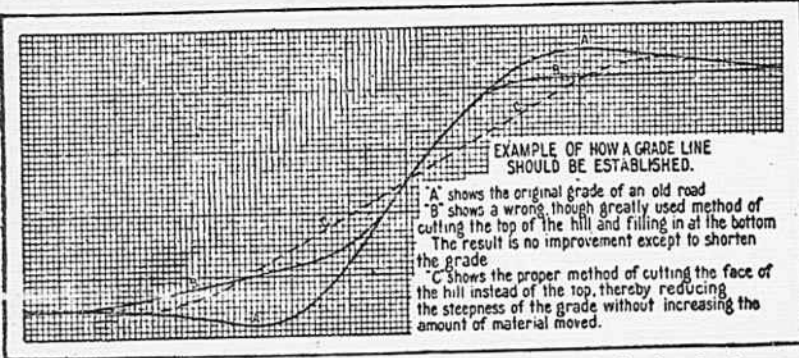


EARTH, SAND-CLAY AND GRAVEL ROADS



EXAMPLE OF HOW A GRADE LINE SHOULD BE ESTABLISHED.
A shows the original grade of an old road.
B shows a wrong though greatly used method of cutting the top of the hill and filling in at the bottom. The result is no improvement except to shorten the grade.
C shows the proper method of cutting the face of the hill instead of the top, thereby reducing the steepness of the grade without increasing the amount of material moved.

(Prepared by the United States Department of Agriculture.)

Well-balanced and experienced judgment regarding the relative importance of the various details involved is a much more valuable asset in undertaking to locate a road than mere technical skill in handling surveying instruments. No knowledge gained from books alone can give that complete grasp of the relations existing between a public road and the community it serves which is so necessary if the location and design of the road are to secure the greatest possible good from the money expended.

In locating or relocating a public road the prime considerations should be, first, the comfort and convenience of the traveling public which it is intended to accommodate, and, second, the economy of public funds. The first consideration fixes the general location of the road and limits such details of design and layout as affect the safety and comfort of travelers. The second should control the detailed working out of a location to suit the topography or surface layout of the region through which the road passes, with due regard for such features of the design as affect the cost of construction, of maintenance and of hauling over the completed road.

The comfort and convenience of travelers, requires, first, that the road pass conveniently close to the dwelling places of those for whose particular use it is built; second, that it be free from dangerous curves and grades and sufficiently wide for safe travel; and, third, that the surface be such as to remain reasonably firm and smooth and to become neither very dusty nor very muddy under any combination of weather and traffic conditions. The extent to which any particular road must meet these requirements depends, of course, on the state of public sentiment in the community which pays for the road. But in most communities it is safe to assume that the standards of excellence as regards the accommodation demanded of public roads will be raised rather than lowered. Due foresight, therefore, should be exercised in working out the location and design of a road, so that later improvements, such as reducing grades, increasing the width of the traveled way, or constructing a better surface, can be made without the necessity of making expensive changes in the location or otherwise wasting any considerable part of the work already accomplished.

Location of Roads.

A few general rules regarding the location and design of public roads may be stated briefly as follows:

1. Avoid sharp curves in the road, because such curves are a menace to traffic. On light grades and level stretches the location should be preferably such that a traveler may see at least two or three hundred feet ahead from any point on the road, and on steeper grades this distance should be increased if automobile traffic is to be reasonably safe. Where the view is unobstructed and the grade is practically level, country roads of ordinary width may be curved to a radius of only about two hundred feet without seriously inconveniencing traffic, but to safeguard against accidents the radius of curves located on grades should be preferably not less than about 300 or 400 feet, even if the view is perfectly open.
2. Provide ample width for vehicles to pass each other without leaving the traveled way.
3. Bear in mind that if a road ever becomes of any considerable importance, its users probably will demand that all the steeper grades be reduced to the lowest maximum that would conform to the general topography of the region which the road traverses.
4. Avoid all unnecessary distance. Aside from the advantages to traffic of a short route, each mile of additional road involves a considerable extra yearly expense for maintenance, and this consideration alone may warrant considerable expense in shortening the route when the road is constructed, provided that the decrease in distance does not materially increase the steepness of the grades.
5. Regard land lines only in so far as this may be done without decreasing the usefulness of the road or increasing its ultimate cost. The tendency in most rural communities is to locate all new roads along land lines, regardless of the suitability of the route, and this has been responsible for much waste in the past. Not infrequently roads located along land lines have been graded at considerable expense, and abandoned later when the community demanded a more highly improved road with better grades.
6. Give reasonable consideration to the pleasing features of the location. A large part of the travel on most country roads is for pleasure, and the degree of pleasure experienced in driving is largely dependent upon the scenic attractiveness of the road.

Laying Out a Road.

