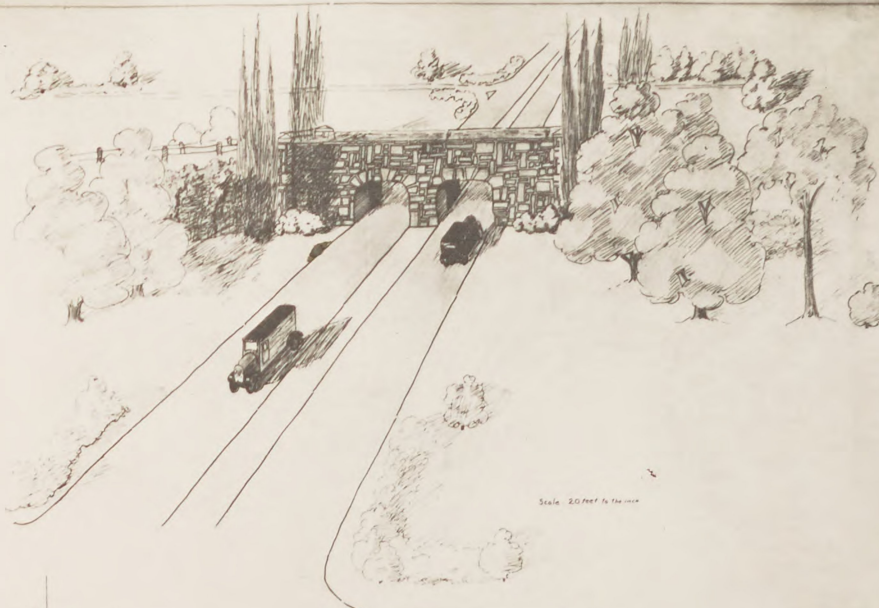
*Best for roadside planting.

M. 78 JUNCTION WITH LAKE LANSING ROAD

SCALE 1 INCH EQUALS 40 FEET
R. W. HITCHCOCK

LANDSCAPE DESIGNER

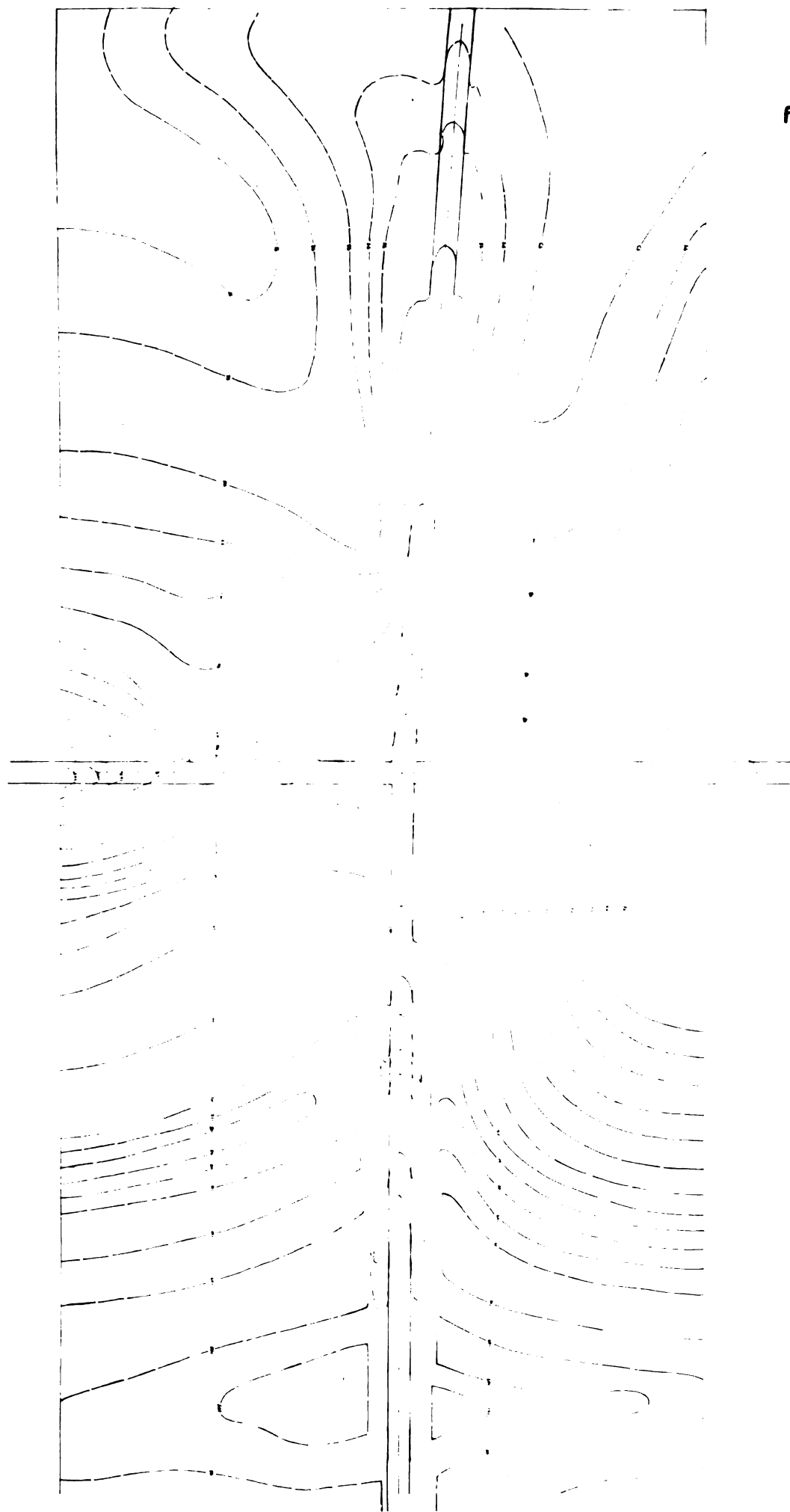
DESIGNED BY... James C. Nelson
SURVEY BY... 1919 L. W. B. Nelson