The actual procedure of laying out a road should be controlled very largely by the lay of the land which the road is to traverse. Where the country is comparatively level, for example, practically the whole problem, aside from proper drainage, may be to determine a reasonable balance between the desire to avoid unnecessary damage to farming land and the purpose to secure a reasonably direct route over good ground.

One of the most common problems in laying out a road in level country is to decide between continuing a circuitous route around cultivated fields or along rectangular land lines, and establishing a new diagonal route across the fields.

In mountainous regions, on the other hand, the problem may be to fit the road to the contour of the country, regardless of land lines, cultivated fields, and all other considerations except grade, drainage and line.

In general, the proper location and design of a road involves: (1) determining its controlling points; that is, fixing its general route with reference to certain points which the road must pass through, (2) surveying a route which passes through the controlling points and is otherwise adapted to the lay of the land, (3) a study of the drainage situation, (4) preparing such plans and drawings as are necessary for proper construction and a complete record.

Controlling Points.

Such features of the locality as gaps through ridges, exposure to the sun, narrow stream crossings, and suitable points for crossing railroads (preferably by means of overhead bridges or under passes), together with the necessity for connecting up with certain centers of population, usually will serve to fix the location of a road within fairly definite limits. For important roads these controlling points are determined by careful inspection of all possible routes.

The Survey.

The care which should be exercised in making a road survey necessarily must depend upon the importance of the road and the amount to be expended in its improvement. An ordinary farm road, for example, usually requires no survey other than lining it by the eye between the controlling points. Some unimportant public roads may require very little more than farm roads in the way of a survey, but if any considerable amount of grading or other work is to be done, either at the time the road is located or later, the survey should include all instrument work necessary to insure that the work will be done economically.

The purposes of a survey are (1) to determine accurately the topography or lay of the land so that the location may follow the route which presents the fewest obstacles, (2) to fit the grade line to the ground surface so as to keep down the amount of grading necessary, (3) to balance cuts and fills so that whatever grading is done will be to the best possible advantage, (4) to line up the road and provide stakes for controlling the work, (5) to obtain data from which proper plans may be prepared and an estimate of cost made, (6) to provide a record that will prevent subsequent contentions among landowners regarding the original location of the road. While the importance of all these purposes is apparent, frequently it is not realized that they cannot be accomplished except by means of a careful survey, and that such surveys can be made only by experienced men who have been trained especially for such work. Farmers and business men generally are inclined to underestimate the amount of skill required to make a road survey properly and their influence has been responsible in the past for much bungling and for uneconomical road work for which they have had to pay in heavy taxes.

The accompanying figure illustrates an error which is made sometimes by inexperienced persons in grading a road without first having surveyed and planned the work. In this figure, which is an actual profile of an existing road, the shaded line shows the original ground surface, the heavy full line shows the grade to which the road was actually constructed, and the dotted line shows a grade line which, if it had been followed, not only would have required no additional work, but would have reduced the steep grade materially and thereby improved the road considerably.

In fitting the grade line to the ground surface and balancing cuts and fills it should be borne in mind that earth, after being thoroughly compacted, will occupy less space in an embankment or fill than in its original position. The customary allowances for shrinkage and waste in road work are:

For heavy cuts and fills.....	10 to 15
For average grading.....	15 to 20
For light grading.....	20 to 30
For very light grading and considerable sod.....	30 to 40

Solid rock will expand from one-third to one-half of its original volume when taken from a cut or excavation and placed in an embankment. But the spaces between the particles of stone should be filled with earth as the stone is being placed in the embankment.

DESTROY MANY PESTS

Horned Larks Range Over Practically Whole Country.

Birds Are Particularly Fond of Weed Seeds—Insect Food Includes May Beetles, White Grubs and Grasshoppers.

(By W. L. M'ATEE.)

Horned larks are small but hardy birds which frequent the open country and never live in forests. They range over practically the whole United States, and are easily recognized by the conspicuous black mark across the breast and the small pointed tufts of dark-colored feathers behind the eyes. These are often erected and cause the appearance referred to in the common name. These birds nest early, often before all the snow has disappeared, and they have a joyous flight song in the mating season.

The food of horned larks consists of 20.6 per cent of animal and 79.4 per cent of vegetable matter. Not quite a sixth of the vegetable food is grain, mostly waste, though some sprouting grain is pulled. This is the most serious charge against the birds and is sustained, but it must be admitted that practically all the complaints were



Horned Larks.

made years ago, when broadcast sowing was the rule. Recent correspondence shows that drilled grain is practically safe from injury.

Weed seeds are by far the largest single component (63.9 per cent) of the food of horned larks, and over 10 per cent of the 1,154 birds examined had eaten them, no fewer than 206 individuals having fed on them, exclusively. Conspicuous among the weed seeds eaten are those of the foxtail grasses, smartweeds, bindweeds, amaranth, pigweeds, purslane, ragweed and crab and barn grasses. Horned larks are among the most efficient weed-destroying birds.