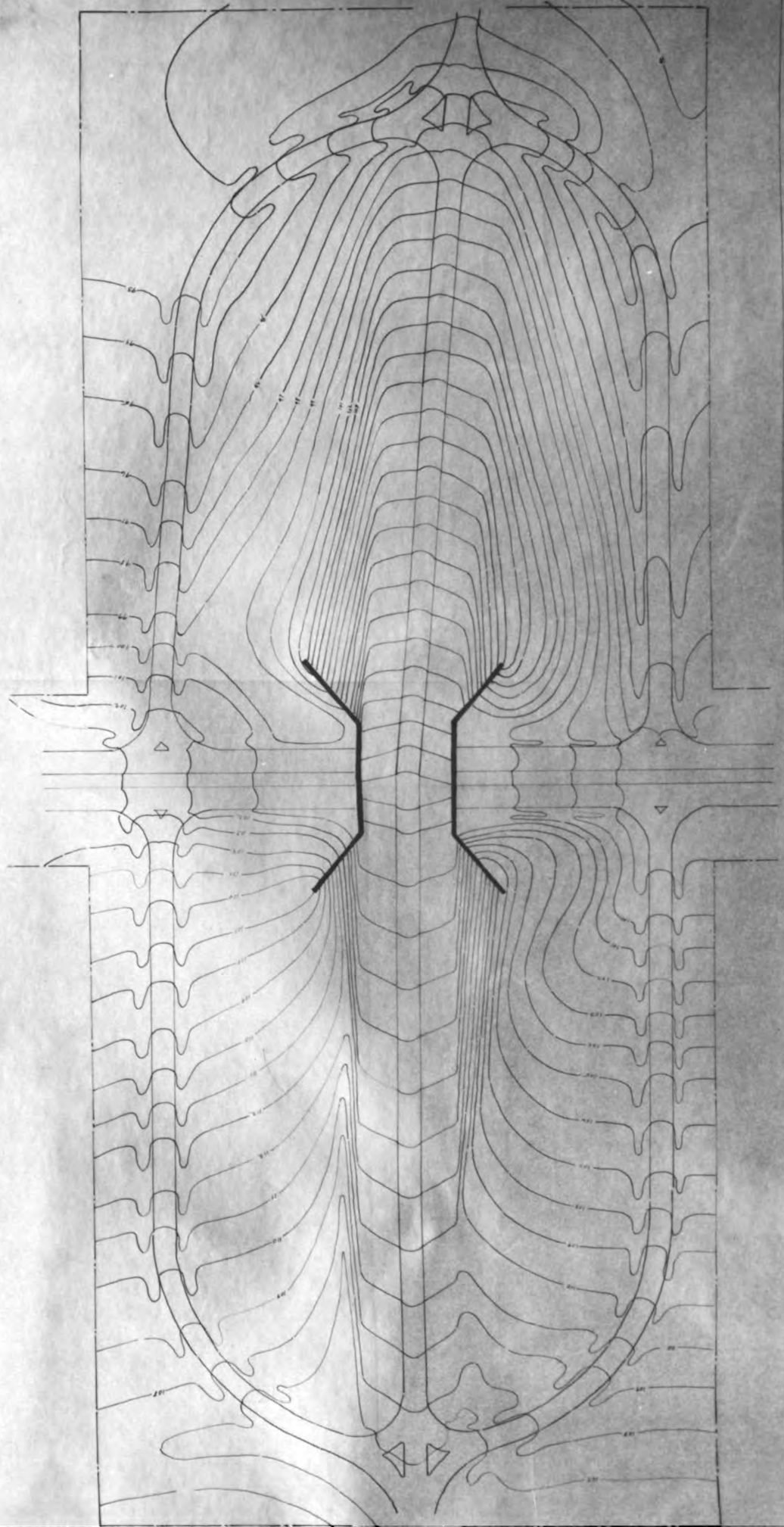
Scale: 20 feet to the inch



ORIGINAL TOPOGRAPHY MAP



112
Fig. 71.



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Figure 1. The effect of the number of trials on the number of correct responses. The number of correct responses was significantly higher than the number of incorrect responses in all cases.

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