The insect food of these birds includes such pests as May beetles and their larvae, the white grubs, leaf beetles injurious to strawberries, cabbage, melons and sugar beets, clover-leaf and clover-root weevils, potato-stalk borers, nut weevils, bill bugs and the chinch bug. Grasshoppers are a favorite food; cutworms are eaten freely.

PLOW IN PROPER CONDITION

Something Wrong When Farmer Must Bear Down or Lift Up Handles—Study Is Necessary.

A plow in proper condition runs smoothly and at an even depth, with very little effort on the part of the plowman. When a plow does not run smoothly, when the plowman must bear down or lift up on the handles, or must constantly hold the plow either one way or the other to keep it from tipping over, something is wrong with it. The point tips down or up too much, or the cutting edge of the share is dull or slants down or up too much. A good plowman must know how a good plow should work and when it does not go right should know what is wrong with it. To know these things requires as much thought and study and mental and mechanical ability as to understand a telephone or a telegraph instrument.

ENCOURAGE GRASS TO GROW

Where Pasture Lands Cannot Readily Be Plowed Application of Lime Is Recommended.

In pasture lands that cannot readily be plowed the best procedure is to apply lime, if needed, and to encourage the grass to grow vigorously by a yearly top dressing of well-rotted barn-yard manure and occasional light applications of commercial fertilizer that is rich in phosphates and nitrogen. In addition, all thin spots in the sod should be reseeded each year with a liberal quantity of good grass seed.

FUNGUS ON CURRANT BUSHES

Declared to Be Bad Neighbors for White Pine Trees—Cause of Injurious Blister Rust.

Currant bushes are very bad neighbors for white pine trees, as the currant bush may act as host for the fungus which causes white pine blister rust.

This disease can be spread by nursery stock of white pine, and those who wish to protect their pine trees should not plant currants near them.

Winthrop College Scholarship and Entrance Examination.

The examination for the award of vacant scholarships in Winthrop College for the admission of new students will be held at the County Court House on Friday, July 6, at 9 a. m. Applicants must not be less than 16 years of age. When scholarships are vacant after July 6 they will be awarded to those making the highest average at this examination, provided they meet the conditions governing the award. Applicants for scholarships should write to President Johnson for scholarship examination blanks. These blanks properly filled out by the applicant should be filed with President Johnson by July 1.

Scholarships are worth \$100 and free tuition. The next session will open September 19, 1917. For further information and catalogue, address President D. B. Johnson, Rock Hill, S. C.

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Opinions from Folks Who Know

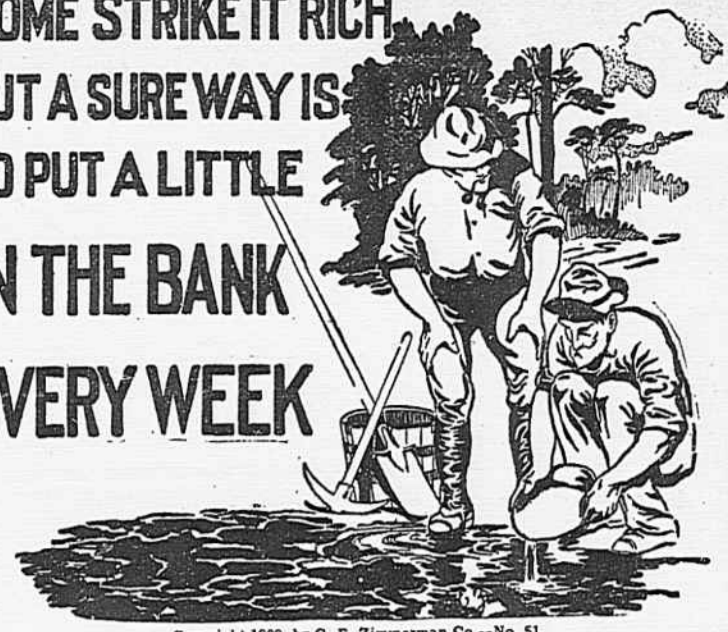
For malarial headache, Granger Liver Regulator entirely relieved my trouble.—J. Height, Wetumpka, Ala. Had heavy headache. Vomited twice to six times a day. Four doses of Granger Liver Regulator made me well.—Loundas P. Brindley, Somerville, Ala.

Mother had sick headache. Granger Liver Regulator did her more good than all the medicine she had taken before.—Pearley Davis, Paco, Ala.

I never expect to be without it in my home.—Jenia Usey, Gadsden, Ala.

It is a great saver of doctors' bills.—Louis N. Kent, Honorville, Ala. There is none better.—Dr. T. E. Cothran, Alexis, Ala. All druggists sell Granger Liver Regulator—25c. Try it.

SOME STRIKE IT RICH BUT A SURE WAY IS TO PUT A LITTLE IN THE BANK EVERY WEEK



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